Stadium Subsidies, Public Choice, and Property Values:
A Test of the Homevoter Hypothesis in King County, Washington

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Abstract: This paper examines whether the "homevoter hypothesis" helps explain popular support for public subsidies in a 1997 referendum on a new stadium for the National Football League's Seattle Seahawks. According to the 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. Measures of anticipated, stadium-induced changes in property values created by analyzing changes in property values following critical information revelations about the new stadium are associated with the extent of support for public subsidies in specifications that fail to account for past voting behavior. But that association disappears when past support is taken into account. The results suggest the need to account for unobserved attitudes towards public subsidies when assessing potential explanations for voter support of such subsidies.

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.
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> 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 they think it will impact their property value. According to the "homevoter hypothesis," residents vote for proposals that they believe will produce net benefits for them by increasing their property's value (Fischel, 2001).

A second possible explanation is that individuals who place more value on the presence of a professional sports team are more likely to live near that team's venue. Their support for public subsidies is mainly attributable to the intangible value they get from the presence of the team, not the change in property values (if there is any) from a new or renovated stadium. Using King County election results and contemporary property value data, this paper takes advantage of a unique sequence of votes to see which of these explanations better explains support in Kings

County for 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; Anderson, 2016). For example, in 2018-19 the Milwaukee Bucks are scheduled to begin play in a new $524 million arena, almost half ($250 million) the financing of which will be public funds. And the Oaklnad Raiders are threatening to move to a new $1.9 billion stadium in Las Vegas which will be paid for in part by $750 million in public funds.

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 literature that is summarized in Coates and Humphries (2008) shows that a team's 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. The homevoter hypothesis goes further by positing that residents vote according to a proposal's anticipated impact on their largest asset – their home. They 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. Dehring, Depken, and Ward (2008) evaluate the applicability of the homevoter hypothesis to the 2004 referendum on the Dallas Cowboys' new stadium and find that voting results are consistent with the hypothesis.

Unsurprisingly, Dehring, Depken, and Ward use cross-sectional variation to show that property value changes explain popular support for public subsidies for the Cowboys Stadium. Referenda on public subsidies are rare events that do not lend themselves to the kind of quasi-experimental design that makes it possible to minimize the likelihood that estimated effects are driven by unobservables. But unobservables could be important in explaining the spatial nature of support for public subsidies, those who are the strongest supporters of public subsidies because they receive the largest intangible value from a professional sports team may choose to live close to that teams venue.

This paper takes advantage of the unique circumstances surrounding the 1997 referendum on a new stadium for the Seattle Seahawks to adds to evaluate the explanatory power of the homevoter hypothesis using an empirical approach motivated by the logic of differences-in-differences. 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, despite the fact that a referendum to subsidize a new Mariners' park had failed in September of 1995.

Allen provided more than $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?" The question passed with 51.1% in favor of the proposal (Ammons, 1997).

This study uses results from the referendum on the Mariners' stadium that took place two years earlier to control for voter preferences. Thus, we are able to account for unobserved attitudes towards public subsidies while still accounting for prospective home value increases by mirroring the approach of Dehring, Depken, and Ward (2008). As did Dehring, Depken, and Ward, we find that measures of anticipated, stadium-induced changes in property values created by analyzing changes in property values following critical information revelations about the new stadium are associated with the extent of support for public subsidies in specifications that fail to account for past voting behavior. But that association disappears when past support is taken into account.

In Section II, we discuss relevant literature regarding sports stadiums and property values and review evidence on the homevoter hypothesis. We present the data in Section III, then outline the econometric model and discuss the results of the two-step empirical process in Sections IV and V. Section VI presents concluding remarks.

II. Literature Review

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 net economic benefit.

While most academic studies have failed to find any benefits associated with sports teams or stadiums, a small minority have found positive effects when trying to quantify the impact of a sports facility by examining its impact on "intangible" factors and property values. Researchers 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 researchers have nevertheless tried to quantify these factors.

One avenue for measuring intangibles is to use evidence from 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.

The absence of any explicit link between market quantities and survey responses leads most researchers to be skeptical of survey results. Hedonic models are the dominant alternative for measuring intangibles. But the evidence of stadium impact on local housing prices is mixed. For example, Carlino and Coulson (2004) find that cities with NFL franchises experience an 8% increase in annual rents. Tu (2005) uses a combination of methods to analyze the changes in property values surrounding the Washington Redskins' FedEx Field. He finds 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 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.

Kiel, Matheson, and Sullivan (2010), however, find 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 divergence of results based on the impact of stadia 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. For example, a key flaw in the Carlino and Coulson (2004) paper may explain the contradiction between their results and those of Kiel, Matheson, and Sullivan (2010). 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. Differences may also be attributable to unique attributes of each stadium project. The method of funding a subsidy, a team's success, and the local sports atmosphere are only a few of many factors which could possibly cause the differences between various studies. Further, since many of these factors are temporally stable attributes of a location and a project, their impact can be accounted for in a differences-in-differences style analysis.

Although the results on property values are inconclusive, they point to a possible reason why residents vote to spend some of their tax dollars on a new stadium. 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.

That expected effects on local property values may influence voter behavior was first argued by Sonstelie and Portney (1980). Increased attention to this idea was stimulated by Fischel (2001). 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. Because most individuals' greatest asset is their home, they have a significant interest in protecting its value.

There have been very few empirical studies of 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 argued that a voucher would be expected to 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) 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 undeveloped land tend to have a greater increase in property values as a result of increases in education 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 future.

Since sports facilities are durable goods, they represent a natural case for evaluating the homevoter hypothesis. Dehring, Depken, and Ward (2008) do just this by looking at the vote to subsidize a new stadium for the Dallas Cowboys in Arlington, Texas. Using a two-step process, 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. First, the authors determine how events signaling that the stadium is more likely to be built influence property values. Two pre-vote announcements indicated to residents that the probability of building the stadium was increasing, and the subsequent changes in house prices were "noisy signals" to homeowners of the new stadium's effect on the value of their homes (Dehring, Depken, and Ward, 2008; p.155). 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 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 in precincts where homeowners probably expect a greater property value boost, there is more support for 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 expected a greater price decrease; there was a 1% decrease in voter turnout for every $1,000 increase in house prices.

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." Both Tu (2005) and Ahlfeldt and Kavetsos (2010) show that such anticipation effects may be important in the case of stadium projects. Additionally, by combining temporal and spatial factors the authors are able to paint a more complete picture of voter behavior. But what Dehring, Depken, and Ward could not do was rule out the possibility that precincts with larger pre-vote price increases were also those precincts that were more favorably inclined towards the public subsidies. By taking advantage of the unique nature of the Seattle case, we are able to build on their analysis by adding controls that account implicitly for attitudes towards public subsidies. Thus, it is to the Seattle case that we now turn.

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).

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, January 1997). 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, January 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, June 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, January 1997; Almond, June 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." 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). We 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, January 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 an extension of the 2% tax on hotels and motels in King County through 2020 (Schaefer, May 9,1997; Schaefer and Carpenter, 1997; Almond, 1997).

IV. Data

The analysis is broken into two steps. The first step is an 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 the dataset are transactional data on real estate sales in King County, downloaded from the King County Department of Assessments website. Following Dehring, Depken, and Ward (2008), we intended to keep all residential property sales. The data, however, did not allow for this – there were an insignificant number of apartments in the data so we 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, we were forced to drop condominiums as well.

We also omitted all sales that were clearly not arms-length transactions. For example, we removed cases when it appears that a homeowner simply transferred the property to a family

member for a selling price of $0. We were able to identify such transactions because they were tagged with "sale warnings;" we omitted any sales with sale warnings from the data.

As noted above, the two announcement dates 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). Given the timing of the announcements and the vote, we 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. We 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. We kept sales past the vote date because there is often a lag between when a property is sold and when the sale is officially recorded. We wanted 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 delay ensured that we were capturing as many of the sales – or noisy signals – that neighbors were witnessing as possible. Following Dehring, Depken, and Ward (2008), we assumed a 30-day lag between when a sale is agreed upon and when it is officially recorded. The effect of this decision is that we handled each announcement as taking place exactly 30 days later – for example, the first announcement was treated as taking place on January 5, 1997 rather than December 5, 1996.

To these transaction data, we then added distance data on how far each property, or "parcel," was from the stadium site. We 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, we 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, we 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.[1] Before merging the distance information with the sales data, we removed certain entries from the distance data. We dropped all entries for which there was no property identifier, which, according to a quick perusal of the properties, included mostly roads and other properties that were unlikely to be residential. We also omitted entries for which the property identifier contained a signal that the property was not among those included in the transactions data.

After merging these various data, there were several hundred "problem" parcels, including duplicates and discrepancies.[2] To resolve these problems so that there was only one parcel for each "PIN" ("Property Identifier Number"), we applied a standard set of rules. Between duplicates with identical attributes except for the house's sale price, we kept the greater price. Between duplicates with identical attributes except for distance from the stadium, we 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, we chose the precinct that included the larger portion of the property, which we determined using the GIS data.

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

[2] There were also approximately 1,500 parcels for which we had no information in the distance data. We were unable to find the distance and parcel information using outside sources, which meant they were dropped from our hedonic analysis.

The last components of the dataset for the hedonic analysis were parcel descriptors, such as property size and house attributes. We drew these data from two sources. First, we downloaded the "Parcel" file from the King County Department of Assessments website. The Parcel file contains attributes for the properties as they *currently* are, so we 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.[3] Second, we used house and property characteristics that were included in the GIS files. These files contained data such as number of stories or lot size of the houses in 1997 or 2001. These data were essential to include in order to remove the possible effects of house attributes on property value. Our final dataset has over 37,500 properties.

The definitions of the various variables are shown in Table 2, and their summary statistics are given in Tables 3 and 4.

We supplemented the data on each property with 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.[4] The summary statistics for these data are shown in Tables 5 and 6, respectively.

Voting precincts in King County are adjusted or redistricted on a regular basis, which presented some problems because we use data from various years. We decided that the base precinct list would be precincts in 1997, according to the list we received from the King Country Elections Office. To assign each parcel to a precinct, we used the GIS software to perform a

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[3] 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 these attributes.

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

spatial join between the voting district map and the parcel map. The earliest voting district map for King County was created in 2001, however. Since all parcels were assigned to 2001 precincts, we 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.[5] We assumed equal population density for this procedure. Thus, when allocating the Census demographic data to these revised precincts, we used a population-weighted average to determine the characteristics.

There were a few problems within the completed dataset that could not be resolved. The final 1997 precinct list was missing six precincts that were in the Census data, and we were 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. In fact, three had no registered voters.

Additionally, there were fourteen precincts in the voting data that were missing from the Census records. We were unable to determine why these precincts were missing or find the relevant descriptive data. These precincts were still included in every part of the analysis except for those using the Census precinct attribute data.[6]

The final dataset is substantially larger than that of Dehring, Depken, and Ward (2008), who used a dataset that included 3,108 sales transactions from a 12-month period and 113 voting

[5] To create this crossover we 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 us with the necessary files.

[6] The Census data lacked any information on renters, which prevented us from accounting for the share of homeowners in each precinct.

precincts in the city of Arlington. We have more than 35,000 transactions from an 18-month period and more than 3,000 voting precincts.

V. Hedonic Analysis: Model and Results

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 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.

We allow for the possibility of both positive and negative stadium effects on house prices, with the net effect depending on proximity to the stadium site. Following Dehring, Depken, and Ward (2008), we also allow for the possibility that the effect changed 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.

To assess the noisy signals perceived by local homeowners, we specified the following hedonic model:

(1) $$\ln(Price_i) = ß_0 + ß1Dist_i + ß_2Dist^2_i + \sum^3_{j=1} ß_jDist_i*Annc_j + \sum^3_{j=1} ß_jDist^2_i*Annc_j + \sum^{17}_{k=1} ß_kMonth_i + \Gamma Char + v_i$$

The logarithm of sale price is the dependent variable. 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; 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), we assume that a sale takes 30 days to close. The other set includes month dummy variables. December 1997 is the reference month to which the other months' coefficients compare.

Two final components in our 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] Sample size drops slightly with each subsequent regression, as a result of adding data from more sources. We ran each regression with the most limited data set to verify that these omissions do not affect the results and found that there was no substantive change in any results with this most restricted dataset.

Table 7 shows the results from the hedonic analysis.[8] For conciseness and clarity, we only present estimates of the coefficients on those variables that are related to distance to the stadium and the timing of the announcements.[9] Because it includes the richest set of property characteristics, along with the precinct demographic information, we focus on the results of the fourth regression.

Most property attribute and demographic variables enter the regressions with the expected coefficients. For example, having a nice view, more bathrooms, and a higher percentage of college graduates in the area correlates with a higher sale price, as does being located in a tideland or shoreland area. Properties subject to airport noise 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.

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[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 down the original house). We omit these properties for which age appears to be negative.

[8] We 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 properties characteristics. With a few exceptions, the estimated coefficients on these variables had the expected signs. The exceptions were erosion hazard, seismic hazard, number of bedrooms, and having a view of the Cascades – all of which had negative effects on house 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 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 we 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. The difference in results may be attributable to the fact that properties in this 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 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]

The variables that are most relevant to this 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 the regressions that include a rich set of covariates, the coefficient on the linear

[10] In addition to age, we also include a quadratic age term and interactions between distance and the two age terms. The coefficient on age squared is consistently positive and significant. Of the interaction terms, only the age-distance interaction is significant in the richest specification. Its coefficient is negative, which suggests that 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 negative factor for properties in the suburbs, but not for those in the city.

distance term from the stadium is negative and highly significant. The coefficient on the quadratic distance term 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.[11] The negative coefficient on the linear term 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 house values.[12]

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 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 of 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 negative for properties further away from the stadium. Interestingly, the June 1997 referendum date interacted with distance had a

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[11] The different sample compositions of the four regressions are due to unavailable information on certain properties for additional attributes. As indicated above, we found no substantive differences using the most limited data set, and thus no indication that the dropped parcels are nonrandom or that the changing sample composition affected the empirical results.

[12] We also tried using a cubic distance term, but it was not statistically different from zero.

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.

We also checked the joint significance of the announcement variables, and neither the second announcement nor the referendum dates were significant. The coefficients on the interaction of the first pre-vote announcement with distance, however, were statistically significant at the 10% level. If we observe any correlation between this first announcement and voting results in the second part of the empirical analysis, then this will allow us to make some determination regarding the homevoter hypothesis; the other effects will not allow such clear conclusions because their effects are so weak. Interestingly, Dehring, Depken, and Ward (2008) similarly find that announcement effects on property prices are very small.

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. 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 absence of strong signals from local property value changes will complicate our ability to evaluate the validity of the homevoter hypothesis.

VI. Voting Analysis: Model and Results

The second step of our analysis ties the signals that were quantified in the hedonic analysis to the voting results for the 1997 Seahawks stadium referendum. To execute this step, we aggregated these so-called noisy effects that homeowners perceived 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 the regression against percent of "yes" votes in the stadium referendum. We 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 model is:

$$(2)\ PctYes_i = ß_0 + ß_1 Annc1\_Effect_i + ß_2 Annc1\_ZeroSales_i + ß_3 Annc2\_Effect_i + ß_4 Annc2\_ZeroSales_i + ß_5 StadDist_i + ß_6 PctTurnout\_1995Mariners + \Gamma Demographics + v_i$$

The results from this regression are shown in Table 9. Because the explanatory variables include estimated values from the hedonic analysis, we bootstrap the standard errors using 500 replications.

The first regression includes only the primary variables of interest (the announcement effects and zero sales dummies), the second adds precinct-level demographics, the third adds distance and the results from the 1995 Seattle Mariners stadium referendum, and the fourth simply removes distance, following Dehring, Depken, and Ward (2008).[13]

The key advantage that our analysis has over that of Dehring, Depken, and Ward (2008) is that we can control for general voter views on sports stadiums and subsidies. Starting in the third regression, we 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 of voters, thus allowing us to better isolate the effect of each announcement.

[13] Dehring, Depken, and Ward (2008) estimated a model omitting distance because they were concerned that distance and percent homeowner were highly correlated. We do not have a measure of ownership rate in our data but still wanted to rule out any possibility that our conclusions could be affected by collinearity.

We include both yes vote and voter turnout measures with the intent of having voter turnout 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, we lack such a measure. Since it is well established that homeowners are more likely to vote (Plutzer, 2001), voter turnout stands in for percent homeowners. The percent yes variable, therefore, is our main mechanism for removing the impact that voters' innate values and perspectives have on how they vote for the Seahawks stadium.

The results in Table 9 show that there is little evidence of a substantive link between announcement effects and favorable votes in the referendum. The second column in the table includes a specification analogous to the preferred specification of Dehring, Depken, and Ward (2008). And in that specification we get results much like those of Dehring, Depken, and Ward; the stadium proposal seems to have little effect on support for the stadium in the first announcement period and a significant effect in the second announcement period.

The results in the third column of Table 9 call into question the robustness of that conclusion. When we add information on the Safeco vote, we find that the impact of the second announcement is barely significant at conventional levels. And the economic impact of the announcement is more than halved. Further, none of the other announcement variables are close to being significant. Thus there is, at most, very limited support for the homevoter hypothesis.

This tepid support for the homevoter hypothesis is further weakened by the fact that, in the hedonic analysis, the second announcement had no real effect on property values. In the hedonic analysis, the only announcement effect that appeared to be significant was the first announcement, which appeared to have a negative effect on property values. If distance is

omitted from equation (2), the coefficient on the first announcement effect is negative and significant, as can be seen in the fourth column of Table 9. But a negative announcement effect is not consistent with the homevoter hypothesis. Further, the case for omitting distance from equation (2) is weak. Thus, none of the results in Table 9 strongly support the homevoter hypothesis.

In the preferred specification of (2), given in the third column of Table 9, the coefficient on distance 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 differs from the finding of Dehring, Depken, and Ward (2008), as their distance coefficients are all negative. The remaining estimates in the third column tend to echo those of Dehring, Depken, and Ward. 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. Our 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 we 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 can serve as a robustness check. 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, consistent with the homevoter hypothesis. The regression specification for this model is as follows:

$$(3)\ PctTurnout_i = ß_0 + ß_1 Annc1\_Effect_i + ß_2 Annc1\_ZeroSales_i + ß_3 Annc2\_Effect_i + ß_4 Annc2\_ZeroSales_i + ß_5 StadDist_i + ß_6 PctYes\_1995Mariners + \Gamma Demographics + v_i$$

The results for estimates of the same specifications as in Table 9 are shown in Table 10. Here, adding the information from the Safeco vote actually strengthens the case for the homevoter hypothesis. The coefficients on the announcement effects for the second announcement switch from negative and insignificant to positive and significant when the Safeco variables are added. However, as was noted earlier, we find no real second announcement effect on prices in the hedonic analysis. So, while the case for the homevoter hypothesis is strengthened by the turnout results, we find much weaker support for the hypothesis than do Dehring, Depken, and Ward (2008).

In all other ways, the estimates of the voter turnout model support the results we obtained when the percent of yes votes was the dependent variable. These estimates in Table 10 serve as a useful confirmation of our earlier results.

VII. Conclusion

This paper aimed to test the logic of the homevoter hypothesis 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. This study examines the validity of this theory using the 1997 referendum on subsidizing a new Seattle Seahawks football stadium.

We build on the basic model of Dehring, Depken, and Ward's (2008) paper on the 2004 referendum for a new Dallas Cowboys stadium in Arlington, Texas, adding controls for voter preferences on the topic by using voter turnout from a very similar 1995 referendum on a new Seattle Mariners ballpark. The analysis necessarily consisted of two steps. First, we 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). We 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, we took these announcement price effects and related them to the votes on the referedum to see if there was evidence in support of the homevoter hypothesis.

The results provide underwhelming support for the homevoter hypothesis. Although we find some relationship between announcement effects and voting behavior, this relationship exists only for the second announcement. But, in our hedonic analysis we find no measurable price effect due to the second announcement. And we find that, once we use results from the 1995 Safeco stadium referendum to control for unobserved attitudes towards public subsidies, the potential impact of the second announcement diminishes substantially. Thus the support for the homevoter hypothesis is weak at best. The hypothesis fails to provide a compelling explanation for why voters favor public subsidies for stadium projects.

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
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

Variable	(1)	(2)	(3)	(4)
Distance/100	1.8214***	-1.9313***	-1.1404***	-2.3534***
	(0.3180)	(0.4669)	(0.4393)	(0.4979)
(Distance/100)^2	-9.0871***	2.7004*	-0.3095	4.0253**
	(1.1026)	(1.6099)	(1.4827)	(1.7642)
Annc1*(Distance/100)	-0.3409	-0.5518	-0.5637*	-0.4555
	(0.4308)	(0.3572)	(0.3288)	(0.3615)
Annc2*(Distance/100)	-0.2064	0.1591	0.1691	0.2071
	(0.3657)	(0.2428)	(0.2214)	(0.2665)
Annc3*(Distance/100)	-0.2598	-0.4331**	-0.4355**	-0.3517
	(0.3076)	(0.2044)	(0.1823)	(0.2312)
Annc1*(Distance/100)^2	0.5746	1.2626	1.4334	1.1979
	(1.5647)	(1.3222)	(1.2067)	(1.3822)
Annc2*(Distance/100)^2	0.5569	-0.8235	-0.8343	-1.1265
	(1.4640)	(0.9658)	(0.8515)	(1.1496)
Annc3*(Distance/100)^2	1.1357	1.9117**	1.8804***	1.6513
	(1.2391)	(0.8144)	(0.6862)	(1.0127)
Age*(Distance/100)	---	0.0130**	-0.0074	-0.0133*
		(0.0064)	(0.0063)	(0.0072)
Age*(Distance/100)^2	---	-0.0520**	0.0043	0.0264
		(0.0204)	(0.0191)	(0.0238)
Month dummies included?	Yes	Yes	Yes	Yes
House characteristics in Table 4 included?	No	Yes	Yes	Yes
Parcel attributes in Table 4 included?	No	No	Yes	Yes
Precinct demographics in Table 5 included?	No	No	No	Yes
Constant	12.1764***	11.3239***	11.3172***	11.2302***
	(0.0201)	(0.0328)	(0.0328)	(0.1083)
Observations	37,349	35,050	34,910	34,518
R^2	0.0259	0.5031	0.5450	0.6322
F-statistic	31.51	572.29	466.31	681.85

Dependent variable is the natural log of sale price. Robust standard errors are shown in parentheses. * $p < 0.1$ ** $p < 0.05$ *** $p < 0.1$

Table 8: Distance and Announcement Effects on Sale Price

		Impact of Announcements on Elasticity		
Distance from Stadium (miles)	**Elasticity of Sale Price with Respect to Distance[1]**	**After Dec 5, 1996 Announcement ($Annc_1$)**	**After April 27, 1997 Announcement ($Annc_2$)**	**After June 17, 1997 Vote ($Annc_3$)**
1	-0.0269	-0.0043	0.0018	-0.0032
5	-0.1151	-0.0168	0.0047	-0.0093
10	-0.1813	-0.0216	-0.0018	-0.0021

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	-423.364	***	Annc1: Effect	-32.948		Annc1: Effect	40.587		Annc1: Effect	-85.466	***
	(25.088)			(165.404)			(94.177)			(27.550)	
Annc1: Zero Sales	8.494	***	Annc1: Zero Sales	7.005		Annc1: Zero Sales	1.395		Annc1: Zero Sales	0.286	
	(1.884)			(5.159)			(2.934)			(1.830)	
Annc2: Effect	100.512	**	Annc2: Effect	338.951	**	Annc2: Effect	157.824		Annc2: Effect	22.058	
	(47.487)			(170.277)			(104.542)			(25.489)	
Annc2: Zero Sales	-0.712		Annc2: Zero Sales	2.491		Annc2: Zero Sales	0.958		Annc2: Zero Sales	-0.105	
	(1.434)			(1.783)			(1.326)			(1.211)	
			Distance /100	55.033		Distance /100	32.966				
				(37.361)			(22.360)				
						Safeco: % Turnout	-0.127	***	Safeco: % Turnout	-0.170	***
							(0.023)			(0.051)	
						Safeco: % Yes	0.708	***	Safeco: % Yes	0.646	***
							(0.023)			(0.042)	
			% White	-0.235	**	% White	-0.089		% White	-0.103	
				(0.099)			(0.098)			(0.126)	
			% Black	-0.281	***	% Black	-0.124		% Black	-0.159	
				(0.101)			(0.100)			(0.129)	
			% Nat Amer	-1.162	***	% Nat Amer	-0.477	**	% Nat Amer	-0.450	**
				(0.270)			(0.203)			(0.220)	
			% Asian Pac Isl	-0.053		% Asian Pac Isl	-0.013		% Asian Pac Isl	-0.047	
				(0.103)			(0.100)			(0.129)	
			% Hispanic	-0.077		% Hispanic	-0.123		% Hispanic	-0.202	
				(0.173)			(0.134)			(0.163)	
			% College Grad	-0.135	***	% College Grad	-0.174	***	% College Grad	-0.167	***
				(0.019)			(0.014)			(0.016)	
			% Unemp	0.135		% Unemp	0.133		% Unemp	0.152	
				(0.116)			(0.100)			(0.097)	
			Median HH Inc/1000	0.340	***	Median HH Inc/1000	0.239	***	Median HH Inc/1000	0.246	***
				(0.017)			(0.013)			(0.015)	
Constant	45.805	***	Constant	623.661	***	Constant	28.419	***	Constant	35.144	***
	(0.956)			(9.889)			(9.776)			(13.181)	
										***	
Obs	2,648		Obs	2,472		Obs	2,471		Obs	2,646	
R^2	0.1662		R^2	0.3405		R^2	0.5893		R^2	0.5560	

Dependent variable is the percent who voted yes on Referendum 48. Bootstrap standard errors are shown in parentheses.
* p < 0.1 ** p < 0.05 *** p < 0.1

Table 10: Regression Results – Voting Analysis: Percent Turnout

(1)			(2)			(3)			(4)		
Annc1: Effect	115.653	***	Annc1: Effect	98.477		Annc1: Effect	58.812		Annc1: Effect	-32.943	*
	(14.622)			(96.974)			(65.756)			(20.042)	
Annc1: Zero Sales	-3.761	**	Annc1: Zero Sales	-5.615	*	Annc1: Zero Sales	-1.327		Annc1: Zero Sales	3.100	***
	(1.959)			(3.220)			(1.849)			(1.196)	
Annc2: Effect	128.664	***	Annc2: Effect	-7.236		Annc2: Effect	210.988	***	Annc2: Effect	107.215	***
	(20.265)			(106.004)			(68.615)			(20.973)	
Annc2: Zero Sales	-0.648		Annc2: Zero Sales	-1.011		Annc2: Zero Sales	1.884	*	Annc2: Zero Sales	1.534	**
	(1.442)			(1.640)			(0.970)			(0.778)	
			Distance /100	-36.877		Distance /100	23.502				
				(22.489)			(15.038)				
						Safeco: % Turnout	0.631	***	Safeco: % Turnout	0.716	***
							(0.021)			(0.029)	
						Safeco: % Yes	0.029	*	Safeco: % Yes	0.057	
							(0.016)			(0.038)	
			% White	0.126		% White	0.018		% White	0.050	
				(0.141)			(0.055)			(0.077)	
			% Black	-0.050		% Black	-0.067		% Black	-0.035	
				(0.142)			(0.055)			(0.078)	
			% Nat Amer	0.202		% Nat Amer	0.093		% Nat Amer	0.033	
				(0.187)			(0.092)			(0.137)	
			% Asian Pac Isl	-0.026		% Asian Pac Isl	-0.042		% Asian Pac Isl	-0.007	
				(0.141)			(0.055)			(0.076)	
			% Hispanic	-0.450	***	% Hispanic	-0.115		% Hispanic	0.044	
				(0.156)			(0.112)			(0.170)	
			% College Grad	-0.023	*	% College Grad	-0.052	***	% College Grad	-0.108	***
				(0.013)			(0.008)			(0.013)	
			% Unemp	-0.099		% Unemp	0.018		% Unemp	-0.007	
				(0.082)			(0.053)			(0.059)	
			Med. HH Inc/1000	0.056	***	Med. HH Inc/1000	0.019	**	Med. HH Inc/1000	0.058	***
				(0.014)			(0.009)			(0.014)	
Constant	33.196	***	Constant	26.516	*	Constant	1.426		Constant	-6.352	
	(0.487)			(14.124)			(5.711)			(8.043)	
Obs	2,634		Obs	2,459		Obs	2,458		Obs	2,631	
R^2	0.0360		R^2	0.2105		R^2	0.5949		R^2	0.5890	

Dependent variable is the percent of registered voters who participated in the election that included Referendum 48. Bootstrap standard errors are shown in parentheses below coefficients. * $p < 0.1$ ** $p < 0.05$ *** $p < 0.1$

References

Ahlfeldt, Gabriel M., and Georgios Kavetsos. 2010. "Form or function? The impact of new football stadia on property prices in London." *MPRA: Munich Personal RePEc Archive* MPRA Paper No. 25003 (Accessed September 14, 2010).

Almond, Elliott. 1997. "Legislators ready to punt on Hawks' stadium." *The Seattle Times*, January 10, 1997.

———. 1997. "S.F. voters approving stadium." *The Seattle Times*, June 5, 1997.

Almond, Elliott, and David Schaefer. 1996. "Allen would help with new stadium, not dome fix-up." *The Seattle Times*, December 10, 1996.

Anderson, Paul M., editor. 2016. *Sports Facility Reports 17*. Milwaukee: Marquette University Law School, National Sports Law Institute.

Baade, Robert A. 1996. "Professional sports as catalysts for metropolitan economic development." *Journal of Urban Affairs* 18 (1): 1-17.

Brunner, E., and J. Sonstelie. 2003. "Homeowners, property values, and the political economy of the school voucher." *Journal of Urban Economics* 54: 239-257.

Brunner, E., J. Sonstelie, and M. Thayer. 2001. "Capitalization and the voucher: An analysis of precinct returns from California's Proposition 174." *Journal of Urban Economics* 50: 517-536.

Carlino, Gerald, and N. Edward Coulson. 2004. "Compensating differentials and the social benefits of the NFL." *Journal of Urban Economics* 56 (May 19): 25-50.

Carpenter, Les, and David Schaefer. 1997. "Seahawk stadium." *The Seattle Times*, April 27, 1997.

Chema, Thomas V. 1996. "When professional sports justify the subsidy, a reply to Robert A. Baade." *Journal of Urban Affairs* 18 (1): 19-22.

Coates, Dennis R., and Brad R. Humphreys. 2008. "Do economists reach a conclusion on subsidies for sports franchises, stadiums, and mega-events?" *Econ Journal Watch* 5 (3) (September): 294-315.

Coates, Dennis, Brad R. Humphreys, and Andrew Zimbalist. 2006. "Compensating differentials and the social benefits of the NFL: A comment." *Journal of Urban Economics* 60 (February 17): 124-131.

Dehring, Carolyn A., Craig A. Depken II, and Michael R. Ward. 2008. "A direct test of the homevoter hypothesis." *Journal of Urban Economics* 64 (January 10): 155-170.

Eigsti, Roger, and Bob Watt. 1997. “Stands on stadiums: Touchdown: Allen's vision deserves vote.” *The Seattle Times*, March 19, 1997.

Fischel, William. 2001. *The Homevoter Hypothesis*. Cambridge: Harvard University Press.

Goldberg, Carey. 1997. “A decision on the Seattle Seahawks' home.” *The New York Times*, May 24, 1997.

Hilber, C., and C. Mayer. 2006. “Why do households without children support local public schools? Linking house price capitalization to school spending.” *Working Paper, Columbia Business School*.

Georgios Kavetsos and Stefan Szymanski, "National Wellbeing and International Sports Events." *North American Association of Sports Economists*, 2008.

Kiel, Katherine A., Victor A. Matheson, and Christopher Sullivan, "The Effect of Sports Franchises on Property Values: The Role of Owners Versus Renters." *Working Papers, College of the Holy Cross,* 2010.

Marwaha, Amitoj. 1997. “Voters don't need another referendum on stadiums.” *The Online Daily of the University of Washington* (February 28, 1997), http://dailyuw.com/1997/2/28/voters022897/.

Pappas, Doug. 2000. “New stadia: Atlanta, Arizona, Seattle.” *Boston Baseball*. http://roadsidephotos.sabr.org/baseball/bb00sta-4.htm

Plutzer, Eric. 2001. “Becoming a Habitual Voter: Inertia, Resources, and Growth in Young Adulthood.” *American Political Science Review* 96 (March): 41-56.

Portney, P. R., and J. C. Sonstelie. 1980. “Take the money and run: A theory of voting in local referenda.” *Journal of Urban Economics* 8: 187-195.

Rosentraub, Mark S. 1996. “Does the emperor have new clothes?: A reply to Robert A. Baade.” *Journal of Urban Affairs* 18 (1): 23-31.

Rosentraub, Mark S., and David Swindell. 1998. “Who benefits from the presence of professional sports teams? The implications for public funding of stadiums and arenas.” *Public Administration Review* 58 (1): 11-20.

Schaefer, David. 1997. “Allen showed them the money -- The big winners in state's most expensive campaign.” *The Seattle Times*, August 12, 1997.

———. 1997. “Opposition counts pennies as stadium campaign opens.” *The Seattle Times*, May 9, 1997.

———. 1997. “Referendum 48 -- from backer to ballots, stadium vote is unique -- returns now arriving in mostly-mail poll on billionaire's plan to keep the Seahawks.” *The Seattle Times*, June 8, 1997.

———. 1997. “Stadium foes chide Allen for not voting -- campaign to set spending record.” *The Seattle Times*, May 28, 1997.

———. 1997. “Voters begin casting stadium ballots -- two-thirds may use mail instead of polling place.” *The Seattle Times*, May 27, 1997.

“The stadium: Safeco Field timeline.” 1999. *The Seattle Post-Intelligencer*. http://www.seattlepi.com/safeco/stadium/timesafe.shtml

Stewart, Tom. 1997. “Referendum 48 -- Eastern Washington is tired.” *The Seattle Times*, June 21, 1997. Letters to the Editor.

Tu, Charles C. 2005. “How does a new sports stadium affect housing values? The case of FedEx Field.” *Land Economics* 81 (3) (August): 379-395.