Stadium Subsidies, Public Choice, and Property Values

A Test of the Homevoter Hypothesis in King County, Washington

An Honors Thesis for the Department of Economics

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Abstract

This paper examines the applicability of William Fischel's "homevoter hypothesis" to the 1997 referendum on subsidizing a new stadium for the National Football League's Seattle Seahawks. According to Fischel's hypothesis, homeowners vote for proposals that will increase their property's value and against those that will decrease their property's value. If the homevoter hypothesis explains voter behavior in this instance, then voters who perceive that their home value will increase – via "noisy signals" from sales in their local neighborhood – will be more likely to support the proposal. This paper has two empirical steps: a hedonic analysis to quantify the stadium's impact on property values and an analysis that connects these price effects to voting results in King County, Washington. The results indicate a very small negative stadium price effect, but do not find a strong correlation between this effect and actual voting results. They yield underwhelming support for the homevoter hypothesis but add valuable depth to literature on this topic.

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Table of Contents

I. Introduction ……. 5
II. Literature Review …….. 9
Subsidies: Economic Theory and Application to Sports ……... 9
The Return on Stadium Subsidies ……. 11
The Homevoter Hypothesis …….. 18
Model Study ……... 21
III. Background ……. 23
IV. Data …… 27
V. Hedonic Analysis: Empirical Model and Results …… 33
VI. Voting Analysis: Empirical Model and Results ……. 41
VII. Conclusion……. 47
VIII. Tables…… 49
IX. Bibliography…… 60

I. Introduction

> With this big, hundreds-of-millions-of-dollars stadium, people from Eastern Washington can watch the games on TV and say, 'Gee, I'm sure glad that Western Washingtoners have such a pretty place to watch football, that their kids might someday, play soccer in there...' [Eastern Washingtoners] see schools in decline, they see migrant children who need to be taught English, they see roads that need care, and land that needs irrigation. The Seahawks? They see them on TV, wherever they might be playing, knowing the game is broadcast from Seattle means little to them. Welfare for pro sports doesn't cut much hay with them. So they vote against it, knowing that it'll do no good, knowing it'll just add to the disbelief, to the head-shaking back in the West, knowing full well that they are to be saddled with another darling of the West.
>
> Tom Stewart, Seattle
> Letter to the Editor, *Seattle Times*
> June 21, 1997

On June 17, 1997, the state of Washington held a special election to determine whether taxpayers would contribute over $300 million to a new stadium for the Seattle Seahawks of the National Football League. Much to the chagrin of residents like Tom Stewart, Referendum 48 passed with a slim 51.1% majority. Residents living closer to the stadium – particularly in King County, where it was to be built – showed more support for the subsidy than did those living further away. This voting pattern raises an important question: why do some residents enthusiastically endorse projects like the one in Seattle, while others believe them to be a huge waste of public funds? One possible explanation is that voters evaluate the merits of a proposal based on how it will impact their property value. According to the "homevoter hypothesis," as advanced by economist William Fischel, residents vote for proposals that they believe will produce net benefits for them by increasing their property's value (Fischel, 2001). Using King County election results and contemporary property value data, this paper seeks to test the applicability of the homevoter hypothesis to Referendum 48.

Identifying voters' motives in this specific instance can help shed light on the increasingly popular trend of subsidizing sports stadiums. Around the mid-twentieth century, governments began directing public funds to the construction of professional sports teams'

stadiums. From 1990 through 2004 taxpayers subsidized well over one half of all new stadium costs, and this trend has continued over the past few years (Moylan, 2007; p.6). For example, the Minnesota Twins recently built Target Field with $392 million raised by an increase in the local sales tax and the Dallas Cowboys now play in a stadium financed with over $325 million of public funds. Currently, both the Minnesota Vikings and San Diego Chargers are threatening to move if taxpayers do not subsidize new venues. Governments have funded these subsidies through bonds, increased sales and hospitality taxes, taxes on ticket purchases, state lottery revenues, decreased land costs and property taxes, and other similar measures.

Despite the prevalence of stadium subsidies, the clear consensus among economists is that sports teams and stadiums do not produce any net positive benefit for the surrounding area. An extensive body of literature shows that a team or stadium's impact on local income, business, employment, tax revenues, crime rates, and related industries is negligible and occasionally even negative. With this knowledge, why do governments continue spending millions of tax dollars on these projects? Proponents argue that the most valuable benefits of a team or stadium cannot be quantified, and that intangibles such as civic pride or international reputation are sufficient to justify the subsidies. Political pressures also account for some of the discrepancy, as representatives are eager to boost their image by retaining the beloved home team and are also manipulated when sports leagues play cities off of each other by threatening to move.

The fact that many of these subsidies require voter approval before they can be enacted suggests there may be another explanation. Traditional public choice models hold that voters will support a proposal if its expected net benefit exceeds its net cost. William Fischel's "homevoter hypothesis" goes further by positing that residents vote according to a proposal's anticipated impact on their largest asset – their home. They tend to support projects that will

increase property values, such as improving schools or protecting the environment, because they expect a return when they eventually sell their home. While there are a few empirical studies of this hypothesis, only one pertains to stadiums. Dehring, Depken, and Ward (2008) evaluate its applicability to the 2004 referendum on the Dallas Cowboys' new stadium and find that voting results are somewhat consistent with the hypothesis. Other papers analyze the impact of a new stadium on property values, but not specifically in the context of the homevoter hypothesis.

This paper adds to this small collection of literature by testing the homevoter hypothesis in the case of the 1997 referendum on a new stadium for the Seattle Seahawks. In 1996, Microsoft billionaire Paul Allen announced his desire to buy the Seahawks from owner Ken Behring, conditional on the guarantee that the public would finance a new stadium. At the same time, the public was already spending $372 million to build a new field for Major League Baseball's Seattle Mariners. A referendum to subsidize a new Mariners' park had failed in September of 1995, but the team's postseason success renewed public interest and in October the Washington State Legislature approved a new funding scheme that did not require a popular vote.

Allen provided over $4 million to fund a statewide special election on June 17, 1997 for Referendum 48, which asked, "Shall a public stadium authority be authorized to build and operate a football/soccer stadium and exhibition center financed by tax revenues and private contributions?" (Ammons, 1997) The question passed with 51.1% in favor of the proposal (Ammons, 1997). Pursuant to the legislation's directions, the Washington State Public Stadium Authority was established to represent residents and work with Allen's First & Goal Incorporated on the stadium construction, which lasted from 2000 to 2002 ("Project History," 2004). Washington's taxpayers contributed more than $300 million of the project's $430 million price

tag, and the funds were raised from state lottery games, the venue's admissions and parking taxes, sales tax credits and deferrals, and an extension of the 2% tax on hotel rooms in King County (Schaefer May 9,1997; Schaefer and Carpenter, 1997; Almond, 1997). Opened in 2002, Seahawks Stadium was later renamed Qwest Field and is now home to both the Seattle Seahawks and Major League Soccer's Seattle Sounders Football Club.

This study builds on the work of Dehring, Depken, and Ward (2008) in several ways. My empirical analysis includes a greater range of property characteristics and precinct demographics, a larger sample size of property sales and ballots, and vote results from a very similar referendum that took place just two years earlier and that may serve as a control variable for voter preferences on the topic. Additionally, the vote in Seattle was much closer than the one in Arlington, Texas (51% as opposed to 55% in favor, respectively), and this closeness will yield more precise regression results. In Section II, I discuss relevant literature regarding subsidization, sports stadiums, and the homevoter hypothesis. I present the data in Section III, then outline the econometric model and discuss the results of my two-step empirical process in Sections IV and V. Finally, Section VI ties it all together with a few concluding remarks.

II. Literature Review

SUBSIDIES: ECONOMIC THEORY AND APPLICATION TO SPORTS

Put simply, a subsidy is "a payment from the government that lowers the price or cost of some economic activity to individuals or businesses" (Fort, 2003; pp. 305-306). When a government subsidizes individuals or businesses, it effectively changes their behavior by altering their cost structure. They are able to supply a greater quantity or charge lower prices than they could have otherwise, and for this reason the subsidy helps not only the recipient but also its consumers. Subsidies do, however, have two major flaws. First, government involvement in the market could introduce inefficiency in the absence of the market failure that the subsidy is designed to correct. Subsidizing a business, industry, or individual could potentially create more problems than it solves. Second, the government must have extensive knowledge of the current state of the industry and be able to estimate how much money is necessary to increase supply to the desired amount. This information is often extremely difficult to find and quantify. In such instances, society may be better off without government involvement.

There are several justifications for using subsidies. In terms of efficiency, a subsidy can address problems created by externalities. When a good produces significant external benefits that are enjoyed by people who do not pay for it, its total benefit is not accurately reflected by the amount paid to the producer for its consumption. The result is underprovision – the producer supplies an amount that is lower than what is socially optimal. A subsidy ameliorates this situation by encouraging output to move closer to the welfare-maximizing amount. In terms of equity, a subsidy can promote certain values that a government or society considers important. For example, the American government frequently subsidizes domestic farmers in order to help them price competitively and stay in business. A subsidy can also affect income distribution,

support top priorities such as education, or advance similar initiatives.

The primary rationale for stadium subsidization is that sports exhibit positive externalities. Sports teams are a public good in that they are both non-excludable (people cannot be prevented from watching or enjoying a team) and non-rival (an additional fan does not reduce existing fans' benefit), and as such they produce public benefits for which the team cannot always charge. Fans can keep up with a team without ever spending a dollar to attend a game or buy a souvenir. Similarly, residents who do not even root for a team may benefit from its success if it increases civic pride and improves the city's reputation. Additionally, many team owners and politicians contend that the presence of a team can increase economic activity in the local area. Restaurants, hotels, and shops around the stadium can sell to fans attending a game, local media outlets may attract readers or viewers for the sports coverage, and out of town tourists may be drawn to visit and spend money in the area.

According to Rodney Fort, those are the two main externalities that justify stadium subsidization: increased economic activity and an improved local identity (Fort, 2003). Local residents benefit tremendously from these consequences of hosting a professional sports team, and would be greatly harmed if they lost the team. As Fort explains, however, teams cannot capture this benefit in ticket prices and related sales; these measures do not reflect the team's entire value to residents. The argument is that government should make up for the difference in order to ensure that its residents do not lose their team or its associated benefits.

As Fort (2003) points out, an important consideration in this discussion is that the four major professional sports leagues in the United States – football, baseball, basketball, and hockey – are all monopolies. Because they face no legitimate competitors, the leagues control their

respective markets. Although there are many cities that would love to host a team, the leagues restrict supply and carefully control the creation of new teams. Competition to host a team compels cities to offer financial incentives. Over the past fifty years, it has become increasingly common for cities to attract teams – or prevent them from leaving – by offering to build a new facility. Teams take advantage of this demand by playing various cities off of one another, threatening to move to whichever one can offer a new stadium.

THE RETURN ON STADIUM SUBSIDIES

Coates and Humphreys (2008) provide a compilation of the extensive literature on stadium subsidization, within which there is a stark contrast between studies by academics (mostly economists) and studies funded by interest groups. Studies by the latter group suggest that attracting or retaining a sports team can significantly boost the local economy. Economists, on the other hand, repeatedly and decisively conclude that sports teams and new stadiums provide no tangible economic benefit.

The reason for this discrepancy, as summarized by Coates and Humphreys (2008), is that the promotional literature suffers from both methodological and theoretical problems. First, building a stadium does not create new economic activity – it merely redistributes it. A new stadium may attract business and visitors from other parts of the city or even other states, at the expense of those regions. Although the narrowly defined local economy improves, from a global perspective there is no net change in economic activity. This idea will be important for my analysis because it links to the concept of "concentrated benefits and diffuse costs," which applies when a project will benefit only a small subset of those who pay for it (Musgrave and Musgrave, 1989). Those who benefit receive a disproportionate share of the project's value, and

thus have an incentive to go to the polls and ensure that the proposal passes. Everyone else, however, receives little or no benefit and pays a small amount (because the cost is spread over such a large group). Consequently, these individuals have less incentive to vote. They are not strongly impacted by either possible outcome, and thus do not perceive any compelling reason to go to the polls (Musgrave and Musgrave, 1989). In this situation, relative participation by different groups may explain why such a proposal is likely to pass. This is one possible explanation for the outcome in Referendum 48.

A similar type of realignment occurs with individuals' entertainment budgets. When individuals spend their disposable income on a sports team, they are simply spending money that would have gone to other entertainment businesses in the area. Because individuals' entertainment budgets are fixed, what they spend on tickets to a game or souvenirs merely decreases what they will spend on activities such as bowling, going to the movies, or similar alternatives.

Second, the "multiplier" of investment in a sports stadium may be largely overblown by promotional literature. Promoters claim that government contributions to new stadiums will produce greater than proportional economic activity as these funds are continually recycled through the local economy. The local multiplier for stadium subsidies, however, is much smaller than that for investment in other businesses. Players and owners, who are the primary recipients of a team's expenses, often do not live in the area and do not spend their earnings on local businesses. The multiplier for activities such as bowling is larger because it is more likely that the bowling alley's owners and employees live in the area. This difference explains why sports subsidies could potentially even reduce local income.

Finally, stadium subsidies have significant opportunity costs. These tax dollars could be spent on a variety of alternatives, including those, such as education, which may have greater popular support and be more likely to yield a positive return. They also could not be spent at all, and instead allow the government to reduce taxes.

For all of these reasons, Coates and Humphreys conclude that the promotional literature is not credible. Academic studies, on the other hand, avoid these common errors and produce a more accurate analysis of stadium subsidization. Regardless of the specific metric, geographic area, time period, or econometric model used, these studies consistently show that stadium subsidies fail to produce tangible economic benefits. Economists have tested the effect of stadium subsidies on virtually every measure of economic activity: income, employment, downtown revitalization, tax revenue, and effect on related industries. Coates and Humphreys' own study (2000) suggests that the presence of a sports team may even reduce real per capita income. They attribute this possibility to substitution in public and private spending, residents' willingness to accept lower incomes in order to live in an area with a sports team, and a team's negative impact on worker productivity.

A related collection of studies assesses the sports industry's economic impact in general. Several authors show that hosting a "mega-event," such as a playoff game or the Super Bowl, does not significantly boost the local economy. Coates and Humphreys (2001) similarly conclude that strikes do not cause any statistically significant change in per capita income. The takeaway from such studies is that the sports industry is very small and does not have a tremendous influence on the larger economy. Baade (1996) points to this fact when explaining why adding a sports team cannot, on its own, revitalize a deteriorating urban economy. Sports play a large role in Western culture and consequently seem very powerful, but the reality is that

the sports are tiny compared to most large corporations and other industries.

One final negative finding is that stadium subsidies are highly regressive. Although promoters often argue that building a new venue will reenergize a downtrodden area and lift up its residents, the reality is that lower income residents are the most harmed. In Sports, Jobs, and Taxes, Noll and Zimbalist (1997) discuss the redistributive implications of these subsidies. More than half of sports teams' revenues go to players, coaches, and executives who earn well above the median income. Additionally, financing the subsidy with sales or property taxes, or through lottery revenues, is regressive because the poorer individuals spend a greater portion of their income on consumption of such good and services. The end result is that the government effectively transfers money from the average to some of the wealthiest citizens – another direct contradiction of the promotional literature.

While most academic studies have failed to find any benefits associated with sports teams or stadiums, a small minority have found inconsistent positive effects in two areas: "intangible" factors and property values. Economists have repeatedly tried to study intangibles like regional unity, civic pride, and happiness because promoters cite these as some of the most compelling reasons to want a sports team. Because these qualities are so difficult to quantify, however, they are studied far less than tangible metrics like income and employment. Coates and Humphreys contend that the consistent findings on "tangible" factors is enough to conclude that stadium subsidization is a poor investment, because the "intangibles" will not be large enough to justify the costs. Yet many economists have nevertheless tried to quantify these factors.

The most common way to measure these intangible factors is through hedonic models, which decompose the value of a sports team into separate parts. Using this method, Carlino and

Coulson (2004) find that cities with NFL franchises experience an 8% increase in annual rents. This dramatic increase suggests that keeping a team may be worth the cost of a stadium subsidy. Intangibles can also be measured through surveys. Kavetsos and Szymanski (2008) use a survey covering twelve European countries to assess the significance of three events: the Olympic Games, FIFA World Cup, and UEFA European Championship. While they find that a "feelgood factor" is associated with hosting football events, their results show that national athletic success is not correlated with general happiness. Rosentraub and Swindell (1998) show that hosting a sports team can increase the city's overall pride. And although they cannot quantify their claims, Chema (1996) contends that a stadium's most important benefit is the "spin off" business that it creates, while Rosentraub (1996) asserts that a city must host a team in order to have a reputation within mainstream Western culture.

Similarly, the evidence of stadium impact on local housing prices is mixed. Several studies show that the presence of a stadium increases local property values. Tu (2005) uses a combination of methods to analyze the changes in property values surrounding the Washington Redskins' FedEx Field. Hedonic pricing models show that properties near the field sold at a discount, but a difference-in-difference analysis suggests that this discount existed before and actually decreased when the stadium was announced and then built. The price improvement was greater for properties closer to the stadium, up to a distance of 2.5 miles. Ahlfeldt and Kavetsos (2010) examine the New Wembley and Emirates stadiums in London, noting that there is a significant anticipation effect that boosts local property values after a new stadium is announced. Additionally, the presence of a new stadium can increase property prices by up to 15%, with the greatest effect on properties closest to the stadium, and that this effect is still significant three kilometers away. They suggest that a stadium's unique aesthetic qualities can increase its effect

on nearby properties, and thus recommend that subsidized stadiums be part of a comprehensive urban design strategy. And finally, as mentioned earlier, Carlino and Coulson (2004) found that the presence of a NFL franchise can boost local rents by up to 8%.

Kiel, Matheson, and Sullivan (2010), however, challenge the significance of these findings by showing that housing prices must be considered in addition to rents. Their study indicates that housing prices, unlike rents, are unaffected by the presence of an NFL team. Furthermore, evidence from subsidized stadiums shows that a greater subsidy is correlated with a larger decrease in local house values. The capitalization of a subsidy's cost (through increased tax burdens) can cancel out any external benefits of a team, thus rendering no net change.

The apparent discrepancy on housing prices can be attributed to several possible factors. While all papers use some variation of a hedonic pricing method, the exact implementation and data sets are vastly different. Tu (2005) only studies FedEx Field and Afheldt and Kavetsos (2010) only study the New Wembley and Emirates stadiums in London, while Carlino and Coulson (2004) and Kiel, Matheson, and Sullivan (2010) examine more general data on large cities in the U.S. over a period of time. Furthermore, a key flaw in the Carlino and Coulson (2004) paper may explain the contradiction between the latter pair of papers. In their analysis of this study, Coates, Humphreys, and Zimbalist (2006) point out that Carlino and Coulson perhaps edit their data set too far, removing units with very low rents and thus skewing the results on the effect of an NFL team. Finally, it is important to remember that other factors play a role in a given stadium's local impact. The method of funding a subsidy, team's success, and local sports atmosphere are only a few of many factors which could possibly cause the differences between various studies – especially when considering those that examine only one or two stadiums, as opposed to a collection of projects over many years.

Although the results on property values are inconclusive, they present an interesting application to public choice patterns. If most economic variables are unaffected by a team or stadium and the impact on intangible factors is unknown, why would residents vote to spend some of their tax dollars on a new stadium? The hope for increased property values could potentially help answer this question. If residents believe that their own house price will benefit from having a stadium nearby, then perhaps this is enough to win their vote. The property value literature shows that homeowners potentially have a lot at stake when a stadium subsidy is proposed, and consequently they will tend to be more politically active and invested in the referendum's outcome. In order to study voting behavior on such referenda, homeowners who vote will be the most crucial. It will also be important to consider the distribution of changes in property values; the existing literature repeatedly shows that homes closer to the stadium generally enjoy a larger price boost, up to around three miles away from the stadium. This distribution may prompt those residents living closest to the stadium to feel strongly about the vote, and perhaps will produce a clear voting pattern.

There are two related issues that must also be kept in mind. First, how is the subsidy being financed? Sports stadium subsides come from a variety of sources including increased taxes (for example, sales taxes or hospitality taxes in the area surrounding the stadium), lottery revenue, and bonds. The subsidy source can significantly influence voter behavior depending on how much of the stadium's cost residents perceive they are paying, relative to the benefits they expect to receive. For example, residents such as Tom Stewart (quoted in the Introduction) who live far from the stadium may be against the subsidy if they are going to carry the burden of increased taxes but do not expect to reap the benefits of the new facility. This relates to the second phenomenon, the economics idea of "concentrated benefits and diffuse costs" (Musgrave

and Musgrave, 1989). If a stadium is funded through a general sales tax increase across a county or state, then there may be a discrepancy between who is bearing the burden of the stadium cost versus who is enjoying it. The costs are "diffuse" because they are spread among many residents, while the benefits may be "concentrated" on those residents living close to the stadium, who can more easily attend games and enjoy the external benefits provided to the surrounding economy. As explained earlier, voters like Mr. Stewart may resent that they do not profit from the new stadium like those in its vicinity do, but because each voter pays only a tiny fraction of the overall cost these voters may be less likely to vote. In stark contrast, those living closer to King County and who expect to reap the benefits of a new stadium will be strongly compelled to vote in favor of the project. This discrepancy in voter turnout could potentially explain why a vote such as Referendum 48 could pass, even if the overall costs exceed the benefits.

THE HOMEVOTER HYPOTHESIS

Expected effects on local property values may influence voter behavior. Sonstelie and Portney (1980) were the first to hypothesize that homeowners vote according to predicted property value changes, but William Fischel (2001) was responsible for truly developing this theory. In what he calls the "homevoter hypothesis," Fischel posits that homeowners vote for policies they expect to increase, or at least preserve, their home value and vote against policies they expect to decrease their home value. "Homevoters" are homeowners who vote in local elections and who usually comprise the most numerous and politically active group in a community. An important concept in this theory is "capitalization," the process by which the future value of various characteristics is factored into an asset's present value. For example, the presence of high quality public schools raises local house prices because people are willing to

pay more for the ability to send their children to good schools. Alternatively, the presence of a dump can be capitalized into – and thereby reduce – property values of houses in an adjacent neighborhood. Other factors that can be capitalized into home values include tax rates, public safety, and environmental conditions.

Why do homeowners vote in this manner? Because most individuals' greatest asset is their home, they have a significant interest in protecting its value. Fischel compares homeowners to shareholders in their local government "corporation." One important difference between shareholders and homeowners, however, is that owning a home is riskier; owners cannot diversify their ownership across multiple houses and do not have many options beyond traditional insurance to protect it from devaluation. When homeowners consider a proposed policy, they do not consider the expected outcome – instead, they focus on the variation in possible outcomes. A homeowner considering a proposal to build new homes in his neighborhood, for example, does not feel at ease because the most likely result is that his home value will increase. He worries about the statistical variance, or possibility that the new homes will somehow reduce his property value. Unless this variance is very small, he is likely to oppose the proposal. Although this thought process is perfectly rational, it can lead to behavior that others consider overly self-interested and pessimistic – the so-called "NIMBY" ("not in my backyard") syndrome.[1]

[1] Fischel extends his theory of voter behavior to several controversial conclusions that are interesting to note despite the fact that they do not apply to the stadium referendum at hand. Because homevoters are the most influential group in most communities, the central motivator of local government is therefore a concern for home values. He also claims that when homeowners act according to property value effects, they "make political decisions that are more efficient than those that would be made at a higher level of government" (Fischel, 2001; p. 4). Local government outcomes are more efficient because the decision-makers – homevoters – are particularly familiar with local conditions and can better anticipate the effects of proposed policies. Their cost-benefit analysis produces more socially optimal outcomes than the decisions of less involved actors at higher government levels would. It is crucial to note, however, that

There have been very few empirical studies on the homevoter hypothesis. Brunner et al. (2001) tested whether voting patterns were consistent with the theory in the case of a 1993 California school voucher initiative, however their results were inconclusive. Brunner and Sonstelie (2003) then examined a similar 2000 California initiative, and again assumed that the voucher would decrease property values in neighborhoods with higher quality schools and increase property values in neighborhoods with lower quality schools. Their results are consistent with the homevoter hypothesis; it was only 39% likely that voters in neighborhoods with superior schools favored the voucher, while it was 56% likely that those in neighborhoods with inferior schools favored the voucher. This evidence suggests that homeowners voted to protect their property values.

Hilber and Mayer (2006) take a different approach and use the homevoter hypothesis to explain why some residents without children support spending on education. Using the supply of vacant land as a proxy for the possibility of capitalization, they find that towns with less developed land tend to spend more on education and to notice a greater increase in property values as a result of such spending. In addition, per pupil spending is positively correlated with the percentage of developed land; this relationship is stronger in communities in which the median voter is a homeowner and strongest in communities with a high proportion of elderly residents. These results lead Hilber and Mayer to conclude that education quality is capitalized into house prices, and to a greater extent in more developed communities. Because they consider a proposal's effect on their home prices before voting, homeowners will often favor spending on durable local public goods even if they do not directly use the good or plan to move in the near

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Fischel's analysis only holds true when costs and benefits occur within a locality; otherwise, public choice decisions are not necessarily efficient. Therefore his extensions do not apply to the case of Referendum 48, in which costs are spread and there is not perfect correspondence between who pays the project's costs and who reaps its benefits.

future.

MODEL STUDY

This paper's analysis is based on a study titled "A Direct Test of the Homevoter Hypothesis" by Dehring, Depken, and Ward (2008). The authors perform the first test of the homevoter hypothesis with respect to a large public project – in this case, subsidizing a new stadium for the Dallas Cowboys in Arlington, Texas. They examine the relationship between voting patterns (the subsidy passed with a 55% majority) and expectations of the stadium's effect on local property values using a two-step process. First, the authors determine how events signaling that the stadium is more likely to be built influence property values. The two pre-vote announcements indicate to residents that the probability of building the stadium is increasing, and the subsequent changes in house prices are "noisy signals" to homeowners that indicate how the new stadium will affect the value of their homes (Dehring, Depken, and Ward, 2008; p.155). By using a hedonic method for this step, the authors are able to observe the stadium's impact across time and across various distances from the stadium location. Second, the authors link results from the first step, as well as demographic data, with voting records from the November 2004 referendum. The connection indicates how the expected property value increases influence homeowner voting behavior.

The authors' results suggest that homeowner support is positively correlated with anticipated changes in house prices, which is consistent with the homevoter hypothesis. Homeowners take expected house price changes into account when voting, effectively weighing the costs and benefits of the project overall. Dehring, Depken, and Ward find that homeowners who expect a greater property value boost are more supportive of the stadium subsidy; support

increased between 0.9% and 1.2% for every $1,000 increase in house prices. Those expecting a greater price increase, however, were also less likely to vote than those who expecting a greater price decrease; there was a 1% decrease in voter turnout for every $1,000 increase in house prices. Other interesting findings include that there were no property value effects beyond three miles from the stadium, homeowners in general were less supportive of the subsidy, and voters in districts without any house sales (and thus no indicators of the stadium's effect on property values) were more likely to support the subsidy.

Dehring, Depken, and Ward's paper is unique for several reasons. Most obviously, it is the first direct test of the homevoter hypothesis in the case of a large public project. It is also the first which tests voting behavior in response to pre-vote property value changes, or so-called "noisy signals." Additionally, by combining temporal and spatial factors the authors are able to paint a more complete picture of voter behavior. My analysis will build upon Dehring, Depken, and Ward's framework and add further evidence on the ability of the homevoter hypothesis to explain voting behavior for stadium subsidy referenda.

III. Background

The Seahawks had played at the Kingdome since the team's inception in 1976 (Goldberg, 1997). They shared the stadium with various other teams, including the Mariners. By the 1990s, many fans, sports writers, and players criticized the stadium for being outdated (Goldberg, 1997;

Pappas, 2000). It was significantly worn and lacked modern amenities, such as luxury boxes, that were becoming standard in all professional stadiums and would help increase revenue.

After an unexpected run in the 1995 playoffs, the Mariners pushed for a new venue of their own. In September 1995, Washington voters narrowly defeated a proposal to raise King County's general sales tax in order to build a new ballpark for the Mariners and renovate the Kingdome for the Seahawks ("The Stadium," 1999; Marwaha, 1997). State legislators, however, found an alternative way to fund the new park through restaurant, tavern, and car rental agency taxes (Marwaha, 1997). Because this new arrangement did not require a public vote, it angered many residents who felt their votes had been worthless (Schaefer, June 8, 1997).

The campaign for a new Seahawks stadium began shortly after the Mariners' plans were underway. Owner Ken Behring, a California developer, threatened to move the Seahawks to Southern California in early 1996 (Almond). Afraid of losing their football team, Seattle residents and legislators began pushing for a new stadium that would tempt the team to stay. Around this time, Microsoft co-founder and Mercer Island resident Paul Allen expressed his desire to buy the team from Behring. In April 1996, Allen, who was also the owner of the National Basketball Association's Portland Trail Blazers, paid Behring $20 million for a fifteen-month option to buy the Seahawks that expired on July 1, 1997 (Almond, Jan 1997; Schaefer, June 8, 1997).

Allen announced that he would not buy the team unless a new stadium was built, and insisted that Washington taxpayers should pay for most of the construction costs (Schaefer 6/8/1997). Bob Whitsitt, president of Football Northwest, which Allen created to oversee the Seahawks purchase, argued that a new stadium was essential to make the team financially viable;

the Seahawks were projected to lose $17 million in the 1997 season and $10 million in the 1998 season (Almond, Jan 1997; Almond, Jun 1997).

There were many suggestions for a new home for the Seahawks, ranging from renovating the Kingdome to moving to the University of Washington's Husky Stadium. On December 5, 1996, however, Allen officially rejected proposals to renovate Husky Stadium. And on December 9th, Whitsitt confirmed that Allen would only buy the team if a new stadium were built (Almond and Schaefer, 1996). Because these announcements confirmed that an existing venue would not suffice, this week will be used as the first "announcement date" in my regression analysis. It marks the time period when King County residents became positive that, if the Seahawks were going to stay, a completely new stadium would be built.

It was largely accepted that the new stadium would be built near the Kingdome's location, in King County. In early March 1997, the Greater Seattle Chamber of Commerce approved Washington Governor Gary Locke's funding proposal, and on April 25th the state legislature officially approved the Seahawks Funding Plan and set the date for a statewide vote on June 17 (Eigsti and Watt, 1997). I will use this April date as the second "announcement date," as it significantly increased the probability that a new stadium would be built.

In the three months leading up to the June 17 vote on Referendum 48, both supporters and opponents of the new stadium campaigned heavily. Allen spent roughly $6.3 million dollars on his "Our Team Works" campaign while opponents in "Stop Stadium Madness, " "No on 48," "Coalition Against Unfair Stadium Taxes," and "Citizens for More Important Things" relied on grassroots efforts to compensate for their lack of funding (Schaefer August 12, 1997; Schaefer May 28, 1997; Carpenter and Schaefer, 1997; Schaefer May 9, 1997).

Referendum 48 outlined a full funding plan to tear down the Kingdome, pay off all remaining Kingdome debt, and build a new complex featuring a stadium, exhibition hall, and parking garage (Schaefer May 9, 1997). The project was estimated around $425 million, and Allen agreed to pay for all expenses above the public's $327 million contribution through a combination of his own money and personal seat licenses (Goldberg, 1997; Almond, Jan 1997). The public would own the stadium but Football Northwest would be in charge of design, construction, maintenance, and operations (Schaefer May 9, 1997). Football Northwest would also keep 80% of the exhibition hall profits and 100% of the stadium's ticket, concession, and naming right profits (Schaefer, June 8, 1997). Allen made it clear that he would not buy the team – which Behring agreed to sell for $200 million – unless the vote passed (Schaefer, June 8, 1997).

All Washington residents could vote on Referendum 48; however, King County residents had the most at stake. Taxpayers would fund their $325 million contribution from five new statewide lottery games, a 10% tax on stadium tickets and parking, a $101 million sales tax credit, and extending the 2% tax on hotels and motels in King County through 2020 (Schaefer May 9,1997; Schaefer and Carpenter, 1997; Almond, 1997). And although Referendum 48 was officially scheduled for June 17, residents in twenty-seven of the state's thirty-nine counties – not including King County – could only vote through mail-in ballots that were sent out several weeks in advance (Schaefer June 8, 1997). In the end, Referendum 48 passed with 51.1% of the vote – 820,364 votes in favor versus 783,584 votes against (Ammons, 1997). For a timeline of all events, see Table 1.

IV. Data

The analysis is broken into two steps. The first step is a hedonic examination of how King County property values change in response to announcements indicating that the new

stadium is more likely to be built. The second step relates average property value changes in each precinct in King County to vote shares on the 1997 stadium referendum.

The first components of my base dataset are transactional data on real estate sales in King County. I downloaded these data, called "Real Property Sales," from the King County Department of Assessments website. Following Dehring, Depken, and Ward (2008), I intended to keep all residential property sales. The data I acquired, however, did not allow for this – there were an insignificant number of apartments in the data so I dropped the few that were present. In addition, most condominiums that appeared in the sales data could not be located in the GIS database used to determine distances from the stadium. As a result, I was forced to drop condominiums as well.

I also omitted all sales that were clearly not the type of transaction I am studying. For example, I removed cases when it appears that a homeowner simply transferred the property to a family member for a selling price of $0. I identified such transactions because they each had been tagged with "sale warnings;" I omitted any sales with sale warnings from my data.

The two announcement dates I chose were December 5, 1996 (when Allen dropped the bid to renovate Husky Stadium, which was closely followed on December 9th by Bob Whitsitt announcing that Allen would only buy the team if a new stadium were built) and April 25, 1997 (when the state legislature passed the Seahawks Funding Plan and set the vote for June 17). I kept data on sales that took place on or after July 1, 1996 through December 31, 1997. The six months of sales data prior to the first announcement provide a baseline for property values in the area, to which I compare later sales. I chose not to go further back than July 1996 in order to avoid any lingering effects of the September 1995 vote on and October 1995 legislative decision

to build a new Seattle Mariners ballpark. I keep sales past the vote date because there is often a lag between when a property is sold and when the sale is officially recorded. I want to be sure to capture sales that neighbors heard about before the vote date, even if they were not officially recorded until months later. Allowing for this administrative delay ensures that I am capturing as many of the sales – or noisy signals – that neighbors are witnessing as I possibly can. Following Dehring, Depken, and Ward (2008), I assume a 30-day lag between when a sale is agreed upon and when it is officially recorded. The effect of this decision is that I handle each announcement as taking place exactly 30 days later – for example, the first announcement is treated as taking place on January 5, 1997 rather than December 5, 1996.

To these transaction data, I then added distance data on how far each property, or "parcel," was from the stadium site. I received 1997 and 2001 Geographic Information System (GIS) data from the King County GIS Center, and used ArcMap software to calculate the distance from the center point of the stadium parcel to the nearest boundary of each parcel in King County. Originally I had intended to only use the 1997 parcel file. However, due to the fact that GIS technology was only newly implemented in King County around 1997, I added the 2001 data to reduce the number of entries that would have to be dropped because they were not present in the 1997 GIS data.[2] Before merging it with the sales data, I first removed certain entries from the distance data. I dropped all entries for which there was no property identifier, which, according to my quick perusal of the properties, included mostly roads and other properties that were unlikely to be residential. I also omitted entries for which the property identifier contained a signal that the property was not of interest to me.

After merging these various data, there were several hundred "problem" parcels,

[2] There were also 140 parcels that were not in the GIS dataset, thus in order to determine their distances from the stadium and voting precincts I used current (2011) geographic data.

including duplicates and discrepancies.[3] To resolve these problems so that there was only one parcel for each "PIN" ("Property Identifier Number"), I applied a standard set of rules. Between duplicates with identical attributes except for the house's sale price, I kept the greater price. Between duplicates with identical attributes except for distance from the stadium, I kept the greater distance. These distance discrepancies were generally extremely small, often only a small fraction of a mile. Between duplicates with identical attributes except for precinct and distance from the stadium, I chose the precinct that included the larger portion of the property, which I determined using my GIS data.

The last components of my base dataset were parcel descriptors, such as property size and house attributes. I collected these data from two sources. First, I downloaded the "Parcel" file from the King County Department of Assessments website.[4] This file contains attributes for the properties as they *currently* are, so I only kept those descriptors that were likely to have remained the same, such as proximity to a waterfront or views of certain geographic points of interest. Second, I used house and property characteristics that were included in the GIS files. These files contained data such as number of stories or lot size on the houses in 1997 or 2001. These data were essential to include in my analysis in order to remove the possible effects of house attributes on property value. My final dataset has over 37,500 properties.

The definitions of the various variables are shown in Table 2 and their summary statistics are listed in Tables 3 and 4. All summary statistics are as expected, with no surprising means or

[3] There were also approximately 1,500 parcels for which I had no information in the distance data. I was unable to find the distance and parcel information using outside sources, and thus had no other option but to leave these parcels with missing data, meaning they were dropped from my hedonic analysis.

[4] There were 395 parcels that were not found in the "Parcel" file, and thus had missing entries for the attributes from this file. They were omitted from any regressions using the various parcel attributes.

variations.

I added two more pieces to my base dataset: demographic characteristics for each King County precinct from the 2000 Census of Population and Housing and voting results from the 1995 and 1997 referenda on new stadiums for the Seattle Mariners and Seattle Seahawks.[5] The summary statistics for these data are shown in Tables 5 and 6, respectively. One thing worth mentioning is that Referendum 48 was a statewide vote. In King County only, support for the proposal was 58%, but areas further from the stadium location showed much less support and thus throughout all of Washington the ballot passed with only 51.1% in favor.

Because these data were all aggregated to the precinct, rather than parcel, level, I had to assign each parcel to a voting precinct in order to use them. The voting precincts in King County are adjusted or redistricted on a regular basis, which presented some problems for my analysis because I am combining data from various years. I decided that the base precinct list would be precincts in 1997, according to data I received from the King Country Elections Office. To assign each parcel to a precinct, I used the GIS software to perform a spatial join between the voting district map and the parcel map. The earliest voting district map for King County, however, was created in 2001. Since all parcels were assigned to 2001 precincts, I created a crossover file that listed how each 2001 precinct converted into a 1997 precinct (by either being torn apart, combined with other precincts, or left alone) and collapsed the data so that the parcels were assigned to 1997 precincts.[6] I assumed equal population density for this procedure, in order to estimate the number of voters in those precincts that were divided or merged together. When

[5] Thanks to Sean Corcoran for supplying the Census data.

[6] To create this crossover I used a master list of annual precinct redistricting and legislative district maps that showed changes in the voting precincts. Thanks to Dave Wilson and Katrina Sroufe at the King County Elections Office for providing me with the necessary files.

allocating the Census demographic data to these revised precincts, however, I used a population-weighted average to determine the various characteristics.

There were a few problems within the completed dataset that I could not resolve. My final 1997 precinct list was missing six precincts that were in the Census data and I was unable to determine how these 2001 precincts could be translated into 1997 precincts. But this inability to include these six precincts is not too significant, as they each included few, if any, voters. Three of them had no registered voters at all and, of the three that did have registered voters, at most one was relevant.

Additionally, there were fourteen precincts in my voting data that were missing from the Census records. I was unable to determine why these precincts were missing or find the descriptive data myself. These precincts were still included in every part of the analysis except for those using the Census precinct attribute data. Additionally, the Census data lacked any information on renters, which I would have liked to incorporate into my analysis.

The definitions and notations for these variables can be found in Table 2 and their summary statistics are listed in Table 5. My data is lacking certain variables compared to Dehring, Depken, and Ward (2008), including standardized test scores that reflect the quality of local schools. This is not a great concern, however, because these attributes were not statistically significant in their analysis and also because the testing program in place in Washington at the time was less publicized and had lower stakes than the one that they analyzed in Texas. Additionally, I cannot include data on the distance from various parcels or precincts to noteworthy downtown areas, such as central Seattle, because the stadium is too close to the city center.

Although my data have some limitations compared to that of Dehring, Depken, and Ward (2008), they also have some advantages. First, the Seahawks' stadium referendum was a much closer vote than the Cowboys' referendum in Texas (51.1% versus 55%). A closer vote suggests that there was perhaps more diversity in the expected effect of the stadium on local property values in Seattle. The data on Seattle, therefore, may provide a more accurate analysis of the applicability of the homevoter hypothesis. Second, the 1995 referendum on building a new Mariners stadium in Seattle provides a baseline against which I may compare the 1997 Seahawks vote results. This comparison will allow me to control for voters' preferences and further isolate the effect of property value changes on voting patterns. There was no such prior vote in Arlington, Texas to allow for a similar comparison. Finally, my data use a much larger sample size. Dehring, Depken, and Ward (2008) use a dataset that includes 3,108 sales transactions from a 12-month period and 113 voting precincts in the city of Arlington. My data include over 35,000 sales transactions from an 18-month period and over 3,000 voting precincts. This larger sample size will increase the accuracy of my analysis and improve my ability to comment on the homevoter hypothesis.

V. Hedonic Analysis: Empirical Model and Results

The first step of this analysis uses a hedonic model to determine the effect of various independent variables, most notably distance from the stadium and sale date relative to various stadium-related announcements, on the sale price of single-family homes in King County.

As discussed in Section II, there is extensive debate among scholars on whether a new stadium will affect the local area positively, negatively, or not at all. Some economists contend

that a new stadium will improve the local economy through "spin off" business growth (Chema, 1996), increased tourism in the area, and intangible boosts to civic pride and unity. If homeowners expect these positive "amenity effects" to exceed any additional tax burden then the demand for houses in the area will increase and, with a fixed supply of houses, home prices will increase (Dehring, Depken, and Ward, 2008).

Conversely, the new stadium could negatively impact the surrounding area. The inconvenience from construction, traffic congestion, crime, and funding an increased police and fire force all have the potential to make living near the stadium less attractive. Thus demand would decrease, or at least not increase as much, and house prices would not rise as much or potentially even fall.

I expect for there to be both positive and negative stadium effects on house prices, and I expect for the net effect to depend on proximity to the stadium site. I also expect for the effect to change in response to announcements before the referendum. After Paul Allen and state legislators made announcements that increased the likelihood of the stadium being built and affirmed that it would be built in the same location as the Kingdome, residents observed nearby house sales and took higher or lower prices as noisy signals of how the local market would respond once the new stadium was built (Dehring, Depken, and Ward, 2008).

To assess the noisy signals perceived by local homeowners, I specified the following empirical model:

$$\ln(\text{Price}_i) = ß_0 + ß1\text{Dist}_i + ß_2\text{Dist}^2_i + \sum^3_{j=1} ß_j\text{Dist}_i*\text{Annc}_j + \sum^3_{j=1} ß_j\text{Dist}^2_i*\text{Annc}_j + \sum^{17}_{k=1} ß_k\text{Month}_i + \Gamma\text{Char} + v_i$$

Following Dehring, Depken, and Ward (2008) I set the logarithm of sale price as the dependent variable; using the logarithmic form will make for easier interpretation. The distance

component of this model allows for the price effect of the stadium to vary with proximity to the stadium. The quadratic distance term allows for the possibility that the price effect of the stadium changes at a certain distance, as represented by the inflection point in the quadratic function. As Dehring, Depken, and Ward (2008) point out, the stadium may be located in a "value peak" or "value crater" relative to the overall price landscape (p. 159). The stadium could have an adverse impact on prices of houses located very close to the stadium but a beneficial impact on house prices beyond a certain point, or vice versa.

This hedonic specification features two sets of dummy variables. One set corresponds to the two pre-referendum announcements and the vote itself (please see Table 1 for a timeline of events that highlights these three dates). Each dummy variable "turns on" if the given property sold after the selected date. Following Dehring, Depken, and Ward (2008) I assume that a sale takes 30 days to close. The other set features 17 dummy variables, each of which corresponds to a specific month. I am analyzing property sales during a time period of 18 months (July 1996 through December 1997), but leave the final month out of my regression in order to avoid collinearity. Thus December 1997 is the reference month to which the other months' coefficients compare.

Two final components in my specification include the distance-announcement interaction terms and the property characteristics. The interaction terms between distance and announcements are crucial to this model. These terms' coefficients express the marginal effect on house price of distance from the stadium after each of the three announcement dates. The property characteristics control for various attributes, ranging from lot size to waterfront views to population demographics, that influence house price.[7] Not including these attributes in the

[7] Using the property characteristics reduces the sample size by 1,132 observations because some of the 2001 data includes properties whose houses were built after 1997 (most likely after tearing

regression could potentially lead to omitted variable bias, in which coefficients on other independent variables are less accurate because they are picking up some of these characteristics' effects on house prices. Sample size drops slightly with each subsequent regression, as a result of adding data from other sources. I ran each regression with the most limited data set to verify that these data drops do not affect the results, and find that there is no substantive change in my results with this most restricted dataset. This confirms that the various dropped entries are indeed a random selection of data points and that doing so does not adversely impact my analysis.

Table 7 shows the regression results from my hedonic analysis.[8] For conciseness and clarity, I only show those variables that are most relevant to my study.[9] Each successive regression includes those variables that are either important to my hypothesis (namely, distance and the distance-announcement interaction terms) or statistically significant in earlier regressions, in addition to whichever new set of variables I am including. Because it includes the most significant property descriptors along with the Census demographic information, the fourth regression is most likely to accurately show the effect of each independent variable on sale price.

Most property attribute and demographic variables enter my regressions with the expected coefficients. Having a nice view, more bathrooms, and a higher percentage of college graduates in the area correlates with a higher sale price. Properties subject to airport noise and

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down the original house). I omit these properties, for which age appears to be negative, in order to ensure consistency in the data.

[8] I use standard errors that are robust to heteroskedasticity for all regressions in this section.

[9] All regressions also include month dummy variables, most of which were statistically significant, and various descriptive variables for the properties themselves. With a few exceptions, these variables all enter my regressions with the expected signs. The exceptions include erosion hazard, seismic hazard, number of bedrooms, and having a view of the Cascades – all of which had negative effects on house sale price.

landslide hazards have lower sale prices, all else equal. A higher percentage of white residents corresponds to a higher sale price, while a higher percentage of minority groups (such as black, Native American, Asian Pacific Islander, or Hispanic groups) corresponds negatively with sale price.

There were a few variables, however, that entered the regressions with unexpected signs. Number of bedrooms was negatively correlated with sale price, while coal mine, erosion, and seismic hazards were positively correlated with price. That a greater number of bedrooms decreases sale price may not be so surprising, however, considering that I hold house size constant in these regressions. Given a constant house square footage, increasing the number of bedrooms will result in smaller bedrooms and thus a decreased house value.

Interestingly, there is only a very weak correlation between house age and property value. Dehring, Depken, and Ward (2008) found this correlation to be quite strong in their analysis; each additional year in age corresponded to a 1.1% decrease in house value. possible explanation for this discrepancy in results is that the mean house age in my data was over ten years older than the mean in their data. Perhaps the fact that houses were overall older in my data reduced the importance of house age to sale price. Additionally, properties in my study are located in a relatively urban area while properties in the Arlington, Texas area are located in a suburban area. In the suburbs, it is often true that newer houses are considered more valuable while older ones are less valuable. The same does not hold true, however, in cities – often times, the older residences are often considered the nicest. This difference in valuation of house age could easily explain the opposite effects of age on property value in our two studies.[10]

[10] In addition to age, I also include a quadratic age term and an age-distance interaction term, both of which are statistically significant. The age-distance interaction term is negative, which suggests that house age becomes increasingly more detrimental to house price as properties get further away from the stadium and city center. This is consistent with the idea that age is a more

The variables that are most relevant to my analysis are distance from the proposed stadium site and the distance-announcement interaction terms. The distance and announcement effects on sale price for houses 1 mile, 5 miles, and 10 miles from the stadium are shown in Table 8. In all regressions, distance from the stadium is highly statistically significant. As expected, distance has a negative correlation with sale price.[11] The quadratic distance term is only significant in my first and last regressions and has an almost negligible coefficient, however it is significant at the 1% level in both cases. It takes a positive value in the fourth regression, which suggests that the downward slope of the curve relating sale price to distance becomes a little less steep as properties get further from the stadium.[12] The negative effect of distance on sale price indicates that the stadium has positive amenity effects on local properties, which was largely expected. Houses closer to the stadium receive a boost in their property values. One important caveat, however, is that the distance effect is muddied by the stadium's proximity to Seattle center. The stadium's positive effect is probably overstated, as proximity to the nearby city also has a positive effect on stadium values. I also tried using a cubic distance term, but because it was not statistically different from zero I did not include it in my final regressions.

The announcement variables help to isolate the effect of stadium proximity from the effect of Seattle center proximity. These variables are solely related to the likelihood of the new

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negative factor for properties in the suburbs, but not for those in the city.

[11] Except in the first regression, where the coefficient on distance is positive; but here the coefficient probably absorbs the effect of other variables that are omitted from the regression, such as property characteristics and precinct demographics.

[12] The different sample compositions of the four regressions are due to unavailable information on certain properties for additional attributes. To verify that the dropped parcels are random and that these changing compositions will not adversely affect my results, I ran several of the regressions using the most limited dataset (from the fourth regression) and compared the results with those originally derived. I find no large differences, and thus no indication that the dropped parcels are nonrandom or that the changing sample composition affects the empirical results.

Seahawks' stadium being built, and thus their effect sheds some light on the importance of the stadium alone. The announcement-distance interaction terms, however, were not highly significant and thus do not indicate a strong impact from the stadium on house prices. The December 1996 announcement had a small negative effect on sale price, but otherwise the pre-stadium construction announcements had no measurable correlation with property values. The April 1997 announcement has a slight positive impact on house prices within five miles from the stadium, as shown in Table 8, but this impact switches to a negative one for properties further away from the stadium. Interestingly, the June 1997 referendum date interacted with distance had a significant yet small negative impact on house prices. This result suggests that after the vote passed on June 17, 1997, properties located near the new stadium site were valued slightly lower. I also checked the joint significance of the announcement variables, and neither the second announcement nor the referendum dates were significant. The first pre-vote announcement, however, was statistically significant at the 10% level. If I observe any correlation between this first announcement and voting results in my second part of the empirical analysis, then this will allow me to make some determination regarding the homevoter hypothesis; the other effects will not allow such clear conclusions because their effects are so weak. In their own study, Dehring, Depken, and Ward (2008) similarly find that announcement effects on property prices are very small. Although some of the coefficients on other independent variables (such as house age) differ from mine, the coefficients on and significance of the announcement variables are quite close.

In sum, there is only a small indication of a market response to stadium announcements prior to the vote. The December 1996 announcement adversely impacted house prices, while the April 1997 one had no consistent effect. These results suggest that there were few "noisy

signals" that indicated to homeowners how the market would be affected by the proposed new Seahawks stadium. Additionally, there is a small negative effect on property values (presumably due to the imminent stadium construction) *after* the referendum. It appears that the stadium's negative amenity effects had a greater impact than the positive ones, thus causing local property values to decrease after it was officially determined that the new stadium would be built. The presence of this post-referendum effect could indicate some market signals that arose immediately prior to the vote, and in any case it will be interesting to test what small noisy signals there were against voting results in the second step of this analysis. The presence of such small noisy signals will make it difficult to conclude that there is any homeowner hypothesis, but I will pursue the second step of analysis as planned in order to discern whether there are any connections at all.

VI. Voting Analysis: Empirical Model and Results

The second step of my analysis ties the noisy signals that I quantified in my hedonic analysis to the voting results for the 1997 Seahawks stadium referendum. Although I found small to nonexistent noisy signals, it is still worthwhile to pursue this second step and find whether there are any interesting connections – however small they may be – that may support or contradict the homevoter hypothesis.

From my hedonic regressions and joint significance tests, I find that only the first announcement (of the three dates I tested) has a statistically significant effect on house values. I then aggregate these so-called noisy effects that homeowners perceive in their local area to the precinct level. The average change in house sale price for each precinct attributable to these announcements is the key independent variable in my regression against percent of "yes" votes in the stadium referendum. I also include a dummy variable to identify those precincts in which there was no house sale during the studied time period. In these precincts, homeowners have no

indicator for how their local market will respond to the new stadium, and thus the corresponding announcement effect is set to zero. The final pieces in this regression are distance from the stadium and demographic information. The complete regression follows:

$$PctYes_i = ß_0 + ß_1 Annc1\_Effect_i + ß_2 Annc1\_ZeroSales_i + ß_3 Annc2\_Effect_i + ß_4 Annc2\_ZeroSales_i + ß_5 StadDist_i + ß_6 PctTurnout\_1995Mariners + \Gamma Demographics + v_i$$

The results from my regression are shown in Table 9. Because these regressions use estimated values from my hedonic analysis, I bootstrap the standard errors using 500 replications following Dehring, Depken, and Ward (2008).

The first regression includes only my primary variables of interest (the announcement effects and zero sales dummies), the second adds distance and the percent turnout of registered voters for the 1995 Seattle Mariners stadium referendum, the third adds precinct-level demographics, and the fourth simply removes distance. Following Dehring, Depken, and Ward (2008), I remove distance in the fourth regression. Although I do not have a variable for percent homeowners in my analysis like they do, I still have some concerns that the distance variable may introduce collinearity into the regression and also want to see whether removing distance changed the results drastically.

The key advantage that my analysis has over that of Dehring, Depken, and Ward (2008) is that I can control for general voter views on sports stadiums and subsidies. Starting in the second regression, I include variables for percent of yes votes and percent turnout of registered voters for the 1995 referendum on subsidizing a new Seattle Mariners ballpark. This proposal was very similar to the 1997 Seahawks stadium one, and these variables will capture some of the general views that voters have toward this topic, thus allowing me to better isolate the effect of

each announcement. Because I include both yes vote and voter turnout measures, voter turnout essentially becomes a proxy for the percent of homeowners that voted. While Dehring, Depken, and Ward (2008) include an independent variable for percent of homeowners in their regressions and find that it is negatively correlated with percent of yes votes, I do not have access to such information for my own analysis. Voter turnout stands in for percent homeowners, however, because a higher voter turnout should correlate with a lower percent of homeowners voting. If the homevoter hypothesis is correct and homeowners have the greatest incentive to vote on public proposals, then increasing overall voter turnout will increase the number of non-homeowner voters, as most homeowners are already voting. The percent yes variable, therefore, complements the turnout one by isolating voters' general views on sports stadium subsidization. This removes the impact that voters' innate values and perspectives have on how they vote for the Seahawks stadium, and therefore produces more accurate coefficients on my true variables of interest – distance and the three announcement dates.

A major flaw in Dehring, Depken, and Ward's (2008) analysis is that they have no control for voter preferences regarding this topic, and thus it is very likely that some of the effect of such preferences is absorbed by the coefficients of other variables in the regressions. This omitted variable bias could significantly alter their conclusions, depending on the strength of these voter preferences.

As Table 9 shows, there is a substantial amount of fluctuation in the regression results depending on which variables are included in each specification. Because it contains the greatest number of independent variables, the third regression likely has the most reliable coefficient estimates. In this regression, only the second announcement's effect on property values (on April 25, 1997) has a statistically significant correlation with the percent of votes in favor of

Referendum 48. This coefficient was similarly positive in the first and second regressions, and it suggests that the "noisy signal" that voters perceived after the second announcement made them more likely to vote "yes." While this would appear to support the homevoter hypothesis, we must remember from the hedonic analysis that the second announcement had no real effect on property values. The only announcement effect that appeared to be significant was that belonging to the first announcement, however the coefficient on this variable in the third regression is not statistically significant. It is significant at the 1% level in the first and fourth regressions, and in these instances the coefficient on the first announcement effect is negative – thereby suggesting that, if there is a correlation, the first announcement's negative effect on property values makes voters less likely to vote in favor of the stadium, which actually would be in support of the homevoter hypothesis. Thus there is, at most, a very small amount of support for the homevoter hypothesis regarding the first announcement.

The dummy variable signaling zero sales in a given precinct during the time period studied has a similar significance pattern to that of the second announcement effect: it is significant only in the first and fourth regressions (for the first announcement only), neither of which I believe to be very accurate.[13] Thus there is very little evidence of how voters in precincts without property sales react to the stadium vote.

There are a few other interesting results from these regressions. The coefficient on distance in my regressions is positive, meaning that voters are more likely to vote in favor of the stadium the further away from the stadium they live. This result directly contradicts what

[13] The first regression is missing the variable that controls for voter attitude toward sports stadium subsidies in general, via voter turnout for the 1995 Mariners referendum. The fourth regression omits distance, which I do not believe is necessary in my analysis since I do not have a percent homeowners variable and which significantly alters the results from the third regression, thereby increasing my suspicion of its accuracy.

Dehring, Depken, and Ward (2008) find, as their distance coefficients are all negative. My explanation for this discrepancy is their lack of a variable (like my 1995 Mariners vote turnout one) that captures voters' attitudes on this type of public proposal. I believe that the effect of these attitudes may be absorbed by other variables' coefficients, and that this is most likely what happened with the distance variables.

Indeed, voter turnout for the 1995 Mariners stadium referendum is highly correlated with the percent of votes in favor of the 1997 Seahawks referendum. The coefficient on the 1995 vote turnout is statistically different from zero at the 1% level, and is positive – which is what I had expected.

I also find that median household income is positively correlated with voting in favor of Referendum 48. This result is probably due to the fact that, all else equal, wealthier individuals and families are more likely to benefit from a Seahawks stadium. Because they have more disposable income, they will be more able to afford tickets to the games and will thus directly benefit from the new facility. Additionally, the taxes that will fund the stadium are also fairly regressive, meaning that they disproportionately impact lower income classes. My analysis also shows that college graduates are more likely to vote against the stadium proposal. College graduates may be more well read on the actual effects of stadiums and sporting events, and therefore less likely to believe politicians' or boosters' claims that the stadium will boost the local economy.

If homeowners vote according to the effect that a proposal will have on their property values, then I would also expect that voters who perceive a stronger price effect – positive or negative – to have a greater incentive to vote. As Dehring, Depken, and Ward (2008) explain,

voter turnout is an alternate dependent variable for percent of yes votes that can also show the strength of the former's regression results. A strong correlation between announcement effects and turnout would indicate that homeowners are indeed responding to market signals about the proposed project's impact on their property values, and thus support the homevoter hypothesis. The regression specification for this model is as follows:

$$PctTurnout_i = ß_0 + ß_1 Annc1\_Effect_i + ß_2 Annc1\_ZeroSales_i + ß_3 Annc2\_Effect_i + ß_4 Annc2\_ZeroSales_i + ß_5 StadDist_i + ß_6 PctYes\_1995Mariners + \Gamma Demographics + v_i$$

The results are shown in Table 10. Like with the percent of yes votes, I follow the same four-regression order and again I find a large amount of fluctuation between specifications. The announcement effect that most consistently has a statistically significant correlation with voter turnout is that of the second announcement. As discussed earlier, however, I noted no real second announcement effect on prices in my hedonic analysis. That is not to say that the correlation is incorrect, as it is certainly possible that the distribution of effects is uneven among precincts and that I have missed key independent variables in my hedonic analysis whose omitted variable bias is interfering with the second announcement's coefficient. But without proof from the hedonic regressions that the second announcement has a measurable effect on prices, I cannot simply use the voter turnout results to say that the homevoter hypothesis is substantiated. This would be a very weak claim.

In all other ways, my regressions on voter turnout support the results I obtained from my regressions on percent of yes votes. My earlier conclusions and observations, including that 1995 vote turnout is highly significant, all hold true. These regressions serve as a useful confirmation of my earlier results.

VII. Conclusion

This paper aimed to test the logic of the homevoter hypothesis, as first proposed by William Fischel in 2001, against an actual public vote on a proposal that would likely affect local property values. According to the hypothesis, homeowners perceive noisy signals from property sales in their local area that indicate how their own property value is likely to change if the stadium is built. They then vote according to the expected effect, voting in favor of proposals that will increase their property value and against proposals that will decrease their property value. My study applies this theory to the 1997 referendum on subsidizing a new Seattle Seahawks football stadium.

I followed the basic model of Dehring, Depken, and Ward's (2008) paper on the 2004 referendum for a new Dallas Cowboys stadium in Arlington, Texas. My study improves upon their work because the Seahawks stadium vote was closer, my sample size is much larger, and I am able to control for voter preferences on the topic by using voter turnout from a very similar 1995 referendum on a new Seattle Mariners ballpark. The analysis consisted of two steps. First, I performed a hedonic analysis to quantify the "noisy signals" perceived by voters in King

County, Washington (the county in which the stadium was to be built). I allowed for variation over distance and time, sectioning out the data with respect to various stadium announcements that increased the likelihood of a new stadium being built. Second, I took these announcement price effects and compared them with actual voting results to see if there was a strong correlation that supported the homevoter hypothesis.

My results provide underwhelming support for the homevoter hypothesis in this specific case. Although I find slight correlations between announcement effects and voting behavior in my second step regressions, this correlation exists only for the second announcement – and in my hedonic analysis I find no measurable price effect due to the second announcement. Thus the support for the homevoter hypothesis in my analysis is weak at best, which is a similar result to that found by Dehring, Depken, and Ward (2008).

My analysis was limited by the assumption that homevoters correctly perceive market indicators. I assume that homeowners accurately detect noisy signals and are able to discern between sale price changes that are due to the new stadium versus those that are due to overall trends in the local real estate market. As Dehring, Depken, and Ward (2008) also point out, imperfect information in voting markets means that politicians or stadium boosters can convince voters that the stadium will have a certain effect on property values, and residents can vote according to these promises instead of according to actual sale patterns that they witness in their area.

Given these limitations, the best way to improve this model is by devising better methods to measure the market signals that homeowners perceive. If future authors can more accurately capture the signals that homeowners use to make their voting choices, they can more precisely

determine whether or not property value changes are one such signal by which homeowners vote. Possible ways to do this include using a different process for selecting the specific announcement dates and looking more closely at real estate trends to determine how detectable property value noisy signals actually are.

VIII. Tables

Table 1: Timeline of Events Related to Referendum 48 and the Seahawks' New Stadium

Date	Event
September 19, 1995	Referendum to issue county bonds to build a new Mariners ballpark and remodel the Kingdome (for the Seahawks) failed 50.1% to 49.9[1]
October 24, 1996	Washington legislature decides to build the stadium using public dollars anyway, despite the September vote[2]
February 2, 1996	Seahawks owner Behring announces intention to move the franchise
April 20, 1996	Behring and Allen agree to an exclusive option for Allen to buy the Seahawks; Allen can exercise the option until July 1, 1997
December 5, 1996 ($Annc_1$)	**Allen drops bid to renovate Husky Stadium[3]**
December 9, 1996	**Whitsitt says Allen will buy the Seahawks only if a new stadium is built[4]**
March 12, 1997	Greater Seattle Chamber of Commerce endorses Governor Gary Locke's proposed funding package for the new stadium; state legislature must now decide whether the proposal makes it to ballot
March 18, 1997	Allen sends open letter to Senator Mark Heavey stating why he said no to Husky Stadium
April 25, 1997 ($Annc_2$)	**Washington state legislature passes Seahawks Funding Plan (Referendum 48) and sets vote for June 17[5]**
June 17, 1997 ($Annc_3$)	**Referendum 48 date; passes with 51.1% (820,364 vs. 783,584 votes)**
2000 - 2002	Stadium is built; in the meantime, Seahawks play at Husky Stadium[6]
July 20, 2002	New stadium opens[7]
August 10, 2002	First Seahawks game (preseason exhibition game vs. Indianapolis Colts)[8]
September 15, 2002	First regular season home game (vs. Arizona Cardinals)[9]
2002 - 2004	Called "Seahawks Stadium"
2004 - present	Called "Qwest Field"

[1] "Safeco Stadium Timeline." *Seattle Post-Intelligencer.* <http://www.seattlepi.com/safeco/stadium/timesafe.shtml>
[2] Reich, Brian. "Case Studies: Seattle, WA." Baseball and the American City. <http://www.stadiummouse.com/stadium/casestudies.html>
[3] Almond, Elliott and David Schaefer. "Play Shifts Downtown For Hawks -- Outcry Prompts Allen To Drop Proposal For Husky Stadium." *The Seattle Times. December 6, 1996.* <http://community.seattletimes.nwsource.com/archive/?date=19961206&slug=2363437>

[4] Almond, Elliott and David Schaefer. "Allen Would Help With New Stadium, Not Dome Fix-Up." *The Seattle Times.* December 10, 1996. <http://community.seattletimes.nwsource.com/archive/?date=19961210&slug=2364233>

[5] Postman, David. "House Oks Stadium Plan -- Funding Package Will Need Voters' Approval." *The Seattle Times.* April 26, 1997. <http://community.seattletimes.nwsource.com/archive/?date=19970426&slug=2535776>

[6] Allen, Percy. "New stadium is out-of-dome experience." *The Seattle Times.* August 2, 2002. <http://seattletimes.nwsource.com/sports/seahawks/stadium/experience.html>

[7] Romero, Jose Miguel. "Stadium opens up, fans say ah!" *The Seattle Times.* July 21, 2002. <http://community.seattletimes.nwsource.com/archive/?date=20020721&slug=stadium21>

[8] Romero, Jose Muguel. "Seahawks Stadium era begins tonight." *The Seattle Times.* August 10, 2002. <http://community.seattletimes.nwsource.com/archive/?date=20020810&slug=hawks10>

[9] "First game in new stadium a downer for Hawks." *The Seattle Times.* September 15, 2002. <http://community.seattletimes.nwsource.com/archive/?date=20020915&slug=webhawks15>

Table 2: Variable Definitions

Variable	Definition
PIN	unique 10-digit parcel identifier; concatenated Major + Minor
Precinct	4-digit voting precinct identifier
Distance	miles from the stadium
Sale Price	
Sale Date: Month	
Sale Date: Day	
Sale Date: Year	
Stories	
Bedrooms	
Sq. Feet - 1st Floor	
Sq. Feet - 2nd Floor	
Living Area	square feet
Basement Area	square feet
Deck Area	square feet
Heat Source	0 = unknown, 1 = oil, 2 = gas, 3 = electricity, 4 = oil or solar, 5 = gas or solar, 6 = electricity or solar, 7 = other
Heat System	0 = unknown, 1 = floor-wall, 2 = gravity, 3 = radiant, 4 = electric baseboard, 5 = forced air, 6 = hot water, 7 = heat pump, 8 = other
Half Baths	
3/4 Baths	
Full Baths	
Year Built	
Year Renovated	
Condition	0 = unknown, 1 = poor, 2 = fair, 3 = average, 4 = good, 5 = very good
Age	
Sq. Feet - Lot	
View: Mt. Rainier	0 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Olympics	1 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Cascades	2 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent

View: Territorial	3 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Seattle Skyline	4 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Puget Sound	5 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Lake Washington	6 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Lake Sammamish	7 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Small Lake/River/Creek	8 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
View: Other	9 = none, 1 = fair, 2 = average, 3 = good, 4 = excellent
Waterfront Location	0 = none, 1 = Duwamish, 2 = Elliott Bay, 3 = Puget Sound, 4 = Lake Union, 5 = Ship Canal, 6 = Lake Washington, 7 = Lake Sammamish, 8 = other lake, 9 = river/slough
Waterfront Footage	square feet
Waterfront Bank	1 = low, 2 = medium, 3 = high, 4 = no bank
Waterfront - Poor Quality	1 = yes, 0 = no
Waterfront - Restricted Access	1 = to residence, 2 = to waterfront, 3 = no waterfront access
Waterfront - Access Rights	1 = yes, 0 = no
Waterfront - Proximity Influence	1 = yes, 0 = no
Tideland/Shoreland	1 = uplands only, 2 = uplands with tidelands/shorelands, 3 = tidelands/shorelands only
Airport Noise	
Historic Site	1 = district, 2 = inventory, 3 = designated, 4 = vacant historic land
Coal Mine Hazard	1 = yes, 0 = no
Erosion Hazard	1 = yes, 0 = no
Seismic Hazard	1 = yes, 0 = no
Landslide Hazard	1 = yes, 0 = no
Steep Slope Hazard	1 = yes, 0 = no
Stream	1 = yes, 0 = no
Wetland	1 = yes, 0 = no
Population	
Families	
Households	
Percent White	
Percent Black	
Percent Native American	
Percent Asian Pacific Islander	
Percent Hispanic	
Median Household Income (hundred $)	
Percent High School Graduates	
Percent College Graduates	
Percent Unemployed	
Percent Yes	
Percent Turnout	
Percent Absentee Ballots	
1995 Referendum: Percent Yes	

Table 3: Summary Statistics – Base Variables

Variable	Observations	Mean	Standard Deviation	Min	Max
PIN	37,396	-	-	-	-
Precinct	37,396	-	-	-	-
Distance	37,396	12.04	6.51	1.07	55.51
Sale Price	37,396	211,913	154,384	50	5,869,310
Sale Date: Month	37,396	-	-	-	-
Sale Date: Day	37,396	-	-	-	-
Sale Date: Year	37,396	1996		1996	1997

Table 4: Summary Statistics – Parcel Attributes

Variable	Observations	Mean	Standard Deviation	Min	Max
Stories	35,090	11.09	6.175	0	35
Bedrooms	35,090	3.217	0.928	0	22
Sq. Feet - 1st Floor	35,090	1,253.95	447.956	0	27,600
Sq. Feet - 2nd Floor	35,090	347.73	541.875	0	4,320
Living Area	35,090	1,852.06	816.651	0.00	27,600
Basement Area	35,090	460.84	564.538	0.00	12,100
Deck Area	35,090	107.99	196.716	0	4,200
Heat Source	35,090	1.94	0.676	0	7
Heat System	35,090	4.72	1.028	0	8
Half Baths	35,090	0.42	0.516	0	6
3/4 Baths	35,090	0.35	0.544	0	5
Full Baths	35,090	1.39	0.583	0	6
Year Built	35,090	1964	-	0	1997
Age	35,090	32.81	-	-	-
Condition	35,090	3.27	0.582	0	5
Square Feet - Lot	36,011	16,512.47	43,666.760	490	2,308,680
View: Mt. Rainier	36,011	0.02	0.232	0	4
View: Olympics	36,011	0.07	0.422	0	4
View: Cascades	36,011	0.07	0.427	0	4
View: Territorial	36,011	0.25	0.781	0	4
View: Seattle Skyline	36,011	0.02	0.248	0	4
View: Puget Sound	36,011	0.07	0.423	0	4
View: Lake Washington	36,011	0.07	0.400	0	4
View: Lake Sammamish	36,011	0.02	0.241	0	4
View: Small Lake/River/Creek	36,011	0.03	0.286	0	4
View: Other	36,011	0.01	0.136	0	4
Waterfront Location	36,011	0.12	0.926	0	9
Waterfront Footage	36,011	1.36	13.522	0	770
Waterfront Bank	36,011	0.02	0.213	0	4
Waterfront - Poor Quality	36,011	0.00	0.025	0	1
Waterfront - Restricted Access	36,011	0.01	0.108	0	3

Waterfront - Access Rights	36,011	0.02	0.125	0	1
Waterfront - Proximity Influence	36,011	0.00	0.048	0	1
Tideland/Shoreland	36,011	0.01	0.158	0	3
Airport Noise	36,011	0.00	0.007	0	1
Historic Site	36,011	0.00	0.027	0	3
Coal Mine Hazard	36,011	0.00	0.046	0	1
Erosion Hazard	36,011	0.01	0.085	0	1
Seismic Hazard	36,011	0.01	0.109	0	1
Landslide Hazard	36,011	0.00	0.065	0	1
Steep Slope Hazard	36,011	0.01	0.073	0	1
Stream	36,011	0.01	0.107	0	1
Wetland	36,011	0.01	0.088	0	1

Table 5: Summary Statistics – Precinct Demographics

Variable	Obs	Mean	Standard Deviation	Min	Max
Population	35,852	1,506.32	948.043	0	6,752
Families	35,852	403.54	261.461	0	1,668
Households	35,852	568.74	348.925	0	3,017
Percent White	35,852	87.26%	14.73%	10.11%	99.40%
Percent Black	35,852	4.04%	9.43%	0.00%	83.25%
Percent Native American	35,852	0.97%	0.97%	0.00%	23.85%
Percent Asian Pacific Islander	35,852	6.75%	7.18%	0.00%	69.61%
Percent Hispanic	35,852	2.62%	1.43%	0.00%	25.02%
Median Household Income (hundred $)	35,852	438.07	143.283	76.60	1,290.06
Percent College Graduates	35,852	33.16%	15.83%	6.83%	86.85%
Percent Unemployed	35,852	3.79%	2.49%	0.00%	33.67%

Table 6: Summary Statistics – Vote Results

Variable	Observations	Mean	Standard Deviation	Min	Max
1997 Seahawks Referendum: Percent Yes	2,668	58.22%	10.96%	0.00%	100.00%
1997 Seahawks Referendum: Percent Turnout	2,651	30.39%	8.86%	0.00%	100.00%
1997 Seahawks Referendum: Percent Absentee Votes	2,668	0.00%	3.43%	0.00%	1.75%
1995 Mariners Referendum: Percent Yes	2,664	50.57%	11.12%	0.00%	100.00%

Table 7: Regression Results – Hedonic Analysis

(1)			(2)			(3)			(4)		
Dist	0.018	***	Dist	-0.015	***	Dist	-0.012	***	Dist	-0.025	***
	(0.003)			(0.004)			(0.004)			(0.04)	
$Dist^2$	-0.001	***	$Dist^2$	0.000		$Dist^2$	-0.000		$Dist^2$	0.000	***
	(0.000)			(0.000)			(0.000)			(0.004)	
Annc1*Dist	-0.003		Annc1*Dist	-0.005		Annc1*Dist	-0.006	*	Annc1*Dist	-0.005	
	(0.004)			(0.004)			(0.003)			(0.004)	
Annc2*Dist	-0.002		Annc2*Dist	0.001		Annc2*Dist	0.002		Annc2*Dist	0.002	
	(0.004)			(0.002)			(0.002)			(0.003)	
Annc3*Dist	-0.003		Annc3*Dist	-0.004	**	Annc3*Dist	-0.004	**	Annc3*Dist	-0.003	
	(0.003)			(0.002)			(0.002)			(0.002)	
$Annc1*Dist^2$	0.000		$Annc1*Dist^2$	0.000		$Annc1*Dist^2$	0.000		$Annc1*Dist^2$	0.000	
	(0.000)			(0.000)			(0.000)			(0.000)	
$Annc2*Dist^2$	0.000		$Annc2*Dist^2$	0.000		$Annc2*Dist^2$	0.000		$Annc2*Dist^2$	0.000	
	(0.000)			(0.000)			(0.000)			(0.000)	
$Annc3*Dist^2$	0.000		$Annc3*Dist^2$	0.000	**	$Annc3*Dist^2$	0.000	***	$Annc3*Dist^2$	0.000	*
	(0.000)			(0.000)			(0.000)			(0.000)	
Constant	12.176	***	Age	0.000		Age*Dist	-0.000	**	Age*Dist	-0.000	**
	(0.020)			(0.000)			(0.000)			(0.000)	
			Age^2	0.000	***	View: Mt. Rainier	0.009		Med HH Inc	0.000	***
Obs	37,396			(0.000)			(0.012)			(0.000)	
R^2	0.0258		Age*Dist	-0.000		View: Olympics	0.021	***	% White	0.002	**
F-statistic	31.45			(0.000)			(0.007)			(0.001)	
			Stories	0.009	***	View: Cascades	0.000		% Black	-0.001	
				(0.000)			(0.006)			(0.001)	
			Bedrooms	-0.045	***	View: Territorial	0.010	**	% Nat Amer	-0.007	**
				(0.006)			(0.005)			(0.003)	
			Half Baths	0.064	***	View: Seattle Skyl	0.045	***	% Asian Pac	-0.003	**
				(0.006)			(0.009)			(0.001)	
			3/4 Baths	0.073	***	View: Puget Sound	0.078	***	% Hispanic	-0.020	***
				(0.012)			(0.007)			(0.002)	
			Full Baths	0.052	***	View: Lake Wash	0.116	***	% Coll Grad	0.007	***
				(0.013)			(0.008)			(0.000)	
			Condition	0.063	***	View: Lake Samm	0.097	***	% Unempl	0.000	
				(0.004)			(0.018)			(0.001)	
					***	View: Small		***			***
			Heat Source	-0.024		Lake/River/Creek	0.070		Constant	11.269	
				(0.004)			(0.009)			(0.105)	
			Heat System	0.029	***	Tideland/Shoreland	0.219	***			
				(0.003)			(0.017)		Obs	34,554	
			Constant	11.314	***	Airport Noise	-0.365	***	R^2	0.6320	
				(0.028)			(0.067)		F-statistic	691.46	

		Historic Site	0.236	
Obs	35,088		(0.146)	
R^2	0.5026	Coal Mine Hazard	0.012	
F-statistic	586.88		(0.041)	
		Erosion Hazard	0.115	***
			(0.0038)	
		Seismic Hazard	0.189	***
			(0.024)	
		Landslide Hazard	-0.025	
			(0.032)	
		Steep Slope Hazard	-0.007	
			(0.047)	
		Constant	11.345	***
			(0.027)	
		Obs	34,948	
		R^2	0.5449	
		F-statistic	474.52	

Dependent variable is the natural log of sale price. All regressions include month dummy, housing, and view or waterfront variables that are not listed. Standard deviations are shown in parentheses below coefficients. * p < 0.1 ** p < 0.05 *** p < 0.1

Table 8: Distance and Announcement Effects on Sale Price

		Announcement Effects		
Distance from Stadium (miles)	**Distance Effect[1]**	**After Dec 5, 1996 Announcement ($Annc_1$)**	**After April 27, 1997 Announcement ($Annc_2$)**	**After June 17, 1997 Vote ($Annc_3$)**
1	-2.65%	-0.45%	0.19%	-0.33%
5	-2.27%	-0.35%	0.10%	-0.19%
10	-1.80%	-0.22%	-0.02%	-0.02%

Effects shown represent percent change in house sale price.

[1] Evaluated at the mean age (32.81 years).

Table 9: Regression Results – Voting Analysis: Percent Yes

(1)			(2)			(3)			(4)		
Annc1: Effect	-408.094	***	Annc1: Effect	156.385		Annc1: Effect	82.303		Annc1: Effect	-81.971	***
	(22.915)			(108.780)			(97.458)			(27.203)	
Annc1: Zero Sales	8.620	***	Annc1: Zero Sales	-2.330		Annc1: Zero Sales	1.038		Annc1: Zero Sales	0.538	
	(2.002)			(3.275)			(2.888)			(1.724)	
Annc2: Effect	92.779	**	Annc2: Effect	379.044	***	Annc2: Effect	200.821	*	Annc2: Effect	20.371	
	(45.112)			(114.678)			(106.814)			(22.708)	
Annc2: Zero Sales	-0.713		Annc2: Zero Sales	1.583		Annc2: Zero Sales	1.098		Annc2: Zero Sales	-0.278	
	(1.624)			(1.510)			(1.318)			(1.159)	
									Safeco: % Turnout	-0.170	***
Constant	45.776	***	Distance	0.932	***	Distance	0.427	*		(0.049)	
	(0.929)			(0.249)			(0.233)				
			Safeco: % Turnout	-0.123	***	Safeco: % Turnout	-0.126	***	Safeco: % Yes	0.646	***
Obs	2,648			(0.021)			(0.022)			(0.043)	
			Safeco: % Yes	0.773		Safeco: % Yes	0.707	***	% White	-0.103	
R^2	0.1658			(0.019)			(0.023)			(0.121)	
			Constant	16.180	***	% White	-0.085	*	% Black	-0.159	
				(1.548)			(0.089)			(0.127)	
									% Nat Amer	-0.449	*
						% Black	-0.120			(0.231)	
			Obs	2,471			(0.091)				
									% Asian Pac Isl	-0.047	
			R^2	0.5231		% Nat Amer	-0.470	**		(0.126)	
							(0.227)				
						% Asian Pac Isl	-0.010		% Hispanic	-0.203	
							(0.090)			(0.158)	
									% College Grad	-0.167	***
						% Hispanic	-0.119			(0.017)	
							(0.130)				
						% College Grad	-0.174	***	% Unemp	0.153	*

	(0.013)			(0.091)	
% Unemp	0.129		Median HH Inc	0.000	***
	(0.094)			(0.00)	
Median HH Inc	0.000	***	Constant	35.151	***
	(0.00)			(13.228)	
Constant	28.082	***			
	(8.876)		Obs	2,646	
			R^2	0.5557	
Obs	2,471				
R^2	0.5898				

Dependent variable is the natural log of sale price. All regressions include month dummy, housing, and view or waterfront variables that are not listed. Standard deviations are shown in parentheses below coefficients. * p < 0.1 ** p < 0.05 *** p < 0.1

Table 10: Regression Results – Voting Analysis: Percent Turnout

(1)			(2)			(3)			(4)		
Annc1: Effect	112.969	***	Annc1: Effect	54.518		Annc1: Effect	37.066		Annc1: Effect	-31.419	**
	(15.213)			(78.643)			(77.767)			(18.495)	
Annc1: Zero Sales	-5.037	**	Annc1: Zero Sales	-2.370		Annc1: Zero Sales	-2.016		Annc1: Zero Sales	2.022	
	(2.137)			(1.980)			(1.891)			(1.488)	
Annc2: Effect	126.238	***	Annc2: Effect	251.561	***	Annc2: Effect	182.163	**	Annc2: Effect	103.145	***
	(21.166)			(83.493)			(85.518)			(21.320)	
Annc2: Zero Sales	-0.609		Annc2: Zero Sales	3.408	***	Annc2: Zero Sales	2.844	**	Annc2: Zero Sales	2.633	**
	(1.714)			(1.159)			(1.119)			(1.226)	
Constant	33.166	***	Distance	0.417	**	Distance	0.183		Safeco: % Turnout	0.717	***
	(0.539)			(0.182)			(0.187)			(0.027)	
Obs	2,634		Safeco: % Turnout	0.658	***	Safeco: % Turnout	0.632	***	Safeco: % Yes	0.057	
R^2	0.0354			(0.014)			(0.020)			(0.040)	
			Safeco: % Yes	0.024	*	Safeco: % Yes	0.029	**	% White	0.049	
				(0.014)			(0.014)			(0.068)	
			Constant	-1.902	*	% White	0.015		% Black	-0.036	
				(1.017)			(0.063)			(0.069)	
						% Black	-0.070		% Nat Amer	0.025	
			Obs	2,458			(0.064)			(0.132)	
			R^2	0.5783		% Nat Amer	0.080		% Asian Pac Isl	-0.008	
							(0.095)			(0.068)	
						% Asian Pac Isl	-0.044		% Hispanic	0.041	
							(0.062)			(0.161)	
						% Hispanic	-0.122		% College Grad	-0.109	***
							(0.117)			(0.014)	

% College Grad	-0.053	***	% Unemp	-0.012	
	(0.009)			(0.058)	
% Unemp	0.016		Median HH Inc	0.000	***
	(0.058)			(0.000)	
Median HH Inc	0.000	**	Constant	-6.254	
	(0.00)			(7.218)	
Constant	1.704				
	(6.371)		Obs	2,631	
			R^2	0.5894	
Obs	2,458				
R^2	0.5954				

Dependent variable is the natural log of sale price. All regressions include month dummy, housing, and view or waterfront variables that are not listed. Standard deviations are shown in parentheses below coefficients. * $p < 0.1$ ** $p < 0.05$ *** $p < 0.1$

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