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AN EMPIRICAL STUDY OF COMPENSATION PAID
IN EMINENT DOMAIN SETTLEMENTS:
NEW YORK CITY 1990 – 2002

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All errors, standard or not, are mine.

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Abstract

No large-scale empirical study on condemnation compensation has been done in the past thirty years. Yet several state legislatures, in response to the *Kelo* case, 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 condemned properties whose owners reached compensation settlements with the condemnor, New York City, between 1990 and 2002. More than 50% of these condemnees were compensated with less than FMV; about 40% received more than FMV; and less than 10% got FMV. Owners of residential properties and non-residential properties alike often received extreme compensations that are less than 50%, or more than 150%, of FMV. Condemnor's political interests and condemnees' ignorance of estimated FMV are the most likely explanations. Compensation level does not correlate with any factor with available data.

Keyword

Compensation, eminent domain settlement, fair market value,
hedonic regression model, New York City

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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 are only four more published studies in the past thirty plus years—either very small-scale (Guidry and Do 1998; Claurette, Kuhn and Schwer 2004) or *not* comparing eminent domain compensation with fair market value (Garnett 2006; Aycock & Black 2008). Hundreds of articles debating over 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% 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 (Michigan Constitution Art. X, §2 [amended 2006]). Indiana, Kansas, and Missouri also have passed laws to require at least 125% of fair market value as compensation in certain cases (Wyman 2007, p. 257 n. 61; Salkin 2006, pp. 10870-71). In New York State, where I will conduct the empirical study, three bills have been introduced in the New York State Legislature addressing the amount of condemnation compensation. Two of them propose that if a condemnee’s home is condemned 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% 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% of the highest approved appraisal” (New York State Bar Association Special Task Force on Eminent Domain 2007, pp. 28-37).² Yet these measures and proposals to increase condemnation compensation lack empirical foundation.

An empirical study on the relationship between condemnation compensation and fair market value³ can inform the scholarly discussions and policy proposals.⁴ Namely, findings of under- or over-compensation tell the 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 also would underpin (or weaken) the claims that the governments have taken inefficiently, as well as arguments that the incentives of landowners were distorted because compensation has been inaccurate.

In this paper, I attempt to fill the empirical gaps. I study New York City because there are numerous, well-documented sales and condemnations and data on them were

¹ The literature has lamented over lack of empirical research on eminent domain. *See, e.g.*, New York State Bar Association Special Task Force on Eminent Domain 2007; Pritchett 2005, p. 897).

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 article 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 over-compensation simply means (without value judgment) compensation lower or higher than fair market value.

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

available to me.⁶ The sale data set, from the New York City Department of Finance, includes all property sales in New York City from 1974 to 2005.⁷ 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 New York City Office of the Comptroller and from the records stored in the five County Courts⁸ in New York City.⁹ I employ hedonic regression models to estimate the fair market value of the condemned properties on which settled compensation were paid and compare the estimated fair market value with the actual compensation.¹⁰

I find that, in total, from 1990 to 2002, New York City paid \$17,311,176¹¹ to 89 condemnees owning residential properties in eminent domain settlements, while the sum of estimated fair market value of these 89 properties is \$21,173,198 — 23% higher than the settlement payment. 47 out of 89 condemnees (or 53%) were compensated with less than fair market value; 36 condemnees (40%) received more than fair market value; 6 condemnees (7%) got roughly fair market value. Furthermore, “compensation percentage” (actual compensation divided by the estimated fair market value) is not bell-shaped; 36 condemnees (40%) received extreme compensation payments — compensations that are higher than 150% or lower than 50% of fair market value.¹²

Note that the settled compensations that this article studies may not be representative samples of all condemnation compensations. I do not have data on compensations received by condemnees who fully accept the condemnor's initial offers; I do not use data on compensations adjudicated by court in this article, either. Distributions of compensation percentages may be different for settled compensations and non-settled compensations.

The takings literature is full of explanatory theories. The fiscal illusion theory and the ideology theory cannot explain why under- and over-compensation both happen frequently and why there are extreme compensations in both directions. The political interest theory, theoretically, provides a good account of my findings, but I do not have data to underpin this theory.¹³ Standard economic theory will describe condemnees as compensation-maximizing. Thus, the only reasonable explanation for condemnees to accept under-compensations is that condemnees and their agents (appraisers and attorneys) under-estimate condemned properties' fair market value. I have also tested

⁶ Lack of good, accessible data, I guess, is an important reason for the scarcity of this kind of empirical studies.

⁷ Because I am a Research Associate at the Furman Center for Real Estate and Urban Policy, New York University (hereinafter “the Furman Center”), and I have conducted the research on my doctoral dissertation under the supervision of its faculty, I had access to the Furman Center's databases.

⁸ New York (Manhattan), Bronx, Kings (Brooklyn), Queens, and Richmond (Staten Island).

⁹ Litigated cases will be analyzed in my next paper.

¹⁰ As for using hedonic model to estimate property value in New York City, *see, e.g.*, Schill, Voicu, and Miller (2007); Ellen, Schwartz, and Voicu (2007); Voicu and Been (2008); Ellen, O'Reagan, and Voicu (forthcoming). As for using hedonic model to estimate property value outside New York City, *see, e.g.*, Graves et. al. (1988); Curran and Schrag (2000); Ioannides and Zabel (2003); Coulson and McMillen (2007); McMillen (forthcoming).

¹¹ Property values used in this paper are all in 2005 dollar, except those used in describing the findings of prior literature.

¹² Throughout the paper, “higher than 150% of fair market value” means compensation percentage >155%; “lower than 50% of fair market value” means compensation percentage <45%. The difference arises from my definition of fair-market-value as compensation percentages between 95% and 105%.

¹³ See the definitions of these theories in Section 6.

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 (individuals or corporations), length of settlement time, and public use after takings. Their influences, however, are not large enough to be detected.

The paper is structured as follows. Section 2 reviews and criticizes 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 examines whether existing theories could explain my findings. Section 7 concludes.

2. LITERATURE REVIEW AND CRITIQUE

The first research (to my knowledge) empirically examining the relationship between compensation and fair market value was Munch's study (1973, 1976) on Chicago.¹⁴ Munch's research remains the only large-scale¹⁵ empirical study on this issue.¹⁶ In this section, I describe Munch's research, point out the flaws of her methodology and criticize her explanations for the results she found.

¹⁴ Burger and Rohan (1967) have conducted an empirical study on Nassau County, NY from 1960 to 1964. They compare the amount of settled compensation with the two *assessed value* by appraisers (who were commissioned by the condemnor agencies), finding that in 84% of 1,221 settlements, the compensation condemnees received was less than the lower one of the two assessed value; in 57% of the settlements, the compensation was lower than 90% of the lower assessed value. In addition, they have 127 court-adjudicated cases. 50% of them got the lower assessment as compensation. 41 cases (32%) receive *higher* than the lower assessment, but in 17 of these 41 cases (42%), the court awards were still lower than the higher of the two assessed value.

¹⁵ Claurette, Kuhn, and Schwer (2004) conducted an empirical study on condemnations in Clark County, Nevada. They have 60 takings cases and 374 comparable sale cases. They ran separate hedonic regressions for takings cases and sale cases; the dependent variable is the appraised values (in cases of takings) or the sale prices (in cases of sales). They found that government appraisers valued some hedonic characteristics differently from the market. This article also used a method that is essentially the same as Munch's (using first a multivariate regression then a bivariate regression), concluding that the compensation appraisals are on average 17% above 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, CA (all cases between April 1991 and October 1991) in a simple hedonic regression model (including only 8 variables) to test whether condemnees were compensated with fair market value. They concluded, "Home purchased by [the government] sells on the average for 4.71% more than homes that are sold through standard negotiated sales." The problem of this research is that it does not compare condemned properties' compensation with *their own* fair market value; rather, it compares condemned properties' compensation with sold properties' sale prices.

¹⁶ 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) is 157% of the average appraised value of the condemned properties.

Aycock and Black (2008) compared the condemnors' offer with special master's appraisals and the final payments, but they only have 16 cases (mostly partial-taking cases).

Using a large dataset of condemned properties for road-building in all 50 states from 1991 to 2005, Kades (2008) examines what factors determine "when governments abjure negotiations with landowners and invoke their condemnation power."

2.1. Munch's Empirical Study on Chicago

Munch's study examined whether condemnation compensation paid to condemnees approximated market value. Munch employed unpublished data of condemnation compensation paid in 798 cases in three large urban renewal projects in Chicago during 1962–1970. 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 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. Munch used data on 1,200 comparable sales in Chicago in 1968–1972 to estimate market value for each condemned property. Munch 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 “[a]s a rough approximation, a \$7,000 parcel receive about \$5,000, a \$13,000 property breaks even and a \$40,000 property may get two or three times its market value.”¹⁷ In 432 of the 798 cases, Munch also knew whether the condemnees settled (in or out of court) or they litigated and got 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 higher in court than in settlement.¹⁸

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 cannot adjust the quality of lawyers according to the stakes of the cases — as the condemnees would do. Therefore, condemnor's lawyers will be “relatively more effective” than condemnees' in low-value cases. Similarly, the former will be less effective than the latter in high-value cases (see Bell and Parchomovsky [2007, p. 889] for an elaboration of this point).

Second, in urban renewal projects, most land parcels are homogenous and relatively low-valued (see Posner [2003, p. 60] for an elaboration of this point), while the high-valued parcels are more individual in character. Compensation paid for the low-value, homogenous parcels carry more weight as precedent. Thus, the condemnor does not want an over-compensated 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.”

Third, litigating has high fixed costs; thus, owners of low-value properties have fewer incentives to sue than owners of high-value properties do. Finally, Munch explained her finding that courts were even further off the mark by noting the possibility that assessors or judges had been bribed.

¹⁷ The average estimated fair market value of Munch's cases is approximately \$12,000. The minimum is \$6,125, while the maximum is \$36,350. I do not convert these three numbers into 2005 dollars.

¹⁸ For the court regression, the intercept is -15.68 and the β is 2.65. For the settlement regression, the intercept is -4.27 and the β is 1.48.

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. On 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 one-family house or an apartment. It is thus unsurprising that the R-squares of the models are only between 0.18 and 0.46.¹⁹

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.²⁰ Thus, using tax assessments in the regression may bias the result. Moreover, in cases where other necessary information of the comparable sales is not available, Munch used tax assessments alone "as a proxy for market value," probably exacerbating the inaccuracy problem.

Third, Munch used comparable sale data 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,"²¹ thus less reliable.

Munch's method to compare 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 receive 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. She should have used descriptive statistics (such as "compensation percentage," which I use in this paper) to compare the 798 pairs of estimated fair market value and actual compensation; at least she should have counted the number of over-/under-compensations.

Munch's explanations for the empirical results are also not very satisfactory. The explanation of over-compensation 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 high-value property owners hire.²² 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 can work 10 hours on a low-valued property case and work 40 hours on a high-valued property case, instead of

¹⁹ Munch ran a regression for each urban renewal project; in addition, she used both the comprehensive model described in the text and a simplified model. Thus there are several R² reported.

²⁰ New York City's tax assessments are inaccurate for these reasons. See Independent Budget Office (2007). It is unclear how inaccurate tax assessments are in the City of Chicago in 1970s. New York City's experience at least caution us not to treat tax assessments as accurate reflection of fair market value.

²¹ "[A] forecast is a prediction about the values of the dependent variable, given information about the explanatory variables...*ex 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). *Accord* Rubinfeld (2000, p. 223).

²² If there are very capable as well as less talented governmental lawyers (not homogeneous), the agency can assign the former lawyers to high-value property cases, to match with the very capable lawyers hired by high-value land's owners, and assign the latter lawyers to low-value property cases. If governmental lawyers are all very capable, not mediocre, they will not be under-qualified for any type of cases. At least in the case of New York City, government lawyers seem to be neither homogenous nor mediocre. From 1994 to 1997, over 20% of the new appointees in the New York City Law Department had attended top-ranked law schools; the statistics before and after that period are similar (Nelson 2008, pp. 318-19).

working 25 hours on every case.

Munch's argument also does not explain why the government would offer higher-than-fair-market-value to owners with more skillful lawyers.²³ If the court or the jury only awards condemnees fair market value, the government can deter most of them from litigating by offering fair market value or slightly more than fair market value.²⁴ The offer, however, is unlikely to be two or three times the fair market value, as Munch found, unless there is some reason to believe that the court or the jury would be prone to award drastic over-compensations just because especially able counsels represent property owners.

The case for under-compensating low-value property owners 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 compensation (to establish an administrative precedent);²⁵ it does not explain why the court or the jury will 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 previously-taken properties is simply 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 low-value property owners tend not to sue because of the high fixed cost of litigation. This is plausible. Nevertheless, in order to explain why the government offers low-value property owners with lower than fair market value compensation in the first place, certain assumptions about government officials' behavior are necessary. For example, the fiscal illusion theory will argue that the goal of government officials is to reduce budget outflow (see Section 6.1); thus, the government will low-ball 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.²⁶

3. NEW YORK CITY EMINENT DOMAIN PRACTICE

3.1. Eminent Domain Procedure²⁷

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

²³ One possibility is that it has nothing to do with lawyers. Rather, high-value property owners are rich and have political clout. They can ask their aldermen to pressure the government agency for a higher compensation. I owe this point to Prof. Geoffrey Miller.

²⁴ Granted, owners of high-value properties may think of fair market value (or slightly more than it) as under-compensation, but if they know that the court will only grant 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 get away with litigation.

²⁵ Besides, at least in the case of New York City from 1990 to 2002, urban renewal project did not tend to condemn low-value properties (figures unreported), as Munch argued. As Table 4 Panel B shows, properties condemned for urban renewal projects can hardly be described as "homogenous."

²⁶ I thank the anonymous referee of CELS 2008 for pointing out that the possibility of bribing Chicago officials in the 1960s and 1970s was common knowledge then, thus needing no proof.

²⁷ There are two eminent domain procedures in New York State. The State's eminent domain action is called "appropriation," while eminent domain action by other entities such as Empire State Development Corporation and New York City is called "condemnation" (N.Y. Eminent Domain Procedure Law § 402; Goldstein and Goldstein 2008a). I focus on the condemnation procedure in the paper.

required appraisal procedure. In practice, if the city needs certain properties for public use, the city's Department of Citywide Administrative Services does a pre-vesting appraisal and the city uses this appraised value to negotiate with the property owners, trying to reach a voluntary deal. If negotiation fails, the city then begins the eminent domain procedure. The city's Law Department commissions an independent appraiser²⁸ to appraise the property value (Bova-Hiatt 2008; Salvatore 2007a, 2007b). The city uses the "highest approved appraisal" as its initial offer to the condemnee (N.Y. Eminent Domain Procedure Law § 303; Goldstein 2008).

The condemnee then has 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 (N.Y. Eminent Domain Procedure Law § 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 Supreme Court (N.Y. Eminent Domain Procedure Law §§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). The condemnees usually only accept the initial offer as advance payment; the city will then start negotiating settlements with condemnees (Salvatore 2007a, 2007b).

If the city and the condemnee fail to work out a settlement, either party can petition the Supreme Court to put the case on the trial calendar.²⁹ New York is the only state that does not provide the parties the option of jury trials (Goldstein and Rikon 2000; Rikon 2005b);³⁰ all condemnation suits in New York are bench trials (N.Y. Eminent Domain Procedure Law § 501).

3.2. Compensation Standard

The United States Constitution and the New York State Constitution both employ the term "just compensation" as the standard for condemnation compensation.³¹ 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 fair market value of properties (*Keator v. State of New York*, 23 N.Y.2d 337 [1968]),³² 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*

²⁸ The city is required to hire independent appraisers to assess property value for condemnation compensation purposes (N.Y. Eminent Domain Procedure Law § 302).

In all federally financed takings, two appraisals by competent, independent appraisers are required (Goldstein and Rikon 2003).

²⁹ There is no statute of limitation as to when an eminent domain case should go to court. That is to say, even after, say, ten years of settlement negotiations, each party can decide to stop negotiating and start litigating (Bova-Hiatt 2008). Bova-Hiatt is Deputy Chief, Tax & Bankruptcy Litigation, New York City Law Department.

³⁰ The U.S. Supreme Court has held that the Seventh Amendment does not provide condemnees with jury trial right (Peterson 2006).

³¹ The Fifth Amendment of the United States Constitution stipulates that "nor shall private property be taken for public use, without just compensation." U.S. CONST. amend. V.

Article 1, Section 7(a) of the New York State Constitution stipulates, "[p]rivate property shall not be taken for public use without just compensation." N.Y. CONST. art. I, § 7(A).

³² 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.

Nassau v. Colony Beach Club of Lido, Inc., 349 N.Y.S.2d 422 [1973]).³³

The term “highest and best use” means that a condemned property must be valued on 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 re-zoning, 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).

3.3. Compensation Appraisal Method

New York City commissions independent real estate experts with “MAI designation”³⁴ to appraise properties the city wishes to condemn.³⁵ These appraisers, as well as condemnees’ appraisers, usually use the comparable sale approach (also known 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 2003, p. 417). Appraisers use 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).

“Case law has held that appraisers have broad discretion as to their methods and sources of information” (Rikon 2005a). When using 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).³⁶

³³ 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). In addition, the condemned properties are valued as if they are “free and clear of all liens, encumbrances and leases” (Rikon 2007).

³⁴ “MAI stands for Member, Appraisal Institute. The Appraisal Institute is an international membership association of professional real estate appraisers.” MAI designation, the most prestigious designation awarded by Appraisal Institute, “is held by appraisers who are experienced in the valuation and evaluation of commercial, industrial, residential and other types of properties” See Appraisal Institute (2007), <http://www.appraisalinstitute.org/about/designations.asp> (last visited Sep.10, 2007); Real estate appraisal—MAI designation—MGMiller Valuations, <http://www.mgmiller.com/MAIdesignation> (last visited Sep.10, 2007).

³⁵ When the city needs an appraisal, a city lawyer in charge of a specific case will suggest about three MAI appraisers who are experienced in the neighborhood to NYC’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 pre-approved 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; three are attorneys practicing tax law (Bova-Hiatt 2007, 2008).

³⁶ 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—though tax assessments are not controlling, they may be considered “along with other evidence of value” (quoting *Matter of City of New York (East Harlem)* (392 N.Y.S.2d 245 [1976])).

Nevertheless, one should not over-emphasize the role of tax assessments in appraisal practice. *First*,

4. ESTIMATING FAIR MARKET VALUE

This article 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 of estimating fair market value and discuss potential methodological challenges. In the next section, I compare estimated fair market value with actual compensation.

4.1. Hedonic Regression Models

I use hedonic regression models³⁷ with robust standard errors to estimate the fair market values for condemned residential properties on which settled compensation were paid.³⁸ The dependent variable in the regression is the natural log of sale prices of properties.³⁹ 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, as well as interaction terms of time and location, in the right-hand side of the regression equation. The model takes the following form:⁴⁰

$$\ln P_{it} = \alpha + \beta H_i + \delta CT_i + \theta L_t + \rho CD * year + \varepsilon_{it}$$

tax assessments are only *one* of the many factors, and the mainstream case law still stresses that it is *not* market value. See, e.g., *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 upon its actual use. See, e.g., *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 [1967]).

Michael Rikon goes on to argue, "[g]enerally, tax valuation is irrelevant" (Rikon 2007).

³⁷ "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).

³⁸ I use 1990–2002 sale prices to estimate 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 "ex ante forecast" employed by Munch (see Section 2.2). For ex post forecast, see Rubinfeld and Steiner (1983); Rubinfeld (2000).

³⁹ Using the natural log form of sale prices as the dependent variable is quite popular in the hedonic model literature (e.g., Coulson and Leichenko 2001, p. 117).

⁴⁰ My model does not directly control for rent regulation for several reasons. *First*, researchers have found that stabilized rent in New York City subsidizes mainly residents in Lower- and Mid-Manhattan and Bronx. The median subsidy in Queens and Staten Island is zero (Pollakowski 2003). *Second*, only rental units containing more than six units could be rent-regulated (not all of them were). Part of the effects, thus, should have been captured in the housing dummies I used; census tract fixed effect 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 NYC housing market, using a similar model to mine, also consider the effect of rent regulation not influential on the regression results (Ellen, Schwartz, and Voicu 2007; Voicu and Been 2008, p. 258 n.34).

where $\ln P_{it}$ is natural log of sale prices of property i at time t ;⁴¹ H_i is a vector of property-related characteristics; 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; 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.⁴² The coefficients to be estimated are α , β , δ , θ , and ρ ; ε is an error term.

Property-related characteristics, H_i , include the following structural characteristics of properties: natural log of building area per residential unit (or total land area); age of building and its square; 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, a garage, or commercial activities; whether there is major alteration before sale; and twelve dummies specifying the property's building class.

The coefficients of the independent variables measure the *average* effect of the hedonic characteristics, time, or location on the *average* sale price (Rubinfeld 2000, pp. 208-10).⁴³ The fair market value estimated by hedonic regression models (using the least-square technique) is the “best” (unbiased, consistent, and efficient; see Rubinfeld [2000, p. 213]) prediction of the *average* sale price that the condemned properties can command if voluntarily sold.

As a robustness check on my findings, I also examine condemnation settlements regarding 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 indicated the sub-types of commercial properties. The regression models for vacant land — constrained by the nature of the property — only use land area, irregular shape, and street corner location as property-related characteristics.

4.2. Data on Sales

I use three data sets.⁴⁴ The first data set, compiled by the NYC Department of Finance, contains all property sales (except co-op sales) over the period 1974–2005.

⁴¹ $\ln P_{it}$ 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 (e.g. 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 regarding building area per residential unit; using Model 2's specifications will allow me to estimate fair market value of these condemned properties. In addition, I use Model 2 as a robustness check for Model 1.

⁴² 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 degree of freedom and cause high multicollinearity.

⁴³ Bayer, Ferreira, and McMillan (2007) indicate that if the variable measures attributes that are in limited supplies (such as Central Park view), 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.

⁴⁴ Because I am a Research Associate at the Furman Center, and I have conducted the research on my doctoral dissertation under the supervision of its faculty, I had access to databases it had been given by NYC Department of Finance.

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);⁴⁵ (2) sales in community districts in which there is 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 has 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 are more than 5,000 dollars. I imposed those limitations in order to pick out genuinely sold properties that are comparable to condemned properties on which settled compensation were paid in terms of time, location, and housing characteristics. 74,879 residential sales of 19 two-digit building classes in 20 (out of 59) community districts are selected.

The second data set, the Real Property Asset Database (known as RPAD), compiled by NYC Department of Finance, contains building class, building characteristics, land area, and tax assessment of each property in New York City for each year between fiscal year 1984 and fiscal year 2004 (that is, from July 1st, 1984 to June 30th, 2005).⁴⁶

The third data set, the Open Balance File (known as OBF), compiled by NYC Department of Finance, contains property tax violations and the amount of unpaid taxes of all properties from the early 1900s until the present. I used 1985–2002 data to check whether condemned properties on which settled compensation were paid had been in tax default before condemnation.

The first column in Table 1 provides summary statistics of the sales used in the hedonic regression models.

4.3. *Regression Results*

Table 2 provides selective regression results for hedonic models using residential property sales. The signs of most coefficients in my principal model (Model 1 in Table 2) are as expected and consistent with prior literature that uses the same data set for hedonic regressions (e.g., Voicu and Been 2008).⁴⁷ For a continuously measured variable in natural logs, such as residential unit size, its coefficient represents the percentage change in property value corresponding to a one 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 sale price with a unit change in the independent variable. For a dummy variable, such as land irregular shape, its 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 of the principle model, 0.87, is higher than the R^2 in prior literature using hedonic regression models and non-NYC data (e.g., Curran and Schrag 2000; Ioannides and Zabel 2003; Coulson and McMillen 2007; McMillen, forthcoming). The R^2 approximates the R^2 found by articles using hedonic regression models to capture the property sale prices in New York City (Schill, Voicu, and Miller 2007; Ellen,

⁴⁵ I do not find condemnation settlements regarding residential properties in 2002, so residential property sales, as well as other relevant data, in 2002 are excluded. I use 2002 data for commercial properties and vacant land.

⁴⁶ 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 RPAD 1999 and RPAD 2003 if RPAD 1990 lacks data thereof. In the few cases of difference in these two sources, I usually use RPAD 2003.

⁴⁷ The coefficient for “number of building of same lot” is expected to be negative (as found in Voicu and Been 2008) while in my regression it turns out positive and statistically significant at 0.1 level.

Schwartz, and Voicu 2007; Voicu and Been 2008). Besides, the signs of most coefficients in the complementary model (Model 1 in Table 2) are as expected and consistent with prior literature (see the survey article by Sirmans, Macpherson, and Zietz [2005]). The R^2 , 0.64, falls within the range of R^2 found by the above-cited papers using non-NYC data.

Table 3 provides selective regression results for hedonic models using commercial sales and vacant land. The signs of most coefficients in Model 1 and Model 2 (regarding commercial sales) in Table 3 are as expected and consistent with prior literature that uses the same data set for hedonic regressions (Ellen, Schwartz, and Voicu 2007). The signs of most coefficients in Model 3 and Model 4 (regarding vacant land sales) in Table 3 are as expected.⁴⁸ The R-squares, from 0.79 to 0.93, 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 the property. The New York City Office of the Comptroller keeps records of every eminent domain *settlement* in the city, if the city is the condemnor.⁴⁹ 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 corporation), borough, block, and lot of the condemned properties (I acquire other characteristics of

⁴⁸ The Furman Center has not done research on vacant land, and there seems to be no consensus in the literature on how to model vacant land value. For example, Preiser (1987) has used 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 in 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 the census tract fixed effects and CD*year fixed effects. My data sets do not include the distance to central business districts or the types of roads properties front. Judged by accuracy, Preiser's model is not very satisfactory — the R-squares, below 0.6 in all but one model, are much lower than the R-squares of my models.

Cunningham's study (2006) 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, distance to CBD," as independent variables, in addition to lot size and odd shape, both of which I use in my model. In New York City, erosion, landslide, flood, etc. seems to be of lesser concern, or of low variability. Thus, not using these variables should not be a problem. The R-square of Cunningham's OLS model is only 0.2.

Dye and McMillen (2007) uses sale 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 or vacant land condemnations in my data set have been vacant for some time, so usually I was not able to ascertain the housing characteristics of the properties before they become vacant land. Moreover, Dye and McMillen (2007) uses this kind of model because they do not have enough vacant land sales, which I do have.

⁴⁹ Therefore, condemnations of which New York State, MTA, Port Authority, etc are condemnors are not included in my data set. These public entities' compensation practices may differ from those of New York City agencies. According to Rikon (2008c), New York State Development Corporation's initial offers to condemnees are usually higher than those proposed by New York City agencies. Rikon is Partner, Goldstein, Goldstein, Rikon, & Gottlieb, P.C.

these properties from RPAD).⁵⁰ I collected data on settlements between 1990 and 2002 from the Office of the Comptroller documents.⁵¹

In order to collect data on court-awarded condemnation compensations, I personally visited the five County Courts in New York City, and retrieved files regarding all types of condemnation disputes in this period. I also collected data on settlements, in case Comptroller Office's records are not comprehensive. Most of the settlements on the court's records can also be found in Comptroller Office's records. However, 40 settlements were contained in the courts' records, but not in the Comptroller Office's records. I included these 40 settlements in the dataset.⁵²

There are in total 430 fee⁵³ condemnation settlements during this 13-year period, as shown in Table 4.⁵⁴ Panel A shows the number of four types of condemned properties for which settlements were reached (residential, commercial, vacant land, or others). One-half of the total condemnation settlements are vacant land (zoned-residential and not-zoned-residential vacant land combined), and a quarter of them involve residential properties (five sub-types — one-family dwelling, two-family dwelling, walk-up apartment, multiple-use residence, and loft building). Most of the others are retail and industry properties.

Panel B in Table 4 breaks down the data by borough/county, showing that Brooklyn and Staten Island account for 72% of the settlements. Panel A and Panel B also exhibit the number of settlements in six types of public projects. About one-half of

⁵⁰ The record also includes the actual payment date and the amount of advance payment (the latter is hand-written and often illegible). I did not code them. The attorneys representing condemnees are also recorded in the documents. I only coded about half of them. In 182 out of 193 settlements, condemnees hired attorneys. In those 11 settlements that condemnees are (or seem to be) self-represented, the property values are small — the most valuable property is worth only about 68,000 dollars

Bova-Hiatt (2008) estimated that about 85%–90% of condemnees who have negotiated settlements hire attorneys.

In about 70% 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 laws).

⁵¹ Most of the condemnations after 2002 have not reached a settlement yet. (I have found only 2 settlements in 2003 and 1 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, while some settlements take more than 10 years. According to United States Government Accountability Office (2006), “[i]n 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, thus not included in my data set. This could also explain why there is a significant drop in the number of settlements after 1998.

⁵² With or without these 40 settlements, my findings are essentially the same.

⁵³ In 38 of the 430 settlements, the city condemned “land and improvement,” which is equal to “fee” (Salvatore 2007b). Salvatore is Chief of Division of Real Property, New York City Office of the Comptroller.

⁵⁴ There are also 145 fixture—for example, machinery—condemnation settlements in Comptroller Office's records. I cannot use fixtures in later analysis, because I have neither data nor other objective standards for fair market value of fixtures. There are also 10 settlements that pay lump-sum compensation to fee and fixture. They are not used in the regressions, because I have no way to figure out how much of the compensation should be assigned to the fee.

A classical definition of fixture is “a thing of an accessory character annexed to houses or lands which become, immediately on annexation, part of the realty itself” (Rikon 2008a). “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 [2007]).

the properties in my data were condemned for urban renewal projects (most of which in Brooklyn) and about 30% of them for Bluebelt project in Staten Island (the Bluebelt project predominantly condemned vacant land).⁵⁵

In the following, I will 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. Column 2 in Table 1 provides summary statistics on the 104 residential property settlements used in the regressions.⁵⁶ Comparing the characteristics of selected sold properties with those of the condemned properties, I find that condemned properties tend to be less valuable, a little larger in size, older, less likely to be a four-or-fewer family house, more likely to have commercial activities in the building, and over-represented in Brooklyn.

5.2. Finding

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 “compensation percentage,” which equals the actual compensation divided by the estimated fair market value. A compensation percentage of 100% means that the compensation paid equals the hedonic regression model’s estimation of the property’s fair market value. I provide a 5% margin of error, and only classify settlements in which compensation percentages are between 95% and 105% as fair-market-value compensation. Settlements in which compensation percentages are below 95% are dubbed under-compensation; above 105%, over-compensation.

Figure 1 shows the distribution of compensation percentage for 55 residential properties. Less than 10% of the condemnees were compensated with fair market value. Approximately one-half of the condemnees received “extreme compensation” — compensations that are 50% higher than, or 50% lower than, fair market value. The top figure shows results derived from my principal hedonic regression model (Model 1 in Table 2), while the bottom figure shows results derived from my complementary model (Model 2 in Table 2). The two figures show only slight differences in compensation percentages, suggesting that my finding is robust (not greatly affected by different specifications of the hedonic regression models).

The rest of the observations have missing information regarding 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 by the complementary model are similar to those by 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 2. Figure 2 reveals similar patterns as Figure 1 — less than 10% of condemnation compensations for residential properties are at fair market value; about 40% of them are above 150% or below 50% of fair market value;

⁵⁵ Bluebelt, a Staten Island-specific program, is “a system of streams, ponds, and wetlands managed by New York City Department of Environmental Protection for storm water management purposes.” See http://www.stormcon.com/sw_0106_staten.html (last visited Feb. 2, 2008).

⁵⁶ The summary statistics (Table 1) and hedonic regressions (Table 2) exclude two observations of condemned loft buildings because of the small number of the observations and the potential effects on regression estimates.

under-compensated properties slightly outnumber over-compensated ones.

Table 5 shows that even though on average the compensation percentage is very fair (101%), some condemnees received more than their due while others received far less. The median estimated fair market value for under-compensated residential properties is almost \$200,000 and their owners were under-compensated for more than \$100,000. The average compensation percentage is only 44%. The median estimated fair market value for over-compensated residential properties, about \$190,000, is slightly lower than under-compensated ones. Nevertheless, median over-compensation for such properties was more than \$80,000. The average compensation percentage is 176%.

Figure 4 shows the compensation percentages of condemned commercial properties;⁵⁷ Figure 5 shows those of condemned vacant land. Both figures indicate a similar pattern that condemnees received extreme compensations.⁵⁸ Table 5 also provides statistics on the magnitude and distribution of over-, under-, and FMV-compensation for condemned commercial properties and vacant land.

Readers should interpret my findings with two important caveats in mind. First, the settled condemnation compensations, which I examine in this paper, are not representative samples of all condemnation compensations. Some condemnees accept the condemnor's initial offers as full payments (called "accepted compensations" hereinafter). Data on accepted compensations are not available. Nevertheless, it should be reasonable to infer that accepted compensations should approximate or surpass fair market value; otherwise, the owners would have incentives to accept the initial offers as only advance payments and negotiate for settlements or go to court. Even if accepted compensations are below fair market value, at least they, as compared to initial offers extended to condemnees who choose to negotiate for settlements, should be closer to fair market value. The initial offers, however, are not the final compensations for condemnees who negotiate with the condemnor. They may end up getting more or less than fair market value.

In sum, initial offers extended to condemnees who accept them can be systematically better-compensating than those extended to condemnees who dispute them. Nevertheless, accepted compensations are not necessarily better-compensating than settled compensations. Condemnees who fully accept initial offers could be compensated differently from condemnees who negotiate for settlements.

Besides, sometimes settlements cannot be reached and the court adjudicates condemnation compensations. Condemnees who receive court-awarded compensations

⁵⁷ The distributions of compensation percentages of commercial properties are surprisingly not robust. If the hedonic regression models for commercial properties (Model 1 and Model 2 in Table 3) use land area instead of building area as the major independent variable, many settlements' compensation percentages will change from >150% to <50%. That is to say, building area model and land area model, while their R^2 are similar, produce drastically different estimates of fair market value. Nevertheless, both models indicate that most condemnees received extreme compensation—only that one model suggests that the compensations are too high and the other suggests that the compensation are too low. I choose to present results based on building area model because it is the standard specification (Ellen, Schwartz, and Voicu 2007).

⁵⁸ I am less confident in the findings regarding commercial properties and vacant land. Unreported figures similar to Figure 3 using commercial properties or vacant land reveal that outliers are not few. This makes it less prudent to rule out the possibility that it is the omitted variable bias that results in the extreme compensation percentages (especially because the estimates by the reported hedonic models regarding commercial properties are not very robust).

could be compensated differently from condemnees who receive settled compensations. Thus, my findings for settled compensations may not be generalizable to non-settled compensations.

The second caveat is that throughout this paper I follow the appraisers' practice (Sciannameo 2008), assuming that in New York City the real estate market is so efficient that sale 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.⁵⁹ In condemnation compensation appraisal, the property should be assessed as if it is free and clear of all liens, encumbrances and leases (Rikon 2005a),⁶⁰ while in ordinary transactions, the sale prices will take the leases into consideration. Appraised value for condemnation compensation (i.e. value of highest and best use), then, should be not lower than sale prices.⁶¹ Thus suppose that condemnation compensation appraisers assess the highest and best use accurately and that my regression models capture sale prices well but treat properties with and without leases the same, my regression model can only *under-assess* highest and best use, thus tending to conclude that condemnees are *over-compensated*. The readers could 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 upon 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 2 shows the accuracy of the estimation by hedonic models on sale prices. The dot and lines indicate the "sale price percentage," which is the sale price divided by fair market value estimated by the principal hedonic model. Almost one quarter of the sale prices equal estimated fair market value; almost 60% of the sale prices are within

⁵⁹ Federal relocation assistance could also cause troubles. In the markets, sellers will take the expenses of relocation into their consideration, but they may not be able to force the buyers to share this type of expenses.

By 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 et. seq.) requires that condemners give condemnees, among others, "actual, reasonable and necessary" relocation assistance (Garnett 2006, pp. 121-23; Goldstein and Goldstein 2008c).

Though federal funds are rarely involved in New York City's condemnation projects (Bova-Hiatt 2008), according to Greilsheimer (2008), depending on negotiation, relocation compensation can be compensated separately or included in the lump-sum settled compensation. Note that according to Bova-Hiatt (2008), however, relocation assistance is paid separately.

My data do not indicate whether a settled compensation includes relocation expenses or not. Because the estimated value by my regression models do not include relocation expenses, some over-compensation could be attributed to the inclusion of relocation compensation. Note, however, that the under-compensated settlements are equally likely to receive relocation compensation, meaning that in such occasions the extent of under-compensation for the property value could have been *under-estimated*.

⁶⁰ By contrast, in assessing property value for sales, appraisers will take the existence of leases into consideration (Sciannameo 2008).

⁶¹ This problem can be solved if there are data on the existence of leases at the time of sales, but such data are not available.

15% of estimated fair market value. The bell-shape distribution of the sale price percentages is a striking contrast to the “bimodal distribution”⁶² of the compensation percentages, shown as bars in Figure 2.

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

Therefore, the methodological challenges boil down to whether the hedonic models systematically mis-estimate 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 building on the same lot are continuous variables. Number of building on the same lot seldom varies (in about 99% 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 square 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 area and land area often received extreme compensations, many condemned properties that received extreme compensations have building area or land area around the mean or median size of sold properties.⁶³

Figure 3 further shows that the limitation of hedonic models is unlikely to be the sole reason for the extreme compensations. The X-axis in Figure 3 represents the estimated fair market value, while the Y-axis is the sale price of sold properties or actual compensation of condemned properties. The upward-sloping dash line marks where the estimated fair market value equals the sale price or condemnation compensations. Each small dot is a sale, while each cross is a condemnation settlement. The 68,503 sales/dots clustered around the dashed line. By contrast, quite a few crosses are far above or below the dash line and thousands of sales/dots that 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 are much more inaccurate than that of *any* sold properties.

Granted, one could further argue that the certain types of properties described above are blighted properties, and that blighted properties are seldom transacted in the market but are only condemned. Thus, the extreme compensation percentages may not reflect problematic compensation practice, but 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 only explain under-compensations but not over-compensations.

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

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

⁶⁴ I thank an anonymous referee for this point.

Second, if the blight is census-track-wise, the hedonic regression models should have taken the effect into account. Third, urban renewal projects aim to revive blighted neighborhood (N.Y. Urban Renewal Law § 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 figure indicates that urban renewal projects actually are more likely to over-compensate condemnees than other types of projects (like Bluebelt or elementary school project).⁶⁵ Finally, if blighted properties are rarely traded, appraisers would also tend to make mistakes, for lack of comparable sales and experience in assessing such properties.

Now I turn to the question why estimates of fair market value of condemned properties by hedonic regression models would be more accurate those by appraisers. First, self-interests do not bias the hedonic regression models. Appraisers should treat appraisals for condemnations exactly as if they, instead, 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/high as the appraiser can reasonably make it. If appraisers want to be hired again by the city, they may adopt as conservative/extreme an estimate of value as possible (Aycock and Black 2008, pp. 53-54).⁶⁷ By contrast, my regression models do not suffer from the desire of continuous employment by the city.

Second, the regression models are arguably more powerful and accurate than appraisal techniques.⁶⁸ The comparable property sales that appraisers use to make their appraisals are limited in number, while the richness of my data and the nature of the hedonic regression model enable me to take into account tens of thousands of sales. Additionally, in making the necessary adjustment in value to reflect the differences between the comparable sales and the condemned property, appraisers make subjective decisions and may make honest mistakes because of inexperience, lack of information, insufficient carefulness, or any number of other problems. By contrast, each coefficient

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

⁶⁶ Sciannameo (2008), an experienced MAI appraiser, asserts that appraisers assume that sale prices reflect highest and best use. Therefore, the assessment method for sale prices and condemnation compensation should be the same.

⁶⁷ Other incentives may also influence appraisers. Previous literature has suggested several behavioral models of appraisers: They may sacrifice some accuracy of assessment to reduce their workload (Shavell 2004, pp. 129-30; Johnson 1989, p. 881). They may deliberately inflate assessments to reduce the chance that their assessments will be challenged in court, where they will face cross-examination (Burger and Rohan 1967: 443). An appraiser 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.

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).

Sciannameo (2008) and Greilsheimer (2008) both cast doubts on the use of regression models in appraising property value. Sciannameo is President, Albert Valuation Group New York, Inc. Greilsheimer is Counsel, Kramer Levin Naftalis & Frankel, LLP.

of the regression models provides sophisticated measure of how the free market values the housing characteristics. Hedonic models may not be perfect but the limitations have been well exposed in the literature; thus, model users could know when to be cautious in application. Finally, while there is no literature on how often appraisers make accurate estimates, from the high R^2 (Table 2) and the bell-shape sale price percentages (Figure 2), we know that hedonic models produce highly accurate estimates of fair market value.

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

6. EXPLANATIONS

An eminent domain attorney and a government lawyer I interviewed both expressed the view that condemnees generally receive fair market value compensation in settlements (Rikon 2008c; Bova-Hiatt 2007). The empirical findings show that condemnees rarely received the fair market value estimated by my hedonic regression models. The takings literature provides several theories positing condemnors' and condemnees' utility functions that might help explain my findings. I examine them below.

One might also posit that compensation percentages may correlate with non-utility-function factors, such as the size, age, or owner type (corporation or individual) of condemned properties, title-vesting year or month, the length of settlement procedure (from title-vesting date to final decree date), the public use after takings, or the borough in which the condemned properties are located. My data do not reveal any distinctive pattern, though.

6.1. Government Officials' Fiscal Illusion

The first theory is the fiscal illusion theory (Dagan 2000, p.138; Dana and Merrill 2002, pp. 41-46; Fischel 2002, p. 549). In a previous paper (Chang 2008a), I argued that the fiscal illusion theory could be interpreted as claiming that government officials aim to minimize takings compensation⁶⁹ and maximize agency discretionary budgets. This theory, thus, can easily explain the under-compensations. It is more difficult for this theory to explain the over-compensations. However, Article 701 of the Eminent Domain Procedure Law allows New York State courts to award condemnees additional compensation to defray litigation expenses (including fees for lawyers, appraisers, and engineers), if the court-determined award "is substantially in excess of" the city's initial

⁶⁹ Michael Cardozo, the current Corporation Counsel of New York City, has stated that his key priorities included "decreasing both the number of litigations in which the City [was] involved as well as the amount the City [paid] in settlements and judgments." (Nelson 2008, p. 326) Thus, city officials could have this policy goal (lowering the amount of settlements) in mind when bargaining with condemnees, thus lowering the takings compensation paid. Granted, Cardozo assumed post on January 2002, the last year in my research period. Nevertheless, on average it takes 7 years to settle, so many condemnations which vested titles in 1990s are finalized during Cardozo's tenure. In fact, 117 of the 154 (76%) settlements that I know the final decree dates are finalized during Cardozo's tenure. Furthermore, Cardozo's predecessors could have similar policy goals.

offer (N.Y. Eminent Domain Procedure Law § 701). Such additional amount the court can order, and do order (Rikon 2007), is very high because an attorney usually collects a contingent fee when handling eminent domain issues (Flower 2005b, p. 320). If government officials aim to maximize agency discretionary budget, Article 701 can give the city officials an incentive not to offer under-compensation (Bova-Hiatt 2007), because low-balling initial offers may backfire—court awards plus litigation expenses may well exceed not-low-balled offers, costing the city more budget.

Although the law only requires reimbursement of litigation expenses when the court determines the compensation awards, in practice, in a settlement procedure the city may still have to pay “701 allowances” to reimburse condemnees’ attorney fees (Flower 2005b, p. 322; Rikon 2008c). Therefore, the budget-minded government officials still have incentives to offer a little more than fair market value to avoid going to court (for litigation or settlement) and ending up paying condemnees’ attorney fees. Some of the drastic over-compensation could then be attributed to the overshooting reaction to the “701 allowances,” but I have no data to prove this hypothesis.⁷⁰

Overall speaking, however, this theory cannot explain why budget-minded officials sometimes worry about 701 allowances and sometimes do not.

6.2. Government Officials’ Political Interest

For fiscal illusion theory’s rival, political interest theory (Levinson 2000; Levinson 2005), government officials actually care about *political* costs and benefits. The political interest theory presumably best explains those who seek re-election. Political appointees and other city employees, however, will more or less follow the mayor’s (or comptroller’s) policy preferences or directions. Thus, assuming that the mayor’s (or comptroller’s) office is paying attention to takings compensation, this theory could be used to explain the under- and over-compensation.

For this theory to hold there should be a political reason why many settled compensation payments are far above fair market value and may be far below. Commentators have argued that local governments in the United States are “majoritarian” (e.g., Fischel 1991, 2001; Fennel 2002; Serkin 2006). That is to say, the local governments will do what the majority of their homevoters want. Nevertheless, the applicability of this model to big cities, like New York, has been challenged (Been 1991). Instead, scholars have argued that interest groups tend to dominate big city politics, as they do in state and federal politics (Ellickson 1977).

Proponents of the interest-group theory would argue that taxpayers in general or specific interest groups do not have strong preferences for under-compensation, because the budget for takings compensation does not come from an earmarked tax receipt; instead, every local taxpayer shares the expense of compensation. By contrast, condemnees are eager to gain as much compensation as possible. If⁷¹ condemnees can organize themselves (or lobby through existing organizations) and put some pressure on city politicians, they should be able to obtain fair market value as compensation (Farber 1992a; Farber 1992b). Additionally, under-compensating condemnees may cost

⁷⁰ Sciannameo (2008) observed that in recent years, the condemnors’ offers to condemnees were higher than before, because the condemnors have been hit hard by 701 allowances. Rikon (2005b) argued, “[t]he potential imposition of a 701 Award has brought about a much greater percentage of settlements of eminent domain claims.”

⁷¹ This is a big “if,” however. See the discussions in Levmore (2000) and Chang (2008a).

incumbents these condemnees' votes and campaign contributions, which will also be put into the city politicians' political calculus.

Given that compensating condemnees with at least fair market value brings politicians no political costs (no protest from taxpayers) and some political benefits (not losing votes and campaign contributions; giving favors to organized political groups), frequent under-compensation may seem puzzling for political interest theorists. The way to solve this puzzle is taking into account *political opportunity costs*, which are the public projects forgone if compensation to condemnees increases. If the city can obtain higher political benefits from the public projects (say, affordable housing) than from compensating condemnees fair market value, it will have incentives to depress compensation to save money for those political-benefit-yielding projects.⁷² On the other hand, if the city budget law allows the appropriated money only to be paid to condemnees, the most probable reason for under-compensation is that the budget is simply insufficient to give each condemnee fair market value compensation, but the political benefits of going forward with the public projects are higher than the political costs incurred by under-compensating condemnees.

Political interest theory can explain the over-compensations by arguing that these condemnees are politically well-connected, although if that is the case, I doubt that their properties will be condemned in the first place. Maybe theirs will, because condemning and compensating well above market value is a quiet way to transfer wealth from public treasury to private pockets. This is of course just a conjecture without any empirical support.

Overall speaking, the political interest theory is flexible enough to explain both under-compensation and over-compensation, because political interests are context-dependent. Nevertheless, I do not know the political influence of condemnees and it is difficult to measure the political interests of the government officials. Without such data, I cannot test whether compensation level actually correlates with political factors.

6.3. Government Officials' Personal Agenda

Government officials (elected or not) may make compensation decisions according to their ideology or other independent interests (Farber and Frickey 1991). A lawyer who chooses to devote herself to working in the public sector instead of to private practice may want justice and equity applied to the condemnees (Bova-Hiatt 2007). I do not have relevant data (such as ideology of government officials) to examine this thesis. However, it is hard to imagine any ideology that prefers to over-compensate some condemnees and under-compensate some condemnees, especially because the compensation level does not seem to correlate with any factor that I have data on.

6.4. Condemnees' Utility Function

The condemnor does not unilaterally determine the amount of settled compensation. Even if the above theories could explain the offers by the condemnor, they cannot be counted on to solely explain the settled compensation or the behaviors of condemnees. Condemnees prefer to maximize their wealth. Why then do they accept the

⁷² This is possible only if the city budget law leaves enough room for the city government to allocate certain unspent budget to projects favored by the city administration.

under-compensating offer? For owners who received slightly less than fair market value, it is understandable, because the gap between compensation and fair market value is not wide enough to be worth the hassle of litigations. Attorneys' contingent fees are usually a certain percentage of the differences between final compensation payments and advance payments. When the differences are narrow, it is not cost-justified for the attorneys to bring the cases to court.

By contrast, owners should have incentives to sue, instead of settle, if their compensation percentages are much lower than 100% and their property value is high enough.⁷³ The stakes are high and the gaps are wide. 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. The high contingent fees of a high-value case should be able to motivate some attorneys to bring the case to court. These owners and attorneys, however, do not resort to the court. Perhaps the only reasonable explanation is that condemnees, their attorneys and appraisers, without the help of sophisticated hedonic regression models, do not realize that the fair market value of the condemned property is much higher than the amount of settled compensation.

7. CONCLUSION

My empirical study on New York City's compensation paid in eminent domain settlements reveals that most condemnees have been 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, while others got much less. The level of compensations does not correlate with any known factor with available data. While I have catalogued several behavioral models of government officials, my data do not allow me to establish which is the most accurate, though theoretically political interest theory seems to be the most likely candidate. Condemnees are willing to accept under-compensation settlements only if they do not know the fair market value of their property is actually much higher than the amount of settlements.

My findings can help policy-makers shape better compensation policies. A Michigan-like stipulation that gives condemnees a 25% premium of fair market value, if implemented in New York City, gives over-compensated condemnees windfall gains (assuming fair market value is the desirable normative criterion) while leaves condemnees whose compensation percentages are below 80% still under-compensated. 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,⁷⁴ New York City should consider using hedonic regression models to estimate fair market value of the 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 no trade secret, this could be the feasible first-step to give condemnees their due.

To empower property owners, the city can 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 the

⁷³ Figure 3 shows that a number of high-value property owners were under-compensated.

⁷⁴ For why accuracy is desirable, *see* Yun-chien Chang (2008b).

regression estimate. Alternatively (or additionally), condemnees should be empowered to do the regressions themselves. The city has already published all post-2002 sale data on the Department of Finance website.⁷⁵ If housing characteristics can also be available on-line, or available to condemnees, condemnees can run regressions themselves to gain more information about the possible distribution of the fair market value of their property, so as to make more informed decision to settle the case at the offered price or bring the case to court.

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 under-invest because of possible under-compensation, can be more informed and sophisticated with more understanding of compensation practice.⁷⁶

⁷⁵ Property Sales Information, http://www.nyc.gov/html/dof/html/property/property_val_sales.shtml (last visited Oct. 11, 2008).

⁷⁶ In my next paper, I will empirically examine whether court-awarded eminent domain compensation tends to be more accurate.

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Table 1 Summary Statistics for the Selected Sold Residential Properties and
Condemned Residential Properties

Property characteristics	Selected sales	Condemnation settlements
<i>Number of observations</i>	74,879	†104
<i>Price/Compensation per residential unit (\$) ^a</i>		
Mean	170,422	104,777
(standard deviation)	(107,437)	(197,511)
Median	156,009	62,610
<i>Estimated FMV per residential unit (\$) ^b</i>		
Mean	163,322	129,385
(standard deviation)	(88,173)	(132,903)
Median	153,810	94,291
<i>Size</i>		
Square feet per residential unit		
Mean	1,268	‡1,263
(standard deviation)	(540)	(938)
Median	1,164	1,053
Land area in square feet		
Mean	3,535	5,710
(standard deviation)	(3,225)	(12,486)
Median	2,900	2,500
<i>Building Class (%) ^c</i>		
1 family-attached house	6.5	1.0
1 family-detached house	37.6	26.0
2 family house	36.1	32.7
3 family house	8.0	5.8
4 family house	2.6	2.9
5 to 6 family house	2.5	5.8
>6 families, no elevator	2.3	3.8
walkup apartment, units not specified	1.1	8.7
multi-use, 1 family with store	0.7	1.0
multi-use, 2 family with store	1.8	7.7
multi-use, 3 family with store	0.5	1.9
multi-use, 4 or more family with store	0.4	2.9
<i>Other Structural Characteristics</i>		
Age		
Mean	60.9	75.4
(standard deviation)	(28.3)	(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

% has garage	37.2	12.5
% has extension	7.6	14.4
% land irregular shape	12.0	19.2
% in street corner location	10.2	19.2
% has commercial units in the building	4.9	13.5
% has major alteration before sale	1.5	2.0
<i>Borough (%)</i>		
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
<i>Year (%)</i>		
1990	7.5	10.4
1991	5.8	18.9
1992	5.9	12.3
1993	6.7	0.9
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	0.9

Source: NYC Department of Finance through Furman Center, NYU.

Note: No residential property condemnation settlements can be found in 2002.

† Two condemned properties that are “loft building” are not included in the summary statistics in the following regressions and analyses.

^a Property value is expressed in 2005 constant dollar.

[‡] Two outliers are excluded here. If their square feet per residential unit, 53,500 and 345,823, are included in the calculation, the mean will be 7,876 (standard deviation 44,887).

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

	Dependent variable=	
	In of price per residential unit (1) residential unit size model	In of price (2) land size model
ln of square feet per residential unit	0.349** (0.005)	
ln of land area (in square feet)		0.296** (0.005)
N of buildings on the same lot	0.020+ (0.010)	-0.076** (0.014)
=1 if has garage	0.040** (0.002)	0.024** (0.002)
=1 if has extension	0.013** (0.004)	-0.019** (0.004)
=1 if has commercial units in the building	0.088** (0.022)	0.114** (0.025)
=1 if 1 family-detached house	0.135** (0.005)	0.047** (0.005)
=1 if 2 family house	-0.297** (0.006)	0.187** (0.005)
=1 if 3 family house	-0.568** (0.007)	0.275** (0.006)
=1 if 4 family house	-0.757** (0.010)	0.254** (0.010)
=1 if 5 to 6 family house	-1.217** (0.012)	0.141** (0.011)
=1 if more than 6 families, no elevator	-1.564** (0.013)	0.507** (0.017)
=1 if walkup apartment, units not specified	-1.330** (0.025)	0.157** (0.023)
=1 if multi-use, 1 family with store	-0.102** (0.028)	-0.010 (0.030)
=1 if multi-use, 2 family with store	-0.535** (0.024)	0.097** (0.026)
=1 if multi-use, 3 family with store	-0.874** (0.031)	0.033 (0.034)
=1 if multi-use, 4 or more family with store	-1.018** (0.032)	0.113** (0.032)
=1 if land irregular shape	0.013** (0.003)	-0.002 (0.004)
=1 if in street corner	0.030** (0.003)	0.036** (0.003)
Property age	-0.005** (0.000)	-0.008** (0.000)
Square of property age	0.000** (0.000)	0.000** (0.000)
=1 if major alteration before sale	0.088** (0.013)	0.126** (0.013)
Constant	9.275** (0.152)	12.156** (0.217)
Quarter-Year fixed effects	Yes	Yes
Census tract fixed effects	Yes	Yes
Community district*year interaction terms	Yes	Yes
Observations	68,503	68,208
R-squared	0.87	0.64

Robust standard errors in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%.
Clustered by lot.[∞]

[∞] Using a cluster in a regression “specifies that the standard errors allow for intragroup correlation, relaxing the usual requirement that the observations be independent.” In other words, the observations are

Table 3 Selective regression results for hedonic models using commercial property sales and vacant land sales

	Dependent variable: ln of price			
	(1)	(2)	(3)	(4)
	Industry properties	Retail properties	Vacant land – Zoned residential	Vacant land – Not-zoned-residential †
Ln of building area (in square feet)	0.683** (0.056)	0.339** (0.062)		
Ln of land area (in square feet)			0.628** (0.053)	0.947** (0.100)
Ln of number of stories	-0.058 (0.076)	-0.033 (0.072)		
Ln of frontage (in feet)	0.076 (0.061)	0.397** (0.067)		
Percentage of commercial units to total units in the block	0.001 (0.001)	0.003* (0.001)		
N of buildings on the same lot	0.021 (0.038)	0.032+ (0.017)		
=1 if has garage	-0.065 (0.263)	0.338+ (0.184)		
=1 if has extension	-0.040 (0.076)	0.130+ (0.067)		
=1 if land irregular shape	0.089* (0.044)	0.110* (0.048)	0.080 (0.120)	-0.153 (0.241)
=1 if in street corner	0.049 (0.056)	0.033 (0.049)	0.054 (0.109)	0.104 (0.266)
=1 if major alteration before sale	0.113 (0.077)	0.289** (0.085)		
Property age	-0.001 (0.006)	-0.002 (0.006)		
Square of property age	-0.000 (0.000)	-0.000 (0.000)		
= 1 if factory or industrial building = 0 if warehouse	-0.067 (0.047)			
= 1 if store building = 0 if gas station or garage		0.150* (0.060)		
Constant	7.039** (0.747)	10.804** (0.920)	5.832** (0.951)	7.970** (2.104)
Quarter-Year fixed effects	Yes	Yes	Yes	Yes
Census tract fixed effects	Yes	Yes	Yes	Yes
Community district * year interaction terms	Yes	Yes	Yes	Yes
Observations	841	1,579	1,305	374
R-squared	0.86	0.82	0.79	0.93

† Not-zoned-residential vacant land's building class is V1, which could have included vacant land in Manhattan below 110th St, but these Manhattan data are excluded in Model 2.

Robust standard errors in parentheses.

+ significant at 10%; * significant at 5%; ** significant at 1%.

Clustered by lot.

independent across clusters (in my regressions, lots) but not necessarily within clusters. Adding a cluster influences standard errors of estimators but not estimated coefficients. See Stata help for `vce_option`, http://www.stata.com/help.cgi?vce_option (last visited Nov. 25, 2008).

Table 4 Number of Fee Condemnation Settlements in NYC 1990–2002

Panel A—Project type by borough

Project type	Borough					Total
	Manhattan	Bronx	Brooklyn	Queens	Staten Island	
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
Others	4	2	15	7	3	31
Total	21	35	167	63	144	430

Panel B—Project type by property type

Project type	Property type						Total	
	Residential	Commercial			Vacant			Others
		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
Others	1	7	7	2	5	3	6	31
Total	106	54	28	8	179	34	21	430

Note: I categorize the settlements into six project types by the project names shown on the title certification sheets.

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

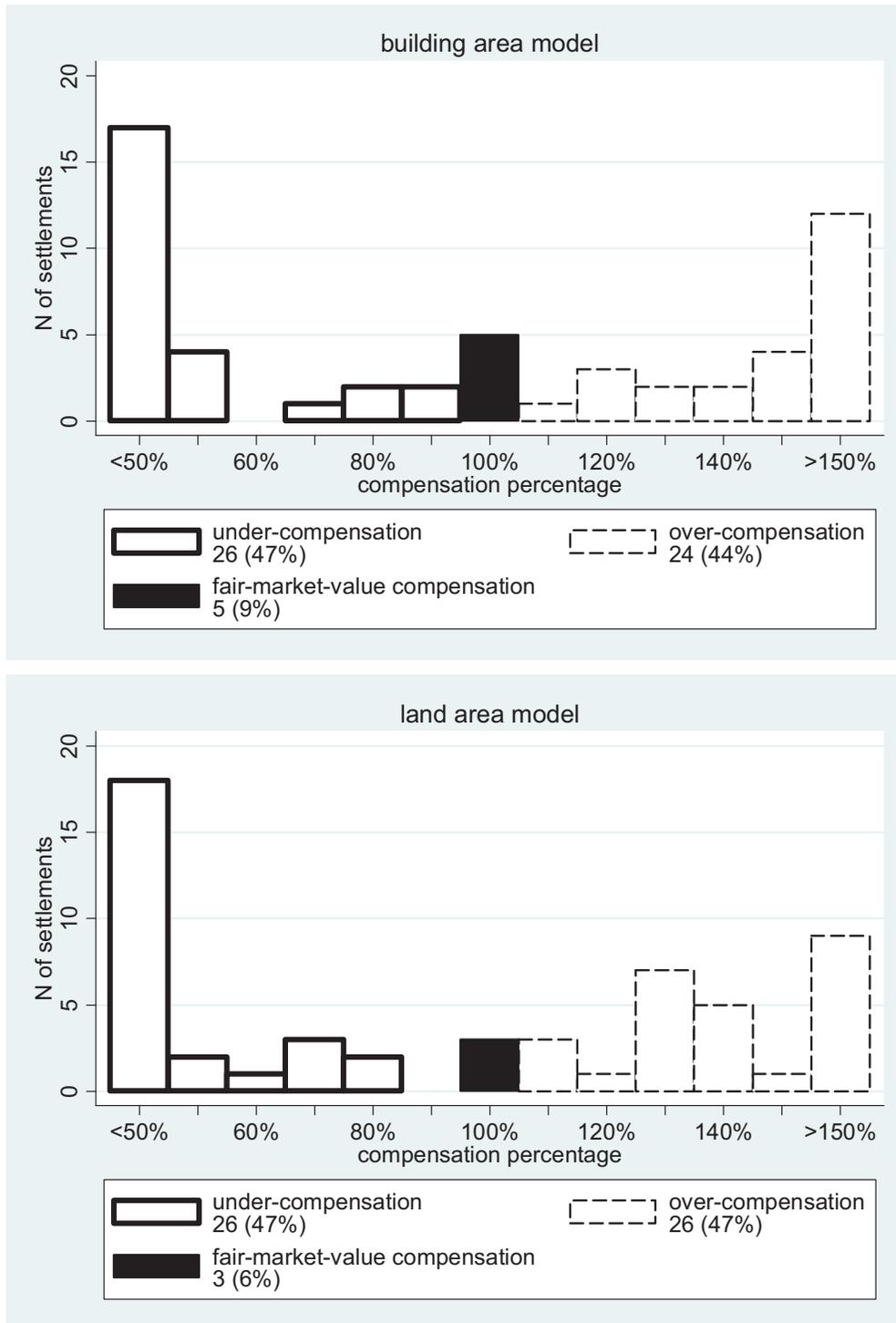


Figure 1. Compensation percentage of 55 condemned residential properties. I define compensation percentage between 95% and 105% as fair-market-value compensation. The 55 settlements shown here are those whose fair market value can be estimated by both hedonic models in Table 2. The top figure uses fair market value estimated by Model 1 in Table 2; the bottom figure, Model 2. Compensation percentage = actual compensation / estimated fair market value.

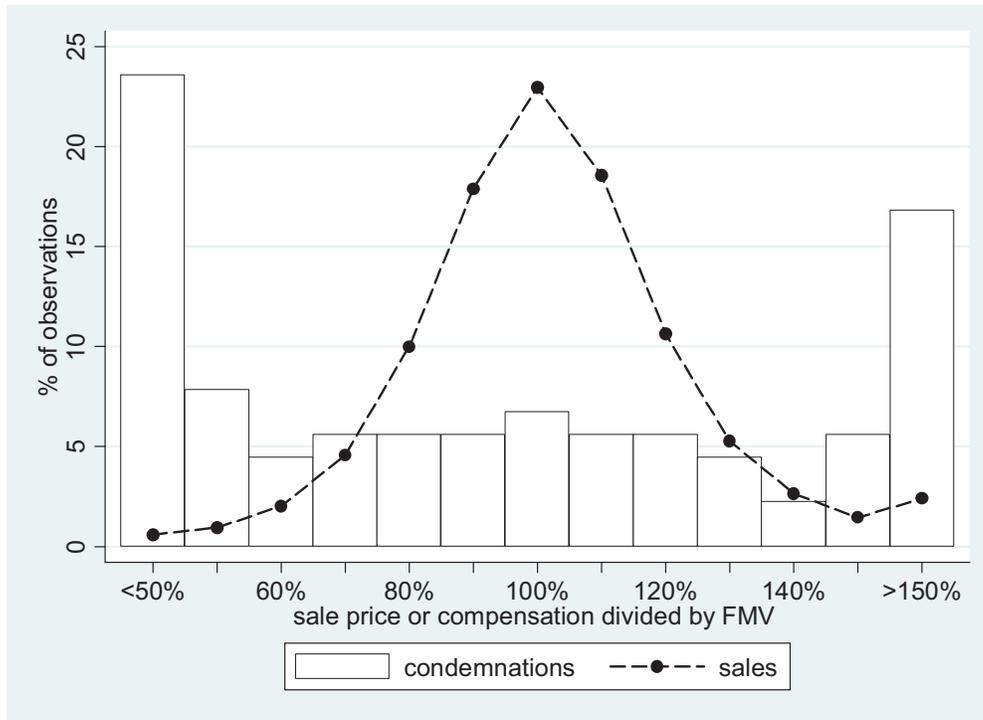


Figure 2. Predictive patterns of hedonic models for settled condemnation compensations and sale prices. The bars show the distribution of compensation percentages for 89 condemned residential properties, the compensation percentages of 55 of which draws from the result shown in the top figure in Figure 1. The other 34 condemned properties' fair market values are estimated by Model 2 in Table 2. Compensation percentage = actual compensation / estimated fair market value. The line exhibits the distribution of "sale price percentage" for 68,503 sold residential properties. Sale percentage = sale price / estimated fair market value. Fair market values of sold properties are all estimated by Model 1 in Table 2.

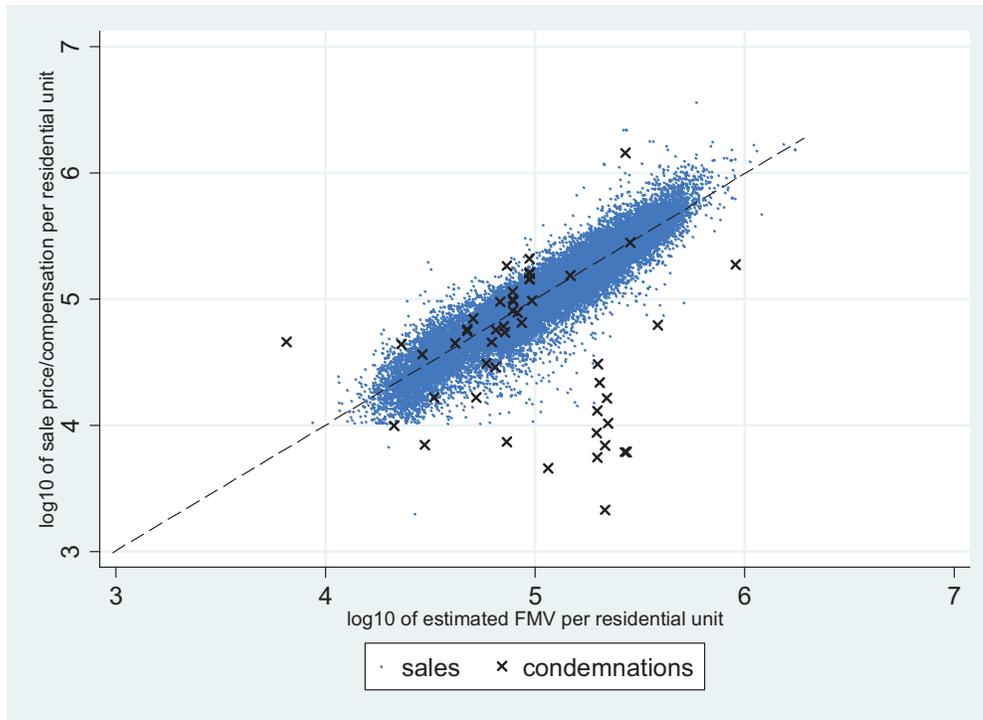


Figure 3. Estimated fair market value versus sale price/compensation for sold properties and condemned properties. The small dots represent 68,557 sales while the crosses represent the 55 condemnations that are shown in Figure 1. The dash line passes through points where estimated fair market value equals sale prices or actual compensations.

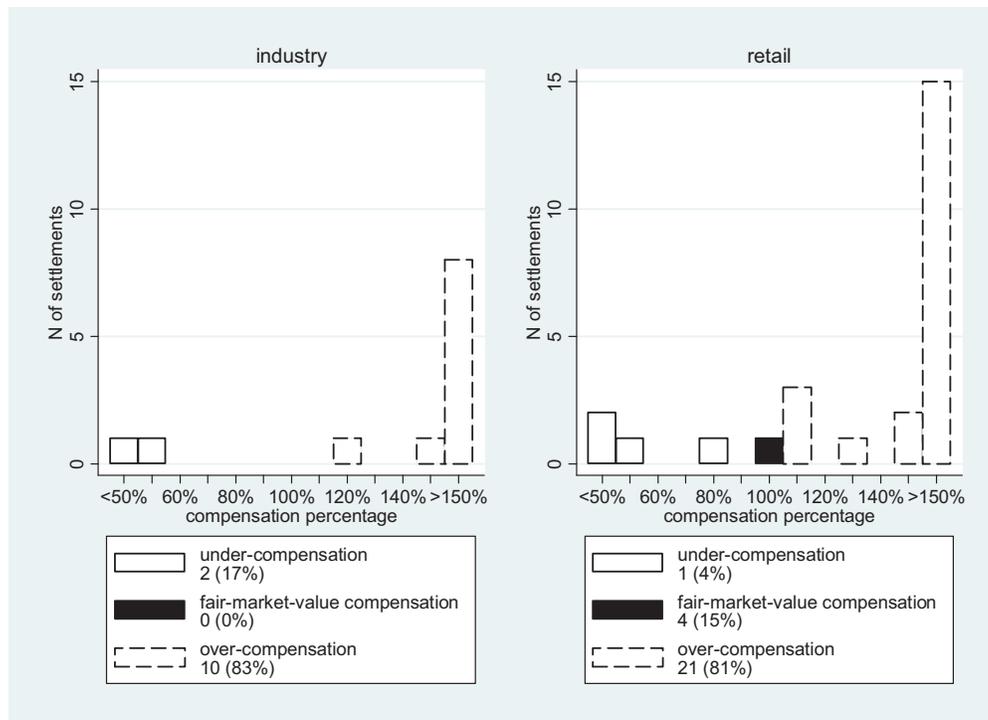


Figure 4. Compensation percentages of commercial properties. The left figure represents condemned industry properties; N=12. Model 1 in Table 3 estimates the fair market value. The right figure represents condemned retail properties; N=26. Model 2 in Table 3 estimates the fair market value. Compensation percentage = settled compensation / estimated fair market value.

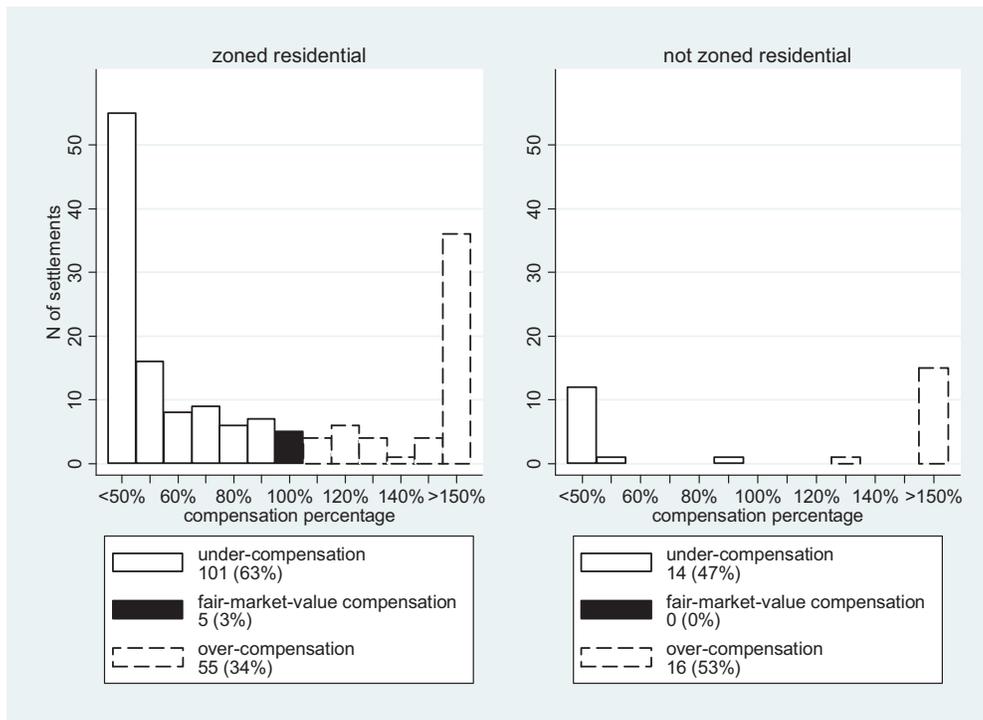


Figure 5. Compensation percentages of vacant land. The left figure represents condemned vacant land zoned residential; N=161. Model 3 in Table 3 estimates the fair market value. The right figure represents condemned vacant land not zoned residential; N=30. Model 4 in Table 3 estimates the fair market value. Compensation percentage = settled compensation / estimated fair market value.

Table 5 Distribution and Magnitude of Over-, Under-, and FMV-compensation

Property type	N (%) of settlements	Median estimated fair market value (\$) [†]	Mean estimated fair market value (\$)	Median deviation from FMV (\$)	Mean deviation from FMV (\$)	Median compensation percentage (%)	Mean compensation percentage (%)
Residential properties	89 (100)	188,582	236,593	-19,417	-43,394	88	101
<i>Under-compensated</i>	47 (53)	197,718	281,065	-106,503	-185,232	49	44
<i>FMV-compensated</i>	6 (7)	152,434	168,847	498	798	100	100
<i>Over-compensated</i>	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
<i>Under-compensated</i>	6 (16)	1,030,113	2,144,034	-808,353	-1,609,313	35	37
<i>FMV-compensated</i>	1 (2)	4,022,575	4,022,575	-136,177	-136,177	97	97
<i>Over-compensated</i>	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
<i>Under-compensated</i>	115 (60)	294,037	1,082,495	-141,021	-941,340	38	38
<i>FMV-compensated</i>	5 (3)	108,490	141,987	1,832	2,241	102	101
<i>Over-compensated</i>	71 (37)	46,671	216,597	80,364	324,012	329	2647

Note. FMV means fair market value.

[†] Property value is expressed in 2005 constant dollars.