The Public Meeting Paradox: How NIMBY-Dominated Public Meetings Can Enable New Housing*

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May 2024

Abstract

Public meetings to consider new housing proposals often feature visible and vocal opposition from neighboring residents, creating a perception that these meetings impede the growth of the housing supply contributing to inequality. We analyze a model where residents can legally challenge a developer's housing proposal. A public meeting serves as a critical tool for developers to identify potential litigants, enabling them to adjust proposals and avoid legal action. Interestingly, developers prefer meetings dominated by opponents since it is easier to identify potentially litigious neighbors. Contrary to common belief, our findings suggest that public meetings dominated by NIMBY opponents can *increase* housing supply by fostering compromise projects. This challenges the prevailing conventional wisdom that unrepresentative meetings significantly restrict housing development. Our analysis instead focuses attention on the threat of litigation as the key driver of the undersupply of housing.

Keywords: formal models, housing politics, NIMBYs, public meetings

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*Authors are listed in alphabetical order. We thank Ryan Copus, Chris Elmendorf, Richard Green and audience members at the University of Southern California and Oregon State University for helpful comments. All errors and omissions are our own.

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Local institutions such as planning boards, city agencies, and school boards often solicit public feedback through local meetings. In the context of housing, scholars have provided evidence suggesting that local, public meetings for variances, zoning changes, and other project approvals often lead to costly delays and result in smaller compromise projects (Einstein, Glick, and Palmer 2020). Furthermore, meetings are not usually representative of the broader community that could be affected by the development, and they are often dominated by opponents (Einstein, Palmer, and Glick 2019; Einstein, Glick, and Palmer 2020; Einstein et al. 2023). The conventional wisdom that has arisen from this research is that unrepresentative planning meetings impose excessive costs on developers and slow the supply of new housing.

We analyze a formal model that demonstrates that public planning meetings may actually benefit developers by allowing them to build larger housing projects than they otherwise would. Moreover, we show that the benefit from these meetings is actually *larger* when they are unrepresentative—i.e., dominated by the strongest opponents. In contrast to the extant conventional wisdom, we argue that unrepresentative public planning meetings can actually expand the supply of housing, relative to a world in which such meetings did not occur.

The key insight of our model is that the threat of costly litigation casts a shadow over the entire housing development pipeline, and public meetings can help mitigate this threat. In particular, a developer would like to know in advance if a particular project would provoke a particularly unhappy neighbor (or set of neighbors) to sue, but she doesn't know for sure if such neighbor(s) live near the proposed project. In the absence of any concrete information one way or the other, she may be inclined to preemptively compromise by proposing a small project that she knows nobody would be likely to sue over.

An "unrepresentative" public meeting in which only the strongest opponents are in attendance gives the developer a good opportunity to learn if such a neighbor actually exists. If so, she'll stick to the small project she knows will prevent a lawsuit. But if not, she can actually proceed with a larger project than she otherwise would have put forward. In essence, the public meeting allows a developer to gain additional information about the depth of local opposition, allowing better calibrated projects that are larger on average.

There are some important limitations of our analysis. First, planning meetings in our model do not lead to administrative rejections of proposed projects. They are therefore best understood as fora for public comment and not adjudicative bodies. Second, we do not analyze whether or how neighbors coordinate with each other to file lawsuits, either before or after a public meeting. On the one hand, meetings may allow opponents of a project to meet one another and coordinate on filing lawsuits at lower per-neighbor cost. On the other hand, an increased awareness that other neighbors oppose a proposed project may incentivize neighbors to free-ride and be less likely to sue. Third, there are no "YIMBYs" in our model who show up to a public meeting in support of a developer's proposal. We believe this is an interesting avenue for future research, but in our model, the developer does not actually want YIMBYs to show up to the public meeting. If they do, they will make it more difficult for the developer to accurately gauge the depth of opposition in the neighborhood. To put it bluntly, since YIMBYs won't threaten to sue the developer, she doesn't need to hear from them—especially if they end up "shouting down" neighbors that she *does* need to hear from.

Local Planning Meetings and NIMBYism

We further a substantive literature on housing and NIMBY-ism, which explores the impact of public meetings and litigation on housing supply and development (Einstein, Glick, and Palmer 2020; Foster and Warren 2022; Brouwer and Trounstine 2024). Despite sky-rocketing housing prices and chronic shortages, developers proposing new housing projects and residents are at odds, even in liberal cities (Brouwer and Trounstine 2024; Ornstein 2023). Much like the model of the strategic interaction between developers and local residents in Foster and Warren (2022), we formalize the incentives of developers, proposing a housing project of variable size, and the citizens who may be opposed to such development. We focus, however, on the institution of a local meeting, even an unrepresentative one, as it can give the developer sufficient information about the opponent citizens to efficiently compromise.

In general, meeting attendance and comments are not representative of the community at large and not representative of all who would be impacted by the proposal, such as prospective residents in the case of housing. Planning and zoning meeting attendees tend to be wealthier, whiter, older, and more likely to be male, homeowners, and local voters than the larger communities in which projects are proposed (Einstein, Palmer, and Glick 2019; Einstein, Glick, and Palmer 2020; Einstein et al. 2023; see also Turner and Weninger 2005, on other types of meetings). Meeting comments are dominated by opposition (Einstein, Glick, and Palmer 2020), especially those who would shoulder the concentrated costs of living near a new development (de Benedictis-Kessner and Hankinson 2019; Hankinson and de Benedictis-Kessner 2022; Marble and Nall 2021). Setting aside normative concerns of unrepresentative local "democracy," the lack of participation by neutral and supportive residents (and prospective residents) has been a proffered explanation for the chronic under-supply of housing.

We take an alternative view of unrepresentative local meetings. The fora are not for aggregating the preferences of all impacted by potential development and coming to a procedurally democratic consensus, but for the strongest opponents of the proposal to make themselves, and their preferences, known. Adams (2004) argues that city council and school board meetings in Santa Ana, California, are used not to directly influence governmental decisions, but for citizens to convey information to officials. In the arena of housing, local officials and planning/zoning board members are not the only actors present to garner information about citizen attendees. Meetings offer developers an opportunity to learn more precisely the preferences of a proposed projects' opponents and complete studies and make other adjustments to "mollify neighbors' concerns" (Einstein, Glick, and Palmer 2020, p. 3). This information is vital to developers hoping to complete projects in a timely, cost-effective manner due to the credible threat of citizen lawsuits.

Regardless of a meeting's procedures or outcome, development of new housing can be delayed by opposed citizens through litigation. Judicial "tastes" have become more friendly to anti-development sentiments since the 1970s, making lawsuits serious concerns for developers (Fischel 2004; Glaeser, Gyourko, and Saks 2005). Courts accept "junk science" traffic analyses as evidence sufficient to deny a project entirely or impose costly traffic mitigation expectations on developers (Currans and Stahl 2024). Even lawsuits that are "frivolous" and ultimately unsuccessful force developers to pay legal costs and delay projects; building permits may expire while a case moves through the system (Einstein, Glick, and Palmer 2020, pp. 27, 123). In their case study of the development of St. Aidan's Church in Brookline, Massachusetts, Einstein, Glick, and Palmer (2020) show how impactful anti-development lawsuits can be: after hiring a Canon Lawyer to challenge the Archdiocese's ability to sell the property, seventy-five residents filed a lawsuit that, while eventually settled, delayed the project by a year. The increasing legalization of, and judicial involvement in, urban planning extends outside the United States to municipalities in Latin America, India, and South Africa (Bhan 2009; Sotomayor, Montero, and Ángel-Cabo 2023; Taylor 2020).

Housing meetings transmit information to developers. As a public forum in which the most opposed neighbors voice their concerns, meeting attendance can indicate citizens' willingness to pursue litigation against developers (Einstein, Glick, and Palmer 2020, p. 122). Meetings attended by the opposition allow developers to identify who the potentially litigious neighbors are and the demands they have for the project. Many housing and local democracy advocates argue that making meetings less costly to attend (in time and location) and conducting wider outreach to bring more than immediate neighbors to meetings can make planning and zoning meetings more representative of both proponents and opponents of housing development (Einstein, Glick, and Palmer 2020; see also Cole and Caputo 1984, on meetings). However, making meetings more representative of the larger community, as well as including prospective residents, would dilute the information on their staunchest opponents that the developers need to make efficient compromises.

In the purview of formal theory, our work speaks to a political economy literature on information aggregation (Ali et al. 2008) and meetings as tools of preference aggregation (Aragonès and Sánchez-Pagés 2009; Collins 2021; Osborne, Rosenthal, and Turner 2000), but we take significant departures by embedding meetings as a source of information in a proposer-litigation setting rather than the direct mechanism for decision making. This generates qualitatively different predictions about who attends meetings and the value of the meeting itself. The inefficiency of uncertainty in our model is similar to canonical work in international relations on bargaining and war. Two sides prefer a negotiated settlement to fighting, as war is costly; however, with private information on their own power and willingness to fight, wars with deadweight loss can still occur rationally (Fearon 1995). Much like war, lawsuits, with their associated legal fees and delays, are costly and if the developer has information about the opposed citizens' willingness to sue, an efficient compromise can be made.

A Model of Citizen Lawsuits

We model the interactions between a developer (D, pronoun "she") who has chosen to develop new housing at a site with $n > 1$ neighbors, each of whom we index by $i \in \{1, 2, ..., n\}$ (pronoun "he" or "they"). We will denote the final size of the project as $x \geq 0$. This parameter can be interpreted in a "static" sense (i.e., the square feet of a new building), or in a "dynamic" sense (i.e., the square feet of a new building negatively weighted by the time it takes to get built).[1]

Lawsuits The developer makes a proposal to build a housing project of size $x_D \geq 0$. If a neighbor is unhappy with the project proposed by the developer, he can decide to sue the developer claiming that the project exceeds some legally acceptable limit, which we label $\overline{x} \geq 0$. For example, the project site might be located in a part of the city that is zoned for single family homes or in a part of town that is densely forested. Then, a neighbor's lawsuit could claim that the developer is not

1. For example, a neighbor unhappy with a proposal to build a 10 floor building may consider it a success to delay construction for a year or two, effectively reducing the project "size" as measured by the height of the building times the number of years he experiences the negative effects from it being in his neighborhood.

complying with a variance she received to increase the project size, or that she has not adequately assessed the environmental impact of a project of the size she proposed. Whether the developer's project complies with all regulations will then be resolved by the judicial process.

Formally, we will assume that $\overline{x}$ is an exogenous parameter that can represent zoning ordinances, existing legal precedent around acceptable project sizes, environmental limitations, etc. While a developer's project proposal can legally exceed this limit (e.g., with a variance)—and it will in our model—this serves as the maximum project size that would be "legally uncontroversial" and below which a lawsuit would not survive a perfunctory motion to dismiss. We assume that if a developer is sued over a project that is below $\overline{x}$, then the lawsuit gets dismissed at no cost to the developer. Since lawsuits are costly (see below) this immediately implies there are never lawsuits over projects where $x_D \leq \overline{x}$.[2] Note that our model allows for the possibility that $\overline{x} = 0$, whereby *no* project on the developer's site would be considered legally uncontroversial.

We model neighbors' lawsuits in a simple and tractable manner. After the developer proposes a project of size x_D, each neighbor independently decides whether to sue the developer. We will use $s_i \in \{0, 1\}$ to indicate neighbor i's decision about whether to sue the developer ($s_i = 1$) or not ($s_i = 0$). If the developer wins all of the lawsuits, then she implements her project of size x_D. However, if she loses any one of the lawsuits, the court issues a ruling that limits the size of the developer's project to be weakly smaller than $\overline{x}$. In this case, we will label the developer's revised proposal (after losing a lawsuit) as x_0.

We assume that each neighbor who decides to sue wins their case with probability ν (i.e., ν for "neighbor wins"), where all lawsuits are independent draws from the distribution over potential case outcomes. Then, the probability that any lawsuit is successful at reducing the developer's

2. One can alternatively assume that such nuisance lawsuits impose a cost on developers, but those lawsuits are perfectly anticipated by the developer and thus already included in the developer's costs (which we describe below).

proposal is given by ρ (i.e., ρ for "reduce"), where:[3]

$$\rho(\boldsymbol{s}) = 1 - \prod_{i=1}^{n}(1 - \nu s_i)$$

and $\boldsymbol{s} = (s_1, s_2, ..., s_n)$ is a vector indicating each neighbor's probability of suing.

Lawsuits are costly to both the suing neighbors and the developer. If neighbor i files a lawsuit, he pays a cost $\kappa_i > 0$. For now, we assume this cost equal for all neighbors, so that $\kappa_i = \kappa_P$ for all i.[4] If any neighbor files a lawsuit, then the developer pays a cost $\kappa_D > 0$. These costs can represent both the direct costs of litigation (e.g., attorneys, court fees, delay costs, etc.) as well as opportunity costs (e.g., resources diverted away from developing other projects).[5]

Potential Coordination Among Neighbors In our model there are multiple neighbors, each of whom makes their own decisions about how to respond to the developer's proposal(s). This raises the possibility that neighbors will consider other neighbors' actions when making their own decisions, generating coordination motives.[6] While these coordination motives are substantively interesting, they are complicated to model and our primary focus is on the developer's uncertainty about the extent of local resistance to her proposed project. So, we set aside neighbors' coordination motives in our current analysis with a simplifying assumption that each neighbor i has a fixed (possibly incorrect) belief about other neighbors' equilibrium actions. We will accordingly say that each neighbor is "behavioral" with respect to their evaluations of other neighbors' actions.[7]

3. An alternative way to model lawsuits is to assume that the court merges lawsuits into one consolidated lawsuit that the developer loses with probability $\rho(k)$, where k is the number of litigants who sue, and ρ increases in k.

4. When we introduce public meetings to our model, this cost may vary across neighbors. See Assumption 3.

5. We assume the developer pays a single fixed cost if at least one lawsuit is filed. Our results would be qualitatively similar if we instead assumed the developer paid this cost for each lawsuit filed, but the analysis would be more cumbersome and require more notation.

6. For example, each neighbor may have an incentive to free ride on the effort of other neighbors, thus reducing all neighbors' incentives to take steps to oppose the developer's project. On the other hand, by banding together, neighbors may be able to increase the likelihood that the developer reduces her project size. Because of these two competing dynamics, it is not obvious whether coordination motives would increase or decrease neighbors' willingness to challenge a developer's project.

7. This effectively means that each neighbor ignores the effect of their own actions on other neighbors, and will generate equilibrium strategy profiles with type-specific symmetric strategies for the neighbors.

Except for this particular assumption, elsewhere in our model we will make the standard formal assumption that players form correct beliefs via Bayes' rule based on other players' equilibrium best responses (when possible).

Preferences over housing We assume each neighbor i gets a weakly positive benefit from new housing, which is weakly increasing in x and captures the idea that new housing is economically beneficial for the community in which it is built (Li 2021; Asquith, Mast, and Reed 2023; Mast 2023). However, we also assume each neighbor is negatively impacted by new housing and suffers a cost that is also increasing in x, capturing the idea that new housing could increase traffic, introduce new shadows, change the character of the neighborhood, or impact adjacent property values.

To capture this trade-off, we represent each neighbor i's preferences over a project x with the following payoff function:

$$v_i(x, c_i) = bx - c_i x^2$$

where $b \geq 0$ and $c_i > 0$. This utility function is strictly concave, single-peaked and symmetric around ideal point $\hat{x}_i(c_i) \equiv b/2c_i \geq 0$. While neighbor i may prefer *some* housing (i.e., when $b > 0$ so that $\hat{x}_i(c_i) > 0$), the external costs created by new housing generally mean that he prefers relatively smaller projects than the developer (who doesn't bear the external costs). All of our results allow for a neighbor who faces only costs from new housing, and thus has an ideal point indicating they most prefer no housing (i.e., $\hat{x}_i(c_i) = 0$).

Importantly, we assume each neighbor faces a potentially different trade-off between the benefit and cost of new housing. We formalize this by allowing c_i to vary across neighbors, capturing the idea that some neighbors are closer to a development site and may face more severe costs, or that some neighbors are simply more prone to NIMBY attitudes than others. While heterogeneity among neighbors is important for our core arguments, we formalize this notion in the simplest manner possible, assuming that each neighbor i's cost can take one of two values: $c_i \in \{\underline{c}, \overline{c}\}$, where $\overline{c} > \underline{c} > 0$.[8] Since the neighbors in our model want smaller projects than the developer due to the additional costs they suffer, we will refer to a neighbor i with $c_i = \overline{c}$ as a "strongly opposing neighbor" or simply "strong opponent" and a neighbor i with $c_i = \underline{c}$ as a "weakly opposing neighbor" or simply "weak opponent."

Each neighbor i knows their own cost, but this is his private information. Formally, we assume that each c_i is independently drawn from a commonly known distribution where $\Pr(c_i = \underline{c}) = \omega$ for all i (i.e., ω for "weak"). Substantively, the probability $1-\omega$ captures the prevalence of extreme NIMBYs in the community around the proposed development site. It can be roughly understood as a measure of the community's NIMBYism.

The developer strictly prefers larger projects up to a point where they become too costly. Accordingly, we assume her payoff from a development of size x is $v_D(x)$, where v_D is a single-peaked function that is weakly concave. The developer's payoff v_D includes a fixed cost for developing the site, which formally incorporates the idea that a project may not "pencil" (i.e., recoup costs and at least break even) if it is not big enough. This means that she will abandon the project all together unless $x \geq \underline{x}$, where $\underline{x}$ is the minimum viable project size that will pencil for the developer. We will call this her "break-even project size" and we will assume she never proposes a project that is smaller than this level.

In our analysis, we focus on the most interesting case in which there is significant conflict between what the developer wants and what the neighbors want, but not so significant that the developer simply abandons the project all together. Formally, we will assume the developer's ideal project size is "substantially" higher than what any of the neighbors would prefer, such that all neighbors would be willing to sue her if the developer proposed her ideal project size of $\hat{x}_D$. We also assume the minimum project size that pencils for the developer would not provoke any lawsuits. This means that, if she wanted to, she could propose a project that creates no legal risk

8. In the analysis below, the discrete type space for the neighbors induces a discrete action space for the developer since it allows to eliminate a wide range of project sizes that are strictly dominated.

and still generates profit. It also implies that her ideal project size is strictly higher than the legally uncontroversial project size.[9]

Sequence and solution concept Summarizing the discussion above, we can now write out the game sequence.

1. The developer makes a proposal of size $x_D \geq 0$.
2. For each neighbor i, his cost c_i is independently drawn and privately revealed to that neighbor.
3. Each neighbor i simultaneously decides whether to sue the developer, $s_i \in \{0, 1\}$.
4. The outcome of each lawsuit is drawn, where with probability $1 - \nu$ the developer wins and probability ν the developer loses.
5. If the developer is not sued or if she wins all lawsuits, then x_D is implemented; otherwise the developer must revise her proposal to $x_0 \in [0, \overline{x}]$, which is then implemented.
6. Each player receives a total payoff equal to their payoff from the final project size $x \in \{x_D, x_0\}$, less the cost of a lawsuit (if they were involved in one).

An equilibrium of this game consists of a strategy profile in which each player is playing sequentially rational strategies, and beliefs for each player at every information set. We will mostly assume that beliefs are updated via Bayes' rule (when possible), as is standard for perfect Bayesian equilibria. However, as we discuss above, we assume that neighbors are behavioral with respect to their assessments of other neighbors' actions.

Suing the Developer

If a neighbor is successful in his lawsuit, then this constrains the developer to build projects smaller than $\overline{x}$. If the developer's break-even project size is larger than this, i.e. $\underline{x} > \overline{x}$, then the court's

9. In Online Appendix A, we formally characterize these assumptions.

ruling will force her to abandon the project all together, $x_0 = 0$. Otherwise, given that $\hat{x}_D > \overline{x}$, after losing a lawsuit for a project $x_D > \overline{x}$ she revises her project down so that $x_0 = \overline{x}$.

For a neighbor i, let $\tilde{\rho}_i(s_i, n) \in [0, 1]$ be his belief that there will be a successful lawsuit by any of the n neighbors, given his own strategy s_i, and where $\tilde{\rho}_i(s_i, n)$ is increasing in s_i.[10] Then neighbor i finds it weakly better to sue ($s_i = 1$) than not sue ($s_i = 0$) if

$$\underbrace{(1 - \tilde{\rho}_i(1, n))v_i(x_D, c_i) + \tilde{\rho}_i(1, n)v_i(x_0, c_i) - \kappa_P}_{\text{expected utility from suing}} \geq \underbrace{(1 - \tilde{\rho}_i(0, n))v_i(x_D, c_i) + \tilde{\rho}_i(0, n)v_i(x_0, c_i)}_{\text{expected utility from not suing}}$$

After rearranging, the condition simplifies to:

$$\underbrace{v_i(x_0, c_i) - v_i(x_D, c_i)}_{\substack{\text{Net value to } i \text{ from a successful} \\ \text{lawsuit reducing the project size}}} \geq \underbrace{\frac{\kappa_P}{\tilde{\rho}_i(1, n) - \tilde{\rho}_i(0, n)}}_{\substack{\text{Cost of litigation weighted} \\ \text{by increased probability} \\ \text{of successful lawsuit}}} \qquad (1)$$

Condition (1) demonstrates that when deciding whether or not to file a lawsuit, a neighbor i must consider three factors: the net value of a successful lawsuit, $v_i(x_0, c_i) - v_i(x_D, c_i)$, the increase in the probability that a lawsuit will be successful if he files his own lawsuit, $\tilde{\rho}_i(1, n) - \tilde{\rho}_i(0, n)$, and the cost of the lawsuit, κ_P. In the next result, we show that neighbor i is weakly disincentivized to sue if the developer's proposal is sufficiently small.

Lemma 1. For a neighbor i, there exists a threshold, $\tilde{x}(c_i) > 0$ such that i will not sue for all $x_D < \tilde{x}(c_i)$, is indifferent between suing and not suing if $x_D = \tilde{x}(c_i)$, and will sue if $x_D > \tilde{x}(c_i)$.

Proof of Lemma 1. This follows from condition (1). The right hand side of this condition is strictly positive and constant in x since $\kappa_P > 0$. The left hand side is a bit more complicated to characterize since v_i is non-monotonic in x. There are three cases to consider.

10. Recall that each neighbor is behavioral with respect to other neighbors' actions (see above), so $\tilde{\rho}_i(s_i, n)$ need not be correct. However, since a neighbor correctly anticipates his *own* behavior, it must follow that the probability of a successful lawsuit is larger when he sues than when he does not sue, $\tilde{\rho}_i(1, n) > \tilde{\rho}_i(0, n)$.

Case 1: $x_D < \overline{x}$. In this case, lawsuits do not constrain the developer and thus $x_0 = x_D$. The left hand side is zero and the condition never holds.

Case 2: $\overline{x} \leq \hat{x}_i(c_i)$ and $x_D \in [\overline{x}, \hat{x}_i(c_i)]$. In this case, the left hand side is strictly decreasing in x_D from either zero (if $x_0 = \overline{x}$) or a strictly negative number (if $x_0 = 0$). In either case, the condition never holds.

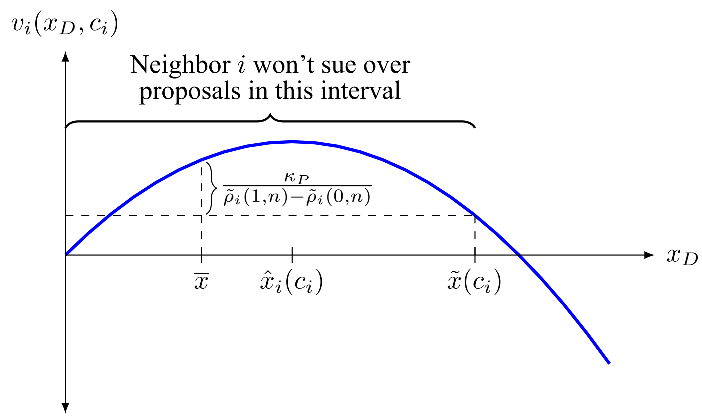
Case 3: $x_D > \hat{x}_i(c_i)$. In this case, v_i is strictly decreasing and the left hand side is therefore strictly increasing with no upper bound. Moreover, at $x_D = \hat{x}_i(c_i)$, the left hand side is weakly negative, implying there exists some threshold $\tilde{x}(c_i) > \hat{x}_i(c_i)$ such that (1) holds for all $x_D \geq \tilde{x}(c_i)$.

For a neighbor i, these three cases together imply that it will be weakly optimal for him not to sue if and only if $x_D \leq \tilde{x}(c_i)$. □

Note that when condition (1) binds, neighbor i is indifferent between suing and not suing. If neighbor i sues when indifferent, this creates an open set problem for the developer, and there can be no equilibrium in which i sues when indifferent. To streamline our analysis going forward, we will thus presume that when a developer's proposal makes a neighbor indifferent between suing and not suing, he does not sue.

In Figure 1, we plot a hypothetical neighbor i's utility over project sizes, illustrating the range of proposals for which he is unwilling to file a lawsuit, given condition (1) above.

Figure 1: *We plot neighbor i's utility over project sizes to illustrate his strategic calculus over when to sue the developer, given that the project size is constrained to $x_0 \leq \overline{x}$ after a lawsuit.*



The costlier a neighbor finds new housing, the smaller this interval is. In Lemma A.2 in the Online Appendix, we demonstrate that a neighbor with lower costs is willing to accept a larger housing development project than a neighbor with higher costs. Going forward, let $x_1 \equiv \tilde{x}(\overline{c})$ and $x_2 \equiv \tilde{x}(\underline{c})$.

Lemma 2. Assuming that a neighbor does not sue when indifferent, then: if $x_D \leq x_1$, none of the neighbors sue; if $x_1 < x_D \leq x_2$, all neighbors with high costs ($\overline{c}$) sue; and if $x_D > x_2$, all neighbors sue.

Proof of Lemma 2. This follows directly from Lemma 1. □

The Developer's Proposal

When she is developing her proposal, the developer does not (yet) know if a lawsuit will occur. For a proposal x_D, let $\tilde{\rho}_D(x_D, n)$ be her belief that there will be a successful lawsuit that reduces the size of her project, and let $\tilde{\lambda}_D(x_D, n)$ be her belief that there will be any lawsuit (successful or not). Then, her ex ante expected utility from making a proposal x_D is:

$$U_D(x_D, n) = (1 - \tilde{\rho}_D(x_D, n))v_D(x_D) + \tilde{\rho}_D(x_D, n)v_D(x_0) - \tilde{\lambda}_D(x_D, n)\kappa_D$$

The fact that there is a discrete set of neighbor types greatly simplifies the the developer's induced choice set when she maximizes this expected utility function.

Lemma 3. In equilibrium, the developer chooses a project size $x_D \in \{x_1, x_2, \hat{x}_D\}$.

Proof. Recall that the developer never proposes a project smaller than her break-even point. Then, $x_D \geq \underline{x}$. Given that v_D is single-peaked around $\hat{x}_D >$ max$\{\underline{x}, \overline{x}, \hat{x}_i(\underline{c})\}$ (using Assumption A.1 in Online Appendix A), then v_D is strictly increasing for all $x_D \in [\underline{x}, \hat{x}_D)$ and neither increasing nor decreasing at $\hat{x}_D$. Then, for any generic right-closed interval X_k such that (1) $X_k \subseteq [\underline{x}, \hat{x}_D]$ and (2) the probability of a (successful) lawsuit is fixed, it is strictly dominated for the developer to choose any $x_D <$ max X_k. Finally, since Lemma 2 defines three intervals in which each the probability of a lawsuit is constant assuming neighbors do not sue when indifferent, then it is strictly dominated for the developer to choose any x_D such that $x_D \notin \{x_1, x_2, \hat{x}_D\}$. Finally, if any neighbor sues when indifferent, this creates an open set problem for the developer (who has no maximizer) and thus there can be no equilibrium in which neighbors sue when indifferent. □

Lemma 3 means that the developer's decision boils down to choosing a project size based on her expectation about the number of lawsuits it will provoke. There are three scenarios to consider.

- **No compromise.** First, consider if the developer proposes her ideal project. We refer to this as "no compromise" that generates a "large" sized project, $\hat{x}_D$. Since all neighbors are willing to sue over a project of size $\hat{x}_D$ (see Assumption A.1 in Online Appendix A), the probability of a lawsuit is $\tilde{\lambda}_D(\hat{x}_D, n) = 1$, and the probability of a success is $\tilde{\rho}_D(\hat{x}_D, n) = 1 - (1 - \nu)^n$. In this case, her expected payoff is:

$$U_D(\hat{x}_D, n) = (1 - \nu)^n v_D(\hat{x}_D) + (1 - (1 - \nu)^n) v_D(x_0) - \kappa_D$$

- **Partial compromise.** Next, consider if she proposes a project that satisfies the weak opponents, but not the strong opponents. We refer to this as "partial compromise" that generates a "medium" sized project, x_2. Then the probability of a lawsuit is $\tilde{\lambda}_D(x_2, n) = 1 - \omega^n$ and the probability of a successful lawsuit is $\tilde{\rho}_D(x_2, n) = 1 - (1 - \nu(1 - \omega))^n$. In this case, her expected payoff is:

$$U_D(x_2, n) = (1 - \nu(1 - \omega))^n v_D(x_2) + (1 - (1 - \nu(1 - \omega))^n) v_D(x_0) - (1 - \omega^n)\kappa_D$$

- **Full compromise.** Finally, consider if she proposes a project that satisfies both the weak opponents and the strong opponents. We refer to this as "full compromise" that generates a "small" sized project, x_1. In this situation, there is no lawsuit, so $\tilde{\lambda}_D(x_1, n) = \tilde{\rho}_D(x_1, n) = 0$.

In this case, her expected payoff is:

$$U_D(x_1) = v_D(x_1)$$

Whether the developer chooses a smaller project size to avoid a lawsuit depends on both the cost of a lawsuit and how she evaluates the lottery associated with a lawsuit. Intuitively, if lawsuits are especially costly or the expected project size induced by a lawsuit is sufficiently bad, then the developer will find the full compromise appealing. Because we are interested in examining how costly lawsuits shapes developers' incentives around meetings, we will assume that when facing any risk of a lawsuit, the developer prefers to make a compromise that reduces the risk of that lawsuit. This assumption means that our analysis is most relevant to situations where developers find lawsuits to be very costly.

Assumption 1 (very costly lawsuits)**.** Lawsuits are sufficiently costly to the developer. Formally, $U_D(x_1) > U_D(x_2, 1) > U_D(\hat{x}_D, 1)$.

This assumption is more likely to hold when (1) the direct cost of litigation, κ_D, is high, (2) the project size resulting from a successful lawsuit, x_0, is small, (3) courts are very friendly to plaintiffs so that ν is high, and (4) there are lots of strong opponents in the neighborhood so that ω is small. We now characterize the equilibrium of the model of citizen lawsuits when lawsuits are very costly.

Proposition 1. In any equilibrium of the model, neighbor i uses the following lawsuit strategy:

$$s_i^*(x_D, c_i) = \begin{cases} 0 & \text{if } x_D \leq \tilde{x}(c_i) \\ 1 & \text{if } x_D > \tilde{x}(c_i) \end{cases}$$

When Assumption 1 holds and lawsuits are very costly, the unique equilibrium features the developer proposing a full compromise, $x_D^* = x_1$.

Proof of Proposition 1. The neighbors' strategy follows from Lemma 1 and the fact that there can be no equilibrium in which neighbors sue when indifferent (see Lemma 3). Together, Assumption 1 and Lemma 3, immediately imply $x_D^* = x_1$. □

Assumption 1 is a crucial assumption for what follows, since it ensures that the developer would rather avoid lawsuits. If, on the other hand, there are circumstances in which she would be willing to face a lawsuit over a larger project, then the value of meetings (that we will establish below) will be lessened.

The Value of Information

Lawsuits are both costly to and risky for a developer. When lawsuits are very costly (Assumption 1), she "preemptively" makes a full compromise and proposes the smallest project that avoids a lawsuit, x_1. In effect, she presumes there will be strong opposition, and proposes a substantially smaller project in line with this presumption. Maybe she would be better off if she were able to learn about the extent of opposition *before* making her proposal? If she did, she would sometimes learn there is actually only mild opposition and she could propose a larger project.

> **Lemma 4.** Given Assumption 1, conditional on learning that she faces only weak opponents, the developer's optimal proposal is x_2 and conditional on learning she faces at least one strong opponent, her optimal proposal is x_1.

Proof of Lemma 4. From Assumption 1, the developer strictly prefers the (certain) payoff $U_D(x_1) = v_D(x_1)$ to the cost of a lawsuit and the lottery induced by either x_2 or $\hat{x}_D$. As the developer becomes more certain there are strong opponents who can decide to sue her, then for $x_D \in \{x_2, \hat{x}_D\}$, $\tilde{\lambda}_D(x_D, 1)$ weakly increases and $\tilde{\rho}_D(x_D, 1)$ strictly increases. This implies that $U_D(x_2, 1)$ and $U_D(\hat{x}_D, 1)$ are weakly decreasing as the developer becomes more certain there are strong opponents, ensuring that Assumption 1 continues to hold when she is certain she faces strong opponents. In this case x_1 remains her optimal choice.

Now consider the reverse case in which the developer becomes certain that she does *not* face any strong opponents. Her three choices are $\hat{x}_D$, x_1 and x_2. Because $x_2 > x_1$ and both induce no lawsuits (since there are only weak opponents), $v_D(x_2) > v_D(x_1)$ and x_2 dominates x_1. Now, the developer faces a choice between not compromising and proposing $\hat{x}_D$ or partially compromising and proposing x_2. Not compromising results in all ($n \geq 1$) weak opponents suing and so $U_D(\hat{x}_D, n) \leq U_D(\hat{x}_D, 1)$. Since the partial compromise results in $v_D(x_2) > U_D(x_1)$, then by Assumption 1, $v_D(x_2) > U_D(x_1) > U_D(\hat{x}_D, 1) \geq U_D(\hat{x}_D, n)$ and the optimal proposal is x_2. $\square$

An immediate implication of Lemma 4, to which we return to later, is that with full information about which neighbors can sue her (if any), she will always choose $x_D \in \{x_1, x_2\}$. Furthermore, given the developer's optimal strategies from Lemma 4, learning about potential opposition in advance gives her an expected utility of:

$$\underbrace{v_D(x_2)\omega^n}_{\substack{\text{Learns there}\\ \text{are only weak}\\ \text{opponents}}} + \underbrace{v_D(x_1)(1-\omega^n)}_{\substack{\text{Learns there are}\\ \text{some strong opponents}}}$$

Then, the value of information to the developer would be

$$\underbrace{v_D(x_2)\omega^n + v_D(x_1)(1-\omega^n)}_{\substack{\text{utility with}\\ \text{information}}} - \underbrace{v_D(x_1)}_{\substack{\text{utility without}\\ \text{information}}} = \omega^n(v_D(x_2) - v_D(x_1))$$

A key question for scholars and political actors is whether and how the housing supply is affected by various aspects of the institutional and political environment. In addition to the developer being better off with information about potential opposition, access to more specific information about community opposition also increases the expected project size since she can perfectly calibrate her proposal to avoid lawsuits. Letting $\mathbb{E}[x|\text{info}]$ and $\mathbb{E}[x|\text{no info}]$ be the expected project size the developer proposes with and without information, respectively, note that:

$$\mathbb{E}[x|\text{info}] = x_2\omega^n + x_1(1-\omega^n) > x_1 = \mathbb{E}[x|\text{no info}]$$

We have demonstrated, at least at an abstract level, that information is valuable to the developer and increases the supply of housing. But how does she acquire information? And is the information she acquires good information? In the next section, we develop a model of planning meetings that explore these questions in detail.

Public Planning Meetings

In many jurisdictions in the United States, local governments require public meetings to review many (if not all) housing proposals made by developers. These meetings provide a forum for any member of the community (such as negatively impacted neighbors) to provide comment on the proposals under consideration. A public meeting thus creates an opportunity for the developer to learn whether there are neighbors in the community that strongly oppose her project.

However, a few issues complicate this story. First, which neighbors actually have an incentive to show up to these meetings? Second, does the developer have an incentive to affect attendance through her initial proposal? And finally, how much does a developer actually learn learn from these meetings? We now extend our baseline model to include the possibility of a planning meeting in order to explore these issues.

Returning to our model, now suppose that the local government requires a public meeting to review every housing proposal made by the developer. Each neighbor can choose whether to attend the meeting and provide feedback, and the developer has an opportunity to revise her initial proposal in response to the feedback in the meeting. We assume she can only revise it down.[11] As before, we denote the post-meeting (i.e., final) proposal by x_D. We now denote the developer's pre-meeting (i.e., provisional) proposal by x_M, where $x_D \leq x_M$.

11. If she tried to revise it up, for example, she would have to attend another meeting, starting the whole process over again.

Informational value of meetings Meetings provide an opportunity for the developer to learn about potential opposition to her proposal by potentially observing whether each neighbor is a strong or weak opponent. But, they are not perfectly informative. For example, time limits on public meetings may prevent some neighbors from publicly registering their objections. More generally, the information provided at meetings may be fairly "noisy," which can prevent the developer from perfectly learning about every attendee. We will model this idea in a simple manner by assuming that only m attendees are publicly revealed to be either weak or strong opponents. If the total number of attendees at the meeting exceeds m, then the each of the attendees has an equal probability of being one of the m attendees, and the developer is unable to learn about those who are not chosen.

Given that the strategic calculus will be somewhat complex, we will make a technical—albeit reasonable—assumption about what happens in the event of an "off path meeting" that has unexpected attendance/non-attendance by some neighbors.[12]

> **Assumption 2** (off path meetings)**.** (i) The developer's off path belief about whether there are strong opponent(s) at the meeting is degenerate. The developer believes there are no strong opponents at an off path meeting if and only if the m publicly observed attendees at an off path meeting are weak opponents.
>
> (ii) At least two attendees can be publicly observed at any meeting ($m \geq 2$).

This assumption simplifies our analysis. First, the idea that the developer becomes convinced there are strong opponents when she observes strong opponents is straightforward. Functionally, these beliefs prevent a single weak opponent from arriving at the meeting to fool the developer into believing there are no strong opponents. Fooling the developer might be useful if a weak opponent prefers the lottery induced by a lawsuit or prefers the partial compromise sufficiently more than the full compromise. While this type of preference misalignment between opponents is possible, it is not general and in any case, our assumption shuts down this channel of influence. Substantively,

12. Somewhat more technically, since perfect Bayesian equilibrium does not pin down beliefs off of the equilibrium path, we need to specify what a developer believes whenever she crafted a proposal to induce certain neighbors to show up, but the actual attendance at the meeting does not match the developer's expectations.

this assumption means the developer has "pessimistic" views when she is surprised to see weak opponents at a meeting off the equilibrium path. These off path beliefs are also consistent with a different model of meetings where the developer can only observe attendance and not distinguish between types. This assumption is most reasonable when we assume that $m \geq 2$, since unilateral deviations by individual neighbors cannot affect the developer's learning as they would still observe a strong opponent if one existed. While questions related to strategic "signal jamming" by neighbors in meetings are interesting, they are beyond the scope of our analysis.

Neighbors' incentive to attend Each neighbor decides whether to attend the public meeting at a cost $k > 0$, where $a_i \in \{0, 1\}$ indicates whether neighbor i attends ($a_i = 1$) or not ($a_i = 0$).[13]

From a neighbor's perspective, showing up to a public planning meeting about a proposed project can persuade a developer that his objections should be taken seriously. But that is not the only reason a neighbor might want to attend a public planning meeting. In many jurisdictions, it is more difficult to win a lawsuit against a developer if objections are not initially raised during the administrative approval process. While the precise legal requirements vary from state to state, the right to sue is often contingent on a plaintiff "exhausting all administrative remedies" prior to filing a lawsuit (Lahav 2016). Public planning meetings are often an important administrative avenue for dispute resolution over housing projects: if a public meeting over a proposal is held, a potential litigant must first attempt to resolve their dispute with the developer (or municipality allowing the development) there or he will risk having his lawsuit thrown out of court.

We accordingly make the following assumption about the value of meeting attendance for future litigation.[14]

Assumption 3 (exhaustion of administrative remedies)**.** A neighbor i cannot sue the de-

13. Since the meeting is about developer's proposal, she must show up. Accordingly, her cost is fixed and plays no role in the analysis. For clarity, we omit it.

14. An alternative way to model this would be to assume each neighbor i has an idiosyncratic probability of winning, $\nu_i(a_i)$, which decreases if the neighbor does not attend—i.e., $\nu = \nu_i(a_i = 1) > \nu_i(a_i = 0)$. This would give the same qualitative results, but the formal analysis would be somewhat different.

veloper over her proposed project x_M if he does not attend the public meeting on that proposed project. Formally, for neighbor i, $\kappa_i \to \infty$ if $a_i = 0$.

In many jurisdictions, members of the public may also get a chance to persuade local officials—such as a planning board—to administratively reject a proposal, allowing neighbors to prevail against a developer without going to court. While this is obviously important (and a promising direction for future research), we set it aside here and treat the planning meeting solely as a forum for public comment. As a result, the meeting serves as a pre-litigation record-building exercise.

Each neighbor's calculation about whether to attend the meeting will depend on what kind of (potentially revised) project he thinks will result from the meeting. In particular, he will consider what types of neighbors are likely to attend the meeting, and how the developer will respond to those types.

If any neighbors attend a meeting, then those neighbors have the ability to sue. Moreover, a neighbor will only attend if she is willing to sue to reduce the developer's initial proposal, since attending a meeting is costly. As a result, after a meeting, the game proceeds as in the baseline model of lawsuits with the caveat that only those who attended can sue. A public meeting does not fundamentally change the calculus of lawsuits, but it does restrict which neighbors may sue.

Given that the developer now makes an initial proposal x_M and the basic calculus of lawsuits from above does not change post-meeting, it follows from Lemma 3 that the developer's revised proposal x_D will be in $\{x_1, x_2, \hat{x}_D, x_M\}$. The developer's choice of her *initial* proposal, x_M will determine which neighbors show up to the meeting to complain. Her proposal could provoke all neighbors to attend, no neighbors to attend or just one type of neighbor to attend. Which neighbors attend determine how informative the meeting is for the developer.

Right away, we can rule out the possibility of a meeting that only weak opponents want to attend. This is because the weak and strong opponents are well ordered in their respective intensities to attend the meeting. When a weak opponent wants to attend the meeting, a strong opponent will as well, but when a strong opponent is indifferent, the weak opponent strictly prefers to stay home.

Lemma 5. There is no equilibrium of the model in which only weak opponents attend a meeting. Formally, there is no equilibrium where

$$a_i(c_i) = \begin{cases} 1 & \text{if } c_i = \underline{c} \\ 0 & \text{if } c_i = \overline{c} \end{cases}$$

Proof of Lemma 5. Suppose by contradiction that there is an equilibrium in which a weak opponent attends the meeting but a strong opponent does not. Let x_M be the proposal that the developer makes in such an equilibrium. In this equilibrium, if the developer observes any attendance at the meeting, she compromises to x_2 (by Lemma 4). Since weak opponents find meetings costly, this implies that they will only find it optimal to attend if $x_M > x_2$. Given the attendance strategies in this conjectured equilibrium, it follows that

$$v_i(x_2, \underline{c}) - k \geq v_i(x_M, \underline{c}) \qquad\qquad v_i(x_2, \overline{c}) - k < v_i(x_M, \overline{c})$$

Rearranging and combining yields the following condition

$$v_i(x_2, \overline{c}) - v_i(x_M, \overline{c}) < k \leq v_i(x_2, \underline{c}) - v_i(x_M, \underline{c}) \tag{2}$$

However, the concavity of the neighbors' utility combined with the fact that $x_M > x_2 > \hat{x}_i(\underline{c}) > \hat{x}_i(\overline{c})$ implies that

$$v_i(x_2, \overline{c}) - v_i(x_M, \overline{c}) > v_i(x_2, \underline{c}) - v_i(x_M, \underline{c})$$

Since $k > 0$, then condition (2) cannot hold. We have thus contradicted the claim that there is an equilibrium in which only weak opponents attend. □

Optimal Attendance by Neighbors

Given that attending a meeting is costly, each neighbor's calculation about whether to attend will depend on whether it is worth paying the cost of attendance to get the opportunity to sue and/or incentivize the developer to revise her initial proposal to a more favorable level. Let x_D^1 and x_D^0 be the revised proposals a neighbor i anticipates if he attends the meeting and doesn't attend the meeting, respectively. Then he finds it weakly beneficial to attend if

$$v_i(x_D^1, c_i) - k \geq v_i(x_D^0, c_i)$$

If no neighbors attend, then x_M is implemented.

Meetings that no neighbors want to attend Every neighbor will weakly prefer to skip the meeting if, for all c_i,

$$v_i(x_D^1, c_i) - k \leq v_i(x_M, c_i)$$

Assumption 2 implies that, after a deviation, the developer believes there is a strong opponent and sets $x_D^1 = x_1$. Then both of these conditions must hold:

$$\max\{v_i(x_1, \underline{c}), v_i(x_2, \underline{c})\} - k \leq v_i(x_M, \underline{c}) \qquad v_i(x_1, \overline{c}) - k \leq v_i(x_M, \overline{c})$$

In equilibrium, a neighbor i will choose $a_i = 0$ when indifferent (i.e., when this condition binds) since otherwise this creates an open set problem for the developer. Because this condition is less likely to hold for strong opponents, then a necessary and sufficient condition for a meeting with no attendance is:

$$v_i(x_M, \overline{c}) \geq v_i(x_1, \overline{c}) - k$$

Since the developer seeks to maximize her project size, she can make an initial proposal of at least x_1 and prevent attendance by any neighbors since the condition strictly holds. But she can do better: since $v_i(x_M, \bar{c})$ is declining for all $x_M \geq x_1$, there exists some value $x_M^{\text{no}} \geq x_1$ where the condition binds and where there is no attendance for $x_M \leq x_M^{\text{no}}$. Finally, since $k > 0$, this threshold is strictly greater than x_1.

Lemma 6. If $x_M \leq x_M^{\text{no}}$, then there no neighbors will attend the meeting, where x_M^{no} is the initial proposal that makes strong opponents indifferent between attending and not attending. Formally $a_i^*(c_i; x_M \leq x_M^{\text{no}}) = 0$ for all c_i.

Proof of Lemma 6. In text. □

Meetings that some neighbors want to attend There are two qualitatively distinct kinds of meetings where neighbors show up. First are "representative" meetings attended by all neighbors. Second are "unrepresentative" meetings where only strong opponents attend. (Recall from Lemma 5 that there is no equilibrium in which only weak opponents attend a meeting.) If only strong opponents attend the planning meeting, then there is either no attendance (implying all neighbors are weak opponents), or all attendees the developer observes at the meeting are strong opponents. So, if the developer observes any meeting attendance, she observes only strong opponents and given Lemma 4, she revises her project down from x_M to x_1.

By Lemma 6, strong opponents will be incentivized to attend if the developer makes an initial proposal $x_M > x_M^{\text{no}}$. Suppose she does. Then the key question for our analysis is how large she can make her initial proposal without provoking the weak opponents to also attend the meeting. In Online Appendix A.2, we walk through the analysis in some detail, which we summarize here.

If a weak opponent neighbor does not go to the meeting, he knows that either project x_M or project x_1 will be implemented, depending on whether there are any strong opponents who show up to the meeting. Of course, if weak opponents would *prefer* a larger project (e.g., x_2) and they believe their attendance has a high enough chance of convincing the developer there are only weak opponents in the neighborhood, then they might have an incentive to attend. But Assumption 2 implies that if he unilaterally deviates and shows up to the meeting, he won't be able to convince the developer to take an action that she otherwise wouldn't have taken.[15] Given that it's costly to attend the meeting, and a deviation won't alter the developer's actions, there is no incentive for a weak opponent to attend the meeting.

The developer understands this thought process. Because she is better off with larger project sizes, in the unrepresentative meeting equilibrium, she'll propose a project $x_M > x_M^{\text{no}}$ that induces the strong opponents to show up to the meeting (and reveal themselves, if they exist), but that is not so high that it *also* provokes the weakly opposed neighbors to show up. What is this level? In Online Appendix A.2, we show that there exists a threshold x_M^{ur} that just makes the weakly opposed neighbor indifferent between attending and not attending, but is sufficiently high to induce attendance by strong opponents. Importantly, it is always strictly greater than x_M^{no} (and thus x_1), and it is even strictly higher than x_2.

Lemma 7. If $x_M \in (x_M^{\text{no}}, x_M^{\text{ur}}]$, then there is an "unrepresentative meeting" in which only strong opponents attend. Formally for a neighbor i,

$$a_i^*(c_i; x_M \in (x_M^{\text{no}}, x_M^{\text{ur}}]) = \begin{cases} 0 & \text{if } c_i = \underline{c} \\ 1 & \text{if } c_i = \overline{c} \end{cases}$$

If $x_M > x_M^{\text{ur}}$, then there is an "representative meeting" in which all neighbors attend. Formally $a_i^*(c_i; x_M > x_M^{\text{ur}}) = 1$ for all c_i.

Proof of Lemma 7. In text and in Online Appendix A.2. □

15. If no strong opponents show up and the deviating weak opponent is the only one at the meeting, then the developer will choose x_1, as she would have even without the deviation. If strong opponents show up, then one deviating weak opponent is not enough to convince the developer since she'll publicly learn about at least two attendees, one of whom must be a strong opponent.

The Developer's Optimal Meeting Strategy

A representative meeting is attended by both strong opponents and weak opponents. While a representative meeting might at first appear to more informative and therefore better for the developer, it is in fact worse. This is due to two features of representative meetings. First, attendance by weakly opposed neighbors can crowd out the developer's learning about the presence of strong opponents. The second is that attendance from weak opponents can compel the developer to compromise when she would not have needed to do so. To develop the core intuition, we consider the simplest version of a representative meeting in which all n neighbors attend the planning meeting. However, our main findings would hold in a more complicated model in which a "representative" meeting was one in which both strong opponents and weak opponents showed up, even if not proportional to their population share.

From Lemma 7, recall that unrepresentative meetings occur when the developer makes an initial proposal $x_M = x_M^{\text{ur}}$, which induces strong opponents to show up, but not weak opponents. Because weak opponents are comfortable with larger projects than strong opponents are (see Lemma A.2 in Online Appendix A), it follows that the developer must make an initial proposal $x_M \geq x_M^{\text{rep}} > x_M^{\text{ur}}$ in order to "convert" the meeting from an unrepresentative meeting to a representative one, where x_M^{rep} is the *minimum* project size that induces weak opponents to attend. In other words, the developer has to propose a more controversial project to create a situation in which the weak opponents now feel it worthwhile to show up to the meeting.

If the developer induces a representative meeting by making a proposal $x_M \geq x_M^{\text{rep}}$, then she will either observe one or more strong opponents and fully compromise (following same logic as an unrepresentative meeting) or she will observe only weak opponents. Because she is not able to observe all meeting attendees (recall she observes only m of the attendees) the latter situation creates some uncertainty. It's possible that some strong opponents attended but she only observed weak opponents. But it's also possible only weak opponents attended. What she does in this situation is complicated and depends on the parameters. However, we will show that, whatever she does after the meeting, it results in strictly lower utility for the developer that what she would get from an unrepresentative meetings. And since representative meetings make the developer worse off, she will never make an initial project $x_M \geq x_M^{\text{rep}}$ that induces all the neighbors to come to the meeting.

Now suppose the developer sees only weak opponents at a meeting. In this scenario, she does not know if there are only weak opponents at the meeting or if there are strong opponents at the meeting that she did not observe. In Appendix A.1, we characterize her belief in this situation: with probability ω^{n-m} she believes there are only weak opponents at the meeting and with probability $1-\omega^{n-m}$ she believes there is at least one strong opponent (that she did not observe). As our earlier analysis makes clear, the developer has three choices: she can fully compromise to x_1, she can partially compromise to x_2 or she can refuse to compromise and stick to her initial proposal of x_M (which must be greater than x_M^{ur}).

First, consider a developer that refuses to compromise whenever she observes only weak opponents. Because neighbors attend a meeting only if they will sue when the developer does not compromise, she will always face a lawsuit in such a situation. By Lemma 4, this is strictly worse than the utility she gets from fully compromising to x_1. Moreover, with an unrepresentative meeting, she gets $x_M^{\text{ur}} > x_1$, which is even better.

Instead, after observing only weak opponents, she could fully compromise. This essentially abandons the informational value of a meeting, since this means she fully compromises regardless of what she observes. In this case, she is not sued and ends up with $v_D(x_1)$. This is, again, strictly lower than the payoff she gets from the unrepresentative meeting, $v_D(x_M^{\text{ur}})$.

Finally, after observing only weak opponents, she could partially compromise. Then she anticipates that with probability ω^{n-m} there are only weak opponents at the meeting and the partial compromise discourages a lawsuit. However, with probability $1-\omega^{n-m}$ there is a strong opponent she did not observe and the partial compromise will end up being insufficient and she will be sued. In this situation, a partial compromise yields $\omega^{n-m}v_D(x_2)+(1-\omega^{n-m})U_D(x_2,n)$. Given

Assumption 1:

$$\omega^{n-m}v_D(x_2) + (1-\omega^{n-m})U_D(x_2, n) < \omega^{n-m}v_D(x_2) + (1-\omega^{n-m})v_D(x_1)$$

And since $x_M^{\text{ur}} > x_2$, then

$$\omega^{n-m}v_D(x_2) + (1-\omega^{n-m})U_D(x_2, n) < \omega^{n-m}v_D(x_2) + (1-\omega^{n-m})v_D(x_1) < v_D(x_M^{\text{ur}})$$

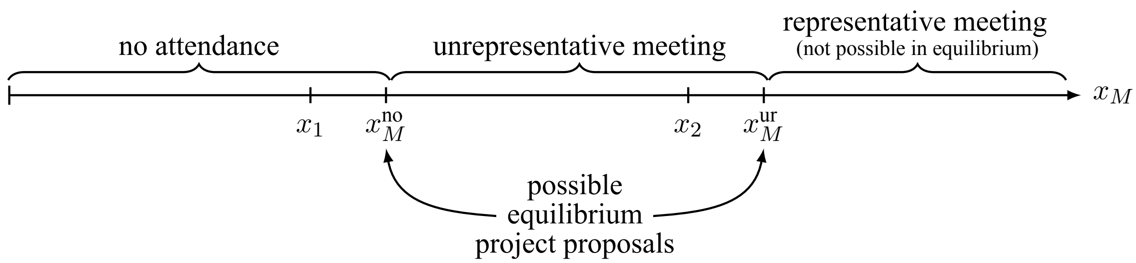
Consider Figure 2, which depicts the neighbors' attendance strategies as a function of the initial project proposal, x_M. Right away, it is apparent that the developer can do weakly better with a meeting than without. For example, if she makes an initial proposal of $x_M = x_M^{\text{no}}$, she will face no lawsuits and will implement a project of this size. without meetings (and given lawsuits are very costly), the best she could do for herself was x_1. But it's even better than that. If she instead decides to make a proposal $x_M = x_M^{\text{ur}}$ that is large enough to cause strong opponents to show up but not so large that weak opponents show up, she'll sometimes learn there *aren't* any strong opponents in the neighborhood. In this case, she can go forward with a project size x_M^{ur} without a lawsuit. In effect, the meeting gives her an opportunity to learn about the depth of opposition in the neighborhood and revise down to the full compromise only if she learns for sure there are strong opponents. In the absence of this opportunity in our baseline model, very costly lawsuits caused her to "preemtively" make the full compromise.

Which meeting strategy will she want to pursue: one that incentivizes no neighbors to show up or one that incentivizes only strong opponents to show up. Consider the developer's payoff from an unrepresentative meeting. From an ex ante perspective, she gets the following lottery:

$$\omega^n v_D(x_M^{\text{ur}}) + (1-\omega^n)v_D(x_1)$$

If instead she decides she would like to avoid a meeting that any neighbors want to attend, she sets

Figure 2: *We depict the types of meetings that are induced by the developer's initial proposal* x_M. *Since the subgames after her initial proposal are identical for each type of meeting, then conditional on wanting to induce a specific kind of meeting, she makes the largest proposal that does so. Whether she finds it optimal to induce a meeting where no neighbor wants to attend* ($x_M = x_M^{no}$) *or one with unrepresentative attendance* ($x_M = x_M^{ur}$) *depends on her expectation about the prevalence of strong opponents in the neighborhood.*



$x_M = x_M^{\text{no}}$ and gets $v_D(x_M^{\text{no}})$. She will prefer the unrepresentative meeting if

$$\omega^n v_D(x_M^{\text{ur}}) + (1-\omega^n) v_D(x_1) > v_D(x_M^{\text{no}}) \Longleftrightarrow \omega^n > \frac{v_D(x_M^{\text{no}}) - v_D(x_1)}{v_D(x_M^{\text{ur}}) - v_D(x_1)} \equiv R$$

Since $x_M^{\text{no}} \in (x_1, x_M^{\text{ur}})$, this may or may not hold. In fact, as $n \to \infty$ or $\omega \to 0$, it is unlikely to hold. As the probability of a strong opponent in the neighborhood increases, it becomes more certain that the developer will have to revise her project to x_1 if her initial proposal generates an unrepresentative meeting. In that situation, she could avoid this revision by instead proposing $x_M = x_M^{\text{no}} > x_1$ and have a meeting without attendance.

We can now finally characterize the equilibrium of the model with meetings.

Proposition 2. If $\omega^n \geq R$, there is an equilibrium of the model with public meetings in which $x_M^* = x_M^{\text{ur}} > x_2$, and the meeting is an unrepresentative meeting with only strong opponents deciding to attend. If $\omega^n \leq R$, there is an equilibrium of the model with public meetings in which $x_M^* = x_M^{\text{no}} > x_1$, and none of the neighbors decide to attend. In any equilibrium, upon observing no attendees at the meeting, $x_D^* = x_M^*$. Upon observing attendees at the meeting, she revises her proposal downward to $x_D^* = x_1$ if she observes a strong opponent at the meeting and to $x_D^* = x_2$ if she observes only weak opponents at the meeting (which is off path). If $\omega^n \neq R$, the equilibrium of the model with public meetings is unique.

Proof. Follows from Lemmas 4 to 7. Lemma 4 and Assumption 2 implies that after observing attendance, $x_D^* \in \{x_1, x_2\}$. □

A common concern is that unrepresentative planning meetings reduce the supply of housing because they enable strong opponents of housing to register their concerns and force the developer to propose smaller projects. In some sense, our model may seem to confirm this intuition. Indeed, in an equilibrium with unrepresentative meetings, if the developer sees any strong opponents at the meeting, she is forced to downsize her project to x_1.

However, our analysis reveals that the intuition that unrepresentative planning meetings reduce the supply of housing is not correct. Unrepresentative meetings reveal to the developer whether there are strongly opposing neighbors who would be very likely to sue. And when there aren't, she can propose bigger projects. Formally, the expected project size with unrepresentative meetings is $\mathbb{E}[x|\text{unrepresentative}] = \omega^n x_M^{\text{ur}} + (1-\omega^n)x_1$

Now consider the two most salient "counterfactual" institutions: representative meetings and no meetings. In representative meetings, all neighbors attend and the developer is forced to compromise down to either x_2 or x_1 depending on who she observes. The expected project size of a representative meeting is bounded above by the perfectly informative case where the developer can match the project size to the type of opposition: implementing x_2 when there are no high types and x_1 otherwise. But representative meetings aren't perfectly informative and so she faces a choice between playing it safe and always revising down to x_1 or gambling on a lawsuit occurring after revising down to x_2. In either case, the upper bound applies and $\mathbb{E}[x|\text{representative}] \leq \mathbb{E}[x|\text{info}] = \omega^n x_2 + (1-\omega^n)x_1$ (where $\mathbb{E}[x|\text{info}]$ was defined in the previous section). Similarly, in a world without public planning meetings and very costly lawsuits, our analysis above showed the developer would preemptively compromise and propose small projects to prevent lawsuits, yielding an expected project size of $\mathbb{E}[x|\text{no meetings}] = x_1$.

Proposition 3. If lawsuits are very costly, then in expectation, unrepresentative meetings generate more housing than either representative meetings or no meetings.

Proof. In text. □

Conclusion

By situating public meetings in the full context of developer-citizen disputes, which includes the credible threat of citizen lawsuits, we show the informational value of unrepresentative public meetings for creating a more efficient development process and increasing the supply of housing. For policy makers and housing advocates that are looking for institutional solutions to the housing crisis, our model suggests that changing public meeting structures to improve attendance or make meetings more representative of the larger community may not yield more housing. Our perspective, that meetings are an informational channel by which developers can avoid the inefficiency of citizen lawsuits, points toward a different set of policy interventions that may be more fruitful for housing supply. In particular, changes to lawsuit procedures, whether through citizen costs or the reversion project size, would be impactful.

While our model addresses two institutional environments (lawsuits with and without meetings) as well as a variety of community sizes and project sizes, there are some limitations to our analysis. Meetings as a forum for conflict between neighbors—in which those less opposed or even supportive of a proposal attend a meeting to drown out the voices of the opposition—is outside the current scope. We have also set aside the meeting administrators' (i.e. the planning board) incentives and potential proposal rejection in order to focus on the conflict between developers and citizens. In future work, we will consider more aspects of meetings than we have so far. In addition to being an information channel between citizens and developers and an administrative remedy, public meetings provide an opportunity for like-minded citizens to meet one another and coordinate. Meetings may allow opposition citizens to coordinate against a developer, perhaps sharing the costs of a lawsuit or improving their chances of winning by working together; from the developers' perspective, meetings would be a double-edged sword, where the information gained creates greater efficiency, but at the cost of creating a stronger legal opponent.

Beyond the context of housing, our model speaks to a larger class of problems in which citizen action is asymmetric: opponents can veto a project (through litigation), but cannot mandate a larger project. Optimal institutional design that gives interested parties' some say in the outcome but the proposal can only be vetoed, not expanded or mandated, is a difficult but important venture.

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Online Appendix for
“The Public Meeting Paradox: How NIMBY-Dominated Public Meetings Can Enable New Housing”

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May 2024

For Online Publication

A Proofs and Additional Formal Results

Assumption A.1. The players’ preferences are such that no neighbor sues over the developer’s break-even project, but all neighbors sue over the developer’s ideal project. Formally, $\hat{x}_i(\overline{c}) < \hat{x}_i(\underline{c}) < \hat{x}_D$ and $\underline{x} < x_1 < x_2 < \hat{x}_D$, where $x_1 = \tilde{x}(\overline{c})$ and $x_2 = \tilde{x}(\underline{c})$.

Lemma A.1. $|x_0 - \hat{x}_i(c_i)| < |\tilde{x}(c_i) - \hat{x}_i(c_i)|$.

Proof of Lemma A.1. The lemma states that reversion policy x_0 is closer to the ideal point $\hat{x}_i(c_i)$ then is the lawsuit threshold $\tilde{x}(c_i)$. Assume not, then by the symmetry of the utility function $v_i(x_0, c_i) < v_i(\tilde{x}(c_i), c_i)$ and the neighbor would strictly prefer not to sue for proposal $\tilde{x}(c_i)$ a contradiction of the definition of $\tilde{x}(c_i)$. □

Lemma A.2. $\tilde{x}(\overline{c}) < \tilde{x}(\underline{c})$.

Proof of Lemma A.2. Let $\hat{x}_i(\overline{c}) < \hat{x}_i(\underline{c})$ (by the assumptions on the neighbors’ ideal points) and $\tilde{x}(c_i) > \hat{x}_i(c_i)$ for all c_i (by the definition of $\tilde{x}(c_i)$ in Lemma 1). We consider two main cases.

Case 1. $\hat{x}_i(\overline{c}) < \hat{x}_i(\underline{c}) < x_0$ or $x_0 < \hat{x}_i(\overline{c}) < \hat{x}_i(\underline{c})$. Define $\tilde{x}_0(c_i) = \max\{x_0, 2\hat{x}_i(c_i) - x_0\}$ and $\tilde{x}(c_i)$ as defined in Lemma 1. Since v_i is strictly concave and $\kappa_P/(\tilde{\rho}_i(1, n) - \tilde{\rho}_i(0, n))$ is constant in

x, then it follows that $|\tilde{x}(\overline{c})-\tilde{x}_0(\overline{c})| < |\tilde{x}(\underline{c})-\tilde{x}_0(\underline{c})|$. Moreover, $\tilde{x}_0(\overline{c}) \leq \tilde{x}_0(\underline{c})$ since $\hat{x}_i(\overline{c}) < \hat{x}_i(\underline{c})$, and then:

$$\tilde{x}(\overline{c}) = \tilde{x}_0(\overline{c}) + |\tilde{x}(\overline{c}) - \tilde{x}_0(\overline{c})| < \tilde{x}_0(\underline{c}) + |\tilde{x}(\underline{c}) - \tilde{x}_0(\underline{c})| = \tilde{x}(\underline{c})$$

Case 2. $\hat{x}_i(\overline{c}) < x_0 < \hat{x}_i(\underline{c})$**.** Consider two subcases:

- **Case 2a:** $\hat{x}_i(\overline{c}) < \tilde{x}(\overline{c}) < x_0 < \hat{x}_i(\underline{c}) < \tilde{x}(\underline{c})$**.** This is not possible since by the definition of $\tilde{x}(\cdot)$, $x_0 \leq \tilde{x}(c_i)$ for all c_i.
- **Case 2b:** $\hat{x}_i(\overline{c}) < x_0 < \hat{x}_i(\underline{c}) < \tilde{x}(\underline{c}) < \tilde{x}(\overline{c})$**.** In this case, the relative distance between the weak opponent's ideal size ($\hat{x}_i(\underline{c})$) and the lawsuit threshold ($\tilde{x}(\underline{c})$) and the default size (x_0) is smaller than for the strong opponent. This combined with the fact that $\underline{c} < \overline{c}$ implies that the utility gain from a lawsuit is strictly smaller for the weak opponent. Since the strong opponent is indifferent between a lawsuit at $\tilde{x}(\overline{c})$, this implies the weak opponent strictly prefers not to sue, a contradiction of the definition of $\tilde{x}(\underline{c})$.

By the pigeonhole principle, this leaves the only remaining, viable ordering for Case 2 as: $x_0 < \tilde{x}(\overline{c}) < \tilde{x}(\underline{c})$. We have thus shown that $\tilde{x}(\overline{c}) < \tilde{x}(\underline{c})$. □

A.1 Deriving the Developer's Belief at a Representative Meeting

Let $a_i(c_i)$ be the strategy used by a neighbor i of type $c_i \in \{\underline{c}, \overline{c}\}$. Since neighbors are behavioral and thus behave independently and have the same incentives, then we can compactly write the weak opponents' strategy as $\underline{a}$ and the strong opponents' strategy as $\overline{a}$. While we assume players use pure strategies in the main text, here we will allow $\underline{a}, \overline{a} \in (0, 1)$. Let a_W and a_S be the total number of weak and strong type attendees at the meeting, respectively. Similarly, let m_W and m_S be the total number of weak and strong type attendees *observed* at the meeting, respectively. The total number of attendees is $a = a_W + a_S$ and the total number of *observed* attendees is $m = m_W + m_S$.

We will characterize the developer's belief at a meeting in several steps. First, what is the probability that there are $0 \leq z \leq a$ weak type neighbors *in the meeting*, i.e. $\Pr(a_W = z)$? This can be formally represented by a binomial distribution that characterizes the probability of z "successes" (i.e., weak opponents) out of a independent trials. One wrinkle is that the probability of "success" and "failure" depend in part on the weak opponents' strategies and in part on the prevalence of weak opponents in the neighborhood. Formally,

$$\Pr(a_W = z) = \binom{a}{z}(\underline{a}\omega)^z(1 - \underline{a}\omega)^{a-z}$$

For example, in an unrepresentative meeting equilibrium in which $\underline{a} = 0$ (and letting $0^0 = 1$), this collapses to

$$\Pr(a_W = z) = \binom{a}{z} 0^z 1^{a-z} = \begin{cases} 1 & \text{if } z = 0 \\ 0 & \text{if } z > 0 \end{cases}$$

Next, given an arbitrary number of z weak opponents in attendance at a meeting of size a, what is the probability that all m observed attendees are weak opponents (i.e. $\Pr(m = m_L | a_W = z)$)? Given that m attendees are independently sampled without replacement, the probability that *only* weak opponents are sampled can be written as follows (with some abuse of notation):

$$\frac{z}{a} \times ... \times \frac{z - (m-1)}{a - (m-1)}$$

This is more precisely written as

$$\Pr(m = m_W | a_W = z) = \prod_{y=0}^{m-1} \frac{z - y}{a - y}$$

For example, suppose that there are 4 weak opponents in attendance in a meeting attended by 10 neighbors total and only 2 weak opponents are observed by the developer. What is the probability of this occurring?

$$\Pr(m = m_W = 2 | a_W = 4) = \frac{4}{10} \times \frac{3}{9} = \frac{6}{45} \approx 0.13$$

To see where this comes from, note that the first draw yields a weak opponent with probability 4/10 since 4 of the 10 attendees are weak opponents. The second draw yields a weak type with probability 3/9 since 3 of the *remaining* 9 attendees are weak opponents.

Recall that what the developer cares about is whether there is a strong opponent that could sue her. So, a key factor in her decision making will be her belief that there are any strong opponents who could sue her—i.e., the probability there are strong opponents at the meeting—given that she observes m_W and m_S. Of course, if $m_S > 0$, then she knows for sure that there is at least one strong opponent who would sue her, so she makes her decision anticipating the possibility of such a suit.

However, if she only observes weak opponents so that $m_W = m$ and $m_S = 0$, she has an inferential problem. There are two scenarios. First, it is possible that there are only weak opponents in attendance, in which case she would only need to compromise with them (a “partial compromise”). Second, it is possible there are strong opponents in attendance, but she just didn’t see them, in which case she would want to compromise with the (unobserved) strong opponents to prevent a lawsuit (a "full compromise"). We use the previous two probabilities to formally characterize the developer's belief about the probability that all attendees are actually weak opponents when she only observes weak opponents, i.e. Pr$(a_W = a | m = m_W)$? We do so using Bayes' rule,

$$\Pr(a_W = a | m_W = m) = \frac{\Pr(m_W = m | a_W = a)\Pr(a_W = a)}{\sum_{z=0}^{a} \Pr(m_W = m | a_W = z)\Pr(a_W = z)}$$

We can immediately make one simplification. Since Pr$(m_W = m | a_W = z) = 0$ for all $z < m$, we can simplify to:

$$\Pr(a_W = a | m_W = m) = \frac{\Pr(m_W = m | a_W = a)\Pr(a_W = a)}{\sum_{z=m}^{a} \Pr(m_W = m | a_W = z)\Pr(a_W = z)}$$

Next, note that the numerator (and one term in the denominator) is:

$$\Pr(m_W = m | a_W = a)\Pr(a_W = a) = \left[\prod_{y=0}^{m-1} \frac{a-y}{a-y}\right]\left[\binom{a}{a}(\underline{a}\omega)^a(1-\underline{a}\omega)^{a-a}\right] = (\underline{a}\omega)^a$$

Finally, we can write the developer's belief as follows:

$$\Pr(a_W = a | m_W = m) = \frac{(\underline{a}\omega)^a}{(\underline{a}\omega)^a + \sum_{z=m}^{a-1} \Pr(m_W = m | a_W = z)\Pr(a_W = z)}$$

A.1.1 Developer Beliefs at a Representative Meeting with Pure Strategies

To develop intuition, let's consider how this belief looks for a representative meeting equilibrium where all neighbors use pure strategies (implying $\underline{a} = 1$) and in a neighborhood of size 3 (i.e., $n = a = 3$) with a meeting with channel 2 (i.e., $m = 2$).

$$\begin{aligned}
\Pr(a_W = 3 | m_W = 2) &= \frac{\omega^3}{\omega^3 + \sum_{z=2}^{2}\left[\prod_{y=0}^{1} \frac{z-y}{3-y}\right]\left[\binom{3}{z}\omega^z(1-\omega)^{3-z}\right]} \\
&= \frac{\omega^3}{\omega^3 + \left[\prod_{y=0}^{1} \frac{2-y}{3-y}\right]\left[\binom{3}{2}\omega^2(1-\omega)^1\right]} \\
&= \frac{\omega^3}{\omega^3 + \left[\frac{2}{3} \times \frac{1}{2}\right]\left[3\omega^2(1-\omega)^1\right]} \\
&= \frac{\omega^3}{\omega^3 + \omega^2(1-\omega)} \\
&= \omega
\end{aligned}$$

So, conditional on observing 2 weak opponents at a representative meeting, she believes all attendees are weak opponents with probability ω and she believes there is at least one strong opponent with probability $1-\omega$.

We can generalize this to a neighborhood of an arbitrary size n and a meeting channel of arbitrary size m:

$$\Pr(a_W = n | m_W = m) = \frac{\omega^n}{\omega^n + \sum_{z=m}^{n-1} \left[\prod_{y=0}^{m-1} \frac{z-y}{n-y}\right] \left[\binom{n}{z}\omega^z(1-\omega)^{n-z}\right]}$$

Note that the product inside the summation in the denominator is a ratio of falling factorials:

$$\left[\prod_{y=0}^{m-1} \frac{z-y}{n-y}\right] = \frac{(z)_m}{(n)_m} = \frac{z!(n-m)!}{n!(z-m)!}$$

We can use this fact to simply each term in the summation:

$$\Pr(a_W = n | m_W = m) = \frac{\omega^n}{\omega^n + \sum_{z=m}^{n-1} \binom{n-m}{z-m}\omega^z(1-\omega)^{n-z}}$$

The summation yields a tidy expression:

$$\Pr(a_W = n | m_W = m) = \frac{\omega^n}{\omega^n + (\omega^m - \omega^n)} = \omega^{n-m}$$

Then, in a representative meeting with n attendees, after having observed m weak opponents, the developer believes that there are only weak opponents in the meeting with probability ω^{n-m}. She believes there is at least one strong opponent with probability $1-\omega^{n-m}$.

The developer's "inferential problem" is the fact that neither of these quantities is zero or one. Her inferential problem becomes "worse" when $\omega^{n-m} \to \frac{1}{2}$.

A.2 Weak Opponents' Incentives in the Unrepresentative Meeting Equilibrium

We consider the strategic calculations of a neighbor i who is a weak opponent. Let $\tilde{h}_i$ be his belief that at least one strong opponent will attend the meeting. He gets the following payoff from not attending an unrepresentative meeting:

$$\underbrace{(1-\tilde{h}_i)v_i(x_M,\underline{c})}_{\substack{\text{All other neighbors}\\ \text{are weak opponents}\\ \text{(no attendance)}}} + \underbrace{\tilde{h}_i v_i(x_1,\underline{c})}_{\substack{\text{At least one other neighbor}\\ \text{is a strong opponent}}}$$

However, what happens if he deviates and attends the meeting? Since observing weak opponents at the meeting is off the equilibrium path, perfect Bayesian equilibrium does not pin down the developer's belief in that situation. By Assumption 2, if she observes any strong opponents, she (correctly) believes there is a strong opponent at the meeting who is eligible to sue. And, if she observes all weak opponents, she believes there are no strong opponents in the meeting.

There are two scenarios in which the developer observes only weak opponents. First, all neighbors could be weak opponents, and without the deviation, there would be no meeting attendance. The weak opponent i believes this happens with probability $(1-\tilde{h}_i)$. Second, the neighborhood could have a mix of weak and strong opponents (probability $\tilde{h}_i$), but with the deviation, only weak opponents are randomly chosen to be observed. In this situation, suppose that a deviating weak opponent i believes only weak opponents are chosen with probability $\tilde{\phi}$.

Recall that each neighbor i believes there will be a successful lawsuit with probability $\tilde{\rho}_i(s_i, n)$. Moreover, since each neighbor's cost is private information, a neighbor i only learns the types of the m attendees whose types are revealed.[1] Let $x_2' \equiv \min\{x_2, x_M\}$ Then, the expected payoff to a weak opponent i for deviating and attending the meeting is:

$$\begin{aligned}(1-&\tilde{h}_i)v_i(x_2,\underline{c})\\ &+\tilde{h}_i\tilde{\phi}\big[(1-\tilde{\rho}_i(0,n))v_i(x_2',\underline{c})+\tilde{\rho}_i(0,n)v_i(x_0,\underline{c})\big]\\ &+\tilde{h}_i(1-\tilde{\phi})v_i(x_1,\underline{c})\\ &-k\end{aligned}$$

From Assumption 2, it follows that $\tilde{\phi}=0$. Then the condition reduces to

$$(1-\tilde{h}_i)v_i(x_2,\underline{c})+\tilde{h}_i v_i(x_1,\underline{c})-k$$

Then there is no incentive to deviate if

$$(1-\tilde{h}_i)v_i(x_M,\underline{c})+\tilde{h}_i v_i(x_1,\underline{c}) \geq (1-\tilde{h}_i)v_i(x_2,\underline{c})+\tilde{h}_i v_i(x_1,\underline{c})-k$$

1. It is possible that a given neighbor i ends up knowing the types of $m+1$ neighbors if she is not among the m whose types are publicly revealed. This won't dramatically change our analysis, and we thus ignore it to make our results more parsimonious.

This reduces to

$$v_i(x_M, \underline{c}) \geq v_i(x_2, \underline{c}) - \frac{k}{1 - \tilde{h}_i} \tag{A.1}$$

Since $v_i(\cdot, \underline{c})$ is decreasing for $x_M > \hat{x}_i(\underline{c})$ and $x_2 > \hat{x}_i(\underline{c})$, then there exists a threshold $x_M^{\text{ur}} > x_2$ where (A.1) binds. Then for all $x_M \leq x_M^{\text{ur}}$, a weak opponent has no incentive to deviate.