The Use of Eminent Domain in Land Assembly: The Case of the Tennessee Valley Authority

by

Carl Kitchens[1]

Abstract

On the heels of the Kelo vs. New London court decision, there has been a renewed interest in bargaining theory when eminent domain is available to a developer. A portion of this research has focused on models of perfect information, which suggest that eminent domain will never be used in equilibrium. These models fail to recognize the importance of asymmetric information and its resulting effects on the use of eminent domain and equilibrium transaction prices. This paper develops a model of asymmetric information in property owner valuations, which predicts that under certain conditions, a land developer will offer all sellers a low price, inducing high value individuals to select into court proceedings. Once in court, these individuals are awarded prices that exceed those made privately. This model is then evaluated empirically by examining property purchases from the creation of the Tennessee Valley Authority's reservoir construction projects during the New Deal. The empirical results show that transactions occurring through court proceedings resulted in higher prices per acre relative to privately settled transactions, consistent with the view that the TVA followed a strategy that led land owners with high unobservable values into eminent domain court proceedings.

[1] kitchct@email.arizona.edu McClelland Hall 401 : 1130 E. Helen St. : P.O. Box 210108 : Tucson, Arizona 85721-0108

1 Introduction

Eminent domain allows an agent to acquire property through the legal environment, forcing transactions to occur that may not otherwise. Typically the right to take property has been used in road building, public works, and urban renewal projects. Following the US Supreme Court's *Kelo vs. New London* 2005 decision, there has been renewed interest in eminent domain legislation. The case has opened the door for private firms to obtain properties through eminent domain, so long as the project can be shown to benefit the community in terms of increased tax revenues. In reaction to this ruling, several states have changed or reviewed their policy regarding eminent domain (Lopez, Jewell, and Campbell 2009). The aim of this paper is to develop a model of imperfect information in order to form predictions of buyer and seller behavior when eminent domain is an option for buyers.[2] These predictions will then be used to empirically study buyer and seller behavior when facing eminent domain using historical data regarding the creation of the Tennessee Valley Authority (TVA).

The TVA was created during the first one hundred days of Franklin Roosevelt's administration in 1933. The TVA was chartered with several ambitious goals: to make the Tennessee River and its tributaries navigable, to electrify and industrialize the south, and to retire marginal farm land. The project was large and involved multiple projects along the fourth largest river system in the United States, which runs through seven states: Virginia, Tennessee, North Carolina, Georgia, Alabama, Mississippi, and Kentucky. To meet these goals, the TVA designed and constructed dams along the main Tennessee River and its major tributaries. To construct the dams, the TVA had to acquire large quantities of land in advance. The 1939 TVA Annual Report states that by the end of the fiscal year, over 528,000 acres had been acquired for

[2] In this paper a buyer will refer to either a public of private entity.

use by the TVA. Over $28 million ($430 million in 2009 dollars) was spent on the acquisitions. The average price paid per acre, including those acquired with eminent domain was $53.36 ($820 in year 2009 dollars).

Within the TVA charter, a provision was made for the corporation to use eminent domain in its land acquisition. The use of eminent domain changes the bargaining process. Transactions are forced by the legal environment if they cannot be made privately. To capture the features that are important in the bargaining process with eminent domain, I develop a simple theoretical model below. When sellers cannot credibly convince the buyer that some aspects of the property lead to higher value, the model predicts that the buyer may find it optimal to use eminent domain to minimize the expenditure on property acquisition. In some cases the buyer offers all sellers a low price for the property, which induces the sellers with high unobserved values to refuse the offers, and the buyer invokes eminent domain court proceedings on those properties. Due to the self selection of high value sellers into court proceedings, the model predicts that the court assessed price will be higher than the private offer made by the developer.

One feature of the model that is critical for the prediction to hold is that the sellers must perceive that the court could evaluate the information provided by the TVA and the seller and decide on values that differed from the TVA offer in ways that did not consistently favor the TVA or the seller. If the sellers perceived that the courts would choose upward biased measures, it may have been optimal for all sellers to refuse the TVA offers and take their chances in the courtroom.

I test the model empirically by developing a new and unique data set from surveys during the creation of the TVA. The information includes the prices offered by the TVA, whether

eminent domain was used, the court's value for the properties in those cases, and a variety of covariates. The raw data suggests two important features for the model and empirical exercise to follow: first, approximately ten percent of all properties were collected by eminent domain; this suggests that models of perfect information, such as the one by Miceli and Segerson (2007), would not adequately predict seller behavior, as these models generally suggest that eminent domain will not be used in equilibrium. Second, it does not appear to be the case that sellers expected the courts to give consistently high awards because many of the awards given were equal to or lower than the initial TVA appraisal. The results show that the average court value per acre on eminent domain properties was higher than the average price per acre in purchases without eminent domain after controlling for a variety of co-variates. The findings are consistent with a setting in which the TVA did not have full information on property values, some sellers could not credibly convince the TVA that their properties were more valuable, and these were typically the types of sellers whose land was taken by eminent domain.

2 A Brief Overview of Eminent Domain

Eminent domain has a long history in the United States. Starting with the ratification of the Bill of Rights, eminent domain was available under the Fifth Amendment. During its early history the law was primarily developed by a series of court decisions at the local and state level. According to Scheiber (1973), three early developments led judges to decide that eminent domain was the right of the state, could be used by the state, but just compensation should be paid to property owners when used. By 1840 eminent domain power was passed from many states to private corporations. The railroads relied heavily on this power to complete projects. The US Supreme Court upheld the position that private companies could be privileged with

eminent domain in an 1848 decision. In many ways the Kelo decision of 2005 follows precedent set by prior decisions.

In the economics literature there have been few empirical studies that examine the use of eminent domain, primarily due to a lack of good data on property level transactions. Munch (1976), studied the use of eminent domain in Chicago 1962-1970. She develops a model to explore when settlement and eminent domain will be used, examining the expected price in court and the costs associated with private and court negotiations. Munch finds that settlement will occur if it is cheaper than the use of eminent domain. However, if a case does go to court, Munch suggests that the structure of court costs leads to high value properties receiving higher prices in the courtroom and possibly in private settlements out of court. To test the model empirically, the author regresses the observed transaction prices on the method of transaction: private negotiation or takings, observed tax assessments, and a prediction of fair market value. The results of this paper show that high value properties tended to receive higher final prices. This paper may suffer from a lack of property characteristic data which is likely not to be fully captured by the tax assessment data or the out of sample fair market value prediction. Furthermore, the market price prediction may have little meaning in a situation where a property owner cannot refuse the transaction.

Gudry (1998) runs a hedonic regression of property characteristics on the transaction price and includes an indicator of whether or not the property was taken with eminent domain proceedings. Gudry finds that when a property is taken by eminent domain, the transaction price is higher. Similar to Munch, this paper may incorrectly identify the effect of eminent domain because the bargaining situation is different for properties sold on the open market and those

facing takings proceedings via eminent domain. The analysis of the samples used in each of these studies ignores the strategic effect that eminent domain has on pricing.

More recently, Chang (2010) has examined whether or not properties in New York City taken with eminent domain received fair market compensation. To do this, the author uses a sample of property transactions to form an out of sample prediction of the property value based on housing characteristics and then compares the predicted value against actual awards in eminent domain cases. The author finds that very few properties were awarded its predicted fair market value. These results suggest that it is important to focus on the data generating process and the selection into eminent domain proceedings. In cases of eminent domain, the property owner does not have the outside option of keeping their property.

In each of the empirical papers described above, the set of transactions evaluated included properties that were sold in private negotiations where eminent domain was never an option for the purchaser. The dataset that I develop below is unique because every single property faced the threat of eminent domain and both initial appraisals and final transaction prices are observable. To my knowledge, this is the first paper to use data pertaining to rejected appraisals and final transaction prices.

Because there is little data available pertaining to eminent domain, a large portion of the literature has focused on the theoretical justification and the effects of eminent domain. Blume, Rubinfeld, and Shapiro (1984) focused on the efficiency of takings procedures, when compensation should be paid, and how the timing of the land assembly announcement will impact seller behavior. Other authors have used various bargaining models to explore the topic of land assembly. Miceli and Segerson (2007) pose a perfect information multi-period game

played by buyers and sellers of property during a land assembly project. When eminent domain is at the disposal of the land purchaser, the Nash equilibrium predicts that all sellers sell their property prior to the use of eminent domain proceedings. Project delays from holdup and court costs are both costly, incentivizing the buyer to in the first period. The buyer also benefits by being able to gain in the surplus to be split from bargaining early.

Other recent work in this area has been presented by Shavell (2010), who models eminent domain using a social welfare function. Shavell uses a continuous distribution of seller values to show welfare comparisons between private government purchase and eminent domain purchases. Shavell also analytically shows that if public funds are costly and there is an increasing number of property owners, that private negotiation success rates approach zero, making it more likely for eminent domain to be used. When there are a high number of high value property owners, it may actually be more efficient to use eminent domain. The model developed here offers similar conclusions in terms of the use of eminent domain due to asymmetries in information.

3 Bargaining with the TVA

The TVA had to acquire a large number of properties to achieve their goal. The bargaining process worked in the following way. Once a suitable reservoir location had been determined based on topography, the TVA developed property requirements for the project. These plans detailed what land must be acquired in order to have a sufficient buffer between the river and private properties due to flooding caused by the creation of a reservoir. The agency would then send out a set of surveyors to examine the characteristics of each property. The TVA made a point of not negotiating extensively with individual sellers, implementing a policy they called “No Price Trading” by which they would assess the region when developing the formula

for the properties in the entire reservoir area. These surveyors would then use a predetermined formula to assess the value of the property based on these characteristics.

More specifically, the TVA had seven land quality designations, ranging from alluvial river bottom to steep hillside. The TVA appraisers would classify what portion of the property belonged to each category. The appraisal would then be a simple linear combination of the amount that the TVA designated for each type of land. Because the classifications were granular in nature, it left room for error in the appraised value.

Once an appraisal had been made, the appraised value was proposed to the owner of the property as the purchase price. If the property owner found the offer satisfactory, the deed to the property was signed over to the TVA for the agreed upon price. If the owner rejected the initial TVA appraisal, the TVA would adjust the offer slightly. If this adjusted offer was refused, the TVA legal division would draw up paperwork to proceed in taking the property under the eminent domain clause of the TVA.[3] A special panel of three independent US District Court judges would examine the case and assign a price that the TVA would have to pay the property owner in exchange for the property. The TVA was responsible for any court fees associated with the case. Once the move to obtain the properties through eminent domain proceedings had begun, both the TVA and the seller had an opportunity to bring evidence to the panel of judges as if the eminent domain proceedings were any other federal trial.

> "It shall be the duty of such commissioners to examine into the value of the lands sought to be condemned, to conduct hearings and receive evidence, and generally to take such appropriate steps as may be proper for the determination of the value of the said lands sought to be condemned, and for such purpose the commissioners are authorized to administer oaths and subpoena witnesses, which said witnesses shall receive the same

[3] Empirically, it is not possible to distinguish the first TVA appraisal from an adjusted offer, and thus they will be treated as a single offer that was either accepted or rejected.

> fees as are provided for witnesses in the Federal courts. The said Commissioners shall thereupon file a report setting forth their conclusions as to the value of the said property sought to be condemned, making a separate award and valuation in the premises with respect to each separate parcel involved. Upon the filing of such award in court the clerk of said court shall give notice of the filing of such award to the parties to said proceeding, in manner and form as directed by the Judge of said court." (McCarthy 1946)

In the court proceedings, the seller could present evidence that was not considered by the TVA in the initial appraisal. For instance, a farmer could show farm income from certain portions of their land to show that their land was more productive than the granular measure dictated by the TVA. The courts could then determine the credibility of this evidence, possibly leading to an increase in the valuation.

4 Theoretical Model

Almost any model of perfect information is unlikely to capture the nuances of bargaining in the shadow of eminent domain. It is highly unrealistic that a buyer will ever know the true value that each seller places on his property, making predictions from perfect information models suspect. Such models predict that eminent domain should never be used because it is always more cost effective to negotiate privately. This result holds in sequential move games as well as cooperative Nash Bargaining games.[4] Since the TVA had to use eminent domain to acquire 10 percent of its properties, the predictions made by perfect information models are rejected. Therefore, I develop a model of asymmetric information; in which there is a distribution of seller types where each type is defined by the seller's private value for their property.

[4] Kitchens and Roomets (2012) show that in Sequential Nash Bargaining that it is always optimal to transact properties privately. The model develop by Miceli and Segerson (2007) also makes this prediction.

First suppose that there is a single buyer tasked with acquiring multiple properties. If all of the properties are acquired, the buyer receives a value for the project of V_b.[5] Additionally, suppose that there are two types of sellers, those with a high value for their property and those with a low value, $V_s = \{C_H, C_L\}$[6], and the probability of being a high type is *a*, such that $0<a<1$. It is assumed that this probability is independent across sellers, therefore the fraction of high type sellers is equal to *a*. Each seller is aware of their property value, while the buyer only knows the distribution of types. The high-type seller cannot credibly convince the buyer that his property has a higher value, but he may be able to provide enough information to a court to convince the court of a higher value. The buyer will make a take or leave it offer to each seller. If rejected, eminent domain proceedings will begin, with the buyer paying *F* in legal fees to the court. The court then collects information from the buyer and the seller and then reports the true value of the property, either $\{C_H, C_L\}$ which the buyer must then pay to the seller to collect the property. [7]

Individually rational sellers will only accept a price higher than or equal to their value. Knowing the rationality of the seller, the buyer will offer one of two prices $P=\{C_H, C_L\}$ in order to minimize the total expenditure on property collection. The price offered by the buyer will depend on the magnitude of the court fees, the difference in seller valuations, and the proportion of seller types.

[5] It is assumed that the value of the developer, $V_{b,}$ is greater than NC_H so that projects are worth undertaking regardless of the distribution of seller types.
[6] In the event that the value distribution is continuous, then the buyer would offer a price above a threshold seller value and all sellers below that value would accept and all sellers with higher values would reject, resulting in a similar separating equilibrium.
[7] The assumption that the courts can perfectly identify types is a simplifying assumption which allows the model to predict scenarios in which eminent domain may be used in equilibrium.

In one scenario, the buyer will minimize their expenditure to collect the properties by offering all sellers the high price. In this scenario, the buyer's payoff is equal to $\pi_b = V_b - NC_H$, where N is the number of properties that the buyer must purchase. However, the expected payoff of offering the low price, P= C_L, is $E(\pi_b) = V_b - N[(1-a)\,C_L + a(C_H + F)]$, where E is the mathematical expectation operator. The buyer will offer the low price when the following inequality holds

$$C_H - C_L \geq \frac{a}{1-a} F$$

As long as the expected legal fees are less than the additional cost of paying every seller the high price, the buyer will offer the low price and eminent domain will be used to collect properties from the high types. The low types will accept the low offer and only the high types will select into court proceedings.[8] As the difference in values between high types and low types increases, it becomes more likely for the buyer to offer a low price to all sellers. As legal fees, F, decrease, the cost of eminent domain falls, thus making it more likely for the buyer to use eminent domain. As the number of high types increases, it is less likely for the buyer to offer a low price because increasing total legal fees would reduce the surplus for the buyer.

One concern may be that low types would try to masquerade as a high type in order to receive the high price; however, by assumption, the court has the ability to credibly determine a seller's type. This makes it unprofitable for low types to select into court proceedings. Because only high-value sellers select into court proceedings, properties purchased through eminent domain proceedings should receive a higher price than those purchased without eminent domain.

[8] Low type sellers are indifferent between court and the private offer; it is assumed that in the indifference case they take the private offer.

This hypothesis, that high value types self select into court proceedings will be tested below using data collected from property purchases by the TVA between 1936 and 1939.

The model also fits a scenario where the buyer can determine C_L based on observable characteristics of the land, but cannot credibly identify other factors that would increase the value of the land for the seller. In this case, sellers with a positive unobservable value component would be high types, and select into court in order to provide evidence and testimony to the court in order to receive an amended price. The court then uses this evidence to determine a new transaction price. Only when the evidence is sufficient to prove that the initial offer was inaccurate does the court award a higher transaction price.

5 Data Sources

The model provides an intuitive framework for how the TVA purchase prices are determined. To examine the issue empirically, a new dataset has been constructed from two newly digitized primary sources. The primary benefit of the dataset is that the offer price and final transaction price are available for every property that faced the potential use of eminent domain, regardless of the actual collection method.

The first source contains information detailing the prices paid for each tract of land at the reservoirs. The source of this data is the original TVA Land Registers, located at the TVA Real Estate Division, Chattanooga, TN. Original documents have been collected for nearly 1200 properties at one of the early TVA construction projects: Guntersville Dam. These land registries provide the name of the owner of the land, the tract size in acres, appraisal of land, appraisal of improvements, the total appraisal, the method by which the property was obtained, and if applicable, court fees and a court assessment. If a property was not obtained by eminent domain,

the appraisal is the amount disbursed to the property owner for the tract in fee simple. At Guntersville Dam, approximately eight percent of properties were obtained through the use of eminent domain.

Additional co-variates for the Guntersville properties that were owner occupied come from TVA Form 970, a family survey completed prior to removing families from land that would be flooded to create reservoirs. The survey collected information on standard demographics such as age, race, education, religion, number of children and income, as well as more specific details pertaining to the house, construction materials, number of rooms, condition, the distance from local gathering places, grocery expenses, produce grown on the property, and farm data. The farm data includes how many acres are planted in each type of crop, livestock holdings and value, machinery holdings and value, and itemized expenses and receipts for the farm. This data has been collected from the National Archives Southeast Region in Morrow, GA.

In the first portion of the empirical exercise to follow below, all data from the land registers can be implemented as long as the only demographic characteristic of interest is farm owner operator status. In order to dig further into the importance of different demographic characteristics relating to the holdout decision, the two datasets were merged for the second portion of the empirical study. During this procedure, a large portion of the data is lost due to absentee ownership of the farm. The 1939 TVA Annual report states that only 152 out of 1182 families living in the reservoir area were owner operators of at least one tract of land. Upon merging the tract data to the family demographics, I find that 290 of the purchased properties were operated by owner occupiers, with the average owner operator controlling 1.8 properties.

Unfortunately, little can be done with the data related to share and tenant farmers living in the reservoir area because the TVA did not negotiate with non owners. The TVA explicitly stated in its 1937 Annual Report that little can be done for those with no property rights. The only support provided to non owners was a referral to other agencies and local charities, such as the state agricultural extension programs, which catalogued available properties in the area, and other New Deal agencies, such as the WPA. Eventually, these individuals may be matched to census records to determine how they fared following removal from the reservoir area, however, that is not the focus of this work.

The TVA tried to map the projects based on existing property lines, however in some cases tract numbers may not reflect the owner's property lines. It was also common for a family or individual to own several disjoint pieces of property. This creates an issue related to whether or not individuals behaved the same way for all of their properties. If property owners made the same decision for each property, it would be appropriate to aggregate the data over the individual. However, if owners make different decisions for different parcels of property, then the piece of property is the appropriate level of analysis. A simple way to determine the unit of observation is to compare the number of properties that each owner had in their possession versus the count of decisions they made for those properties. For example if an individual owned three properties and held out for only two properties, then the appropriate unit of observation is the property, not the individual. The data show that many landowners made separate decisions on different tracts and did not make the same decision for all tracts, therefore the analysis will proceed using the tract as the unit of observation.

An examination of the raw data reveals that the sellers did not find going to court to be automatically superior to accepting the TVA appraisal. Figure 1 shows a plot of the price per

acre awarded by the court versus the price per acre appraised by the TVA. Many of the properties that had eminent domain used against them either received no difference in their payment or actually had their payment slightly lowered relative to the initial appraisal. However, this relationship between court awards and TVA appraisals does not condition on the observable characteristics of each property such as the productivity of the land, differential levels of improvement, or home characteristics. To assess whether or not the TVA systematically made low offers to holdouts, these characteristics and quality differences must be taken into account.

6 Empirical Model

The model above outlined a scenario in which only high value individuals select into court proceedings, which predicts that court awards should be higher on average than the corresponding private appraisal made by the TVA. The empirical portion of this paper will directly test whether or not individuals that selected into court proceedings received higher average prices per acre than the average TVA appraisal. The second portion of the empirical exercise will focus on determining the factors that made an individual more likely to holdout.

I first test whether or not an individual received a higher price overall by going to court. If court awards were always higher, it may induce individuals to systematically select into court proceedings. To test the relationship between eminent domain and the final transaction price I specify the following ordinary least squares (OLS) regression.

$$(1) \quad Final\ Price_i = \beta_0 + \beta_1 Acres_i + \beta_2 EminentDomain_i + \beta_3 EminentDomain_i * Acres_i + \gamma X_i + \varepsilon_i$$

In this specification, the dependent variable is the final transaction price. The final transaction price is equal to the TVA appraisal value when the property was acquired through private

negotiations and is equal to the court award when the property was acquired through eminent domain. The final price is composed of a based level β_0 and a value per acre β_1. To test whether or not properties taken by eminent domain systematically received higher prices than privately negotiated settlements, I examine the sum of β_2+β_3, at the average size property. Additional characteristics control for differences in the productivity of the land which may impact its value.

In all of the ways that I have estimated regression equation 1, I find that the linear combination of β_2+β_3 for the average sized property is not statistically different from zero. This provides some empirical evidence that sellers would not have the incentive to uniformly reject the TVA appraisal and go to court to elicit a higher price. Given that the OLS estimate of β_2 is negative, it suggests that there may be negative selection into court proceedings, or rather that individuals who received low appraisals by the TVA conditional on property characteristics were more likely to go to court. One way to interpret this result is that by going to court, individuals who were given initially low offers were able to improve their offers to the level of the appraisal that the TVA gave to similar properties initially. However, this claim will be examined in detail in the next empirical specification.

The full set of regression results are presented in Table 1. Each column corresponds to a separate regression. Columns 1 and 2 refer to the Land Register Sample while Columns 3-5 refer to the TVA Family Survey Sample.

7 Did Eminent Domain Improve Outcome for Those That Went to Court

Thus far the empirical results have suggested that going to court did not lead to wholesale improvements in the final transacted price. What has not been discussed is whether or not there were improvements for individuals who went to court. The raw data presented in Figure 1

suggested that court valuations were typically less than or equal to the TVA appraisal. However, Figure 2 shows that there were differences in how the Court and the TVA valued property. Namely, it appears as though the Court places higher value on larger properties. In this section, I examine whether or not properties that were taken by eminent domain received higher prices per acre relative to their initial appraisals.

To test whether or not individuals going to court improved their position, I regress the difference between the TVA Appraisal and the court award for each property taken by eminent domain on the acreage and other observable property characteristics from the land register sample.

$$(2) \quad Court - TVA\ Appraisal_i = \beta_0 + \beta_1 Acres_i + \gamma X_i + \varepsilon_i$$

In each specification, I find that conditional on observables, individuals who went to court improved their outcomes. The sum of $\beta_0 + \beta_1$ at the average sized property shows that those who went to court improved their offer by \$189- \$224, which is statistically significant. This is approximately a 4.5-5.5 percent increase over what the TVA appraisal. The full set of results are shown in Table 2.

These results suggest that there were improvements that could be made when going before the court for an individual property owner. However, as stressed before, the court played an important screening role in determining which characteristics were overlooked by the TVA during its appraisal process. Because it was not clear that there would be major improvements in the final transaction price, as outlined by the results in regression equation 1, only those who received a substantially lower price than their property warranted selected into court proceedings.

8 What Determined the Sellers Choice to Go to Court Under Eminent Domain

In section 4, the model strictly predicted that individuals will hold out due to differences in an appraisal and personal valuation from the land, however, there may be multiple reasons why any single property owner would refuse the TVA's appraisal. In this section, I explore both monetary and behavioral reasons for why an individual would holdout.

I estimate the probability that the land owner would hold out and refuse to accept the appraised value offered by the TVA. Specifically, I specify the following probit regression.

$$(3) \quad Holdout_i = \alpha_0 + \alpha_1 Improve_i + \delta X + \omega_i$$

Holdout is a binary {0,1} variable that indicates if a property owner refused the TVA appraisal. $Improve_i$ is an out of sample prediction from the estimation of equation 2, which estimated the difference between Court awards and TVA appraisals. This variable is used to approximate the expected increase in value that an owner could receive by going to court. X is a vector of additional covariates, including variables constructed from the property register, and in the second empirical specification, characteristics from the family survey, which will be described in more detail below.

Equation 3 is first estimated using the TVA Land Register Sample. In this specification, the right hand side variables, owner operator status, acreage of the property, number of properties owned, county indicators, and the share of the total project that the property represents. Marginal effects from this specification are presented in Table 3.

The results show that the prospect of a larger award does make an individual more likely to refuse TVA's appraisal, however the expected Court-TVA value is not have a statistically

significant. Factors that do impact the probability of holdout include whether or not an individual is an owner operator, and the number of properties held by the seller. Owner operators were 4.3 percent more likely to hold out than absentee landowners. Sellers with more tracts of land were 3.8 percent less likely to hold out for each additional property. Owner operators were more likely to feel a connection to the land because they have invested their lives in the production of the land. This can be examined in more detail by using the TVA Family Survey Subsample.

When Equation 3 is estimated using the TVA Family Survey Subsample, the expected increase, Court-TVA, did not have a significant impact on the holdout decision. Owner operators with high levels of debt were more likely to holdout, for every $1000 in debt held, the probability of holdout increased by 1.3 percent. Debt may play two important roles in the decision to holdout. First, the ability to use a property as collateral may show that the property is of a certain quality such that banks and lending institutions are willing to acquire the property in the event of default. Secondly, sellers may place a value on the ease of credit associated with owning a particular property, which they may not be able to maintain once they acquire a replacement property. Also, being forced to sell a specific parcel of land may put the seller at risk for defaulting on their debt due to changes in land quality that would arise from moving to a new piece of land.

Demographic characteristics also affected the decision to holdout. For every additional year that a seller lived in the community, the probability of holdout increased by .2%. This meant that someone who had lived in the community 25 years was 5 percent more likely to holdout than a new arrival. One interpretation of this result is that people who lived in the community for a long period of time had more network connections which potentially reduced the cost of

operating a farm or business in the community. New arrivals did not have these connections and were not rooted in the community, and thus did not have to incur a cost due to removal.

Opinions towards the development also affected the decision to holdout. Individuals who claimed to actively support the TVA and its projects were 6.8 percent less likely to holdout than an individual who was critical or antagonistic towards the TVA. This could be an indication of how the sellers believed that the project would affect their lives following development. For some individuals, the prospect of electrification may have outweighed any concerns associated with adjustment to a new property.

Assuming that only high value types were the eventual holdouts, the results suggest that individuals who have a high subjective value for their property are those who have a connection with the land. This connection is stronger for owner operators than absentee owners, and within owner operators, individuals who have lived in the community for an extended period of time, have financial attachments to the land, or disapprove of the future land use are the most likely to holdout.

8 Conclusions

The ability of a developer to use eminent domain fundamentally changes the property acquisition process. This paper examines how prices are determined when eminent domain is available to a land developer who must collect multiple properties from sellers with heterogeneous private valuations that are not observable to the developer. The model predicted that the developer will make a blanket offer of the low price in situations where the expected legal fees associated with court proceedings are lower than the additional cost of buying all properties for the value of the highest value seller. In this case, high value sellers self select into

court proceedings where the properties are collected by eminent domain. The prediction that the use of eminent domain by a developer is optimal in some settings is a stark contrast to predictions made in perfect information models which predict that eminent domain will not be used. This model was then used to study the use of eminent domain during the property assembly phase of the TVA at Guntersville Reservoir.

The empirical exercise demonstrated support for the imperfect information model with heterogeneous sellers. Eminent domain was used in contrast to the predictions of the perfect information model. The court awards did not always exceed the TVA offers under eminent domain and only about 10 percent of the properties were sold under eminent domain, so sellers did not anticipate that the court would always offer higher prices. The imperfect information model implied that the average price on eminent domain lands would be higher than the average price on land where the seller accepted the TVA offer. The courts awarded higher values per acre on lands taken under eminent domain than on the lands the TVA purchased directly. In an analysis of who held out and ended up in court, holdouts were more likely to have lived in the community for an extended period of time, were owner operators, had high debt levels, and might have received an offer that was lower than offers on comparable property.

While the model suggest that it is cost minimizing for the buyer to use eminent domain in some settings, it is not clear what the total social cost are when developing a large land area. The families living in the reservoir location had to search for new properties in a market that experienced a demand shock for land, which likely led them to obtain properties that were of lower quality than their initial holdings. Depending on size these post removal land quality differences, the net benefits of the project, which were used as justification for eminent domain proceedings, may in fact have been negative. Land acquisition is only one component of the

greater problem of land use development. Additional research must be undertaken to fully understand the total social cost of land acquisition, family removal and resettlement, and the long run economic performance of the projects themselves.

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Figures

Figure 1 – TVA price Per Acre vs. Court Price Per Acre for Properties Collect by Eminent Domain

Figure 2 – Difference between Court Award and TVA Appraisal by Size of Property for Properties in Court

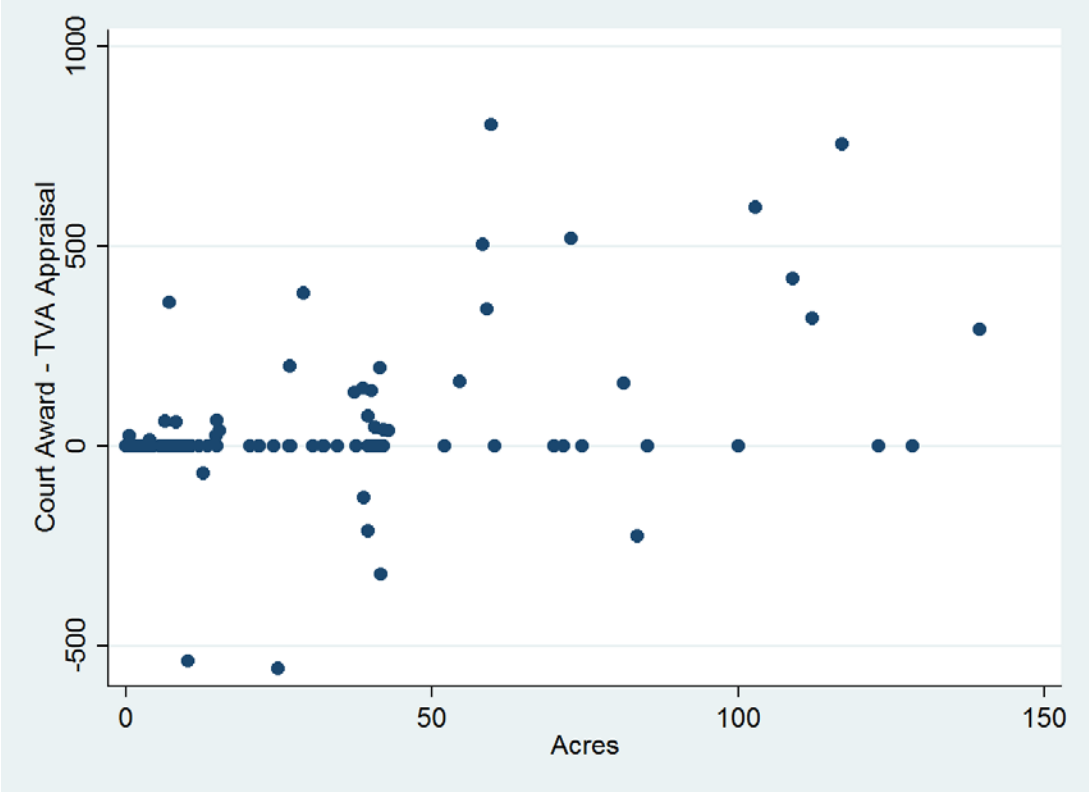

Table 1: Regression Results Equation 1

	Land Register Sample				TVA Family Survey Sample					
	1		2		3		4		5	
Acres	23.627	*	23.148	*	42.791	***	42.609	***	38.116	***
	(13.339)		(13.256)		(2.743)		(2.816)		(4.442)	
Condemned	-2538.15	***	-2501.01	***	-1712.883	**	-1708.456	**	-1975.184	*
	(874.401)		(853.140)		(699.109)		(718.021)		(755.889)	
Acre X Eminent Domain	40.191	***	39.674	***	28.553	**	28.01	**	29.076	**
	(14.025)		(13.647)		(11.023)		(10.997)		(12.353)	
Marshall County			2176.77	***			1053.328	**	991.055	
			(668.059)				(473.204)		(420.924)	
Jackson County			1607.285	**						
			(762.305)							
Acre Share			174.156				44.361		389.431	
			(456.991)				(315.534)		(451.394)	
# Properties			-515.075	*			6.343		94.913	
			(286.362)				(301.851)		(368.930)	
Owner Operator			665.743	**						
			327.772							
Constant	2485.195	***	1293.128	***	1622.415	***	1029.227	*	-2273.444	
	840.94		402.454		278.168		573.219		2989.377	
$\beta_2 + \beta_3$Acres	154.66		157.17		200.15		168.22		-27.06	
	(447.470)		(450.130)		(1040.900)		(1047.490)		(1096.820)	
R^2	0.312		0.321		0.567		0.573		0.667	
N	1285		1285		294		294		250	

*** p<.01, **p<.05, *p<.1

Table 2: Regression Results Equation 2

	Land Register Sample				TVA Family Survey Sample			
	1		2		3		4	
Acres	6.106	***	7.263	***	6.096	***	7.073	***
	(0.808)		(1.594)		(1.408)		(2.075)	
Jackson			-97.897				-211.857	
			(79.060)				(208.420)	
Acre Share			-1015.89				-1213.518	
			(963.574)				(1010.578)	
# Properties			135.513				207.938	
			(118.250)				(128.516)	
Owner Operator			-131.538					
			(115.183)					
Constant	-80.492	**	-173.727		-129.911		-313.989	
	(40.500)		(131.024)		(90.007)		(207.230)	
$\beta_0 + \beta_1$Acres	224.79	***	189.40	**	174.89		39.68	
	(47.100)		(76.820)		(120.180)		(634.830)	
R^2	0.613		0.629		0.553		0.582	
N	109		109		27		27	

*** p<.01, **p<.05, *p<.1

Table 3: Marginal Effects from Probit Regression
Equation 3

	1		2	
(Court - TVA) ($1000)	0.0142		0.0355	
	(0.0375)		(0.0335)	
Owner Operator	0.0437	**		
	(0.0244)			
Marshall County	-0.0287		-0.0275	
	(0.0282)		(0.0299)	
Jackson County	-0.0063			
	(0.0281)			
Acres	-0.0002		-0.0004	
	(0.0002)		(0.0002)	
# Properties	-0.0385	**	-0.0140	
	(0.0168)		(0.0254)	
Debt ($1000)			0.0130	***
			(0.0047)	
Insurance ($1000)			0.0029	
			(0.0080)	
Years in Community			0.0020	**
			(0.0008)	
Husband Education			0.0023	
			(0.0048)	
Married			-0.0554	
			(0.0595)	
Income 1935			-0.0003	
			(0.0013)	
Opinion Towards TVA				
Neutral			0.0156	
			(0.0516)	
Interest			-0.0066	
			(0.0527)	
Active			-0.0682	**
			(0.0197)	
N	1285		277	

*** p<.01, **p<.05,
*p<.1