An Empirical Study of Compensation Paid in Eminent Domain Settlements: New York City, 1990–2002

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ABSTRACT

No large-scale empirical study on condemnation compensation has been done in the past 30 years. Several state legislatures, in response to *Kelo v. City of New London,* have changed laws to increase condemnation compensation, despite the lack of empirical grounds. To fill in the empirical gap, I use hedonic regression models and about 80,000 sales to estimate the fair market value (FMV) of 430 condemned properties whose owners reached compensation settlements with the condemnor, New York City, between 1990 and 2002. More than 50 percent of these condemnees were compensated with less than FMV, about 40 percent received more than FMV, and less than 10 percent received FMV. Owners of residential properties and nonresidential properties alike often received extreme compensations that are less than 50 percent or more than 150 percent of FMV. Extreme compensation results from bias-prone and inaccurate appraisal methods. Using the available data, I find that compensation level does not correlate with any factor.

1. INTRODUCTION

There is a vacuum of empirical studies on eminent domain compensation.[1] Since Munch's (1973, 1976) empirical research on eminent domain compensation in Chicago, there have been only four more published

1. Other authors have lamented the lack of empirical research on eminent domain. See, for example, New York State Bar Association (2007), Pritchett (2005, p. 897), and Evans (1999, p. 1666).

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studies in the past 30 years, and they were either very small scale (Guidry and Do 1998; Clauretie, Kuhn and Schwer 2004) or did not compare eminent domain compensation with fair market value (Garnett 2006; Aycock and Black 2008). Hundreds of articles debating eminent domain issues have long been forced to base their analyses on assumptions or anecdotes rather than on actual understanding of how much eminent domain compensation has been paid.

Policy makers, too, have had to make decisions without knowing how much condemnors actually pay condemnees. In the aftermath of *Kelo v. City of New London* (545 U.S. 469 [2005]), Michigan State has amended its constitution to require payment of "not less than 125 percent of that property's fair market value, in addition to any other reimbursement allowed by law," if the condemned properties are their owners' principal residence (Mich. Const. art. X, sec. 2 [amended 2006]). Indiana, Kansas, and Missouri also have passed laws to require at least 125 percent of fair market value as compensation in certain cases (Wyman 2007, p. 257 n.61; Salkin 2006, pp. 10,870–71). In New York State, where I conducted this empirical study, three bills have been introduced in the legislature to address the amount of condemnation compensation. Two of them propose that if a condemnee's home is con-

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demned for an economic development project, the condemnee shall be entitled to "compensation—in addition to statutory compensation already provided for—an amount equal to 150 percent of the fair market value of the property." The other proposes that "[i]n the case of an economic development project, condemnee to be paid at least 125 percent of the highest approved appraisal" (New York State Bar Association 2007, pp. 38, 35).[2] Yet these measures and proposals to increase condemnation compensation lack empirical foundation.

An empirical study of the relationship between condemnation compensation and fair market value[3] can inform scholarly discussions and policy proposals.[4] Namely, findings of under- or overcompensation tell legislators whether such proposed reform on takings compensation will award condemnees with more or less than the "real" fair market value.[5] The empirical results would also underpin (or weaken) claims that governments have taken property inefficiently and arguments that the incentives of landowners were distorted because compensation was inaccurate.

In this paper, I attempt to fill the empirical gaps. I study New York City (NYC) because there are numerous, well-documented sales and condemnations, and data on them were available to me.[6] The sales data set, from the NYC Department of Finance, includes all property sales in New York City from 1974 to 2005. A series of other data sets (compiled for property tax purposes) contain each property's hedonic characteristics and other information since 1984. In addition, I collected data on settled condemnation compensation between 1990 and 2002 from title certification sheets stored in the NYC Comptroller's Office and from

2. These two proposals have not become law yet.

3. "Fair market value," according to Dana and Merrill (2002, pp. 169–70), is "the amount a willing buyer would pay a willing seller of the property, taking into account all possible uses to which the property might be put other than the use contemplated by the taker."

4. This paper assumes that fair market value is the desirable normative standard for takings compensation. It is not a necessary assumption for my empirical study, but it can simplify my narratives. For example, under- and overcompensation simply mean (without value judgment) compensation that is lower or higher than fair market value.

5. The two proposals in New York may leave the impression that condemnees will receive a 25 percent or 50 percent premium in addition to fair market value, whereas what condemnees actually receive may still be lower or much higher than fair market value.

6. Lack of good, accessible data, I suppose, is an important reason for the scarcity of this kind of empirical study. Because I was a Research Associate at the Furman Center for Real Estate and Urban Policy, NYU, and I have conducted the research on my doctoral dissertation under the supervision of its faculty, I had access to the Furman Center databases.

the records stored in the five county courts[7] in New York City. I use hedonic regression models to estimate the fair market value of the condemned properties on which settled compensation was paid and compare the estimated fair market value with the actual compensation.[8]

I find that, in total, from 1990 to 2002, New York City paid $17,311,176[9] in eminent domain settlements to 89 condemnees owning residential properties, whereas the sum of estimated fair market values of these 89 properties was $21,173,198, which is 23 percent higher than the settlement payment. Forty-seven (53 percent) of the 89 condemnees were compensated with less than fair market value, 36 condemnees (40 percent) received more than fair market value, and six condemnees (7 percent) got roughly fair market value. Furthermore, the compensation percentage (that is, the actual compensation divided by the estimated fair market value) was not bell shaped; 36 condemnees (40 percent) received extreme compensation payments—that is, compensations that are higher than 150 percent or lower than 50 percent of fair market value.[10]

Note that the settled compensations discussed here may not be representative samples of all condemnation compensations. I do not have data on compensations received by condemnees who accept the condemnor's initial offers, nor do I use data on compensations adjudicated by court. Distributions of compensation percentages may be different for settled and nonsettled compensations.

I argue that the condemnor and condemnees are willing to settle for extreme compensations because they do not have objective estimates of fair market value, and they have to rely on their own appraised value for decision making. They believe that they settle at fair market value when their appraised values are close to each other—even though my

7. The courts are New York (Manhattan), Bronx, Kings (Brooklyn), Queens, and Richmond (Staten Island).

8. On using hedonic models to estimate property values in New York City, see, for example, Schill, Voicu, and Miller (2007), Ellen, Schwartz, and Voicu (2007), Voicu and Been (2008), and Ellen, O'Reagan, and Voicu (2009). On using hedonic models to estimate property values outside New York City, see Graves et al. (1988), Curran and Schrag (2000), Ioannides and Zabel (2003), Coulson and McMillen (2007), and McMillen (2008).

9. Property values are in 2005 dollars, except those describing the findings of prior literature.

10. Throughout the paper, "higher than 150 percent of fair market value" means a compensation percentage greater than 155 percent; "lower than 50 percent of fair market value" means a compensation percentage less than 45 percent. The difference arises from my definition of fair market value as compensation percentages between 95 percent and 105 percent.

estimates may consider such settled compensations extreme. If the two parties' appraised values diverge, the condemnor and condemnees may still settle for various reasons, such as saving litigation expenses. Fair market value estimated with hedonic models could not affect their decisions.

Moreover, settled compensations are often extreme because the condemnor and condemnees use appraised value assessed with bias-prone and inaccurate appraisal methods. Appraisal methods are not as powerful as hedonic regression models in estimating fair market value. Appraised value becomes even more inaccurate when the condemnor or condemnees manipulate the assessed market value, which is made possible by the subjective nature of appraisals. I have also tested whether compensation level correlates with other factors, such as the condemned properties' blight, tax default history, location, size, title-vesting year and month, owner type (individual or corporate), length of settlement time, and public use after takings. The influences of these factors, however, are not large enough to be detected.

The paper is structured as follows. Section 2 reviews and critiques the literature. Section 3 outlines eminent domain and compensation laws in New York City. Section 4 elaborates the specifications of the hedonic regression models, explains how property sales are selected, and reports the regression results. Section 5 summarizes the pertinent condemnation data, reports my findings after comparing actual compensation with estimated fair market value, and answers several methodological challenges. Section 6 explains why compensations are often extreme and why the condemnor and condemnees are willing to settle for extreme compensations. Section 7 concludes.

2. LITERATURE REVIEW AND CRITIQUE

To my knowledge, the first research that empirically examined the relationship between compensation and fair market value was Munch's studies (1973, 1976) of Chicago.[11] Munch's research remains the only

11. Berger and Rohan (1967) conducted an empirical study on Nassau County, New York, from 1960 to 1964. They compared the amount of settled compensation with two assessed values made by appraisers (who were commissioned by the condemnor agencies) and found that, for 84 percent of 1,221 settlements, the compensation that condemnees received was less than the lower of the two assessed values; for 57 percent of the settlements, the compensation was lower than 90 percent of the lower assessed value. In addition, they analyzed 127 court-adjudicated cases; 50 percent of condemnees received the lower as-

large-scale[12] empirical study on this issue.[13] In this section, I describe Munch's research, point out flaws in her methods, and critique her explanations for the results she found.

2.1. Munch's Empirical Study of Chicago

Munch's research examined whether condemnation compensation paid to condemnees approximated market value. She used unpublished data on condemnation compensation paid in 798 cases in three large urban renewal projects in Chicago during 1962–70. To estimate the market value of the condemned properties, Munch first designed a regression model in which market value is the dependent variable and the independent variables include assessed value of properties for tax purposes, value per foot of frontage, number of months from the month of first

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sessment as compensation. Forty-one cases (32 percent) resulted in more than the lower assessment, but in 17 (42 percent) of these 41 cases, the court awards were still lower than the higher of the two assessed values.

12. Clauretie, Kuhn, and Schwer (2004) conducted an empirical study on condemnations in Clark County, Nevada. They had 60 takings cases and 374 comparable sale cases. They ran separate hedonic regressions for takings cases and sale cases; the dependent variable was the appraised values (for takings) or the sale prices (for sales). They found that government appraisers valued some hedonic characteristics differently from the market. They also used a method that is essentially the same as Munch's (using a multivariate regression and then a bivariate regression) and concluded that the compensation appraisals were, on average, 17 percent higher than the estimated fair market value. Guidry and Do (1998) used 132 "eminent domain sales/government purchases" and 75 sales of single-family homes in San Diego (all between April 1991 and October 1991), in a simple hedonic regression model that included only eight variables, to test whether condemnees were compensated with fair market value. They concluded that a "[h]ome purchased by [the government] sells on the average for 4.71% more than homes that are sold through standard negotiated sales" (Guidry and Do 1998, p. 235). The problem with this research is that it relies on a condemnation dummy that indicates whether an observation is a sale or a government purchase. The coefficient of this dummy tells us (after controlling for seven other variables) only the average difference in market value between sales and government purchases. It does not compare condemned properties' compensation with their own fair market value. The average difference does not tell us the distribution of overcompensation and undercompensation and can be easily skewed by outliers, given the small number of observations.

13. Three other empirical studies on eminent domain do not compare actual compensation with fair market value. Garnett (2006) conducted a case study in St. Joseph County, Indiana. She found that the average total settled compensation (property value plus relocation assistance) was 157 percent of the average appraised value of the condemned properties. Aycock and Black (2008) compared condemnors' offers with special masters' appraisals and the final payments, but they have only 16 cases (mostly partial-taking cases). Using a large data set of properties condemned for road building in all 50 states from 1991 to 2005, Kades (2008, p. 1) examines what factors determine "when governments abjure negotiations with landowners and invoke their condemnation power."

observation in each sample, number of tenants with listed phones, a commercial use dummy, several zoning dummies, and an interaction variable of the commercial use dummy and the assessed value of properties. She used data on 1,200 comparable sales in Chicago in 1968–1972 to estimate market value for each condemned property. She then used a second, bivariate regression model to compare the estimated market value with the actual compensation paid to condemnees.

Munch found that "low-valued properties receive less than market value and high-valued properties receive more than market value" and that, "[a]s a rough approximation, a $7,000 parcel receives about $5,000, a $13,000 property breaks even and a $40,000 property may get two or three times its market value" (Munch 1973, p. 60).[14] In 409 of the 798 cases, Munch's data also indicated whether the condemnees settled (in or out of court) or litigated and received court-adjudicated awards. Somewhat surprisingly, Munch found that court awards were more regressive. That is, low-value properties were compensated less in court than in settlement, whereas high-value properties were compensated more in court than in settlement.[15]

Munch provided several explanations for the phenomenon. First, she argued that because the condemnor agency, the Department of Urban Renewal in Chicago, was constrained to use city government lawyers, it could not adjust the quality of lawyers according to the stakes of the cases, as the condemnees would do. Therefore, condemnor's lawyers would be "relatively more effective" than condemnees' in low-value cases. Similarly, the former would be less effective than the latter in high-value cases (see Bell and Parchomovsky 2007, p. 889).

Second, in urban renewal projects, most land parcels are homogenous and of relatively low value (see Posner 2003, p. 60), whereas the high-value parcels are more individual in character. Compensation paid for the low-value, homogenous parcels carries more weight as precedent. Thus, the condemnor does not want an overcompensated low-value case to become a precedent for numerous later cases; moreover, "[g]reater precedent value on low valued parcels would create an incentive to devote more resources to obtaining a low price" (Munch 1973, p. 63).

Third, litigating has high fixed costs; thus, owners of low-value properties have weaker incentives to sue than do owners of high-value prop-

14. The average estimated fair market value of Munch's cases is approximately $12,000. The minimum is $6,125, and the maximum is $36,350.

15. For the court regression, the intercept is −15.68, and the β value is 2.65. For the settlement regression, the intercept is −4.27, and the β value is 1.48.

erties. Finally, Munch explained her finding that courts were even further off the mark by noting the possibility that assessors or judges had been bribed.

2.2. Critique of Munch's Study

Munch's pioneering study has its limitations. First, she was not able to include in the regression model several important variables, such as the housing characteristics for the condemned properties. For other important variables, she was forced to use proxies, such as the number of tenants with listed phones, rather than data about whether the property was a single-family home or an apartment. It is thus unsurprising that the R^2-values of the models are only .18–.46.[16]

Second, her model included property tax assessments as an independent variable. Tax assessments may not reflect real market value because of legal constraints, infrequent updating, or appraising errors.[17] Thus, using tax assessments in the regression may bias the result. Moreover, in cases where other necessary information for comparable sales is not available, Munch (1973, p. 59) used tax assessments alone "as a proxy for market value," probably exacerbating the inaccuracy problem.

Third, Munch used sale prices between 1968 and 1972 to estimate market value for condemned properties between 1962 and 1970. The model's estimation of fair market value from 1962 to 1968 is an ex ante forecast[18] and thus is less reliable.

Munch's method of comparing estimated fair market value and compensation is puzzling. Her bivariate model uses estimated fair market value to predict compensation. Munch states that "a $7,000 parcel receives about $5,000" not because one or more condemned properties worth around $7,000 actually suffer from a $2,000 discount but because she puts $6,464 into the right-hand side of the regression equation and gets a predicted compensation of $4,985 (Munch 1973, p. 111). This is

16. Munch ran a regression for each urban renewal project; in addition, she used both the comprehensive model described here and a simplified model. Thus, there are several R^2-values reported.

17. New York City's tax assessments are inaccurate for these reasons (see Independent Budget Office 2007). It is unclear how inaccurate tax assessments were in Chicago in the 1970s. New York City's experience at least cautions us not to treat tax assessments as accurate reflections of fair market value.

18. "[A] forecast is a prediction about the values of the dependent variable, given information about the explanatory variables. . . . *[E]x ante* forecasts . . . predict values of the dependent variable beyond the time period in which the model has been estimated" (Rubinfeld and Steiner 1983, p. 102). Rubinfeld (2000, p. 223) agrees.

especially problematic when a few outliers substantially skew the fitted line. She should have used descriptive statistics (such as the compensation percentage, which I use here) to compare the 798 pairs of estimated fair market values and actual compensations; at least she should have counted the number of over- and undercompensations.

Munch's explanations for the empirical results are also not very satisfactory. The explanation of overcompensation for high-value properties seems to rely on the assumption that government lawyers are homogenous and mediocre and thus are less effective than the more capable lawyers whom high-value property owners hire.[19] Nevertheless, even if government lawyers are indeed homogenous and mediocre, they should be able to adjust their work hours according to stakes of cases or capabilities of opponents' lawyers. For example, government lawyers might work 10 hours on a low-value property case and 40 hours on a high-value property case instead of working 25 hours on every case.

Munch's argument also does not explain why the government would offer more than fair market value to owners with more skillful lawyers.[20] If the court or the jury awards condemnees only fair market value, the government can deter most of them from litigating by offering fair market value or slightly more than fair market value.[21] The offer, however, is unlikely to be two or three times the fair market value, as Munch found,[22] unless there is some reason to believe that the court or the jury

19. If there are very capable as well as less talented governmental lawyers (that is, they are not homogeneous), the agency can assign the former to high-value property cases, to match the very capable lawyers hired by the high-value land's owners, and assign the latter to low-value property cases. If governmental lawyers are all very capable, they will be qualified to handle any type of case. At least in the case of New York City, government lawyers seem to be neither homogenous nor mediocre. From 1994 to 1997, over 20 percent of the new appointees in the NYC Law Department had attended top-ranked law schools; the statistics before and after that period are similar (Nelson 2008, pp. 318–19).

20. One possibility is that such offers have nothing to do with lawyers. Rather, owners of high-value property are rich and have political clout. They can ask their aldermen to pressure the government agency for higher compensation. (I owe this point to Geoffrey Miller.)

21. Granted, owners of high-value properties may think of fair market value (or slightly more) as undercompensation, but if they know that the court will grant only fair market value, they will not sue. Given that litigating is costly and attorneys' fees are not necessarily reimbursed, the government could even offer slightly lower than fair market value and still avoid litigation.

22. Note that a few outliers could create this huge gap. If there were outliers and Munch has excluded them when using estimated fair market value to predict compensation, the gap could be much smaller, or even nonexistent.

would be prone to award drastic overcompensations just because especially able counsels represent property owners.

The case for undercompensating owners of low-value property also is questionable. The thesis that compensation for low-value properties has more precedent value could at most explain why governments have incentives to offer low levels of compensation (to establish an administrative precedent);[23] it does not explain why the court or jury would systematically agree with the government's low offer. Furthermore, because appraisers assess compensation through comparable sales, not comparable condemnations, how much the government has compensated for previously taken properties is irrelevant. Thus, appraisals through comparable-sale analysis still are required in assessing the value of low-value condemned properties. It is thus unclear what value a precedent of giving low compensation has.

Munch also argued that owners of low-value property tend not to sue because of the high fixed cost of litigation. This is plausible. Nevertheless, to explain why the government offers such property owners less than fair market value compensation in the first place, certain assumptions about government officials' behavior are necessary. For example, the fiscal illusion theory asserts that the goal of government officials is to reduce budgetary outflow (Chang 2009b); thus, condemnors will lowball their offers. Finally, Munch asserted that bribery could explain the regressive awards by the court, but she did not offer any evidence of bribery in the cases she studied.[24]

3. NEW YORK CITY'S EMINENT DOMAIN PRACTICE

3.1. Eminent Domain Procedure

New York City does not have its own eminent domain laws; it follows New York State's Eminent Domain Procedure Law, which, however, does

23. Besides, at least in the case of New York City from 1990 to 2002, urban renewal projects, which Munch studied, did not tend to condemn low-value properties (figures unreported), as Munch argued. As Table 5 shows, properties condemned for urban renewal projects can hardly be described as homogenous. Therefore, the prerequisites for Munch's precedent-value thesis does not hold water in New York City.

24. I thank the anonymous referee of the 2008 Conference on Empirical Legal Studies for pointing out that the possibility of bribing Chicago officials in the 1960s and 1970s was common knowledge then, thus needing no proof.

not elaborate on the required appraisal procedure.[25] In practice, if the city needs certain properties for public use, the city's Department of Citywide Administrative Services does a prevesting appraisal, and the city uses this appraised value to negotiate with the property owners in an effort to reach a voluntary deal. If negotiation fails, the city then begins the eminent domain procedure. The city's Law Department is required to commission an independent appraiser to appraise property value for condemnation compensation purposes (Em. Dom. Proc., sec. 302).[26] The city uses the "highest approved appraisal" as its initial offer to condemnees (Em. Dom. Proc., sec. 303; Goldstein 2008).

Condemnees then have three choices: "accept the offer as payment in full," "reject the offer as payment in full and instead elect to accept such offer as an advance payment," or reject the offer (Em. Dom. Proc., sec. 304). In the latter two situations, the city then may file a petition seeking an order allowing the filing of an acquisition map in the New York Supreme Court (Em. Dom. Proc., secs. 401, 402). "Upon entry of the order, the map will be filed. It is the filing of the map that vests title" in the city (Rikon 2007, p. 2). The condemnees usually accept the initial offer only as advance payment; the city then negotiates a settlement with condemnees.[27]

If the city and the condemnee fail to work out a settlement, either party can petition the New York Supreme Court to put the case on the trial calendar.[28] New York is the only state that does not provide the parties the option of jury trials (Goldstein and Rikon 2000; Rikon

25. There are two eminent domain procedures in New York State. The state's eminent domain action is called "appropriation," and eminent domain action by other entities such as the Empire State Development Corporation and New York City is called "condemnation" (Em. Dom. Proc., sec. 402; Goldstein and Goldstein 2008a). I focus on the condemnation procedure in this paper.

26. Lisa Bova-Hiatt, deputy chief of the Tax and Bankruptcy Litigation Division, New York City Law Department, interview with the author (September 5, 2008), and Galliano Salvatore, chief of the Division of Real Property, New York City Comptroller's Office, interviews with the author (September 13 and October 11, 2007). In all federally financed takings, two appraisals by competent independent appraisers are required (Goldstein and Rikon 2003).

27. Galliano Salvatore, interviews with the author (September 13 and October 11, 2007).

28. There is no statute of limitations for an eminent domain case. That is to say, even after, say, 10 years of settlement negotiations, either party can decide to stop negotiating and start litigating (Lisa Bova-Hiatt, interview with the author, September 5, 2008).

2005b);[29] all condemnation suits in New York are bench trials (Em. Dom. Proc., sec. 501).

3.2. Compensation Standard

The U.S. Constitution and the New York State Constitution both use the term "just compensation" as the standard for condemnation compensation.[30] The Eminent Domain Procedure Law does not elaborate on the term's meaning. The New York Court of Appeals, however, has long held that "just compensation" means compensating condemnees with the fair market value of properties (*Keator v. State of New York*, 23 N.Y.2d 337 [1968]),[31] which is the amount a willing buyer offers and a willing seller accepts for "the highest and best use" of the property at the time of condemnation (*Town of Islip v. Joseph Mascioli*, 49 N.Y.2d 354 [1980]; *County of Nassau v. Colony Beach Club of Lido, Inc.*, 349 N.Y.S.2d 422 [1973]).[32]

The term "highest and best use" means that a condemned property must be valued according to its most valuable, reasonably probable future use, regardless of actual use (Santemma 2005). The highest and best use, however, is not boundless. For example, a future highest and best use may result from rezoning, special use permit, or zoning variance. Condemnees must "establish that there existed, on the title vesting date, a reasonable probability that the asserted highest and best use could or would have been made of the subject property in the reasonably near future and the use was economically feasible" (Flower 2005a, pp. 176–77).

29. The U.S. Supreme Court has held that the Seventh Amendment does not provide condemnees with the right to a jury trial (Peterson 2006).

30. The Fifth Amendment of the U.S. Constitution stipulates, "nor shall private property be taken for public use, without just compensation." Article 1, Section 7(a) of the New York State Constitution stipulates that "[p]rivate property shall not be taken for public use without just compensation."

31. The U.S. Supreme Court also adopts fair market value as the compensation standard (*United States v. 564.54 Acres of Land*, 441 U.S. 506 [1979]). Dana and Merrill (2002) and Merrill (2002) discuss the use of fair market value as compensation standard.

32. Nevertheless, the property should be assessed "absent consideration of the deleterious effect on the value of that property that has resulted from the threat or pendency of the condemnation proceeding or from the various activities conducted in advance thereof" (Flower 2005a, p. 182). In addition, the condemned properties are valued as if they are "free and clear of all liens, encumbrances and leases" (Rikon 2007, p. 9).

3.3. Compensation Appraisal Method

New York City commissions independent real estate experts with MAI designation[33] to appraise properties the city wishes to condemn.[34] These appraisers, as well as the condemnees' appraisers, usually use the comparable-sale approach (also know as the market data approach) for assessing residential properties and always use this approach to assess vacant land (Rikon 2005a, 2007). In the comparable-sale approach, "an opinion of market value is developed by comparing properties similar to the subject property that have recently sold, are listed for sale, or are under contract" (Geraci 2002, p. 417). Appraisers use the income capitalization approach to assess income-producing properties; "simply put, this approach finds the present value of real property based on its future income" (Rikon 2007, p. 9).

"Case law has held that appraisers have broad discretion as to their methods and sources of information" (Rikon 2005a, p. 170). When using the comparable-sale approach, appraisers make subjective adjustments to reflect the differences in the compared properties (Goldstein 2008). Appraisers might take the properties' tax assessments into consideration, but only as one of the many factors, because different assessment standards are used in tax assessment (current use) and condemnation assessment (highest and best use).[35]

33. The acronym MAI stands for "member, Appraisal Institute." The Appraisal Institute is an international membership association of professional real estate appraisers. The MAI designation, the most prestigious designation awarded by the Appraisal Institute, "is held by appraisers who are experienced in the valuation and evaluation of commercial, industrial, residential and other types of properties" (Appraisal Institute, Professional Designations: MAI Designation [http://www.appraisalinstitute.org/designations/MAI_Designations.aspx].) See also MGMiller Valuations, MAI Designation (http://www.mgmiller.com/MAIdesignation).

34. When the city needs an appraisal, a city lawyer in charge of a specific case will suggest three MAI appraisers who are experienced in the neighborhood to New York City's Appraisal Committee. It is up to the committee to decide which appraiser to hire for the specific case. About 50 MAI appraisers who are on a list preapproved by the committee are eligible to appraise for the city. The Appraisal Committee has 12 members—six of them are public officials in New York City, three are attorneys practicing takings law, and three are attorneys practicing tax law (interviews with Lisa Bova-Hiatt, September 10, 2007, and September 5, 2008).

35. The New York State Supreme Court, in *Village of Irvington v. Sokolik* (831 N.Y.S.2d 351 [2006]), sums up the case law in New York: although tax assessments are not controlling, they may be considered along with other evidence of value (see, for example, *Matter of City of New York [East Harlem]* [392 N.Y.S.2d 245 (1976)]). Nevertheless, one should not overemphasize the role of tax assessments in appraisal practice. First, tax assessments are only one of the many factors, and the mainstream case law still stresses that

4. ESTIMATING FAIR MARKET VALUE

This paper examines how closely compensation paid to residential properties in eminent domain settlements in New York City approximates fair market value. In this section, I introduce my econometric methods for estimating fair market value and discuss potential methodological challenges.

4.1. Hedonic Regression Models

I use hedonic regression models[36] with robust standard errors to estimate the fair market values for the condemned residential properties on which settled compensation was paid.[37] The dependent variable in the regression is the natural log of the sales prices of properties.[38] Because I have a comprehensive data set, I am able to use informative hedonic characteristics of the properties as independent variables. I also include time and location fixed effects and interaction terms of time and location in the right-hand side of the regression equation. The model takes the following form:[39]

$$\ln P_{it} = \alpha + \beta \boldsymbol{H}_i + \delta \mathbf{CT}_i + \theta \boldsymbol{I}_t + \rho \mathrm{CD} \times \mathrm{year} + \varepsilon_{it},$$

tax assessments are not market value (see, for example, *Matter of City of New York [Boston-Secor Houses]* [306 N.Y.S.2d 918 (1969)]). Second, the methods for assessing value for tax purposes and those for compensation purposes are drastically different. Properties in condemnation compensation procedures should be assessed according to the highest and best use, whereas for tax purposes, properties should be assessed on their actual uses (see, for example, *Allied Corp. v. Town of Camillus* [80 N.Y.2d 351 (1992)]; *Stillwell Equipment Corp. v. Assessors for Town of Greenburgh* [251 A.D.2d 672 (1998)]). Third, even if a property owner has just asserted her property value in a tax certiorari proceeding, the city cannot use the owner's recent asserted value as the sole evidence of fair market value in condemnation proceedings. In other words, valuation by the owner "for tax purposes will not be permitted to outweigh the more competent and convincing proof of value which was presented by both sides in [the condemnation compensation] proceeding" (*In re Real Property in Seaford, Town of Hempstead, Nassau County* [276 N.Y.S.2d 499, 504 (1967)]). Rikon (2007, p. 9) goes on to argue, "Generally, tax valuation is irrelevant."

36. "At its simplest, a hedonic equation is a regression of expenditures (rents or values) on housing characteristics. The independent variables represent the individual characteristics of the dwelling, and the regression coefficients may be transferred into estimates of the implicit prices of these characteristics" (Malpezzi 2002, p. 68).

37. I use 1990–2002 sales prices to estimate the fair market value of condemned properties on which settled compensation were paid in the same period. Thus, I am using the more accurate ex post forecast instead of the ex ante forecast employed by Munch (see Section 2.2). On ex post forecasts, see Rubinfeld and Steiner (1983) and Rubinfeld (2000).

38. Using the natural log form of sales prices as the dependent variable is quite popular in the hedonic model literature (for example, Coulson and Leichenko 2001, p. 117).

39. My model does not directly control for rent regulation for several reasons. First,

where $\ln P_{it}$ is natural log of the sales price of property i at time t,[40] $\boldsymbol{H}_i$ is a vector of property-related characteristics, $\mathbf{CT}_i$ is a group of census tract dummy variables (one for each census tract) that capture the effect of any observed or unobserved census-tract-level time-invariant characteristics on prices, $\boldsymbol{I}_t$ are dummy variables indicating the quarter and year of the sale, and CD × year is a series of interaction dummies of community districts and year.[41] The coefficients to be estimated are α, β, δ, θ, and ρ; ε is an error term.

Property-related characteristics, $\boldsymbol{H}_i$, include the following structural characteristics of properties: the natural log of building area per residential unit (or total land area); the age of building and its square; the number of buildings on the same lot; whether the lot has irregular shape or is on a street corner; whether the building has an extension or garage or is used for commercial activities; whether there is major alteration before sale; and 12 dummies specifying the building class.

The coefficients of the independent variables measure the average effect of the hedonic characteristics, time, or location on the average sales price (Rubinfeld 2000, pp. 208–10).[42] The fair market value esti-

researchers have found that stabilized rent practices in New York City subsidize mainly residents in lower and mid-Manhattan and the Bronx. The median subsidy in Queens and Staten Island is zero (Pollakowski 2003). Second, only rental properties containing more than six units could be rent regulated (and not all of them were). Part of the effects, thus, should have been captured in the housing dummies I used; census tract fixed effects should also capture some of the rent regulation effect. Of course, it would be better to use a rent regulation dummy to capture its effect directly, but there is no datum indicating whether a property was rent regulated at the time of sale and condemnation. Finally, prior literature on the NYC housing market, using a model similar to mine, also considers the effect of rent regulation not to influence on the regression results (Ellen, Schwartz, and Voicu 2007; Voicu and Been 2008, p. 258 n.34).

40. The term $\ln P_{it}$ is the natural log of price per residential unit when building area per residential unit is used as the major independent variable (Table 2, model 1); $\ln P_{it}$ is the natural log of price when total land area is used as the major independent variable (Table 2, model 2). Model 1 is based on prior literature (for example, Voicu and Been 2008) and has better predictive power. I use an alternative specification (model 2) because about one-third of the condemned properties have missing information for building area per residential unit; using model 2's specifications allows me to estimate fair market value of these condemned properties. In addition, I use model 2 as a robustness check for model 1.

41. Following Schwartz et. al. (2006), I use interaction terms between year and community districts, instead of census tracts, in order not to use up too many degrees of freedom and cause high multicollinearity.

42. Bayer, Ferreira, and McMillan (2007, p. 592) indicate that if the variable measures attributes that are in limited supply (such as a view of Central Park), the coefficient reflects market price driven by marginal buyers. Variables in my regression models capture "housing and neighborhood attributes [varying] more or less continuously throughout the metropolitan area." Thus, my regression models should still reflect mean preferences.

mated by hedonic regression models (using the least squares technique) predicts the average sales price that the condemned properties can command if voluntarily sold.

As a robustness check on my findings, I also examine condemnation settlements for commercial properties and vacant land. The hedonic models take similar forms. The regression models for commercial properties add the number of stories, the size of frontage, percentage of commercial units to total units in the block, and several dummy variables indicating the subtypes of commercial properties. The regression models for vacant land—constrained by the nature of the property—use only land area, irregular shape, and street corner location as property-related characteristics.

4.2. Data on Sales

I use three data sets. The first data set, compiled by the NYC Department of Finance, contains all property sales (except the sales of cooperatives) over the period 1974–2005. From this data set, I selected a subset of sales, defined as (1) sales between 1990 and 2002 (during which I have data on compensation paid in condemnation settlements),[43] (2) sales in community districts in which there was at least one condemnation settlement between 1990 and 2002, (3) sales of properties in a building class (defined and assigned by NYC Department of Finance) that had at least one condemnation settlement between 1990 and 2002, (4) sales that the NYC Department of Finance identified as arms-length sales, and (5) sales in which the prices were more than $5,000. I imposed those limitations in order to pick out genuinely sold properties that are comparable to condemned properties on which settled compensation was paid in terms of time, location, and housing characteristics; 74,879 residential sales of 19 two-digit building classes in 20 of 59 community districts are selected.

The second data set, the Real Property Asset Database (RPAD), compiled by NYC Department of Finance, contains building class, building characteristics, land area, and tax assessment of each property in New

43. I do not find condemnation settlements for residential properties in 2002, so residential property sales and other relevant data for 2002 are excluded. I use 2002 data for commercial properties and vacant land.

York City for each year between fiscal years 1984 and 2004 (that is, from July 1, 1984, to June 30, 2005).[44]

The third data set, the Open Balance File (OBF), compiled by the NYC Department of Finance, contains property tax violations and the amounts of unpaid taxes of all properties. I used 1985–2002 OBF data to check whether condemned properties on which settled compensation was paid had been in tax default before condemnation.

Table 1 presents summary statistics of the sales used in the hedonic regression models.

4.3. Regression Results

Table 2 provides selected regression results for hedonic models using residential property sales. The signs of most coefficients in my principal model (model 1) are as expected and are consistent with prior literature that uses the same data set for hedonic regressions (for example, Voicu and Been 2008).[45] For a continuously measured variable in natural logs, such as residential unit size, the coefficient represents the percentage change in property value corresponding to a 1 percent change in the independent variable. For a continuously measured variable such as age, the coefficient, multiplied by 100, is interpreted as the percentage change in sales price with a unit change in the independent variable. For a dummy variable such as irregularly shaped land, the coefficient is equal to the difference in log value between properties that have the attribute and those that do not (Case 2006, p. 231; Schill, Ioan, and Miller 2007, pp. 294–95). The R^2-value of the principal model, .87, is higher than that in prior literature using hedonic regression models and non-NYC data (for example, Curran and Schrag 2000; Ioannides and Zabel 2003; Coulson and McMillen 2007; McMillen, 2008). The R^2-value approximates that found in studies using hedonic regression models to capture the property sales prices in New York City (Schill, Voicu, and Miller 2007; Ellen, Schwartz, and Voicu 2007; Voicu and Been 2008). The signs of most coefficients in the complementary model (model 1) are as

44. I use building characteristics of the condemned properties at the time of condemnation (title-vesting date). Land area, which is presumably stable, was gathered from the Real Property Asset Database for 1999 (RPAD 1999) and RPAD 2003 if RPAD 1990 lacked data thereof. In the few cases of difference in these two sources, I usually use the data in RPAD 2003.

45. The coefficient for the number of buildings on the same lot is expected to be negative (as in Voicu and Been 2008), while in my regression it is positive and statistically significant at the .1 level.

Table 1. Summary Statistics for Residential Properties: Selected Sales and All Condemnation Settlements

	Sales		Settlements	
Observations	74,879		104[a]	
Price or compensation per residential unit (constant 2005 $)				
Mean	170,422	(107,437)	104,777	(197,511)
Median	156,009		62,610	
Estimated FMV per residential unit ($):				
Mean	163,322	(88,173)	129,385	(132,903)
Median	153,810		94,291	
Size per residential unit (square feet):				
Mean	1,268	(540)	1,263[b]	(938)
Median	1,164		1,053	
Land area (square feet):				
Mean	3,535	(3,225)	5,710	(12,486)
Median	2,900		2,500	
Building class (%):				
Single-family attached house	6.5		1.0	
Single-family detached house	37.6		26.0	
Two-family house	36.1		32.7	
Three-family house	8.0		5.8	
Four-family house	2.6		2.9	
Five–six-family house	2.5		5.8	
More than six families, no elevator	2.3		3.8	
Walk-up apartment, units not specified	1.1		8.7	
Multiuse, one family with store	.7		1.0	
Multiuse, two families with store	1.8		7.7	
Multiuse, three families with store	.5		1.9	
Multiuse, four or more families with store	.4		2.9	
Structural characteristics:				
Age (years):				
Mean	60.9	(28.3)	75.4	(40.5)
Median	67.0		79.5	
Mean number of buildings on the same lot	1.0		1.0	
Mean number of residential units	2.2		3.7	
Garage (%)	37.2		12.5	

Extension (%)	7.6	14.4
Land irregular shape (%)	12.0	19.2
On street corner (%)	10.2	19.2
Commercial units in the building (%)	4.9	13.5
Major alteration before sale (%)	1.5	2.0
Borough (%):		
Manhattan	1.5	9.6
Bronx	4.6	9.6
Brooklyn	32.6	49.0
Queens	34.1	24.0
Staten Island	27.2	7.7
Year (%):		
1990	7.5	10.4
1991	5.8	18.9
1992	5.9	12.3
1993	6.7	.9
1994	7.6	8.5
1995	7.8	25.5
1996	9.1	13.2
1997	9.8	2.8
1998	10.1	2.8
1999	9.8	1.9
2000	10.3	1.9
2001	9.7	.9

Note. Values in parentheses are standard deviations. No settlement for condemnation of residential properties can be found for 2002. FMV = fair market value.

[a] Excludes two condemned properties that are loft buildings.

[b] Excludes two outliers. If their square feet per residential unit, 53,500 and 345,823, were included, the mean would be 7,876 (44,887).

Table 2. Regression Results for Hedonic Models Using Residential Property Sales

	Residential Unit Area (Model 1	Land Area (Model 2)
Log of land area (square feet)	.349** (.005)	.296** (.005)
Buildings on the same lot	.020+ (.010)	−.076** (.014)
Equals one if has garage	.040** (.002)	.024** (.002)
Equals one if has extension	.013** (.004)	−.019** (.004)
Equals one if has commercial units in the building	.088** (.022)	.114** (.025)
Equals one if two-family house	−.297** (.006)	.187** (.005)
Equals one if three-family house	−.568** (.007)	.275** (.006)
Equals one if four-family house	−.757** (.010)	.254** (.010)
Equals one if five- or six-family house	−1.217** (.012)	.141** (.011)
Equals one if more than six families, no elevator	−1.564** (.013)	.507** (.017)
Equals one if walk-up apartment, units not specified	−1.330** (.025)	.157** (.023)
Equals one if multiuse, one family with store	−.102** (.028)	−.010 (.030)
Equals one if multiuse, two families with store	−.535** (.024)	.097** (.026)
Equals one if multiuse, three families with store	−.874** (.031)	.033 (.034)
Equals one if multiuse, four or more families with store	−1.018** (.032)	.113** (.032)
Equals one if land irregular shape	.013** (.003)	−.002 (.004)
Equals one if on street corner	.030** (.003)	.036** (.003)
Property age	−.005** (.000)	−.008** (.000)
Square of property age	.000** (.000)	.000** (.000)
Equals one if major alteration before sale	.088** (.013)	.126** (.013)
Constant	9.275** (.152)	12.156** (.217)
Observations	68,503	68,208
R^2	.87	.64

Note. The dependent variable for model 1 is the log of price per residential unit; the dependent variable for model 2 is the log of price. Values in parentheses are standard errors. Both models contain quarter-year and census tract fixed effects and community district × year interaction terms.

+ Significant at 10%.

** Significant at 1%.

expected and consistent with prior literature (see Sirmans, Macpherson, and Zietz 2005). The R^2-value, .64, falls within the range of those found by the above-cited papers using non-NYC data.

Table 3 provides selected regression results for hedonic models using commercial sales and vacant land. The signs of most coefficients in models 1 and 2 in Table 3 are as expected and are consistent with prior literature that uses the same data set for hedonic regressions (Ellen, Schwartz, and Voicu 2007). The signs of most coefficients in models 3 and 4 in Table 3 are as expected.[46] The R^2-values, which range from .79 to .93, are quite high.

5. COMPARING COMPENSATION WITH FAIR MARKET VALUE

This section starts with a summary of the condemnation data I collected, followed by my findings of how well New York City has compensated condemnees, and ends with my responses to potential methodological challenges.

5.1. Data on Condemnation

I compiled a database of all properties that the city acquired through a settlement after filing a petition in court to exercise its power to condemn

46. The Furman Center has not done research on vacant land, and there seems to be no consensus in the literature on how to model its value. For example, Peiser (1987) uses many independent variables, including distance to central business districts; whether the land fronts a major street, a minor street, or an expressway; whether the land is on a street corner or in the middle of a block; population density; neighborhood characteristics; and macroeconomic variables. I control the neighborhood characteristics and macroeconomic trend by census tract fixed effects and the interaction of community district and year fixed effects. My data sets do not include the distance to central business districts or the types of roads that properties front. In terms of accuracy, Peiser's model is not very satisfactory—the R^2-values, which are below .6 in all but one model, are much lower than the R^2-values of my models. Cunningham's (2006) study on the effect of house price uncertainty on vacant land value used scenic view, high erosion danger, high flood danger, high seismic danger, high risk of landslide, water problems, difficult topography, and distance to CBD as independent variables, in addition to lot area and irregular shape, both of which I use in my model. In New York City, erosion, landslide, flood, and the like are of lesser concern or of low variability. Thus, not using these variables should not be a problem. The R^2-value of Cunningham's ordinary least squares model is only .2. Dye and McMillen (2007) use sales prices of tear-down houses as a proxy for vacant land value. Nevertheless, their model is not appropriate for my purpose because the vacant land sales and vacant land condemnations in my data set are for properties that have been vacant for some time, so usually I was not able to ascertain their prior housing characteristics. Moreover, Dye and McMillen (2007) use this kind of model because they do not have enough vacant land sales.

Table 3. Regression Results for Hedonic Models Using Commercial Property and Vacant Land Sales

	Commercial		Vacant Land	
	Industrial (Model 1)	Retail (Model 2)	Zoned Residential (Model 3)	Not Zoned Residential (Model 4)
Log of building area (square feet)	.683** (.056)	.339** (.062)	. . .	. . .
Log of land area (square feet)	. . .	. . .	.628** (.053)	.947** (.100)
Log of number of stories	−.058 (.076)	−.033 (.072)	. . .	. . .
Log of frontage (feet)	.076 (.061)	.397** (.067)	. . .	. . .
Percentage of commercial units to total units in the block	.001 (.001)	.003* (.001)	. . .	. . .
Buildings on the same lot	.021 (.038)	.032+ (.017)	. . .	. . .
Equals one if has garage	−.065 (.263)	.338+ (.184)	. . .	. . .
Equals one if has extension	−.040 (.076)	.130+ (.067)	. . .	. . .
Equals one if land irregular shape	.089* (.044)	.110* (.048)	.080 (.120)	−.153 (.241)
Equals one if on street corner	.049 (.056)	.033 (.049)	.054 (.109)	.104 (.266)
Equals one if major alteration before sale	.113 (.077)	.289** (.085)	. . .	. . .
Property age	−.001 (.006)	−.002 (.006)	. . .	. . .
Square of property age	−.000 (.000)	−.000 (.000)	. . .	. . .
Equals one if factory or industrial building	−.067 (.047)	. . .	. . .	. . .
Equals zero if warehouse	. . .	. . .	. . .	. . .
Equals one if store building	. . .	.150* (.060)	. . .	. . .
Equals zero if gas station or garage	. . .	. . .	. . .	. . .
Constant	7.039** (.747)	10.804** (.920)	5.832** (.951)	7.970** (2.104)
Observations	841	1,579	1,305	374
R^2	.86	.82	.79	.93

Note. The dependent variable is the log of price. Robust standard errors are in parentheses. All models contain quarter-year and census tract fixed effects and community district × year interaction terms. The building class of vacant land that is not zoned residential is V1, which could include vacant land in Manhattan below 110th Street, but these Manhattan data are excluded in model 2.

+ Significant at 10%.

* Significant at 5%.

** Significant at 1%.

the property. The NYC Comptroller's Office keeps records of every eminent domain settlement in the city, if the city is the condemnor.[47] The documents contain information such as title-vesting date, final compensation payment, nature of condemnation (fee or fixture), name of condemnation project, nature of condemnee (individual or corporate), borough, block, and lot of the condemned properties. (I acquire other characteristics of these properties from RPAD.)[48] I collected data on settlements between 1990 and 2002 from these Comptroller's Office documents.[49]

To collect data on court-awarded condemnation compensations, I visited the five county courts in New York City and retrieved files for all types of condemnation disputes for this period. I also collected data on settlements, in case the Comptroller's Office records were not comprehensive. Most of the settlements on the court's records can also be found in Comptroller's Office records. However, 40 settlements were

47. Therefore, condemnations of which New York State, the Metropolitan Transit Authority , the Port Authority, and so forth are condemnors are not included in my data set. These public entities' compensation practices may differ from those of NYC agencies. According to Michael Rikon (a partner at Goldstein, Goldstein, Rikon, & Gottlieb, P.C., interview with the author, January 30, 2008), New York State Development Corporation's initial offers to condemnees are usually higher than those proposed by NYC agencies.

48. The record also includes the actual payment date and the amount of advance payment (the latter is handwritten and often illegible). I did not code them. The names of the attorneys representing condemnees are also recorded in the documents. I coded only about half of them. In 182 of 193 settlements, condemnees hired attorneys. In those 11 settlements that condemnees were (or seemed to be) self-represented, the property values were low—the most valuable property was worth only about $68,000. Lisa Bova-Hiatt (interview with the author, September 5, 2008) estimates that about 85–90 percent of condemnees who have negotiated settlements hire attorneys. In about 70 percent of the 193 settlements, condemnees are represented by the same law firm, Goldstein, Goldstein, Rikon & Gottlieb, P.C, or its predecessors. (This law firm is a merger of three major law firms practicing exclusively eminent domain law.)

49. Most of the condemnations after 2002 have not reached a settlement yet. (I found only two settlements in 2003 and one settlement in 2004.) The settlement procedure is very time consuming. The average lag from title-vesting date to the final decree date is 7 years (based on 153 settlements)—the quickest settlement was handled in 2 years, whereas some settlements take more than 10 years. According to the U.S. Government Accountability Office (2006, p. 36), "In New York City, a contested condemnation can take more than ten years to settle." Therefore, settlements whose title-vesting date is around year 2000 may still be pending and thus not included in my data set. This could also explain why there is a significant drop in the number of settlements after 1998. Sagalyn (2001, p. 385) documented 34 settlements of condemnations in Times Square (not included in my data because the condemnor is not New York City) and found that on average it took almost 10 years to settle.

contained in the courts' records but not in the Comptroller's Office records. I included these 40 settlements in the data set.[50]

There are 430 fee[51] condemnation settlements during this 13-year period.[52] Table 4 shows the four types of condemned properties for which settlements were reached (residential, commercial, vacant land, and other). One-half of the total condemnation settlements are vacant land (zoned residential and not zoned residential combined), and a quarter of them involve residential properties (five subtypes—single-family house, two-family house, walk-up apartment, multiple-use residence, and loft building). Most of the others are retail and industrial properties.

Table 5 breaks down the data by borough, showing that Brooklyn and Staten Island account for 72 percent of the settlements. Tables 4 and 5 also present the number of settlements in six types of public projects. About one-half of the properties in my data were condemned for urban renewal projects (most of which were in Brooklyn), and about 30 percent of them were condemned for the Bluebelt project in Staten Island. (The Bluebelt project predominantly condemned vacant land.)[53]

In the following section, I focus on the analysis of residential properties because the peculiarity of commercial properties and the limited amount of available information regarding vacant land and other types of properties may reduce the accuracy of my analysis. Comparing the characteristics of selected sold properties with those of condemned properties, I find that condemned properties tend to be less valuable, a little larger in size, older, less likely to be a house for four or fewer families,

50. With or without these 40 settlements, my findings are essentially the same.

51. In 38 of the 430 settlements, the city condemned "land and improvement," which is equal to "fee" (Galliano Salvatore, interview with the author, October 11, 2007).

52. There are also 145 fixture (for example, machinery) condemnation settlements in Comptroller's Office records. I do not use fixtures in later analysis because I have neither data nor other objective standards for the fair market value of fixtures. There are also 10 settlements that pay lump-sum compensation to fee and fixture. I do not use them in the regressions because I have no way to figure out how much of the compensation should be assigned to the fee. A classic definition of fixture is "a thing of an accessory character annexed to houses or lands which becomes, immediately on annexation, part of the realty itself" (Rikon 2008). "Machinery is 'deemed a fixture' where it is installed in such manner that its removal will result in material injury to it or the realty, or where the building in which it is placed was specially designed to house it, or where there is other evidence that its installation was of a permanent nature" (*In re City of New York, re Melrose Commons Urban Renewal Area Phase II. Kaiser Woodcraft Corp.* [837 N.Y.S.2d 2, 4 (2007)]).

53. Bluebelt, a Staten Island–specific program, is "a system of streams, ponds, and wetlands managed by NYCDEP [New York City Department of Environmental Protection] for stormwater management purposes" (Vokral, Gumb, and Mehrotra 2001).

Table 4. Fee Condemnation Settlements in New York City, 1990–2002, by Property Type

Project Type	Residential	Commercial			Vacant		Others	Total
		Retail	Industry	Office	Zoned Residential	Not Zoned Residential		
Urban renewal	75	43	20	4	45	25	7	219
Bluebelt	6	1	0	1	115	5	3	131
Park	2	1	0	0	14	1	2	20
Road	14	1	0	1	0	0	3	19
Elementary school	8	1	1	0	0	0	0	10
Other	1	7	7	2	5	3	6	31
Total	106	54	28	8	179	34	21	430

Note. Settlements are categorized into the six project types by the project names on their title certification sheets. Bluebelt, a Staten Island–specific program, is a system of streams, ponds, and wetlands for managing storm water.

Table 5. Fee Condemnation Settlements in New York City, 1990–2002, by Borough

Project Type	Manhattan	Bronx	Brooklyn	Queens	Staten Island	Total
Urban renewal	10	26	152	31	0	219
Bluebelt	0	0	0	0	131	131
Park	2	2	0	6	10	20
Road	0	0	0	19	0	19
Elementary school	5	5	0	0	0	10
Other	4	2	15	7	3	31
Total	21	35	167	63	144	430

Note. Bluebelt, a Staten Island–specific program, is a system of streams, ponds, and wetlands for managing storm water.

more likely to have commercial activities in the building, and overrepresented in Brooklyn.

5.2. Findings

Using the coefficients derived from the hedonic regressions, I estimate the fair market value of the condemned properties at the time of condemnation. To better show the relationship between the estimated fair market value and the actual compensation, I compute the compensation percentage, which equals the actual compensation divided by the estimated fair market value. A compensation percentage of 100 percent means that compensation paid equals a property's fair market value estimated by hedonic regression models. I provide a 5 percent margin of error and classify only settlements in which compensation percentages are between 95 percent and 105 percent as fair market value compensation. Settlements in which compensation percentages are below 95 percent are considered undercompensation, and those above 105 percent are classified as overcompensation.

Figures 1 and 2 show the distribution of compensation percentage for 55 residential properties. Less than 10 percent of the condemnees were compensated with fair market value. Approximately one-half of the condemnees received extreme compensation—compensation that is 50 percent higher than or 50 percent lower than fair market value. Figure 1 shows results derived from my principal hedonic regression model (model 1 in Table 2), and Figure 2 shows results derived from the complementary model (model 2 in Table 2). The two figures show only slight differences in compensation percentages, which suggests that my finding

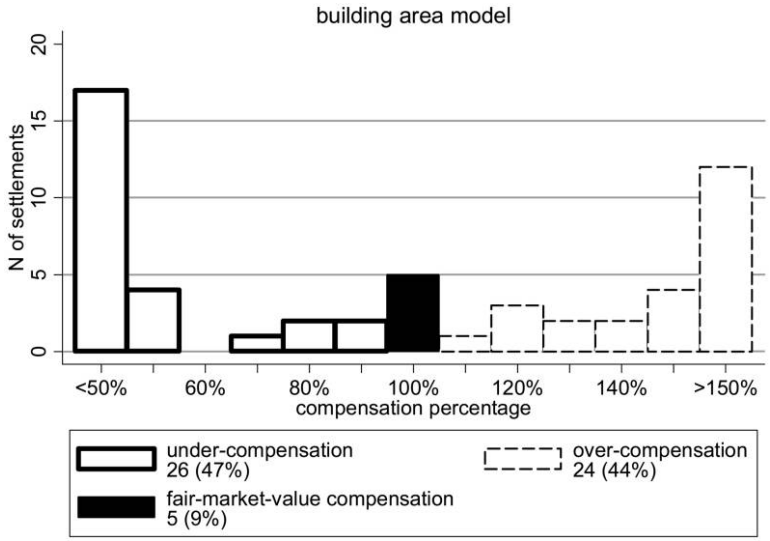

Figure 1. Compensation percentages for 55 condemned residential properties: building area model.

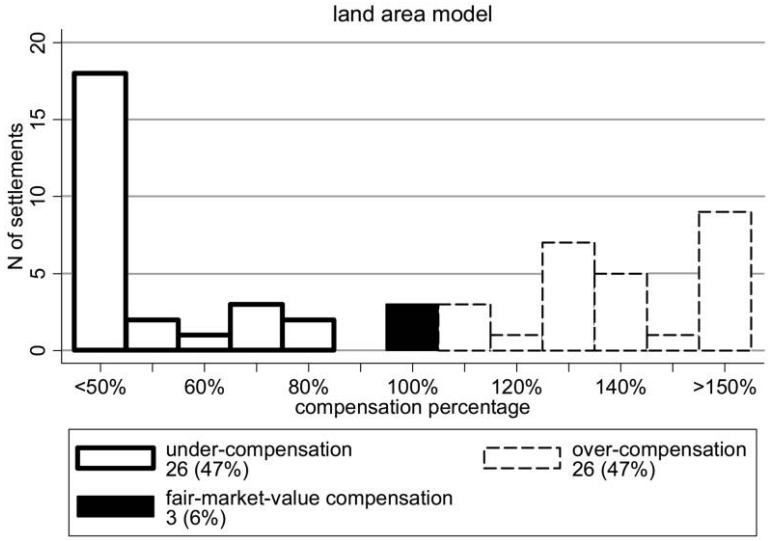

Figure 2. Compensation percentages for 55 condemned residential properties: land area model.

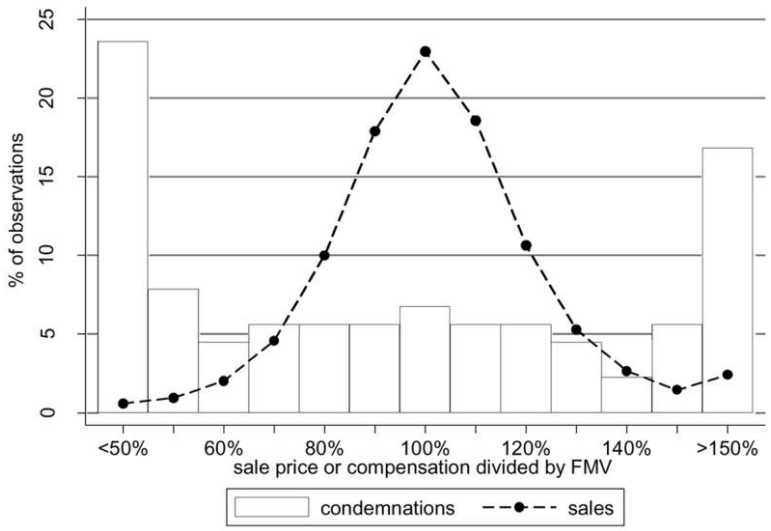

Figure 3. Predicted patterns of settled condemnation compensations and sale prices

is robust (that is, not greatly affected by different specifications of the hedonic regression models).

The rest of the observations have missing information for either building area or number of residential units; thus, I cannot use the principal hedonic model to estimate these residential properties' fair market value. Because the estimations of the complementary model are similar to those of the principal model, I use the complementary model to estimate fair market value for 34 of these properties, the compensation percentages of which, along with the compensation percentages of the 55 properties, are shown in Figure 3. The bars show the distribution of compensation percentages for 89 condemned residential properties, 55 of which draw from the results shown in Figure 1. The other 34 condemned properties' fair market values are estimated by model 2 in Table 2. The line exhibits the distribution of sales price percentages for 68,503 sold residential properties. Figure 3 reveals patterns similar to those in Figures 1 and 2—less than 10 percent of condemnation compensations for residential properties are at fair market value, about 40 percent of them are above 150 percent or below 50 percent of fair market value, and undercompensated properties slightly outnumber overcompensated ones.

Table 6 shows that even though, on average, the compensation is

Table 6. Distribution and Magnitude of Overcompensation, Undercompensation, and Fair Market Value (FMV) Compensation

		Estimated FMV		Deviation from FMV		Compensation Percentage	
Property Type	Settlements	Median	Mean	Median	Mean	Median	Mean
Residential properties	89 (100)	188,582	236,593	−19,417	−43,394	88	101
Undercompensated	47 (53)	197,718	281,065	−106,503	−185,232	49	44
FMV compensated	6 (7)	152,434	168,847	498	798	100	100
Overcompensated	36 (40)	188,582	193,057	83,417	134,419	150	176
Commercial properties	38 (100)	141,617	610,828	103,806	102,506	191	273
Undercompensated	6 (16)	1,030,113	2,144,034	−808,353	−1,609,313	35	37
FMV compensated	1 (2)	4,022,575	4,022,575	−136,177	−136,177	97	97
Overcompensated	31 (82)	132,285	204,022	140,153	441,525	216	325
Vacant land	191 (100)	148,901	735,996	−41,204	−446,272	66	1009
Undercompensated	115 (60)	294,037	1,082,495	−141,021	−941,340	38	38
FMV compensated	5 (3)	108,490	141,987	1,832	2,241	102	101
Overcompensated	71 (37)	46,671	216,597	80,364	324,012	329	2647

Note. Property values are expressed in 2005 constant dollars. Values in parentheses are percentages. Deviation from FMV equals actual compensation minus estimated FMV. Compensation percentages equal actual compensation divided by estimated FMV.

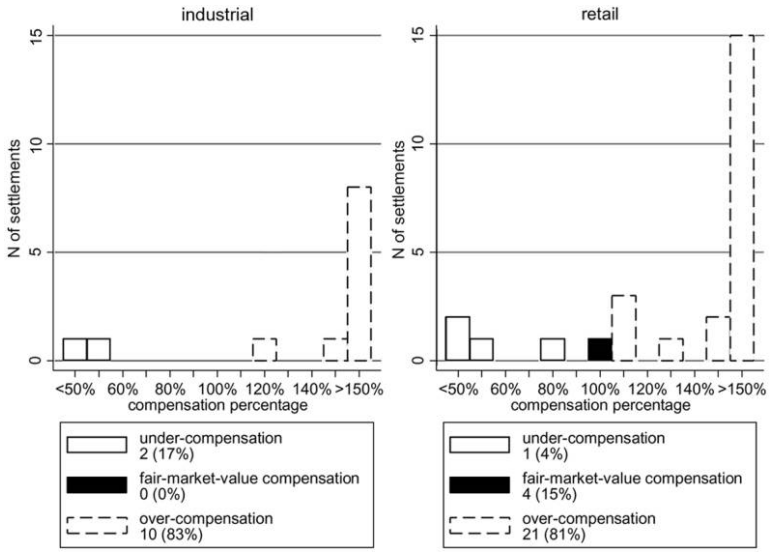

Figure 4. Compensation percentages for 12 industrial and 26 retail properties

very fair (compensation percentage equals 101 percent), some condemnees received more than their due, whereas others received far less. The median estimated fair market value for undercompensated residential properties is almost $200,000, and their owners were undercompensated by more than $100,000. The average compensation percentage is only 44 percent. The median estimated fair market value for overcompensated residential properties, about $190,000, is slightly lower than for undercompensated ones. Nevertheless, the median amount of overcompensation for such properties was more than $80,000. The average compensation percentage is 176 percent.

Figure 4 shows the compensation percentages of condemned commercial properties;[54] Figure 5 shows those of condemned vacant land.

54. Model 1 in Table 3 estimates the fair market value for condemned industrial properties, and model 2 estimates the fair market value for condemned retail properties. The distributions of the compensation percentages of commercial properties are surprisingly not robust. If the hedonic regression models for commercial properties (models 1 and 2 in Table 3) use land area instead of building area as the major independent variable, many settlements' compensation percentages change from greater than 150 percent to less than 50 percent. That is to say, although the R^2-values are similar for the building area and land area models, they produce drastically different estimates of fair market value. Nevertheless, both models indicate that most condemnees received extreme compensations—

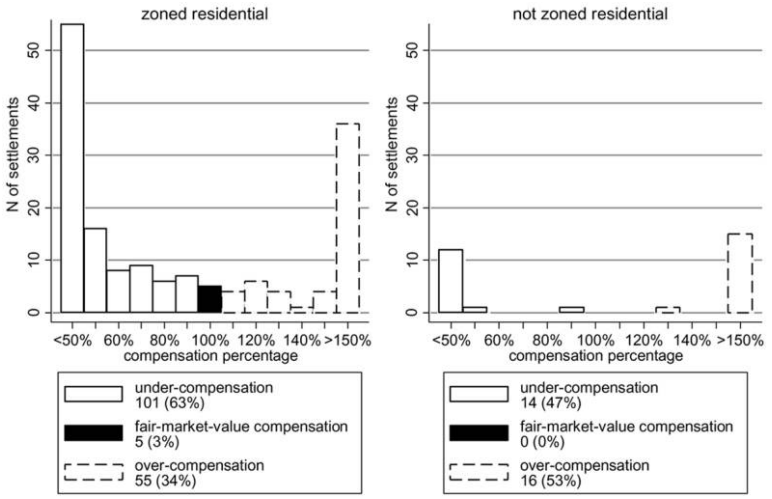

Figure 5. Compensation percentages for 161 residential and 30 nonresidential vacant land properties.

The figures indicate a similar pattern: many condemnees received extreme compensation.[55] Table 6 provides statistics on the magnitude and distribution of overcompensation, undercompensation, and fair market value compensation for condemned commercial properties and vacant land.

Readers should interpret my findings with two important caveats in mind. First, the settled condemnation compensations that I examine in this paper are not representative samples of all condemnation compensations. Some condemnees accept the condemnor's initial offer as full payment. Some condemnees cannot reach a settlement with the condemnor and thus petition the court to adjudicate condemnation compensations. These condemnees may be compensated better or worse than

only that one model suggests that compensation levels are too high and the other suggests that they are too low. I choose to present results based on the building area model because it is the standard specification (Ellen, Schwartz, and Voicu 2007).

55. I am less confident in the findings for commercial properties and vacant land. Unreported figures similar to those in Figure 5 using commercial properties or vacant land reveal that outliers are not few. This makes it less prudent to rule out the possibility that omitted variable bias results in the extreme compensation percentages (especially because the estimates from the reported hedonic models for commercial properties are not very robust).

those who received settled compensations. Thus, my findings for settled compensations may not be generalizable to nonsettled compensations.[56]

The second caveat is that I follow the appraisers' practice[57] and assume that in New York City the real estate market is so efficient that sales prices systematically capture the highest and best use (or fair market value) of properties. This assumption, however, does not hold under certain circumstances—for example, situations in which the property is encumbered by a lease.[58] In condemnation compensation appraisal, the property should be assessed as if it is free and clear of all liens, encumbrances, and leases (Rikon 2005a),[59] whereas in ordinary transactions, the sales prices will take leases into consideration. Appraised value for condemnation compensation (that is, value of highest and best use), then, should not be lower than sales prices.[60] Thus, suppose that condemnation compensation appraisers assess the highest and best use accurately and that my regression models capture sales prices well but treat properties with and without leases the same; my regression model can only underassess highest and best use, thus tending to lead to the conclusion

56. Data on initial offers are not available. I explore court-adjudicated compensation in Chang (2009c).

57. Daniel Sciannameo, president of Albert Valuation Group New York, Inc., telephone interview with the author (April 7, 2008).

58. Federal relocation assistance could also cause trouble. In the market, sellers will take the expenses of relocation into consideration, but they may not be able to force buyers to share this type of expense. In contrast, if federal funds are used in condemnation, the Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs Act (42 U.S.C. 4601) requires that condemnors give condemnees, among other things, "actual, reasonable and necessary" relocation assistance (Garnett 2006, pp. 121–23; Goldstein and Goldstein 2008b). Although federal funds are rarely involved in New York City's condemnation projects (interview with Lisa Bova-Hiatt, September 5, 2008), according to James G. Greilsheimer (counsel, Kramer Levin Naftalis & Frankel, LLP, telephone interview with author, April 8, 2008), depending on negotiation, relocation compensation can be compensated separately or included in the lump-sum settled compensation. Note that, according to Bova-Hiatt (interview of September 5, 2008), however, relocation assistance is paid separately. My data do not indicate whether a settled compensation includes relocation expenses. Because my regression models do not include relocation expenses, some overcompensation could be attributed to the inclusion of relocation compensation. Note, however, that undercompensated settlements are equally likely to include relocation compensation, which means that the extent of undercompensation for those properties could be underestimated.

59. In contrast, in assessing property value for sales, appraisers will take the existence of leases into consideration (Daniel F. Sciannameo, telephone interview with the author, April 7, 2008).

60. This problem could be solved if there were data on the existence of leases at the time of sale, but such data are not available.

that condemnees are overcompensated. Readers should interpret my findings with this caveat in mind.

5.3. Methodological Challenges

As Merrill (2002, p. 128) has commented, there is no real "market" in condemnation. Fair market value "is not really an 'objective' standard"; the value must be developed using "various imperfect valuation techniques." To justify my empirical findings, I have to explain why my estimations of fair market value based on hedonic regression models should be trusted as a good measure. In addition, I have to explain why regression models provide a better measure of fair market value than the appraisers' assessments at the time of condemnation.

Figure 3 shows the accuracy of hedonic models' estimation of sale prices. The dotted curve indicates the sales price percentage, which is the sales price divided by the fair market value estimated by the principal hedonic model. Almost one-quarter of the sales prices equal the estimated fair market value; almost 60 percent of the sale prices are within 15 percent of the estimated fair market value.[61] The bell-shaped distribution of the sales price percentages is a striking contrast to the bimodal distribution[62] of the compensation percentages, shown as bars in Figure 3.

Granted, hedonic models are not perfect, as about 5 percent of the sales prices are above 150 percent or below 50 percent of estimated fair market value. This could result from inevitable coding errors in the data sets, or those outliers could simply be anomalies that no hedonic model or appraisal technique can predict accurately. This imperfection, however, could also be attributed to omitted variables, such as scenic view, or the limitation of hedonic regression models.

61. To make sure that hedonic regression models are generally powerful, I go back to the original sales data set, picking out arms-length sales above $5,000 and transacted between 1990 and 2003 (there are about 310,000 such sales). I then randomly assign the sales into two groups. For each borough, I run a hedonic regression (the same as those used here, except that I add several building class dummies) using sales from one group and then use the coefficients to predict the sales prices of properties in this group as well as those in the other group (which are not used in the regressions). Unreported figures show that the predictive powers of the hedonic models are essentially the same for both groups. In addition, the distribution of the actual sales price divided by the predicted sales price is always bell shaped and centers around 100 percent. This result is similar to that described in the text. This finding strengthens my argument that my hedonic regression models are very good at estimating the fair market value (sales prices) of properties. (I thank Lloyd Cohen for suggesting that I run this check.)

62. Note that the two peaks at two tails are the results of the accumulation of all extreme observations.

Therefore, the methodological challenges boil down to whether the hedonic models systematically misestimate the value of certain types of properties and whether most condemned properties belong to such types. I do not think so. First, hedonic models are indeed less reliable in estimating fair market value for properties with extreme hedonic characteristics. Most independent variables in the hedonic regression models, however, are dummy variables (their value is either zero or one); thus, there is no extreme value. Only building area (or land area), property age, and number of buildings on the same lot are continuous variables. The number of buildings on the same lot rarely varies (in about 99 percent of the cases, there is only one building on one lot). Condemned properties tend to be older, but no condemned properties' ages are out of sample. Judged by the coefficients of age and age squared reported in Table 2, age is not influential enough to produce such extreme estimates so frequently. Similarly, no condemned properties' building areas and land areas are out of sample. Although properties with extremely large building and land area often received extreme compensations, many condemned properties that received extreme compensations have building or land area around the mean size of sold properties.[63]

Figure 6 further shows that the limitation of hedonic models is unlikely to be the sole reason for the extreme compensations. The *X*-axis represents the estimated fair market value, whereas the *Y*-axis is the sales price of sold properties or actual compensation of condemned properties. The dashed line marks where estimated fair market values equal sales prices or condemnation compensations. Each dot is a sale, and each cross is a condemnation settlement. The 68,503 sales cluster around the dashed line. In contrast, quite a few crosses are far above or below the dashed line, and thousands of sales share the same X-value (fair market value). Even if hedonic models cannot accurately estimate fair market value for certain types of properties, and condemned properties tend to be such types, one would not expect to find that the estimated fair market value of condemned properties is much more inaccurate than that of any sold properties.

Granted, one could further argue that the properties described above are blighted properties and that blighted properties are seldom transacted in the market but are often condemned. Thus, the extreme compensation

63. I also compare the summary statistics of condemned properties, sold properties with extreme sales price percentages, and sold properties without extreme sales price percentages. There is no obvious systematic difference between the former two data sets and the latter.

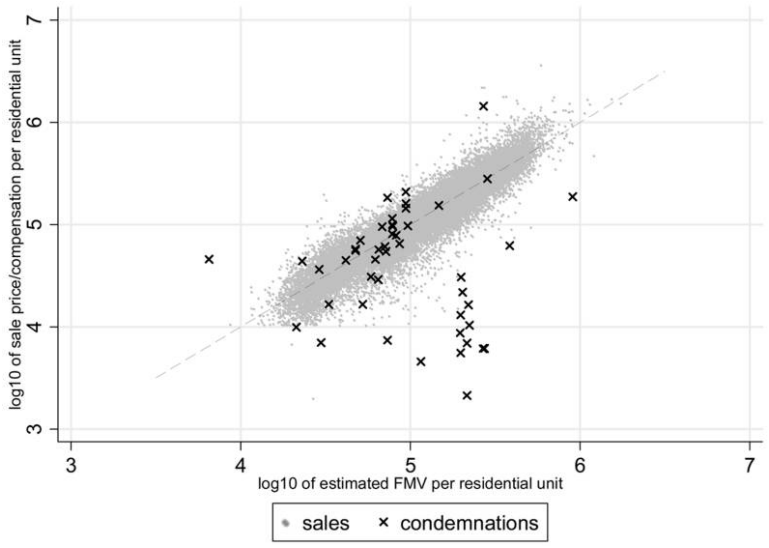

Figure 6. Estimated fair market value versus sales price for sold residential properties (N = 68,503) and compensation for condemned residential properties (N = 55).

percentages may not reflect problematic compensation practice but rather the inability of hedonic models to capture the low value of rarely traded blighted properties.[64] My response to this argument is that, first, this thesis can explain undercompensations but not overcompensations. Second, if the blight is a long-term census-tract-wise phenomenon, the hedonic regression models should have taken the effect into account. Third, urban renewal projects aim to revive blighted neighborhoods (N.Y. Urb. Renewal L. sec. 502), and many of these projects condemn properties; if blighted properties' real fair market value should be lower than what the hedonic models estimate, urban renewal projects should consistently give compensations lower than the estimated fair market value. However, unreported figures indicate that urban renewal projects are actually more likely to overcompensate condemnees than are any other type of projects (for example, Bluebelt or elementary school pro-

64. I thank an anonymous referee for this point.

jects).[65] Finally, if blighted properties are rarely traded, appraisers would also tend to make mistakes because of lack of comparable sales and experience in assessing such properties.

Now I turn to the question of why estimates of fair market value of condemned properties made by hedonic regression models would be more accurate than those made by appraisers. First, self-interest does not bias the hedonic regression models. Appraisers should treat appraisals for condemnations exactly as if they had been asked to assess the property for the purposes of a free-market sale, purchase, or mortgage.[66] Appraisers, however, assess condemned properties with the knowledge that their appraisals will be used for compensation. They know that they are hired on an ad hoc basis by the city government, which may want the assessments to be as low or high as the appraiser can reasonably make them. If appraisers want to be hired again by the city, they may adopt as conservative or extreme an estimate of value as possible (Aycock and Black 2008, pp. 53–54).[67] In addition, although condemnees are usually not repeat players, condemnees' attorneys are. Like the city government, attorneys could ask or hint to appraisers to push the appraised value to the limit. By contrast, my regression models do not suffer from the desire of continuous employment by the city or attorneys.

Second, the regression models are arguably more powerful and ac-

65. I also try to use other proxies for blighted properties, such as condemnation of contiguous land, tax default records in the 5 years before condemnation, and change of tax assessments before condemnation. I find that tax assessments are stable, and only two condemned residential properties have a record of tax default. In addition, there is no obvious difference in compensation percentages between condemned properties whose neighboring properties are also condemned and those whose neighboring properties are not condemned.

66. Daniel Sciannameo (telephone interview with the author, April 7, 2008), an experienced MAI appraiser, asserts that appraisers assume that sales prices reflect highest and best use. Therefore, the assessment method for sales prices and condemnation compensation should be the same.

67. Other incentives may also influence appraisers. Previous literature has suggested several behavioral models. For example, appraisers may sacrifice some accuracy of assessment to reduce their workload (Shavell 2004, pp. 129–30; Johnson 1989, p. 881). They may also deliberately inflate assessments to reduce the chance that their assessments will be challenged in court, where they will face cross-examination (Berger and Rohan 1967, p. 443). Appraisers may assess conservatively in difficult cases (Aycock and Black 2008, p. 54) because they do not want to lose their designations or reputations because of inaccurate assessments.

curate than appraisal techniques.[68] The comparable property sales that appraisers use to make their appraisals are limited in number, whereas the richness of my data and the nature of the hedonic regression model enable me to take into account tens of thousands of sales. In addition, in making the necessary adjustment in value to reflect the differences between comparable sales and the condemned property, appraisers make subjective decisions and may make honest mistakes because of inexperience, lack of information, insufficient care, or any number of other problems. In contrast, each coefficient of the regression models provides a sophisticated measure of how the free market values the housing characteristics. Hedonic models may not be perfect, but their limitations have been well exposed in the literature; thus, model users could know when to be cautious in application. In contrast, it is unclear under what circumstances appraisers tend to make biased assessments. Finally, although there is no literature on how often appraisers make accurate estimates, from the high R^2-values (Table 2) and the bell-shaped sales price percentages (Figure 3), we know that hedonic models produce highly accurate estimates of fair market value.

In sum, hedonic regression models generally are more accurate and unbiased than appraisers in estimating the fair market value of condemned properties. The slight differences in housing characteristics between sold properties and condemned properties cannot explain the drastic differences between sales price percentages and compensation percentages.

6. DISCUSSION

This section tries to explain why settled compensations often deviate from my estimated fair market value and why both parties still agree to settle, instead of going to court. I make two reasonable assumptions: in the beginning of the negotiation, a condemnee's appraised fair market value is higher than a condemnor's appraised fair market value (otherwise, the condemnee would have accepted the condemnor's initial of-

68. Practitioners have claimed that although regression analysis is frequently used by appraisers, "an experienced appraiser may be able to arrive at a value opinion with greater reliability (and cost effectiveness) by going directly to four or five 'good' sales that he or she 'knows' provide a high degree of comparability to a given parcel" (Chalmers and Sorrells 1994, p. 559). Daniel Sciannameo (telephone interview with the author, April 7, 2008) and James G. Greilsheimer (telephone interview with author, April 8, 2008) cast doubts on the use of regression models in appraising property value.

fer), and they will settle at a value within the range of the two appraised values.

At first, it seems puzzling that condemnees are willing to settle for extreme undercompensation instead of going to court.[69] It is also difficult to explain that the condemnor sometimes settles for extreme overcompensation and sometimes settles for extreme undercompensation. Nevertheless, the reason becomes clear after we take into account the fact that neither the condemnor nor condemnees know the hedonic models' estimated fair market value when they negotiate for settlements. Both parties compare the amount of proposed compensation with their own appraised market value to determine whether to settle. The alternative to settlement is litigating in court, but the court has no knowledge of the models' estimated fair market value either. Judges render decisions based on appraisal reports submitted by the two parties.

Therefore, the two parties settle because the condemnor's and condemnees' appraised values are close to each other and both parties earnestly consider their settlements as giving fair market value—even though fair market value estimated by the hedonic models is far above or below the amount of settled compensation. Indeed, an eminent domain attorney and a government lawyer both expressed the view that condemnees generally receive fair market value compensation in settlements.[70] If there is a wide gap between the two parties' appraised values, they may still settle in order to save litigation expenses, reduce the risk that the court would rule in favor of the other party, and so forth.

Why do settled compensations often deviate from the hedonic models' estimated fair market value? I argue that the appraisal methods are responsible for the deviation. If both parties' appraised values approximate fair market value estimated by hedonic models, settled compensation will not be extreme. If one or two parties' appraised values do not approximate such an estimated fair market value, settled compensation could be extreme. As discussed in Section 5.3, the appraisal methods are unsatisfactory as a compensation-determining tool because they

69. Owners should have incentives to sue instead of settle if their compensation percentages are much lower than 100 percent and their property value is high enough. Bench trials are likely to increase the compensation considerably. Contingent fees make litigation almost costless for condemnees. The prospect of 701 allowances would further increase the expected payoff of litigating (Em. Dom. Proc., sec. 701; Flower 2005b, p. 322; Michael Rikon (interview with the author, January 30, 2008). The high contingent fees of a high-value case should motivate some attorneys to bring the case to court.

70. Michael Rikon (interview with the author, January 30, 2008) and Lisa Bova-Hiatt (interview with the author, September 5, 2008).

can be biased by the condemnor's or condemnees' self-interest[71] and because they are subjective and inaccurate in nature. It is difficult to disentangle the two effects to determine which characteristic contributes more to the extreme compensations.

One might wonder whether there might be other explanations for extreme compensations. I have tested whether compensation percentages correlate with factors such as the size, age, or owner type (corporation or individual) of condemned properties, title-vesting year or month, length of settlement procedure (from title-vesting date to final decree date), public use after takings, or borough in which the condemned properties are located. My data do not reveal any distinctive pattern.

In sum, settled compensations often deviate from estimated fair market value because appraisal methods are bias prone and inaccurate. The condemnor and condemnees settle for extreme compensations mainly because they do not have the hedonic models' estimated fair market value as the benchmark value.

7. CONCLUSION

My empirical study of New York City's compensation paid in eminent domain settlements reveals that most condemnees are awarded compensation that differs from fair market value estimated by hedonic regression models. Some condemnees received much more than they were due under the fair market value standard, whereas others got much less. The compensation level does not correlate with any known factor with available data. The extreme compensation is the product of using bias-prone and inaccurate appraisal methods. The condemnor and condemnees are willing to settle for extreme compensation because they do not have the hedonic models' estimated fair market value as an objective benchmark value.

My findings can help policy makers shape better compensation policies. A Michigan-like stipulation that gives condemnees a 25 percent premium over fair market value, if implemented in New York City, would give overcompensated condemnees windfall gains (assuming fair

71. Generally speaking, the fiscal illusion theory (Dagan 2000, p. 138; Dana and Merrill 2002, pp. 41–46; Fischel 2004, p. 549) argues that a condemnor prefers to undercompensate a condemnee; the political interest theory (Levinson 2000, 2005) predicts that a condemnor would want to vary compensation levels according to, among other factors, the political influences of condemnees; and the ideology theory (Farber and Frickey 1991) indicates that the condemnor's ideology may influence the compensation level.

market value is the desirable normative criterion), while condemnees whose compensation percentages are below 80 percent would remain undercompensated. The priority for policy should be increasing the accuracy of takings compensation, not increasing takings compensation. To increase accuracy and reduce undesirable property value manipulation,[72] appraisers in New York City should consider using hedonic regression models to estimate the fair market value of condemned properties and using such estimated fair market value as a benchmark value or as a complement to appraisers' assessments. Because my data all come from the city, and my models are not secret, this could be the feasible first step to give condemnees their due.

To empower property owners, the city could be required to disclose to the condemnees the fair market value estimated by the regression and, if the initial offer is lower than the regression estimate, the reason why the offer deviates from it. Alternatively (or in addition), condemnees should be empowered to perform the regressions themselves. The city has already published all post-2002 sales data on the Department of Finance Web site.[73] If housing characteristics are also available, condemnees can run regressions themselves to gain more information about the possible distribution of the fair market value of their properties, so as to make more informed decisions whether to settle the case at the offered price or bring the case to court.[74]

Takings scholarship would benefit from more empirical studies on condemnation compensation. The debate between the fiscal illusion theory and the political interest theory, as well as various other inquiries such as whether property owners underinvest because of possible undercompensation, will be more informed and sophisticated with more understanding of compensation practices.

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72. For why accuracy is desirable, see Chang (2009a).

73. City of New York, Department of Finance, Property: Rolling Sales Update (http://www.nyc.gov/html/dof/html/property/property_val_sales.shtml).

74. In Chang (2009c), I empirically examine whether court-awarded eminent domain compensation tends to be more accurate.

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