

State Intervention in Local Land Use Decision-Making: The Case of Massachusetts

Associate Professor Lynn M. Fisher
UNC Kenan-Flagler Business School
Lynn_Fisher@unc.edu

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Abstract

The permitting process for residential development in the U.S. is largely administered by local governments. This paper empirically assesses the responsiveness of local decision-makers to a state-mandated permitting process which may require them to ignore or override locally-adopted land use regulations. I develop a screening model to formalize expectations about permitting outcomes between developers, who hold private information about their projects, and local Zoning Boards of Appeal under the rules of the Massachusetts law known as Chapter 40B. I then analyze a novel data set of 40B permit applications made during the period 1999-2005. I examine summary statistics and estimate a bivariate probit model with selection in order to jointly evaluate the determinants of local permit approvals and developer acceptances of permits. I find that, in general, local institutions comply with the state-mandated permitting process, and that permits granted to developers typically result in housing production. I also find that information asymmetries and community characteristics influence the success of the permitting process in a manner consistent with this study's screening model.

Keywords: Zoning, Land use regulation, Local governments

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Introduction

In 1969, the state of Massachusetts undertook a deliberate attempt to coordinate the production of housing between cities and their suburban counterparts. The Comprehensive Permit Law, dubbed *Chapter 40B* after its section of the state code, was plainly motivated by the June 1969 Report of the Committee on Urban Affairs in Massachusetts:

[t]he Committee of Urban Affairs has found that there is an acute shortage of decent, safe and low and moderate cost housing throughout the Commonwealth. Neither the cities nor the surrounding areas are able to adequately house those young and elderly people already living within their borders who desire such housing. This emergency cannot be relieved, by either private or public action, solely within the confines of the cities because of the already high density and the increasing cost of land and construction. Unless land in less densely populated areas is available, there will not be enough housing in any city or community for returning Vietnam veterans and they will be forced to go elsewhere. Yet necessary land in such areas is often unavailable because of restrictive zoning controls or similar local regulations. Moreover, where land is available, the process of obtaining local approval is so protracted as to discourage all but the most determined and well-financed builders who often do not have the interests of the community at heart. Unless shortsighted controls can be avoided, regional needs considered, and the whole process of building made faster, both suburb and city will suffer together.

In its modern form, Chapter 40B allows developers to override local land use regulations when communities cannot demonstrate that at least 10% of their housing stock is subsidized and is affordable to low and moderate income households. Under these circumstances, the law grants developers the right to seek a single, comprehensive permit for residential development that conforms to state standards, but does not necessarily abide by local zoning or regulations that are more restrictive than the state's. In particular, developers may obtain greater building density, avoid certain design standards and even change the locally-zoned use of land through the 40B permitting process. In return for this latitude, developers must retain at least 25% of the housing

units, typically in perpetuity, under price or rent-restrictions so as to be affordable to households earning 80% of Area Median Income.¹

A challenging aspect of the state law is that its implementation is delegated to a local land use institution, the Zoning Board of Appeals (ZBA). On one hand, the delegation of constrained decision-making power takes advantage of existing local institutions and provides for local input. On the other hand, to the extent that the proposed development is adverse to local interests, implementation may deviate significantly from legislative intent. An interesting question is whether the alternate permitting procedure created by the state under Chapter 40B results in local decisions that fulfill the intent, and not just the letter, of the state law.

In this paper, I first develop a model with asymmetric information in order to formalize expectations about permitting outcomes under the rules of Chapter 40B. Because 40B developments fail to adhere to local land use regulation and zoning, I assume that these projects are not welcome by communities. A developer holds private information about the cost of the housing project, and therefore only the developer knows the true extent of the zoning and regulatory relief that she requires in order to make the project, with its affordable housing component, feasible. The crux of the problem for a ZBA charged with approving (possibly with modifications) or denying a permit application is that by law the ZBA permitting decision cannot

¹ Alternatively, only 20% of the units must be set aside in exchange for deeper affordability gains, but this provision is rarely used. Also, the length of time for which affordability must be preserved was initially poorly specified, but now units are typically required to be affordable in perpetuity.

render the project unprofitable (or infeasible) if the developer promises to bear the cost of delivering the required affordable housing units.²

I then analyze a novel data set of 285 Chapter 40B permit applications made during the period 1999-2005 to 98 communities surrounding, but not including, the city of Boston. I also observe developer appeals of local permit decisions, and whether approved developments result in actual housing production. The average density of all proposed projects is about 9.5 units per acre, dramatically higher than the typical density of newly developed single family housing in the region. Despite the size and density of proposed projects, 82% of the applications for permits are approved by local ZBAs. While 34% of all ZBA decisions are appealed by developers, only 21% of approved permits are appealed, and most appeals are settled “out of court,” consistent with the claim that the appeal and its subsequent discovery process reveal information.

Approved permits that are not appealed by developers result in completed projects 73% of the time, although that rate is closer to 90% if you account for the housing market downturn near the end of our sample period. In all cases, the completed projects have at least 25% affordable housing units.

To further explore the predictions of the screening model, I estimate a bivariate probit model with selection to jointly evaluate the determinants of local permit approvals and whether approved permits settle the developer’s application or are appealed for state review. One naïve expectation is that high income, low-affordability, suburban communities will be more likely to resist Chapter 40B projects (a classic not-in-my-backyard or NIMBY outcome). In my sample,

² As explained in a latter section, it is assumed, however, that the state quasi-judicial body that hears developer appeals of ZBA decisions is able to observe the true costs of development, which are revealed through a legally-mandated discovery process.

places with elected city councils (“cities”) have 2.5 times the population and 3 times the housing density of the communities that utilize town meetings (“towns”). I therefore use the form of government to identify urban versus suburban places surrounding Boston. Contrary to a simple NIMBY explanation, but consistent with the screening model, the selection-stage estimation explaining ZBA decisions to approve or deny 40B applications shows that cities – which have relatively high affordability and more multifamily housing *ex ante* – are 15% more likely than towns to deny permit applications.

To explain this finding, consider that if cities have greater administrative capacity or experience with multi-family housing development (and hence, better information), then one might expect cities to have better outcomes on appeal vis-à-vis developers. In this sample, developers succeed on appeal against cities 53% of the time as compared to a 72% success rate when disputing the town ZBA decisions. The flip side of this conjecture is that if city ZBAs are more familiar with multifamily housing, then when they choose to approve a permit they may be more likely to craft a permit that a developer will find acceptable. Conditional on approval, my estimations show that developers are 24% more likely to accept city ZBA permits without an appeal (as compared to permits offered by towns).

The results are not without some support for the NIMBY hypothesis. 40B permitting outcomes are systematically worse for specific developments proposed on sites initially zoned for low-density residential housing. ZBAs are also more likely to deny specific projects proposed for rental housing as compared to owner-occupied housing. However, examination of community-wide characteristics, like median household income, school quality, education and percent white

are consistent with, and wholly fail to contradict, the robust finding that cities and places with more affordable housing *ex ante* are more likely to deny 40B applications.

In summary, this paper develops a framework for exploring the outcomes of a specific state intervention in local land use decision-making. Conditional on its institutional set-up and strong state enforcement, the data make the case that such interventions are feasible and that decision-makers at the local level respond to the incentives confronting them.

In the next section, I provide additional detail about the Chapter 40B and its implementation. Then, I develop a screening model to guide my empirical investigation. Next, I describe the data, proceed with its analysis and present my conclusions.

Overview of the Permitting Process

Chapter 40B in Massachusetts streamlines the typical permitting process and provides me with a unique opportunity for observing the process and its outcomes. First, the law requires that a single permit be issued by a local government, thus simplifying the interaction between local government and developers.³ Second, as is true of most permitting procedures, permits are public documents that allow me to directly observe the terms of the permit (and whether it is offered at all). Third, because this system has a special, dedicated procedure for resolving permitting disputes, it is straightforward to observe how developers react to local government decisions by observing whether or not they appeal the local decision (a process analogous to

³ Typically developers must seek multiple permissions from a variety of local boards or departments such as the local Conservation Commission, the engineering department, fire department, design committee or board of health to name a few possibilities.

litigation).⁴ I also observe the appeal outcomes which characterize the degree to which developer rights are enforced. Finally, whether or not proposed projects are ultimately built is also observable.⁵ Therefore, I am able to assess the outcomes of this state law, and to relate variations in project, developer and local community characteristics to the specific outcomes resulting from the permitting process.

Massachusetts has generally been classified as a “home rule” state, implying that local governments wield a wide range of land use regulatory powers (Richardson *et al.* 2003). It is somewhat surprising, then, that a law such as Chapter 40B which explicitly challenges local power would arise in Massachusetts. Indeed, there is an interesting history associated with its passage in the state legislature, and it was originally intended for use by non-profit developers (Krefetz 2001). In the early 1990s, the law was effectively expanded to allow for-profit private-sector developers to utilize the Chapter 40B permitting process.

The practical impact of Chapter 40B is that it modifies the extant permitting process when local communities fail to meet the state’s affordable housing requirement. Specifically, these modifications are available to developers when less than 10% of a community’s housing stock is subsidized and affordable to low or moderate-income households.⁶ If a developer chooses to

⁴ All disputes must first go to an appointed state administrative agency and cannot leap-frog into the state court system without first submitting to adjudication at the administrative level.

⁵ Almost all 40B applications and built projects studied set aside 25% of the units within a project to be “affordable.” Thus while the degree of affordability for each project is observable, this study does not emphasize affordability as an explanatory variable in analyzing 40B outcomes .

⁶ Unlike many other state policies, actual performance, not planned or future production, matters for meeting this threshold. In addition, the housing must be subsidized or produced under a qualified program in order to count towards the threshold. Simply having cheap housing in a community will not satisfy the state’s goal unless it qualifies as “subsidized.” The subsidized housing inventory is kept by the state’s Department of Housing and Community Development on an ongoing basis. If at any time a community believes that it has reached the 10%

submit a 40B permit application the permitting process changes in two basic ways. First, and unlike most permitting processes that require multiple permits or permissions, Chapter 40B requires communities to bundle all permitting decisions into a single, comprehensive permit. Developers make an application for a comprehensive permit to the local ZBA which must decide whether to approve the application and issue a permit (with or without modifications to the initial developer proposal, called conditions), or to deny the application outright and to refuse the permit. In Massachusetts, Zoning Boards of Appeal consist of 3 to 5 members appointed by the community's mayor or board of selectmen. Conditions – reductions in project size or other restrictions in permits – are permissible to the extent that projects are not rendered “uneconomic” or infeasible. In fact, the ability to place conditions in permits allows ZBAs to modify projects to suit local needs or to share in some of the anticipated profits should the ZBA allow, for example, greater density.

Second, developers may appeal the local ZBA's permit decision in a relatively expedited process to the Housing Appeals Committee (HAC) – a state-level administrative body. As directed by law, the HAC does not grant unlimited density or discretion to private developers when reviewing appeals. However, the intention of the law is to allow developers to build at densities sufficient to ensure that a project is financially feasible. Importantly, a developer must set aside 25 percent of the units to be affordable for households that make less than 80 percent of the

subsidized housing threshold, it may begin to deny 40B applications, subject to the developer appeal process discussed below.

median household income for the area.⁷ In effect, additional market-rate units provided by increased density, and other zoning and regulatory relief, provide a subsidy to developers.

Because the Chapter 40B process results in a potential change to the highest and best use of land based upon the outcome of the Chapter 40B permitting process, the surplus created by any regulatory override is likely to initially be divided between a developer and landowner through private bargaining. Each land deal, therefore, is expected to differ depending upon the site's characteristics, the sophistication of the parties and the degree of competition for the site.

Although there are many aspects of a particular development for which a developer is expected to possess more knowledge than local government officials, uncertainty over land costs is a major source of developer private information. Higher land costs may lead developers, all else equal, to seek additional density or other regulatory relief in order to support those costs. In addition, due to the fact that the law prohibits local governments from rendering projects infeasible, developers may have incentives to inflate reported costs in order to negotiate greater exceptions to local zoning rules when profits from additional density exist.

As a rule, community opposition to Chapter 40B permit applications is strong. A common claim is that new, high density development results in escalating fiscal costs to existing property owners, especially if the new project is anticipated to house children. Fischel (2001) argues that homeowners are sensitive to activities that affect home values because most homeowners hold a relatively undiversified wealth portfolio dominated by their home. Homeowners are likely to be active participants in matters of zoning and the permitting of new development since even slight

⁷ This is the most common arrangement. It is also possible for developers to provide a greater degree of subsidy in exchange for fewer affordable units. However, in the sample of for-profit projects examined here, all projects are 25% affordable (or slightly more due to odd unit counts).

changes in the area and its amenities are perceived as having the potential to create significant negative impacts on homeowner asset value. In addition, issues of environmental degradation related to development are frequently contentious in the permitting process in Massachusetts.

In sum, there are five critical features of the law and the housing market that I incorporate in a model of the permitting process. First, under Chapter 40B developers have access to sufficient regulatory relief so as to make development, including the provision of affordable units, feasible. Second, homeowners and local community groups prefer to exclude development not currently allowed under their extant local regulations, and seek to limit the extent of any exceptions granted. Third, the nature of the permitting process is such that the local government “moves” last. Therefore, the ZBA can make a take-it-or-leave-it offer to the developer regarding the permit application. Fourth, the total cost of permitting when a developer elects to appeal is greater than the total cost of arriving at a settlement (for both parties), since the cost of an appeal must be added to time and cost already expended to arrive at a permit decision. Finally, the possibility of overriding existing land use regulation is expected to influence the value of land. The actual cost of land is determined by private bargaining between a developer and a land owner and is the main source of the developer's private information about the development project's costs. Due to the structure of the permitting game, developers seeking to maximize profits may have incentives to inflate reported land costs, thereby making their reports less than credible.

A Model of Local Implementation

In this section I introduce a model borrowed from the literature on litigation in order to provide structure my subsequent interpretation of Chapter 40B permit application outcomes. In particular, the model helps to specify conditions under which community denials of applications or developer appeals are likely.

Model Set-up

The model developed below is a simple screening model with voluntary (but costly) disclosure of information related to previous models of litigation by Bebchuk (1984), Shavell (1989), Sobel (1989) and Farmer and Pecorino (2005). The basic features of the model's setup below are generalizable to other permitting scenarios. However, a change in the structure of information or the order of moves in the bargaining game may have profound impacts on bargaining outcomes (Sobel, 1989). If the voluntary disclosure of information is costly, Sobel (1989) shows that the informed party will not voluntarily disclose private information. The rationale is straightforward. Because the uninformed party moves last, she can design a take-it-or-leave-it offer that will extract the full surplus of avoiding litigation from the informed party.

Public hearings are a standard feature of most permitting processes. In the Chapter 40B process, for example, public hearings must commence promptly after a comprehensive application is received. While it would seem that the ZBA could use the public hearing process to extract relevant information from developers, anecdotally it appears that developers resist or obfuscate when asked for additional detail or information.

By way of example, one community administrator related that: "the developer is very taken with 'concept plans' and the Board is very insistent on seeing things like porches, decks, sidewalks, drainage, etc. They keep submitting new concepts and the Board keeps reiterating, details, please. The Board should be so lucky as to get to the decision process."

Besides the tactic of delaying a decision, a ZBA has few tools at its disposal in this process to compel full disclosure, and in the case of Chapter 40B, even the ability to delay is circumscribed by regulation. Therefore, although public hearings may be required, the developer's revelation of information is ultimately voluntary, and public hearings are not truly a discovery process where truth-telling is compelled by law (and associated sanctions).

The permitting game and its notation can be summarized as follows.

0. Private negotiation between the developer and a land owner determines the project's land cost, and in combination with all other development costs, determines the developer's type, x . Let $x \in [a, b]$, where a represents a known, minimum cost (given the value of land in its alternate, by-right use). Likewise, b is an upper bound to the cost of development. Let the distribution of developer types be described by the cumulative distribution function $F(x)$ with density $f(x)$. Given the domain of x , let $F(x) = 0$ if $x \leq a$ and $F(x) = 1$ if $x \geq b$.
1. The developer makes an application for a comprehensive permit to the ZBA and decides whether to reveal her private information about her type at cost z .

2. The ZBA decides whether to approve a permit in response to the developer's application, or to deny the application and offer no permit.
3. Conditional upon approval, the ZBA issues a permit for a particular type of project for which the developer has a valuation of the approved project which I denote $s \in [a, b]$. For simplicity, s is also assumed to represent the cost to the community if the project built to the specifications outlined in the approved permit.
4. The developer decides whether to appeal the ZBA's permit decision. A developer is expected by all parties to be successful on appeal with probability p , and the monetized value of the permit awarded by the adjudicator in the event of success is π . The developer's incremental cost (relative to the cost of settlement) of undertaking an appeal is c_d , and the community incurs the incremental cost c_m in the defense of an appeal. If successful in her appeal, the developer obtains the payoff $\pi - x - c_d$ from development, and because the community incurs the incremental cost c_m in the defense of an appeal, the community incurs the total cost $\pi + c_m$ if the developer wins. If, with probability $1 - p$, the court finds in favor of the ZBA, each party bears its own costs from appeal, c_d and c_m , respectively.

The structure of the game and each party's decision rules are known to both parties and the courts. Local governments, however, do not observe a developer's type and only know the *distribution* of developer types. My further assumption, as in standard in the law and economics literature, is that the discovery process that commences upon appeal will reveal the actual cost of the project, and thereby the scope of the project that a developer requires in order to proceed with development.

Analysis

In this section I outline the analysis of the game, derive the optimal permit offer, and identify the conditions under which local government choose to bargain with developers in the context of the game. I also briefly revisit the incentives of developers to reveal, at a cost, private information.

The analysis proceeds by starting with the last step and working backwards. In step 4 of the game, when $s < x$, the incremental value of the project to the developer (beyond the value of land under her control) is zero. Therefore, for appeals to be pursued in equilibrium when $s < x$, it must be the case that the developer's expected payoff from a successful appeal is non-negative such that $p(\pi - x) - c_d \geq 0$. Rearranging, this implies that the developer's value of any permit awarded on appeal must be $\pi \geq x + c_d/p$. For convenience, I assume that the court that finds in favor of the developer bestows a permit so that this condition holds with equality. This implies that developers do not make excess profits through litigation, and that the expected (full information) award from winning is $\pi = x + c_d/p$. Therefore, all developers of type $x \leq s$ accept the offer s , and developers of type $x > s$ reject the offer and appeal.

In step 3, if a ZBA knows x and wants to settle the developer's application for a permit without litigation, it will offer the developer exactly $s = x$, minimizing its costs from development while also avoiding the costs of an appeal. When there is no revelation of private information by the developer, however, the ZBA must make an offer based on the information about the distribution of developer types and its expectation of when developers will be willing to settle. The community's expected cost from issuing a permit with value s is,

$$(2) \quad s \int_a^s f(x)dx + \int_s^b [p\pi + c_m]f(x)dx.$$

The first term in (2) represents the cost to the community from a settlement – that is the value of the settlement offer it makes multiplied by the likelihood that the offer is accepted by the developer when $x \leq s$. The second term represents the community's expected cost from a developer's appeal when the ZBA's offer is rejected. The cost of an appeal includes the incremental community cost of defending an appeal, and the developer's cost of appeal as well, since this is part of the expected court award (π) to the developer. Increasing the settlement offer, s , increases the cost of settlement to the community while decreasing the likelihood of a costly appeal. The optimal offer balances these two considerations. Specifically, the first and second order conditions from the minimization of (2) with respect to s are,

$$(3) \quad F(s) - [(c_d + c_m) - (1 - p)s]f(s) = 0, \text{ and}$$

$$(4) \quad (2 - p)f(s) - [(c_d + c_m) - (1 - p)s]f'(s) > 0,$$

Assuming that the inequality in (4) holds, let a solution to (3) be denoted s^* .

The first order condition in (3) may have a solution $s^* \leq a$ when $(1 - p)a - (c_d + c_m) \geq 0$.⁸ This occurs when the expected payoff from appeal is great enough to offset the total costs of an appeal. At $s^* \leq a$, an appeal is certain since developers appeal whenever $s \leq a \leq x$. If it is at all costly to write a permit, then local communities will not bother to write a permit that they

⁸ A settlement offer greater than b is never optimal.

expect to be rejected by the developer, and this expectation guides the ZBA decision rule for approving versus denying a developer application.

Definition. A ZBA *approves* an application and issues a permit with value $s > a$ when $(c_d + c_m) - (1 - p)a > 0$. Because writing a permit is costly, a ZBA is said to *deny* a permit when $(c_d + c_m) - (1 - p)a \leq 0$.

According to the conditions above, denials are more likely to occur when the probability of developer success on appeal is low, when the total costs of an appeal are low, and when the minimum project value is large.

Assuming that conditions for an approval hold such that $s^* > a$, total differentiation of (3) yields,

$$\partial s^* / \partial (c_d + c_m) > 0, \quad \partial s^* / \partial p > 0.$$

Notice that the total appeal costs, not just the community's appeal costs, are expected to increase the value of the ZBA's permit offer. In this model, a developer's costs from appeal matter for the community because the expected appeal award is assumed to incorporate these costs. In addition, the optimal offer is also expected to be higher when the likelihood that developers win on appeal is higher. I state the implications for the overall likelihood of settlement in the following Remark.

Remark. Because $F'(s) \geq 0$, the equilibrium likelihood of settlement is non-decreasing in the total incremental costs of an appeal and the expected probability that a developer will win an appeal.

Returning to step 1, consider the developer's incentives to reveal her private information when $z \geq 0$. First, notice that if the conditions for a denial are satisfied, then a developer will never incur the costs to reveal her type if $x > a$ because the community prefers its expected payoff from an appeal (which is expected to follow a denial) to settling for any $s \in [a, b]$. However, even if the community prefers a settlement, developers still have no incentives to reveal their type. If they do so, they expect to only receive a permit worth $s = x$ which fails to compensate them for the sunk costs of providing the information.⁹

The overall outcome of the bargaining game is stated in the following proposition.

Proposition. In equilibrium, developers do not reveal private information about their type, and communities offer s^* to settle permit applications when conditions for an approval hold, and developers appeal offers with probability $1 - F(s^*)$. When conditions for a denial are satisfied, communities make no settlement offer, and developers appeal denials with probability 1.

Empirical Implications of Model

The intent of this model is to provide guidance for understanding the effectiveness of state intervention in local land use decision-making when there is local implementation of the law in

⁹ Of course, the ZBA may attempt to credibly commit to provide compensation for the costs of revealing information through their settlement offer. In Massachusetts, there are regulatory measures which attempt to facilitate partnerships between communities and developers which may be interpreted as a mechanism for information sharing. However, the fact remains that such partnerships are fraught with other potential costs, and the ZBA still has the last "move" and may renege on promises to compensate developers.

question. A key assumption of the model is that appeals are costly and that in the event of disputes, an adjudicator awards permits of sufficient value with the expectation that the pursuit of these permits is worthwhile *ex ante*.¹⁰ Developers do not always “win” because idiosyncratic factors may lead adjudicators to find in favor of “local concerns” about the project, such as safety and health.

Empirically, if developers choose to pursue this permitting path instead of the regular permitting process, then this choice serves as evidence about the strength of enforcement. More importantly, it suggests that awards on appeal are sufficiently rich that developers will engage the process at all. Another prediction of the model, conditional on enforcement, is that developers appeal ZBA denials with probability 1. In addition, when the law is well-enforced, ZBAs are only predicted to deny applications in cases where the probability of developer success on appeal is low enough or the proposed use of the site is particularly intense (and therefore costly to the community).

By observing whether projects are ultimately built, I can verify that permitted projects are feasible and that ZBAs and the HAC do more than merely appease the letter of the law by issuing permits that in fact are not actionable.

¹⁰ The assumption about the magnitude of awards differs from the extant literature on litigation because here real investment decisions depend on achieving a particular threshold value through the permitting process or subsequent appeal. This incentive requires that the settlement award, in the event that developers win, be greater than the straightforward value of their claim by an amount that makes the pursuit of litigation a non-negative proposition in expectation. More typically, courts are modeled as awarding only the value of a claim in dispute which, from the viewpoint of a winning litigant, is reduced by the extent of litigation costs incurred. Litigants in these models pursue litigation so long as the expected payoff (less litigation costs) exceeds a settlement offer in hand.

Interestingly, the model also makes plain that there is local discretion in the permitting process which should be empirically observable through differences between developer applications and ZBA-issued permits, and the variety of tradeoffs that ZBAs make between, for example, permitted units and other conditions placed on developers in permits. The model does not make specific predictions about the nature of these tradeoffs, however.

Below, I first examine the basic outcomes of applications – whether they are approved or denied by ZBAs, the nature of the offered permits, whether developers appeal ZBA decisions and whether projects are ultimately built. Then I consider some simple multivariate specifications to sort among the correlates of the approval and appeal decisions.

Data and Summary Statistics

In 2007 MIT/CRE Housing Affordability Initiative requested data from 144 contiguous cities and towns in the Boston, Massachusetts metropolitan area, excluding the city of Boston, about all Chapter 40B applications made to them between 1999 and 2005. Researchers followed up to confirm information and collect additional data at community offices and by phone. Then in 2008 additional follow-up was performed to complete data about the resolution of these applications, including whether developers obtained comprehensive permits from ZBAs, whether appeals were filed and whether projects ultimately obtained building permits – indicating that the projects were built.

This process eventually yielded data from 142 communities. Eleven of these communities already exceeded the 10% subsidized housing threshold at the beginning of the sample period.

104 communities and cities had at least one 40B application during the period 1999-2005, resulting in data on 404 developer applications. From this initial project-level data, 18 observations were either still pending before a ZBA or withdrawn before receiving a ZBA decision and were therefore unusable. An additional 26 observations have incomplete information about relevant variables in the model, and one observation was deemed an outlier having twice the density of any other project. Finally, 74 observations are not included in the analysis sample because the developers were either non-profits (24) or public agencies (6) or pursued a variant of the permitting process (44). In each of these cases profit limitations are not a relevant concern (and developer profits are a key reason private information matters in the screening model). This process produced a final sample of 285 applications by for-profit developers in 98 towns and cities representing almost 24,000 units of proposed housing.

Towns and cities in the sample received an average of just over 3 Chapter 40B applications for which they rendered a ZBA decision during this time period, and while 90% of the sample had 6 or fewer applications, the maximum was 12. The availability of suitable land within this mature housing market is considered by most to be a main driver for the location of these applications. To corroborate this claim, I estimate a simple Poisson regression model of the number of applications received by each community. Unsurprisingly, communities with greater land area and better accessibility receive more applications between 1999 and 2005.

Figure 1 shows the number of sample applications by year. The ramp up in the number of applications per year mimics the housing market cycle, and applications peak in 2004, a year ahead of peak prices in the owner-occupied market in the Boston area. Table 1 summarizes project, developer and community characteristics associated with the 285 developer applications, and also stratify the sample by whether the ZBA initially approved or denied the application.

The average density of all proposed projects is about 9.5 units per acre, and over 70% of the projects are proposed as owner-occupied dwellings. Panel B reveals that rental projects are over 2.5 times as large (in terms of units proposed) on average as compared to owner-occupied projects. The bulk of the projects are proposed on sites initially zoned for single family housing on lots sizes of an acre or less (“small” lots by Boston standards), although a third are proposed on sites zoned for single family houses on lots over one acre in size. (Very few projects are actually proposed on sites initially zoned for multi-family production, and if so are coded as commercial zoning here.)

Table 1 also reports the means of 5 descriptors of the 98 communities in the sample to provide evidence of the variation in the places receiving comprehensive permit applications. In particular, the table shows summary statistics for the 2000 Census population, the standardized accessibility to employment measure (a gravity index of a community’s accessibility by car and public transport to all of the region’s jobs from Fisher *et al.* 2009), the 2000 Census median household income for each community, the subsidized housing inventory as of 2001 relative to the community’s 2000 Census housing stock (from the MA Department of Housing and Community Development), and a dichotomous variable indicating whether the legislative form of government is city council or town meeting.

Enforcement

Referring to Figure 2, the majority of applications in the sample are approved (with conditions) while 18% of all applications receiving a ZBA decision are denied. Overall, 34% of all ZBA decisions are appealed by developers to the HAC, but this differs greatly depending on whether

the ZBA decision is an approval or a denial. Consistent with the model's assumptions, nearly all (92%) of the denied applications are appealed. Only 21% of approved applications are appealed.

ZBA approvals not appealed by developers result in completed projects 73% of the time, attesting to the feasibility of the permits granted to developers notwithstanding the requirement to deliver 25% rent and price restricted units within these projects. This rate increases to nearly 90% for the applications receiving a ZBA decision prior to 2005. Following 2005, the housing market started to turn, and fewer of the projects receiving decisions in 2005 or later have acquired a building permit. Regarding appeals of approved applications, only 9 cases proceeded to the point of receiving an HAC decision and all were found in favor of developers.¹¹ Most appeals of approvals were settled "out of court," consistent with the claim that the appeal itself reveals information, as does the subsequent discovery process. However, perhaps because of market timing, only 53% of approved and appealed projects are ultimately built.

Appeals resulting from ZBA denials are twice as likely as appealed approvals to proceed all the way to an HAC decision, and developers "win" just over 70% of the time in these cases. Only 37% of denied and appealed projects are ultimately built.

Using estimates from Dillman and Fisher (2008) of total housing production (based on tax assessor data), completed 40B housing units may represent nearly one-half of the total units built during this period in the 142 sample communities.

¹¹ It should be noted that ultimately some of these decisions were appealed by towns and cities to the state court system, resulting in on-going litigation and sometimes an eventual overturn or modification of the HAC decision.

Local Discretion

ZBAs move last and make permit offers in the game as outlined above after receiving developer applications through the 40B application process. I observe the developer's proposed number of housing units and the ZBA's permitted units as well as the number of conditions imposed on the project in the ZBA permit. Interestingly, ZBA permits entail a 14% reduction in units on average as compared to developer applications and also include an average of 45 conditions.¹² These numbers vary in a statistically significant manner between tenures. Owner occupied projects receive a larger "haircut" in general with a 16% reduction in units and 46 conditions. Rental projects that are approved receive a permit with 9% fewer units and 41 conditions on average. These findings are generally consistent with the idea that owner-occupied projects were more profitable during this time frame (and hence would potentially have more "fat" to be trimmed by ZBAs). Recall that the legal benchmark that guides the HAC in appeal cases is that ZBAs cannot render a project "uneconomic," essentially meaning unprofitable. It seems reasonable then that developers propose larger projects when potential profits are greater and that ZBAs in turn may attempt to reduce these projects to a scale deemed sufficient to support the development of the project's affordable units.

Table 2 examines the correlations between the number of conditions and unit reductions (relative to units proposed in the developer's application), by tenure. For owner-occupied projects, the number of conditions in a permit is positively (and significantly) correlated with the percent unit reduction. Further, the percent unit reduction appears to be modestly increasing as the proposed

¹² The nature of "conditions" varies widely and no attempt to distinguish among different types of conditions is attempted here. In addition, developers may offer conditions in their initial application or during public hearings, however I am unable to distinguish between these voluntary versus involuntary conditions.

project size increases. These findings are consistent with the tension between developer interests in maximizing profits and ZBA desires to minimize the project's local impacts.

The number of conditions found in permits granted to rental projects, however, is uncorrelated with the percentage reduction in units. While the number of conditions increases as the proposed size of rental projects increases, the percent change in units is uncorrelated with the proposed size of the project. The lack of clear relationship between project size and unit reductions in particular is consistent with anecdotal claims that rental projects had much thinner profit margins as compared to owner-occupied housing during this period. The results suggest that ZBAs could add conditions to modify aspects of how a more complicated, larger project would be delivered, but could not as effectively reduce project size without rendering the project infeasible.

I consider two other potential correlates with permit characteristics, community accessibility to jobs and the median income of the community. In better locations, developer competition for sites may be greater, thus competing away potential profits to development on these sites (in favor of landowners). With respect to community characteristics, wealthier places may expend more resources in addressing 40B applications, resulting in "tougher" permits either because they acquire better information or are less concerned about the cost of future appeals. In fact, the number of conditions found in owner-occupied permits is decreasing in a community's accessibility, but increasing in its median income. Neither access nor income is significantly correlated with rental permit conditions or unit changes.

It appears that ZBAs make choices regarding what they concede in permits. It is entirely possible that they choose to tolerate more housing units in return for greater concessions in terms of design, site improvements, parking or even outright contributions to local government. Therefore, the

value of a permit ultimately hinges on the joint consideration of both the number of units permitted and the number and nature of the conditions attached to the permit.

In the next section, I consider the implications of these permit decisions with respect to the likelihood of avoiding costly appeals in a multivariate context.

Chapter 40B Decisions

Estimation Strategy

Model equation (3) sets out the equilibrium expectation for settlement conditional on a ZBA permit offer. Recall from the model assumptions and its proposition, ZBA denials yield no permits and are automatically appealed by developers. On the other hand, if an approval is forthcoming, then in equilibrium the likelihood of settlement is increasing in the total costs of an appeal and decreasing in the expected community payoff from an appeal (both affecting the value of the permit offered). Suppose that the underlying value of an approved permit net of developer costs ($s - x$ in the terms of the screening model) can be described as

$$y_{2i}^* = x_{2i}\beta + u_i.$$

where u_i is independent of x_{2i} . Per the discussion in the previous section, I only imperfectly observe the value of permits since I cannot fully capture the nature of the conditions attached to the permit nor many other idiosyncratic features of projects. However, I expect to observe settlements whenever the net permit valuation is positive

$$y_{2i} = \begin{cases} 1 & \text{if } y_{2i}^* > 0 \\ 0 & \text{if } y_{2i}^* \leq 0 \end{cases}$$

Based on this latent variable formulation, the obvious approach for examining the settlement of approved projects would be to use a probit regression of y_{2i} , an indicator for whether the ZBA approval of project i is accepted by the developer, on x_{2i} , a vector of community and project characteristics suggested by the screening model. However, I may need to correct for sample selection since I only observe permit offers in the event of ZBA approvals ($y_{1i} = 1$).

I expect to observe a ZBA approval of a 40B application when the total community costs of denying the application are greater than the expected benefits. However, I only observe whether or not the permit is approved and not the latent valuation of the community. To specify a model for estimation, suppose that the valuation in the case of project i is given by

$$y_{1i}^* = x_i \delta + v_i,$$

in which x_i is a vector of community and project specific characteristics expected to capture the costs and benefits of a denial, and v_i is independent of x_i . I observe,

$$y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^* > 0 \\ 0 & \text{if } y_{1i}^* \leq 0 \end{cases}$$

Assuming that v_i has a standard normal distribution, I can estimate a probit model based on

$$P(y_{1i} = 1 | x_i) = \Phi(x_i \delta),$$

where $\Phi(\cdot)$ represents the cumulative distribution function of the normal distribution and δ is the coefficient vector to be estimated.

Returning attention to the analysis of settlements and assuming that the errors (u, v) from the two latent variable specifications above are jointly normally distributed (with zero means, unit variances and a correlation coefficient of ρ), the probability of settlement conditional on approval is therefore,

$$P(y_{2i} = 1 | x_{2i}, y_{1i} = 1) = \frac{\Phi_2(x_{2i}\beta, x_i\delta, \rho)}{\Phi(x_i\delta)}$$

where Φ_2 is the bivariate normal cumulative distribution function.

I therefore use a bivariate probit specification with sample selection to estimate the coefficients of interest in both the selection/approval stage and the settlement stage. This approach is also useful since I am interested in the selection/approval equation based on its own merits. In all specifications discussed below, I report standard errors further corrected for clustering by community since there are sometimes multiple projects (observations) per community.

Next, I describe the specific variables used in each probit specification and their expected signs.

Determinants of ZBA Approvals

Approvals will be more likely when both p and $(c_d + c_m)$ are higher and a is lower. The probability of developer success on appeal and the costs of appeal are highly idiosyncratic to particular projects and are not something easily observed, although some candidate proxies are proposed below. On the other hand, differences in minimum valuations of projects can be at least partially captured by the *ex ante* zoning of the site which defines its alternative use. For example, a commercially zoned site may be expected to have greater potential value than the same parcel zoned for large-lot single family housing, all else equal. In addition, rental projects are typically much larger than owner-occupied projects suggesting that minimum size of these projects will be greater. To the extent that larger projects predict greater costs to the community (e.g. more school children), proposed rental tenure may proxy for greater a , all else equal.

During the sample period, which captures the uptick in housing demand for the Boston region, local ZBAs had to learn about p by observing applications in other communities or from their own experience. Therefore, I control for the year of the developer's application and also for how many applications have been received by a community under the assumption that decisions made earlier in the sample period and in communities with less experience may involve underestimation of the court's support of developers.

In addition, the number of applications received by communities varies considerably, ranging from 1 to 12 applications over the 7 year period observed in the sample. Some communities have more, and more desirable, developable land than others. Therefore, conditional on their Subsidized Housing Inventory, ZBAs may anticipate a greater number of future Chapter 40B

applications. In the context of a repeat game (even with different developers), denying the first few applicants may help establish a community's reputation as being a tough, or at least a more costly, place to develop.¹³

To further explore this idea, I use the Poisson regression model reported on earlier of the number of applications received by each community. I use the predicted number of applications from this model as a control in the probit analysis. If ZBAs correctly anticipate the number of future applications that they will receive, they may be more likely to deny early applications when they anticipate more future applications (that is, the cost of an appeal is expected to be lower in these early cases). When more future applications are anticipated, ZBAs may find the net costs of denying initial applicants to be lower since the costs of establishing a reputation for being tough are effectively spread across multiple future applications. Thus being one of the first applications may also be more likely to result in a denial because the perceived cost of the appeal defense is lower. I cannot distinguish this effect from the hypothesis above that ZBAs may have to learn about HAC decisions (and thus may be more likely to deny early applications), but both arguments suggest that being the first 40B application to a community may make a ZBA denial more likely.

In summary, I expect that ZBA approvals will be more likely when the extant zoning is residential and when the proposed tenure is for owner-occupied housing, and less likely for early applications (both in sample time and within a series of applications in a particular community) and when ZBAs expect more 40B applications.

¹³ Unfortunately, developer names in the data are typically related to a limited liability corporation or similar organizational forms, not the underlying firm name. Developers typically form LLCs to undertake each individual project, and therefore I am unable to easily and systematically match projects by developer.

Determinants of Settlements Conditional on Approvals

Developers appeal denied applications with probability one. On the other hand, appeals of approved permits are assumed to occur due to asymmetric information that causes the valuation of the offered permit to be too low. In this section, I lay out the strategy for investigating when permits “settle” developer applications, or said differently, when developers fail to appeal offered permits. The model predicts that permit values, and therefore settlements, will be greater when costs ($c_d + c_m$) and the probability of developer success on appeal (p) are higher. As discussed above, neither of these features of projects are easily captured by the data. The summary statistics strongly suggest that developers have good chances of winning the appeal of an approval. I have noted that the likelihood of HAC decisions going in favor of developers does vary according to whether projects are approved versus denied by ZBAs. This suggests that ZBA are able to draw distinction among projects according to their likelihood of developer success and that controlling for selection when investigating settlements is an important way of controlling for unobserved differences in project characteristics and in particular, differences in p .

Several features of projects suggest circumstances under which information asymmetry could reasonably be greater between ZBAs and developers, thus making settlements less likely.

Whether a developer owns the site or has it under contract (and conditional on the outcome of the permitting process) is expected to influence the extent of asymmetric information between developers and communities with respect to land costs. In particular, contracts may create

ambiguities in the actual cost of land for the project and provide less certainty for ZBAs attempting to make a permit offer. Since developers must report the nature of their control over the site in permit applications, I code this information as a dichotomous variable taking a value of 1 if the developer owns the site outright and zero otherwise.¹⁴ In addition, because rental projects are in general less profitable than owner-occupied projects during this period of rapid house price increases, there is more room for dispute regarding developer profits in the context of for-sale housing. Likewise, less profit should be available when alternative uses of the site are higher-valued (because developers will in fact have higher land costs, all else equal).

Thus, I expect permit acceptance, conditional on approvals, to be more likely when the proposed tenure is rental, the extant zoning is commercial, and when developers own the site.

Interestingly, these predictions suggest that residential zoning and rental tenure have opposite effects on the modeled outcomes (approval and settlement). In particular, ZBAs will be more likely to deny applications that they perceive as more costly, but conditional on the fact that they choose to approve a permit, these same factors mitigate in favor of permit offers that developers will find acceptable.

Results

Table 3 displays the results of estimating a bivariate probit model with selection. The main dependent variable is a dichotomous variable indicating whether or not developers settle (and do not appeal) a permit resulting from a ZBA approval, which in turn is the dependent variable for the selection equation labeled as such. Despite my concerns regarding selection, the hypothesis that the equations are independent cannot be rejected at a 5% level of significance in any of the

¹⁴ As alternatives to outright ownership, developers may demonstrate control through the existence of contracts for sale or options over land in order to pursue the permitting process.

three specifications reported in Table 3. Effectively, the Wald test cannot reject the hypothesis that the error terms of the underlying latent variable models are uncorrelated. However, the test of independence is sensitive to the particular specification, and I report the p-values of the associated Wald test here for completeness.

Consider the determinants of approvals in the first specification. I find that the coefficients have signs in the expected directions with the exception of single family zoning. The results suggest that approvals are more likely when projects are owner-occupied but less likely when projects are proposed on sites previously zoned for residential use, when the application is one of the first 40B applications to a community and when communities are more likely to receive 40B applications.

There is some evidence that ZBAs and communities learn about enforcement of the state law over time – the first applications in a community are more likely to be denied. Even though Chapter 40B has been around since 1969, the role of for-profit developers only emerged in the 1990s, and so new precedent had to be established during the sample period. My control for *early application* is also highly correlated with a time dummy for the year of application.

Substituting application year dummy variables for the dummy variable *early application* shows that the likelihood of a denial falls over the sample period in general (results not reported in table).

Moving on to the determinants of settlements, all coefficients are signed in the expected direction. Owner-occupied projects and projects on land zoned for residential uses are more likely to be appealed whereas projects for which the developer owns the land prior to making an application are more likely to be settled.

Based on this first specification, the main departure from the predictions of the screening model is that projects proposed on land zoned for single family housing are more likely to be denied. A narrow interpretation of the screening model is that the absolute size or density of projects proposed on land zoned for commercial use may render them more valuable to deny. However, it may be that the *relative* difference in 40B project size or density compared to its surroundings may make denial of projects on residentially zoned sites more valuable. The rationale is straightforward – residentially-zoned land is more likely to abut other residential land. The proposed densities of 40B projects may seem extreme relative to surrounding single-family development, and externalities from 40B projects may be perceived as more harmful with respect to nearby housing as compared to commercial buildings. Then again, nearby single family homeowners may simply be more vocal at public hearings and with their local board members than neighboring commercial landlords.

Indeed, an alternative hypothesis to that presented by the screening model suggests that higher income communities with less affordable housing *ex ante* may be more likely to resist 40B developments, resulting in fewer approvals or lower rates of settlement, in spite of the expected costs of appeals. Community subsidized housing inventory (SHI) from the beginning of the sample period is a natural proxy for the extent of affordability by community. In this sample, places with a greater SHI are also those with more multifamily zoning and better access to jobs, but with lower incomes, less education and more ethnic diversity. Nonetheless in specification 2 of Table 3, communities with initially greater proportions of affordable housing are *more* likely to deny 40B applications (although no more or less likely to have approved projects settled). Substituting median household income for SHI produces a similar result – higher income communities are more likely to approve 40B applications (and no more or less likely to obtain

settlements). The main difference in estimation results from inclusion of SHI when compared to specification 1 is that the coefficient on owner-occupied projects is no longer estimated precisely enough to retain significance in the settlement model, although its sign remains negative. In other specifications not reported here, I control for additional community characteristics, including school quality, education and percent white. The most robust of community characteristics is SHI. After controlling for variation in SHI, none of the other community characteristics mentioned, including median household income, is significantly different from zero when included in both models.

Beyond the characteristics already mentioned, places with higher SHI are more likely to be cities as opposed to towns. In my sample, places with elected city councils (“cities”) have 2.5 times the population and 3 times the housing density of the communities that utilize town meetings (“towns”). Thus, I also use the form of government to identify urban versus suburban places. As suggested previously, to the extent that the suburbs are wealthier and have less affordable housing, these may be places that resist Chapter 40B applications more vigorously.

In addition, Schuetz (2008) reports that city councils historically adopted more multifamily zoning as compared to towns in her study of the Boston area. Thus a further difference between cities and towns may be that cities have more planning staff and board members, including those on the Zoning Board of Appeals, with experience in multi-family development as compared to personnel in suburban locations that mainly deal with single family housing. Such experience might lower the costs of arriving at and/or defending a permit decision.

In specification 3, I incorporate an indicator variable for city council (17 out of 98 communities have city councils) while still controlling for *SHI*. The coefficient on *council* is negative and

significant in the approval model, but positive in its relationship with settlements. In addition, *SHI* retains its negative sign and statistical significance with respect to approvals when I include *council*. Together, these results seem counter to expectations that Chapter 40B would be resisted by the high-income, low-affordability and smaller communities of Massachusetts. In addition, why would cities, which are more willing to deny claims, also be more likely to reach settlements with developers when they approve 40B permit applications?

As suggested by the screening model, the expected cost of appeal matters for permitting outcomes. If cities have greater administrative capacity or experience with multi-family housing development, then one might expect cities to have better outcomes on appeal vis-à-vis developers. Returning to the data, I find that the total rate of appeal in places with and without a city council was virtually indistinguishable at 34.09% and 33.61%, respectively. However, developers succeeded on appeal against cities 53% of the time as compared to a 72% success rate when disputing town decisions, suggesting that cities may fare better on appeal.¹⁵ Likewise, if city ZBAs are more knowledgeable, they may be more likely to craft permits that developers will find acceptable when city ZBAs choose to approve a permit. This evidence is merely suggestive and while differences in success on appeal *may* reflect differences in administrative capacity, I cannot rule out the possibility that other, unobserved differences in either projects or communities explain the observed city-town differences in permitting outcomes.

In summary, I find that applications for an owner-occupied project are associated with a 10% increase in the likelihood of approval while projects proposed on land formerly zoned for residential uses are 8% less likely to be approved and 13% less likely to settle (assessing the

¹⁵ A simple t-test rejects the null that these rates are the same at the 10% level of significance, albeit with a very small subsample of city council appeals (15 total).

marginal effects of the final specification at the medians).¹⁶ A one percentage point increase in the SHI of a community is associated with a 3.5% decrease in the approval rate. Changing to a city council from a town meeting form of government results in a 15% decrease in the probability of an approval, and a 24% increase in the likelihood of settlement, conditional on an approval. Finally, developer ownership of the project's land is associated with a 12% increase in the rate of settlement.

Conclusions

This paper develops a framework for considering outcomes from state intervention in local land use decision-making. The screening model explicates how private information and the expected cost of appeals resulting from disputes matter for permitting outcomes. The basic data support the model's assumption that developers' rights are well-enforced in this case. For applications initiated in 1999 - 2005, developers appeal almost all denials of permits, and the permits that they accept are completed with high probability, despite the required provision of affordable housing. Further, there is evidence that local ZBAs exercise discretion over permits awarded and do not merely rubber-stamp developer applications. The fact that most appeals are settled "on the courthouse steps" is also consistent with the underlying assumption of asymmetric information. At the same time, the expectation that high income, low-affordability, suburban communities would be more likely to resist Chapter 40B projects is shown to be unfounded.

¹⁶ To compute marginal effects, I set the model variables equal to their median values. This "median" project is an owner-occupied project proposed on residentially zoned land that is under contract (not owned), and in a community that has a SHI of 4% , expecting to 3 applications and that does not have a city council.

Because this paper's focus was on the behavior of towns and cities below the 40B threshold of 10% subsidized housing, it did not examine the question of why so many communities have not achieved that target. The study period coincided with a huge national housing boom, but only 15 additional communities (of the 98 below the threshold at the study's outset) crossed the 10% subsidized housing threshold during the study period. To the extent that communities value control over development within their borders, it is mysterious that they do not act to change their own circumstances and facilitate the state's goals in order to be relieved of the threat of Chapter 40B developer applications.

In practice, however, compliance is difficult. Large debates exist on the topic, but one central criticism of Chapter 40B is that the requirement to create "subsidized" housing is particularly onerous and an unfunded demand on communities. While changes to planning and zoning may encourage more development, these mechanisms provide few guarantees that changes will produce *subsidized* housing units required to advance communities towards the 10% subsidized housing goal. In light of many concerns, the law continues to be modified and other alternatives to encourage affordable housing supply have been advanced. In any event, Chapter 40B survived a state-wide ballot initiative to overturn it in 2010, and will therefore continue to be a part of the Massachusetts regulatory landscape for the immediate future.

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Figure 1. Number of Developer Chapter 40B Applications by Application Year

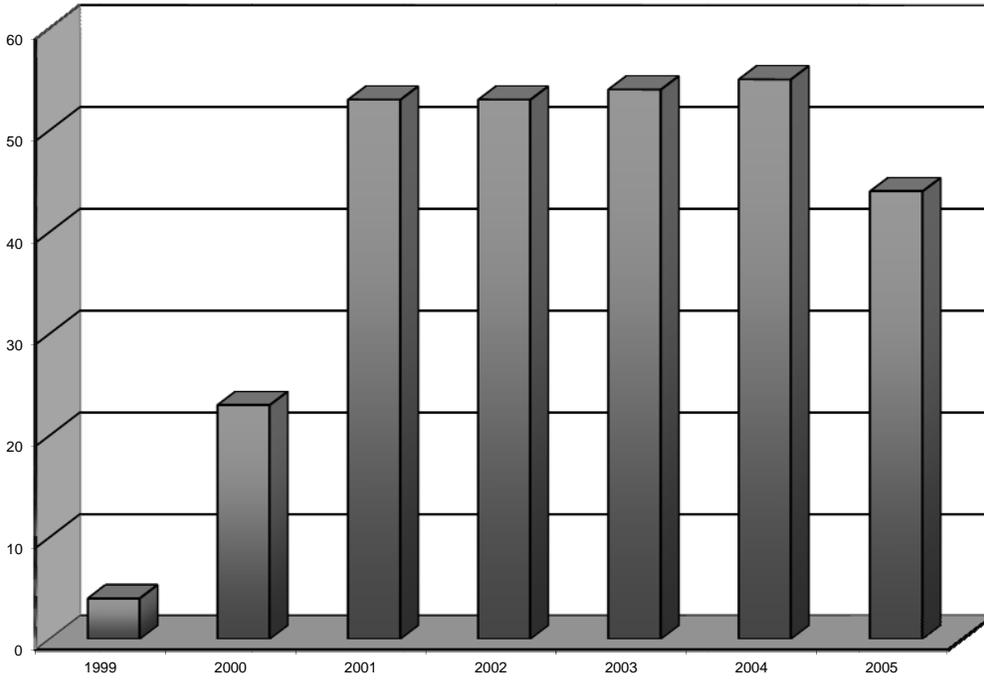


Figure 2. Permitting Process Outcomes

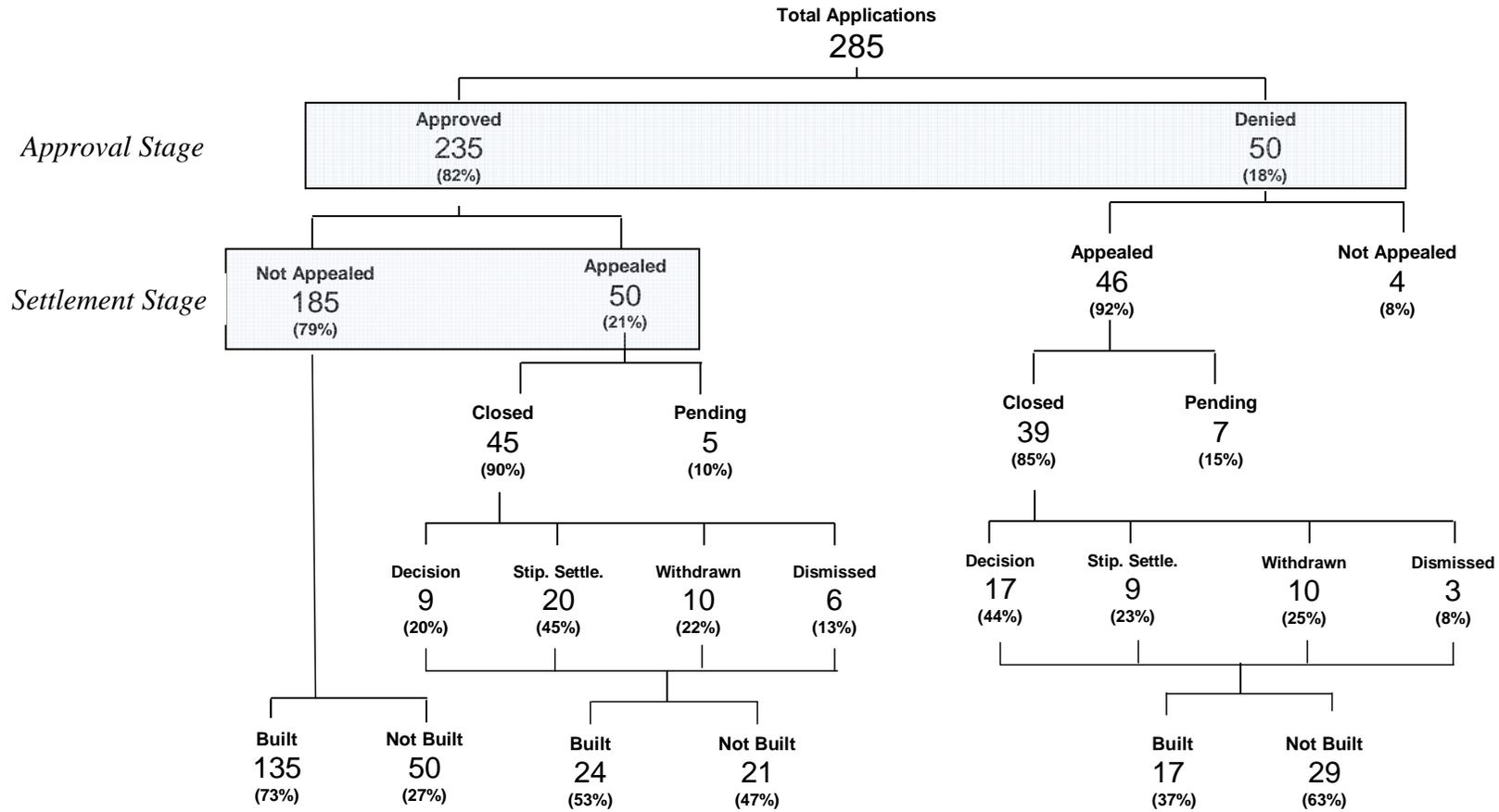


Table 1. Sample Means

<i>Panel A. 40B project and municipal characteristics</i>						
<i>Project Characteristics (N=285)</i>	Full Sample			Means by ZBA Decision		
	Mean	Min	Max	Approved (235)	Denied (50)	
Owner-occupied	0.73	0	1	0.76	0.60	
Proposed Units	94	2	550	88	125	
Site Size (Acres)	19	0.15	240	17	25	
Proposed Density	9.43	0.22	113	9.15	10.80	
Res Zoning (Large lot)	0.34	0	1	0.34	0.34	
Res Zoning (Small lot)	0.38	0	1	0.36	0.46	
Non-res. Zoning	0.28	0	1	0.29	0.20	
Approved	0.82	0	1	1.00	0.00	
Appealed	0.34	0	1	0.21	0.92	
<i>Municipal Characteristics (N=98)</i>						
Town Population (2000)	22,335	2,380	83,829			
Std. Accessibility	-0.07	-1.33	3.23			
Median HH Inc (\$)	72,259	42,932	141,818			
Sub. Hsg. Inv. (%)	4.39	0	8.63			
City Council	0.17	0	1.00			
<i>Panel B. Tenure</i>						
	Owner-Occ.	Rental				
Proposed Units	64	177				
Site Size (Acres)	18	20				
Proposed Density	7.16	15.64				
N	208	77				

Accessibility is measured using the town-level job accessibility index from Fisher et al. (2008), standardized across 144 contiguous suburban towns and cities around the city of Boston. A higher index score indicates greater relative accessibility to the region's jobs (with mean 0 and standard deviation of 1). Town population and median household income by community is from the 2000 Census. The SHI is from 2001 relative to 2000 Census housing units MA Department of Housing and Community Development.

TABLE 2. Correlations Among ZBA Permit Characteristics*Panel A. Ownership Units (N = 178)*

	No. Cond.	Unit Decr.	% Unit Decr.	Prop. Units	Ln(Access)	Ln(Income)
No. Cond.	1.0000					
Unit Decr.	0.0600 0.4265	1.0000				
% Unit Decr.	0.2382 0.0014	0.5626 0.0000	1.0000			
Prop. Units	0.0676 0.3702	0.6828 0.0000	0.1479 0.0489	1.0000		
Ln (Access)	-0.1532 0.0412	-0.1377 0.0669	-0.0530 0.4825	-0.0860 0.2537	1.0000	
Ln (Income)	0.2853 0.0001	-0.1173 0.1188	0.1134 0.1319	-0.2720 0.0002	0.2093 0.0051	1.0000

Panel B. Rental Units (N = 57)

	No. Cond.	Unit Decr.	% Unit Decr.	Prop. Units	Ln(Access)	Ln(Income)
No. Cond.	1.0000					
Unit Decr.	0.0017 0.9898	1.0000				
% Unit Decr.	0.0251 0.8530	0.7489 0.0000	1.0000			
Prop. Units	0.2858 0.0311	0.3965 0.0023	0.0149 0.9124	1.0000		
Ln (Access)	-0.0046 0.9730	0.0069 0.9597	-0.0910 0.5009	0.2638 0.0474	1.0000	
Ln (Income)	0.1451 0.2815	0.0915 0.4985	0.0776 0.5663	-0.0775 0.5666	0.2509 0.0597	1.0000

This table presents correlation coefficients and p-values for the number of conditions, the decrease in units, and the percentage decrease in units observed in approved permits (decreases are relative to the developer's application). The table also presents correlations of the permit characteristics with the proposed size of the project, the accessibility of the town's location in which a project is proposed and the median income of the town.

Table 3. Bivariate Probit Estimation with Selection

	(1)		(2)		(3)	
	settle	approve	settle	approve	settle	approve
Owner-occupied	-0.3340*	0.4864***	-0.2889	0.3591**	-0.2432	0.3404*
	[0.187]	[0.183]	[0.195]	[0.181]	[0.195]	[0.181]
SF Res. Zoning	-0.4077**	-0.3706*	-0.4175**	-0.3847*	-0.4278**	-0.3903*
	[0.188]	[0.213]	[0.198]	[0.213]	[0.196]	[0.212]
Land Owner	0.3749**		0.3899*		0.3608*	
	[0.188]		[0.200]		[0.200]	
Ln(Accessibility)	0.0431		0.0258		0.0141	
	[0.258]		[0.267]		[0.272]	
Initial SHI			0.0561	-0.1822***	0.0113	-0.1366***
			[0.054]	[0.046]	[0.055]	[0.047]
Council					1.0540**	-0.4908**
					[0.467]	[0.231]
Expected 40B Apps		-0.0744**		-0.0768*		-0.0803*
		[0.038]		[0.040]		[0.041]
Early Application		-0.5756***		-0.6084**		-0.5959**
		[0.220]		[0.244]		[0.246]
Constant	0.9858	1.5026***	0.8445	2.4883***	1.0438	2.3921***
	[2.306]	[0.287]	[2.376]	[0.407]	[2.402]	[0.410]
Rho	-0.76		-0.502		-0.615	
Observations	285	285	285	285	285	285
Log-Likelihood	-240.2	-240.2	-233.3	-233.3	-228.5	-228.5
Wald test p-value	0.204		0.444		0.308	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

This table reports the coefficients and standard errors (adjusted for clustering on 98 towns) of a bivariate probit estimation with sample selection. The Wald test is for the independence of the two equations ($\rho = 0$). Settlement ("settle") of a 40B application is only observed in the event that a municipality approves a 40B permit. Thus the dependent variable of the selection equation is "approve." The variable "Owner-occupied" controls for the tenure of the proposed project. "SF Res. Zoning" controls for whether the site was zoned for single family housing at the time of application. Land owner refers to whether the developer owns the land on which the project is proposed or only holds it under contract or option. "Ln(Accessibility)" is the natural log of a measure of municipality job accessibility from Fisher, Pollakowski and Zabel (2009). High values of the accessibility index indicate greater access to the region's jobs by the most advantageous transportation mode from a particular municipality. Council is an indicator variable for whether the community has a council form of government (the alternative is to use town meetings). "Expected 40B Apps." is the predicted number of 40B applications based on municipal characteristics. Finally, "Early Application" controls for whether a particular application is the first or second application received by a town during the sample period.