



RESIDENTIAL LAND USE REGULATIONS IN NEW HAMPSHIRE: CAUSES AND CONSEQUENCES

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Published by the Josiah Bartlett Center for Public Policy

Residential Land-Use Regulations in New Hampshire: Causes and Consequences¹

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Executive Summary

Why have house prices and rents increased so much in New Hampshire? This study finds that residential land-use regulations, mostly at the local level, are a major cause. Examples of local regulations that prevent people from building homes include: minimum lot sizes, frontages and setbacks, single-family-only requirements, bureaucratic requirements for accessory dwelling units, maximum heights and densities, minimum parking requirements, historic and village district requirements, municipal land ownership, subdivision regulations, impact fees, and simply the unwillingness of zoning boards to issue variances. Widely available measures show that New Hampshire is one of the most restrictive states in the country for residential development. By suppressing building, land-use regulations drive up the price of housing as demand rises. Removing or relaxing these regulations would allow prices to rise more gradually.

The consequences of housing scarcity for our state are significant. This study finds that residential building regulations are associated with growing socioeconomic segregation and slowing population growth. As housing becomes more expensive, fewer people are moving to New Hampshire, especially to those towns that are most expensive. Those who stay are disproportionately wealthy and college-educated, while middle- and lower-income families leave because they cannot find affordable housing. Costly housing in towns with better schools also limits families' access to educational opportunity. Finally, the sprawl caused by anti-density policies such as minimum lot sizes increases drive times and road maintenance costs and worsens air and water quality.

New Hampshire municipalities have enacted these restrictions on growth for several reasons. First, there is a widespread perception that allowing home-building would increase the number of children in local schools. However, the other side of the home-building equation is that new home construction leads to substantial growth in the tax base, relieving the tax burden on the rest of the town. Moreover, school populations are falling across most of the state, and so adding more children would not necessarily require more spending. So the "fiscal" motivation for restricting home-building does not make much sense today.

¹ I wish to acknowledge helpful suggestions and comments from Andrew Cline and Max Latona and research assistance from Brian Chen, Kerri Roy, and Sophia Pajakowski. All errors are my own.

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The main reason for growing development restrictions seems to be “rent-seeking.” In other words, some homeowners in the towns with the biggest housing demand see zoning as a way of boosting their wealth by artificially limiting the supply of housing. This process may have gotten out of hand now, though, as pandemic-driven housing demand has well outstripped supply. Many Granite Staters have seen their homes rise in value, but this rise may be merely notional, because it is now so difficult to find a new house after selling the old one. The rapid aging of the New Hampshire population makes reform to relax local planning and zoning regulations all the more crucial.

As the rent-seeking explanation would predict, the places with the most stringent rules on building new homes tend to be the ones that historically saw big growth in housing demand. Portsmouth, Hanover, and some of their surrounding towns are among the most regulated towns in the state, along with a few Lakes Region and White Mountains locations. Some of the wealthier suburbs of Manchester and Nashua – Hollis, Windham, and Bedford – are also near the top of the list. By contrast, the inland Appalachian belt of New Hampshire, running from western Cheshire County to the North Country, is the least regulated part of the state. There’s a definite trend in the historical data, whereby towns that saw large growth in the 1960s and 1970s enacted restrictions that then choked off growth in the later 1980s and 1990s. By contrast, population density does not seem to correlate with increases in regulatory stringency, even though it may have been a motivation for towns to adopt zoning to begin with. Some of the towns with the strictest rules have low densities and very little industrial activity, like Hanover and Lyme.

Another correlation observed in the data finds that towns that lie nearby other towns that increased their restrictions on housing were themselves more likely to enact new restrictions on housing. In other words, municipal land-use regulation in New Hampshire looks like a kind of “arms race.” When one town tightens, others are also provoked to tighten so that they don’t get a disproportionate share of new housing construction. As a result, all towns end up with less construction and stricter regulations than they really want.

To get out of the arms race and make decent homes affordable to Granite Staters of all ages and walks of life, policymakers and citizens have to understand how local land use regulations affect the supply and price of housing. Better policies will come from a better understanding of the downstream effects of these regulations. In addition to showing how land use regulations affect housing supply and prices, this study suggests several state- and local-level policy changes that could provide relief. At the local level, zoning ordinances could be revised to allow homes to be built on smaller lot sizes, with smaller frontages, and with smaller setbacks. Building permit caps could be removed. Multi-family housing options, such as duplexes and triplexes, could be allowed in additional locations. In urban areas, minimum parking and maximum height restrictions could be eased. At the state level, the state could enact a regulatory takings compensation law, so that municipal governments would have to compensate landowners for new regulations that substantially take away the value of their property. The state could directly preempt the most egregious forms of exclusionary zoning, such as minimum lot sizes above a certain level and building permit caps. The state could also authorize towns to decentralize planning authority to neighborhood or even block levels. At such a small level, residents are unlikely to adopt rent-seeking forms of zoning, because builders and home-buyers could easily go elsewhere. State government could authorize municipal land-use compacts that would allow neighboring municipalities to offer multi-community planning, where the impacts of regulation on the whole commuting area could be considered. Finally, an open-enrollment law for public school choice would at least ameliorate one of the negative consequences of exclusionary zoning for middle- and low-income families: being locked out of good schools.

1 Introduction

The housing boom and bust during the 2000s and the runup in housing prices in many markets since then have gotten many economists and policy analysts thinking about why housing has become so unaffordable in so many places. While strong demand for housing is certainly part of the story, the crucial piece of the puzzle is the maze of costly regulations property owners confront when trying to build new housing. By crushing new supply, many local governments have put decent housing out of reach for the working poor and even middle-income households.

Over the last two decades, residential building regulations have become one of the hottest topics in economic research. Economists have found that these regulations are the most important factor determining differences in cost of living from place to place in the U.S. (Glaeser & Gyourko 2002; Glaeser, Gyourko, & Saks 2005a; Glaeser, Gyourko, & Saks 2005b; Quigley & Raphael 2005; Ihlanfeldt 2007; Molloy 2018). Accelerating house prices in tightly regulated places drive away workers to places where regulations are milder and prices cheaper (Glaeser, Gyourko, & Saks 2006; Glaeser & Tobio 2007; Saks 2008; Ganong & Shoag 2017). Because workers cannot always afford to live where they are most needed, U.S. GDP may be 10 percent lower than it would otherwise be (Hsieh & Moretti 2017).

What are residential building regulations, and why do economists think they are so important?

Residential building regulations consist of planning and zoning rules and decisions affecting the building of new homes. The modern practice of zoning – dividing a jurisdiction’s territory into zones with predetermined rules for which types of land use would be allowed in each zone – was developed in Germany in the 1870s and spread to the United States in the 1910s (Whitnall 1931; Gardner 2017). The familiar type of zoning in which whole neighborhoods were set aside exclusively for detached, single-family houses was pioneered by Los Angeles in 1920 (Whitnall 1931: 12). The United States and Canada stand out as the only developed countries that use single-family, residential zoning districts; in Europe, mixed-use development has always been accepted (Hirt 2014). Today, Houston is the only large city in the U.S. without formal zoning, although its city council does promulgate land-use regulations.

This study investigates the economics of residential building regulations that reduce the supply of new housing and applies research findings to New Hampshire. It turns out that New Hampshire has some of the worst-offending municipal governments in the United States, and the growth of red tape in housing development in this state helps to explain our slow growth since the 1990s, our aging population, growing income segregation between our towns, and escalating home prices in many of our communities.

The sidebar on the right gives just a small sampling of the myriad regulatory requirements on landowners that discourage home-building. While any one of these regulations taken individually might seem reasonable or at least harmless, in total the detailed local planning and zoning regulations around the state add significantly to the cost of building homes. Because so few land uses are allowed “by right,” landowners must seek conditional use permits and special exceptions, and planning and zoning boards can slow-walk these applications and require costly

Residential building regulations may reduce U.S. GDP by 10% (Hsieh & Moretti 2017).

tests and reports. All these barriers add to the cost of building homes, decrease the supply of housing, and raise the cost.

The next section explains the three major motivations for housing supply regulation, the theory and evidence on the effects of antigrowth zoning, and the political motivations for antigrowth zoning. Section three turns to New Hampshire and provides evidence on both the causes and consequences of antigrowth residential building regulations. Section four sums up the key findings.

2 The Economics and Politics of Housing Supply Regulation

2.1 Rationales for Housing Supply Regulation

Fischel (2015) argues that zoning in the U.S. began as a response both to the automobile, which made residential neighborhoods physically separated from places of work feasible for the first time in human history, and to the motorized truck, which made it easier for industrial facilities to intrude into residential areas. Fischel refers to simple zoning that divides a jurisdiction into residential, commercial, industrial, and mixed-use areas as “good housekeeping zoning.” While the common law of nuisance and private deed restrictions are substitutes for this kind of zoning (Siegan), for the most part good-housekeeping zoning has been uncontroversial for decades.

A second motivation for regulation is so-called “fiscal zoning.” Hamilton (1975) shows that localities can use zoning to ensure that new home-buyers pay a property tax equivalent to their benefit from locally provided goods, rendering the local property tax an efficient user charge. For instance, local governments could require new developments to pay an impact fee to cover the cost of extending public services and utilities. Localities may be more willing to allow age-restricted housing for the elderly than general single- or multifamily housing, because elderly households do not put children into local schools. Regulations could also require minimum lot sizes or minimum square footages in order to ensure that any new homes built will be expensive enough to pay a hefty property tax bill.

New Hampshire law charges local planning boards to “[p]rovide against such scattered or premature subdivision of land as would involve danger or injury to health, safety, or prosperity by reason of the lack of water supply,

Examples of New Hampshire Regulations That Limit Home-Building

- Hanover’s zoning map prohibits housing, even by special exception, on nearly half of its land area and requires 10-acre minimum lot sizes on much of the rest.
- Manchester prohibits housing of more than three stories or 45 feet in height.
- Rye requires providing two off-street parking spaces for homeowners that build an accessory dwelling unit (ADU) and bans detached ADUs.
- Portsmouth has historic, downtown, and character districts, each of which overlays and adds to the regulations of the regular zoning districts, specifying detailed aesthetic features of the buildings and properties, such as the pitch of roofs, size of yards, and appearance of facades.

drainage, transportation, schools, fire protection, or other public services, or necessitate the excessive expenditure of public funds for the supply of such services” (Vann 2018). If fiscal zoning is done right, it reduces the overall property tax burden.³

A third motivation for residential zoning is to raise the prices of existing homes, resulting in a windfall for existing homeowners and possibly involving nakedly exclusionary motives toward low-income and minority buyers. This kind of “rent-seeking” zoning is the most controversial. Directly restricting new housing by capping building permits, forcing houses to be spread out (through minimum lot sizes and bans on multifamily homes and apartments), enforcing building codes arbitrarily, or simply delaying development approvals can each raise the prices of existing homes if demand is increasing.

While antigrowth zoning raises rents and the prices of already-built houses, it reduces average property values.

2.2 The Effects of Rent-Seeking Housing Regulation

2.2.1 Theory

For economists, the effects of regulation matter more than the motivations. When regulation loads extra costs onto residential development, whether by simply making home-building illegal in certain places or by adding delays and costly reviews, it restricts the growth of the housing stock. The effects of growth-control regulation are easy to see in a simple supply and demand framework (Figure 1) (Sorens 2018).

In Figure 1, P_1 and Q_1 represent, respectively, the pre-growth equilibrium price and quantity in the housing market, P^* and Q^* represent the post-growth equilibrium price and quantity of housing without growth control zoning, and P_2 and Q_2 represent the post-growth equilibrium price and quantity of housing with growth control zoning. Zoning can make housing supply inelastic only above the pre-growth equilibrium, generating a kinked supply curve (Green, Malpezzi & Mayo 2005: 334). Homeowners and governments in metropolitan areas that are not growing cannot derive rents from limiting housing supply, but those in areas that are growing can enjoy these rents from regulation. In growing areas, zoning raises the prices of homes and reduces population, transferring wealth from new residents and local owners of developable land to owners of already-developed land. Importantly, while antigrowth zoning raises rents and the prices of already-built houses, it reduces *average* property values in a jurisdiction, because the losses to landowners who are prevented from developing new housing exceed the gains to people who already own houses (Fischel 2001).

³ Vann, a New Hampshire urban planner and legislator, argues that by prioritizing large-lot development over infill development, most New Hampshire towns are failing to get fiscal zoning right.

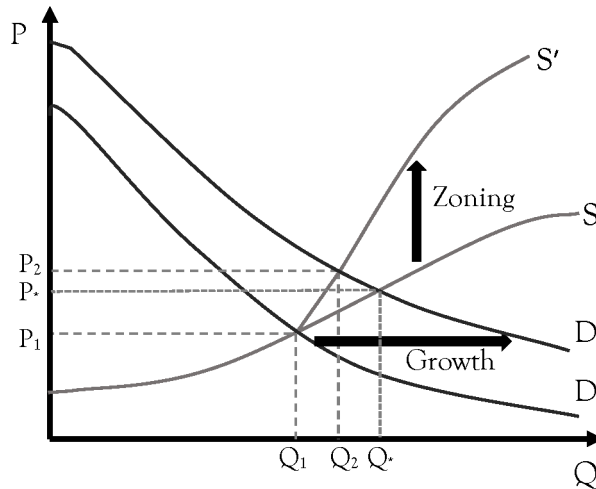


Figure 1: Effects of Growth-Control Housing Regulation

Rent-seeking, antigrowth zoning will not work if the local jurisdiction lacks monopoly power. If there are many, interchangeable local jurisdictions in a metropolitan area, for instance, home buyers can simply go to jurisdictions with more relaxed regulations (Hamilton 1978; Fischel 1980, 1981). However, some jurisdictions may enjoy monopoly power because they host important employers or rare amenities that home buyers seek. The evidence below will show that New Hampshire municipalities with immobile employers, such as universities and state government offices, feature much more restrictive zoning regulations.

Rent-seeking zoning therefore causes some places to have more expensive housing and slower population growth. Between two equally desirable locations, the less regulated location will have more affordable housing and faster growth. Prices do not equalize between the two locations so long as the more expensive location has some amenities or attractive employment opportunities that are not available in the cheaper location, causing some households to be willing to pay the higher price to live in the more costly place (Roback 1982; Chen & Rosenthal 2008).

In general, wealthier households will be more willing to pay to live in more regulated jurisdictions than lower-income households, because housing makes up a smaller share of their household budget. As Ganong & Shoag (2017: 78) point out, “Lawyers continue to earn much more in the New York area in both nominal terms and net of housing costs, but janitors now earn *less* in the NY area after housing costs than they do in the Deep South. This sharp difference arises in part because for lawyers in the New York area, housing costs are equal to 21 percent of their income, while housing costs are equal to 52 percent of income for New York area janitors.”

“Anything not related to health or safety is a tax on new housing construction.”

How does rent-seeking housing regulation affect the *distribution* of house prices and rents? If regulation effectively represents a per-unit tax on housing construction, it should make smaller, affordable projects less attractive to buyers, less profitable, and therefore less widely available, per Alchian & Allen’s (1964) famous theorem. A recent *Union Leader* story was revealing on this score:

“Atkinson builder Steven Lewis said some towns use zoning ‘to socially engineer communities to keep lower-income people out,’ such as requiring larger setbacks that

increase a house's costs. He said 'needless regulations' boost the price of a new home by at least 25 percent. 'Anything not directly related to health and safety is a tax on new-house construction,' Lewis said. . .

"Moe Archambault, a real estate broker who has marketed new homes in developments in Hooksett and Dunbarton, said things have changed over the past 15 years. Some towns now 'want granite curbing and underground utilities and sidewalks' - costs that get built into home prices. New homes, he said, are difficult to build for much less than \$300,000 today."⁴

We should therefore expect more strictly regulated municipalities to have higher-quality housing stock and less available for buyers at the bottom end of the market.

2.2.2 Nationwide Evidence

The economic literature finding that stricter zoning regulations raise housing costs is voluminous (Glaeser & Gyourko 2002; Glaeser, Gyourko, & Saks 2005a; Glaeser, Gyourko, & Saks 2005b; Quigley & Raphael 2005; Ihlanfeldt 2007; Molloy 2018). In a recent literature review, Molloy (2018) points out that while the relationship between zoning and *average* housing costs is well established, the effect of zoning on housing affordability at the lower end of the housing market is less well known, although the existing evidence is consistent with theory: regulation particularly reduces the affordability or available quantity of the bottom end of the housing market (Malpezzi & Green 1996; Charles 2013).⁵ This section of the paper presents some data visualizations to make the relationship clearer.

Figure 2 shows the relationship between each state's residential building restrictions in the mid-2000s, as measured by the Wharton Residential Land Use Regulatory Index (WRLURI) (Gyourko, Saiz, & Summers 2008), and 2007 cost of living, as measured by the Bureau of Economic Analysis' (BEA) state price parities.⁶ The WRLURI includes the number of entities whose approval is required for development to proceed, minimum lot sizes, typical approval process time, public and political involvement in the approval process, hard building permit caps, open space requirements, affordable housing requirements, and impact fees as measures of regulation.

⁴ *Union Leader New Hampshire Sunday News*, October 7, 2018, p. 3.

⁵ The effect of housing regulation on rents is smaller than that on sale prices but still positive (Malpezzi 1996; Green 1999; Xing, Hartzell, & Godschalk 2006).

⁶ The WRLURI comes from a survey of municipal and county officials from hundreds of jurisdictions conducted in 2005 and 2006. No more recent study has been conducted.

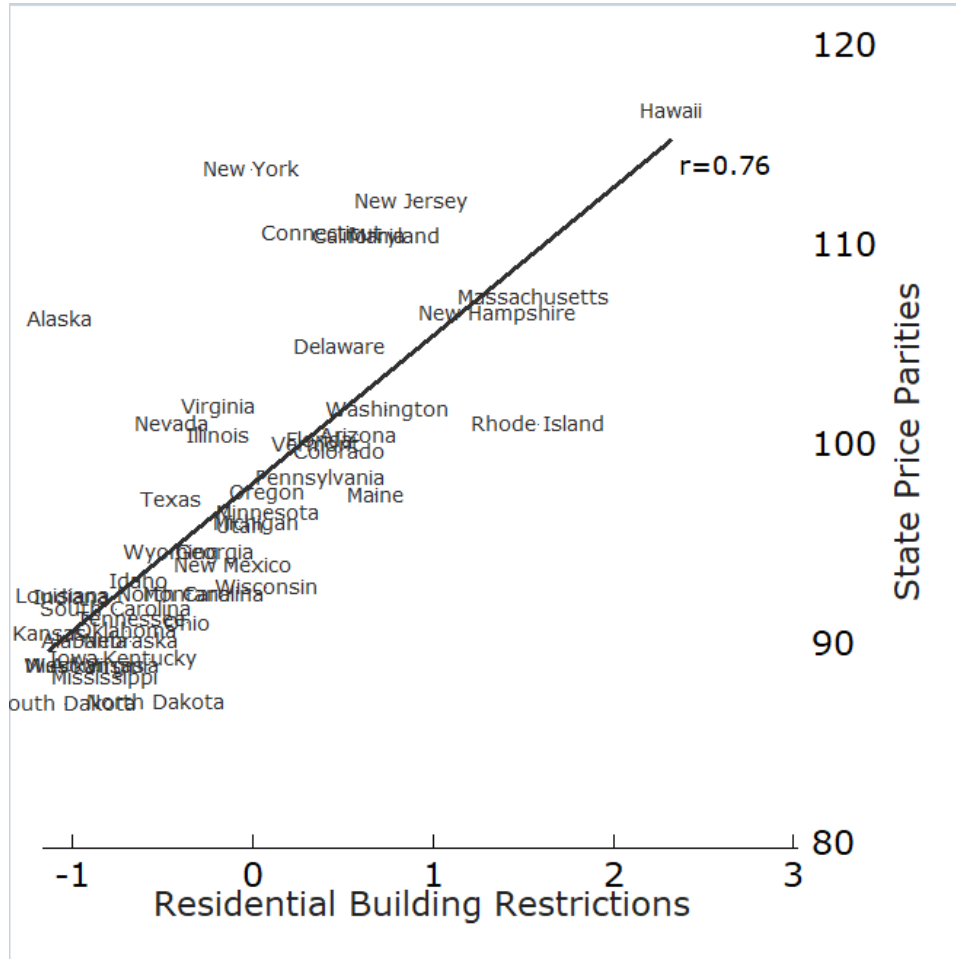


Figure 2: Zoning and Cost of Living in the 50 States

According to the WRLURI, New Hampshire was the fourth most regulated state for homebuilding and the eighth most expensive state in the country just over a decade ago.⁷ Hawaii, Rhode Island, Massachusetts, and New Jersey, in that order, were the other top-five states for housing regulation. Today, New Hampshire remains the eighth most expensive state, with a general cost of living 5.9 percent above the national average.⁸

The relationship between housing supply regulation and cost of living over all 50 states is extremely strong and positive. As we have seen, there are good reasons to believe that a causal effect of regulation on prices is responsible for this relationship, implying that by reducing zoning restrictions, New Hampshire could substantially cut the cost of living for thousands of families.

High cost of living should drive families out of state, particularly non-wealthy families. A simple bivariate correlation between cost of living and net migration would understate the harmful effects of residential building restrictions, because only jurisdictions that expect to experience growth have any incentive to adopt rent-seeking zoning, because only when demand is growing can homeowners get a windfall by limiting new housing. Still, states that have stricter homebuilding regulations experience net out-migration (Figure 3). The Y axis in Figure 3 represents the net domestic migration rate, that is, the number of people moving to a state from other states minus the number of people moving out of state to other states, between July 1, 2007 and July 1, 2014, divided by the number of residents as of July 1, 2007.

The fact that people are moving from more regulated to less regulated states is remarkable, since a past history of net migration encourages more regulation. The expense of living in regulated states suggests that these states are desirable locations; demand for housing is high. Net migration is negative because low- and average-income households make the decision to leave these costly states, while high-income households stay or even come in. The former group outnumbers the latter by a wide margin, making net out-migration consistent with high housing cost, a combination that would otherwise be paradoxical since it would suggest that less desirable states (to migrants) are more desirable (to housing demanders).

According to Wharton School researchers, New Hampshire was recently the fourth most regulated state for housing. We are also the eighth most expensive state in the

⁷ According to the most recent data from 2016, New Hampshire is still the eighth most expensive state in the country (excluding District of Columbia).

⁸ Bureau of Economic Analysis, "News Release: Real Personal Income for States and Metropolitan Areas, 2016," May 17, 2018, <https://bit.ly/2t1TRrZ>.

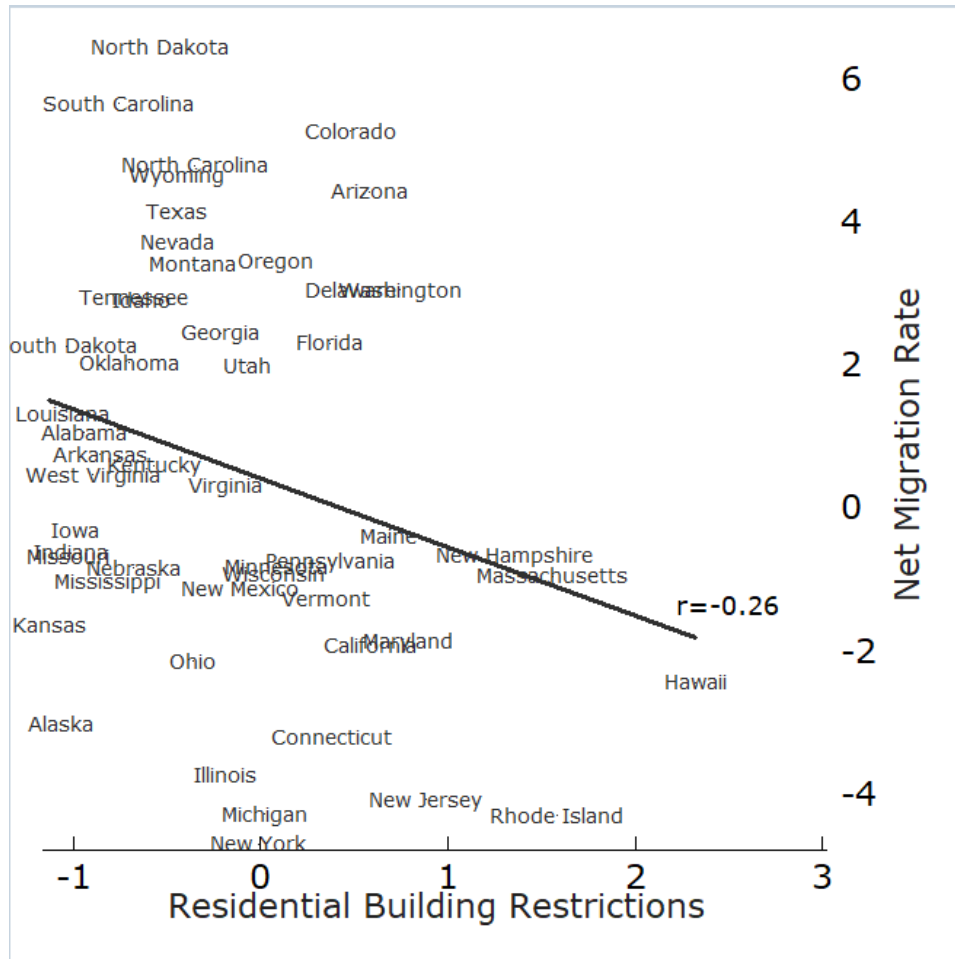


Figure 3: Zoning and Net Migration in the United States

Figure 3 also shows that there are a few high-amenity and business-friendly states without strict building regulation: these states have much higher net in-migration rates than would be expected given their level of housing regulation. Colorado, Arizona, Nevada, and Oregon are examples of states with high household-demanded amenities but not the highest levels of building regulation. In-migration to the Dakotas, the Carolinas, Wyoming, Delaware, and Texas is probably better explained by business environment than household-demanded amenities. Note that New Hampshire lost people during this time period, a stark reversal of the 1970s to 1990s, when the state was a major migration destination.

The true effect of zoning on net migration is far more negative than it appears in Figure 3 because of the reverse-causation problem already described. Saks (2008), Zabel (2012), and Ganong & Shoag (2017) all show that housing regulation deters Americans from moving to high-cost localities and states. Ruger & Sorens (2018) have investigated the causal effect of cost of living on net interstate migration using spatial multiple regression to control for other factors that drive migration. If we control for other features that make a state attractive to migrants, such as climate, crime rates, taxes, and capital stock, then we should get a less biased estimate of the true effect of cost of living on migration.⁹ Using the estimates from their state-to-state

⁹ We should *not* control for employment or income growth, because these variables are as much effects of migration as they are causes. In the language of statistics, they are endogenous.

migration models, Ruger and Sorens (2018: 139) find that a standard-deviation increase in state i 's cost of living relative to state j is associated with net out-migration from state i to state j of 0.026 percent of the average of the two state's populations in the pre-Great Recession period (2001 to 2008) and of 0.017 percent in the post-Great Recession period (2008 to 2017). We can

infer that reducing New Hampshire's zoning restrictiveness so as to cause cost of living to fall by a standard deviation, still leaving it higher than the average state's, could increase in-migration to New Hampshire over the next nine years by roughly $0.00017 * 325000000 = 55,250$ people.

Zoning restrictions drive non-wealthy households out of the area, which should in turn cause per capita income to rise among those residents that remain. Figure 4 shows the relationship between the WRLURI and per capita income across states in 2007, not adjusted for differences in cost of living across states.

States with more restrictions on homebuilding have higher per capita incomes, not because they are somehow more economically productive, but because they tend to drive non-wealthy households out of state. This evidence suggests that New Hampshire's high cost of living and tight zoning restrictions are particularly harmful to middle- and lower-income families.

Residential land-use regulations that raise cost of living may reduce immigration from other states.

2.2.3 Housing Supply Regulation, Class and Race Segregation, and Educational Inequality

Because housing supply restrictions drive out lower-income households, and the public school system in the United States is still largely based on geographically assigned districts, housing supply restrictions tend to force children from lower-income families into income- and race-segregated schools that tend to be lower-performing, limiting their opportunities for upward socioeconomic mobility. Neighborhood racial and class segregation indicators tend to be worse in metro areas with stricter residential zoning, especially minimum lot size regulations (Rothwell & Massey 2010; Rothwell 2011).

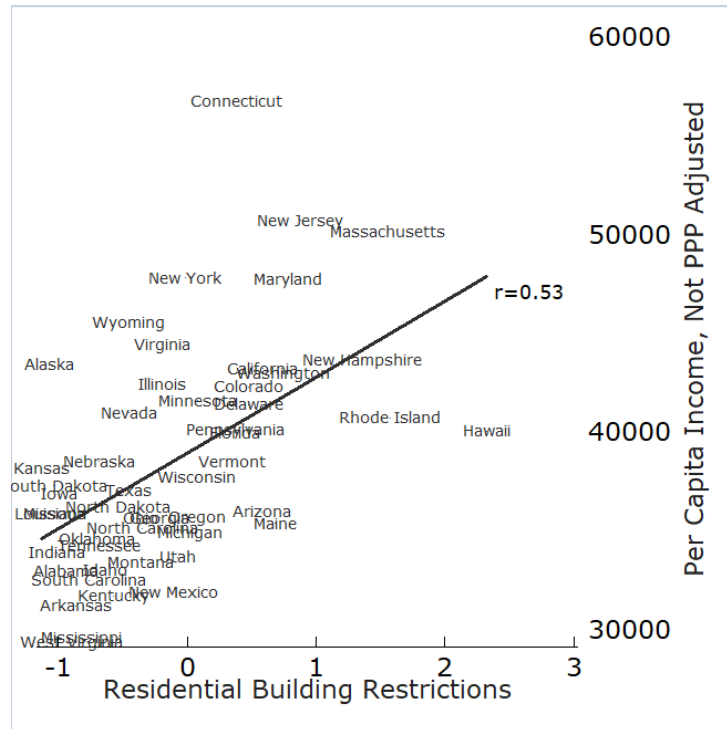


Figure 4: Zoning and Per Capita Income in the 50 States

In a study for the Brookings Institution, Rothwell (2012: 1) finds that “Northeastern metro areas with relatively high levels of economic segregation exhibit the highest school test-score gaps between low-income students and other students. Controlling for regional factors such as size, income inequality, and racial/ethnic diversity associated with school test-score gaps, Southern metro areas such as Washington and Raleigh and Western metros like Portland and Seattle stand out for having smaller-than-expected test score gaps between schools attended by low-income and middle/high-income students.” Moreover, “housing costs an average of 2.4 times as much, or nearly \$11,000 more per year, near a high-scoring public school than near a low-scoring public school,” and “[l]arge metro areas with the least restrictive zoning have housing cost gaps that are 40 to 63 percentage points lower than metro areas with the most exclusionary zoning.” Therefore, eliminating “exclusionary zoning in a metro area would, by reducing its housing cost gap, lower its school test-score gap by an estimated 4 to 7 percentiles.”

Eliminating exclusionary zoning in a metro area would reduce its housing cost gap and therefore its school test-score gap (Rothwell 2012).

2.3 The Politics of Rent-Seeking Zoning

Why are incumbent homeowners able to transfer wealth to themselves from landowners and new residents through growth-control zoning in some contexts but not others? Texas, the Carolinas, the Dakotas, Florida, Arizona, and Nevada have kept the door open to new migrants and made it easy to develop new housing stock, while New England, New Jersey, and California have not.

Fischel (2001) argues that the strength of the “homevoter” coalition at the local level determines the stringency of housing regulations. In rural contexts, the median voter owns

developable land and opposes rent-seeking zoning. Therefore, regulation either does not exist or has a light touch in rural areas. As already mentioned, there is also no rent-seeking incentive to restrict new housing in places where there is little demand for new housing (Saiz 2010). In large cities and in states where counties, not municipalities, make land-use decisions, homeowners prefer strict zoning laws, but they are usually unable to influence the local political process, unless state government has expressly empowered them to do so, as in California. But in growing suburban and small-town jurisdictions where municipalities make land-use decisions, the homevoter coalition has both the incentive and the power to seek restrictive zoning.

For Fischel, homevoter power has at least as many upsides as downsides. Homevoters closely monitor their local governments for performance because they know their property values depend in part on the efficiency of local government, and the decentralization of spending and taxation decisions to the municipal level allows would-be residents an ample menu of public service and tax burden mixes (Tiebout 1956). Precisely in those places where local government is most responsive to taxpayers and most efficiently provides its services, local governments are also most susceptible to exclusionary or rent-seeking zoning.

Fischel is a Dartmouth economics professor and has served on the Hanover zoning board. It is likely that the New Hampshire experience informed his development of the “homevoter hypothesis.” As the next section reveals, his hypotheses about the politics of zoning fit New Hampshire particularly well.

2.4 Conclusions from Prior Research

Strict residential building regulations reduce population growth in attractive areas and raise the cost of housing. As a result, they transfer wealth away from new residents, landowners, and builders toward owners of existing homes and may particularly reduce the supply of affordable housing for purchase. Further consequences include an increase in per capita income in more regulated jurisdictions, as lower-income households are more likely to move away to avoid housing costs, more class and racial segregation in neighborhoods, more educational disparity across jurisdictions, and significantly lower total GDP due to spatial misallocation of labor.

New Hampshire has some of the strictest residential building restrictions in the United States, particularly in the southeastern suburbs, White Mountains, parts of the Lakes Region, and the towns closest to Dartmouth College. These restrictions likely account for the state’s low population growth and more sluggish than usual economy since the early 2000s.

In the next section, I explore the extent to which residential building restrictions differ across jurisdictions in New Hampshire. These data can be used to explore which towns are suppressing affordable housing, with possible consequences for state policies to address the problem.

3 Residential Building Regulation in New Hampshire

3.1 Previous Measures of Land-Use Regulation

There have been several attempts to measure the extent to which regulations prevent homebuilding. The Glaeser and Gyourko (2002) approach is to compare actual house prices to the price of construction, referring to the difference as the “land-use tax.” The flaw in this approach is that surges in housing demand could cause prices to rise even if supply is not constrained by regulation, since it takes time to build houses. Nevertheless, the core intuition behind this approach makes sense and can be improved upon.

The WRLURI developed by Gyourko et al. (2008) is based on a survey of local officials. It asks them about the presence of several different land-use regulation tools, ranging from impact fees to minimum lot sizes and building permit caps, as well as the activism of homeowners on proposed developments in their area. One problem with this approach is that it crams together several factors that are not really regulations at all, such as local homeowner activism. Another is that it cannot possibly incorporate all the myriad tools local governments have at their disposal for slowing down or discouraging new housing. It is well known that, regardless of the planning regulations on the books, zoning boards have at their disposal a broad menu of stratagems to kill projects they dislike, such as mandating costly environmental and traffic impact studies. In New Hampshire, planning boards write the ordinances and zoning maps, and zoning boards grant variances, but zoning boards' attitudes toward new projects are not measurable. Furthermore, even the regulations themselves do not have straightforward interpretations without complex local knowledge. For instance, a one-acre minimum lot size in a rural zone might impede few projects, while the same restriction in an urban cluster could bring all new residential development to a halt.

Regardless of the planning regulations on the books, zoning boards have a broad menu of stratagems to kill projects they dislike.

Two economists have developed a new measure for the state level: the number of state appellate court decisions since 1920 containing the phrase “land use,” divided by state population (Ganong & Shoag 2017). The idea is that states with more regulation will have more lawsuits over land use. This is the noisiest measure of all for comparing states, but it has the virtue of being available over time, and the authors show that it correlates reasonably well with other measures of land-use regulation. It is worth mentioning that by this measure, New Hampshire is the fifth most regulated state in the country, as of 2017. Thus, both of the widely used measures of residential land-use restrictions show New Hampshire as one of the five most regulated states in the country.

Sorens (2018) introduced a new measure of residential building restrictions for New Hampshire. This measure does not rely on a dubious summary of on-the-books regulations but instead improves upon the Glaeser and Gyourko (2002) approach of measuring the “land-use tax” on the price of a home. The next section describes the approach and the data used.

3.2 Measuring Housing Supply Restrictions in New Hampshire

My approach develops an economic proxy for housing supply elasticity – the responsiveness of housing supply to price – for every local jurisdiction in New Hampshire with sufficient data. The first step in building this variable is to come up with an estimate of *excess price*, the extent to which a typical home sells for more in a town than it would elsewhere in the state. To do this, I collected nearly the whole population of single-family home sales that were publicly listed for the period from January 1, 1998 to July 29, 2021 from redfin.com, then limited the dataset to houses with at least one bedroom, one bathroom, 700 square feet, and a price of at least \$10,000.¹⁰

¹⁰ In addition, obviously miscoded observations with absurdly low square footage per bathroom or bedroom, absurdly large square footage or lot sizes, and square footage larger than lot size were dropped.

3.2.1 Excess House Price by Town

The strategy for coming up with an excess price measure by town works as follows. First, I build a statistical model of house sale price to get unbiased coefficient estimates on house features such as square footage and age. Then I use those coefficient estimates to get a predicted value for each house sale in the dataset. Then it is possible to calculate an excess price measure for each house, that is, the actual sale price minus the predicted sale price. Finally, the excess price is averaged over all house sales for each town and each period. There are three periods: 1998 to 2006, corresponding to a general rise in house prices, 2007 to 2012, corresponding to a general decline in house prices, and 2013 to 2021, another upswing in the house price cycle. (Multiple years are taken to ensure sufficient sample size of home sales even in small towns.) This is the measure of “excess price.” In essence, it measures how expensive houses are in town relative to the prices they should command given their characteristics.

Once the dataset of house sales was appropriately pared down, I built a log-linear statistical model of sale price:

$$\ln(\text{Price}_i) = \tau_t + \gamma_j + \beta_1 \ln(\text{Bedrooms}_i + 1) + \beta_2 \ln(\text{Bathrooms}_i + 1) + \beta_3 \ln(\text{SqFt}_i + 1) + \beta_4 \ln(\text{LotSize}_i + 1) + \beta_5 \ln(\text{Age}_i + 1) + \beta_6 \text{CurrentUseEligible}_i,$$

where i subscripts each sale, j each jurisdiction, and t each year, and τ and γ are vectors of coefficient estimates on matrices of year and jurisdiction dummies, respectively. *CurrentUseEligible* is a dummy variable for lot sizes greater than 10 acres, which can qualify for property tax reductions under New Hampshire law. The regression results are displayed in Appendix Table A2 (the town and year dummies are not reported).

Newer houses with more bathrooms, more square footage, bigger lot size, and current use eligibility sell for more, unsurprisingly. These coefficient estimates are used to create the excess prices for each house sale. Then the house sale excess prices are averaged by town and time period, as described above.

Figure 5 is a standard deviation map of excess price for all New Hampshire towns with data for the 2013–2021 period. Stratford, Northumberland, and Berlin in Coös County emerge as the most affordable towns in the state, while New Castle and Rye on the Seacoast are the least affordable. Other especially unaffordable towns are Portsmouth, Newington, and “the Hamptons” on the Seacoast, Hanover and Lyme in the Dartmouth College area, Moultonborough on Lake Winnepesaukee, and Hale’s Location, a tiny mountain township comprised mostly of a golf course community.

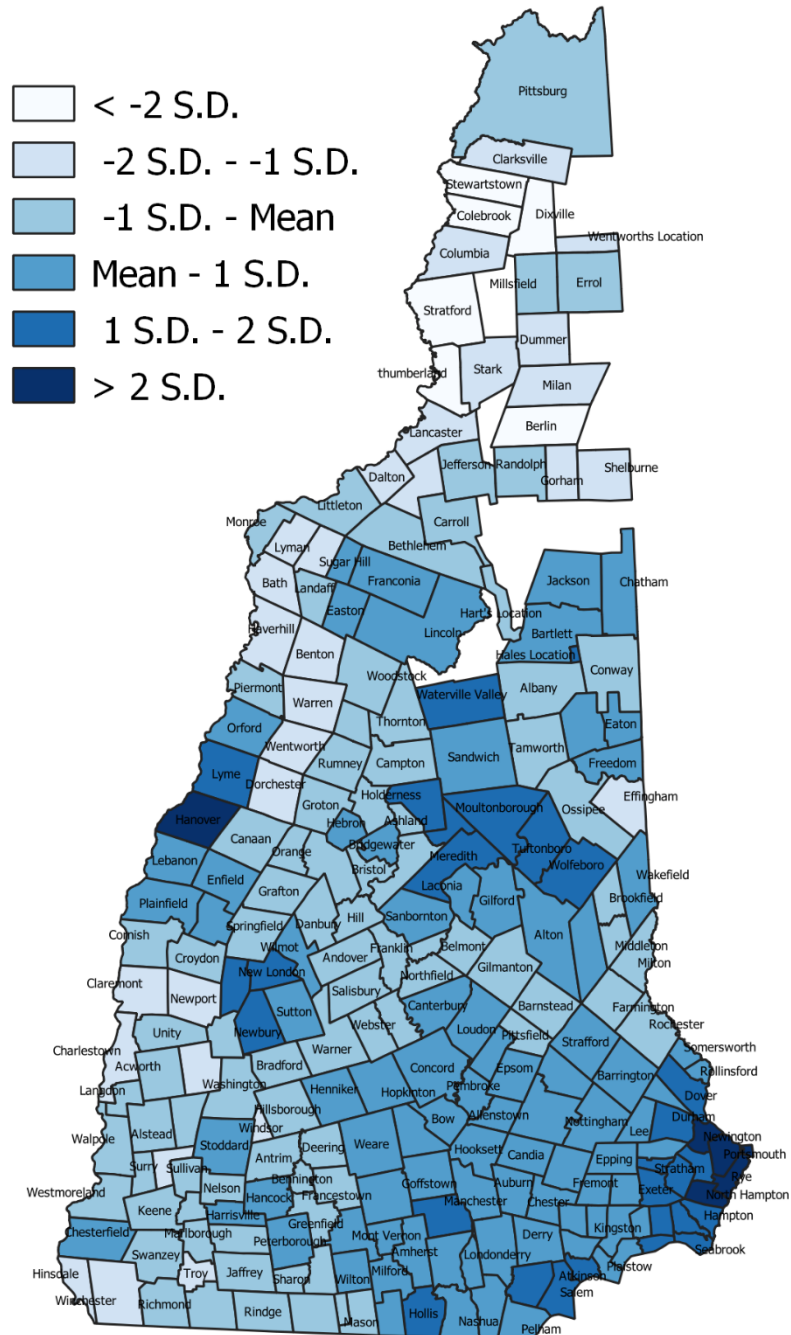


Figure 5: Standard Deviation Map of Excess Price by New Hampshire Town, 2013–2020

To get a handle on the numbers involved, consider that the average single-family house price during this period was \$305,318. The statistical model suggests that an equivalent house in Hanover would have sold for \$678,819. In Glaeser and Gyourko (2002) terms, that means the “land-use tax” on this house in Hanover amounts to 122%.

Another way to think about the data is to see what price the model predicts for an affordable-type home and then see what that type of home would have cost in particular towns. Consider, then, a house on a half-acre lot, built in 1950, with three bedrooms and one and a half bathrooms and 1,500 square feet, and sold in 2020. In towns like Keene, Warner, Conway, and

Rochester, all right around the statewide average, this house would have cost about $\exp(7.32 - 0.07 \times \ln 71 + 0.008 \times \ln 4 + 0.315 \times \ln 2.5 + 0.508 \times \ln 1501 + 0.035 \times \ln 21701 + 0.93) \cong \$223,000$. In Hanover this house would cost about \$496,000, in Portsmouth \$556,000. New Hampshire's two largest cities are more reasonable. This house would cost about \$283,000 in Manchester and about \$315,000 in Nashua.

In towns like Keene, Warner, Springfield, and Rochester, all right around the statewide average, this house would have cost about \$223,000. In Hanover this house would cost about \$496,000, in Portsmouth \$556,000.

These differences across localities partly reflect the impact of planning and zoning regulations and geographic limits to homebuilding like steep slopes and public lands, but they also reflect demand and unobserved characteristics of houses that vary systematically from place to place.

Manchester has been losing population to the suburbs since at least 1930, while Nashua has been growing. Moultonborough, Center Harbor, and Sunapee have many expensive lakefront homes, while Rye, New Castle, Portsmouth, and Hampton have oceanfront homes. Waterville Valley's population lives next to a major ski resort. These unobserved factors in the model help drive demand and higher prices.

To measure restrictions on housing supply, then, I try to net out the impact of differential demand growth across localities. The next section explains the method.

3.2.2 Housing Supply Elasticity by Town

As Figure 1 showed, housing price reflects the interaction of demand and supply. If demand is growing, prices rise provided housing supply is at all inelastic. Between two locations with equally rapid demand growth, actual quantity of housing supplied is lower and price is higher in the location with less elastic housing supply. Assuming that less elastic housing supply largely reflects the impact of planning and zoning regulations and decisions, we can estimate a locality's underlying attitude toward residential development by estimating both quality-adjusted price (performed in the previous section) and growth in quantity of housing supplied and demanded.

A rough estimate of quantity of housing supplied and demanded is population growth. Suppose a town's population is growing rapidly and its measured excess price is high. We should infer that the town's high excess price of housing might simply reflect, at least in part, strong growth in housing demand. To see how much of the impact is due to growth in housing demand, we should compare this town to others with similar population growth. Is excess price similarly high in other fast-growing towns?

We can try to estimate the "free-market" relationship between town population growth and excess price by looking specifically at those towns that lack zoning altogether. We know that housing development is less regulated in these towns, and so the statistical relationship between population growth and excess price in these towns is our best guess at the relationship that would prevail in the absence of planning and zoning regulations.

This relationship is expressed in a formula, which allows us to predict the free-market excess price that "should" prevail in each town given in its growth in quantity of housing demanded. To the extent that a town has a higher excess price than this predicted amount, we can infer that the difference is largely a result of inelastic housing supply caused by residential building restrictions.

Figure 6 is a scatter plot of average excess price by town from 2013 to 2021 against the log ratio of 2019 population to 2006 population. I used the 2006 to 2019 population growth

because 2006 was the peak of the last housing cycle, and pent-up demand from growth during the falling-prices period of 2007 to 2012 would likely show up in house prices once they started rising again due to the strong economy. Towns without zoning are highlighted, and the dashed line expresses the estimated statistical relationship between the two variables only for these towns. There is a modestly positive relationship between quantity demanded growth and excess price among these towns. The measure of housing regulation used in this study is given by each town's difference between its excess price and this line of best fit, with towns below the line of best fit set to zero (it is not possible, presumably, to have *negative* housing regulation). Unsurprisingly, no-zoning towns have low prices, even when they are growing rapidly.

Now imagine that Figure 6 is divided into four quadrants. In the upper left are towns with slow population growth from 2006 to 2019 and with higher than average excess price. In the bottom left are towns with slow growth and lower than average excess price. In the top right are towns with fast growth and high prices, and in the bottom right are towns with fast growth and low prices. We can be most confident that upper-left towns have barriers to residential building: they have high prices despite sluggish demand. We can be most confident that bottom-right towns have loose restrictions on residential building: they have low prices despite rapidly growing demand. But as it turns out, the relationship between demand and price is fairly flat, and so towns in the upper-right mostly have tight restrictions too, and towns in the bottom-left have mostly loose restrictions.

By extrapolating the line to all observed values of population growth, we can come up with a predicted value of excess price for every town under the counterfactual of no zoning, as well as a residual value. That residual is the index of *housing regulation*: it represents how much more expensive a town is than expected given both the characteristics of housing and its population growth. By performing this same exercise for excess price over the 1998 to 2006 period against population growth from 1997 to 2006, I can create an index of housing regulation for the last period of rising house prices as well.

Figure 7 maps housing regulation for New Hampshire localities for the last nine years. It is not much different from the map of excess price (Figure 5). The same geographic patterns

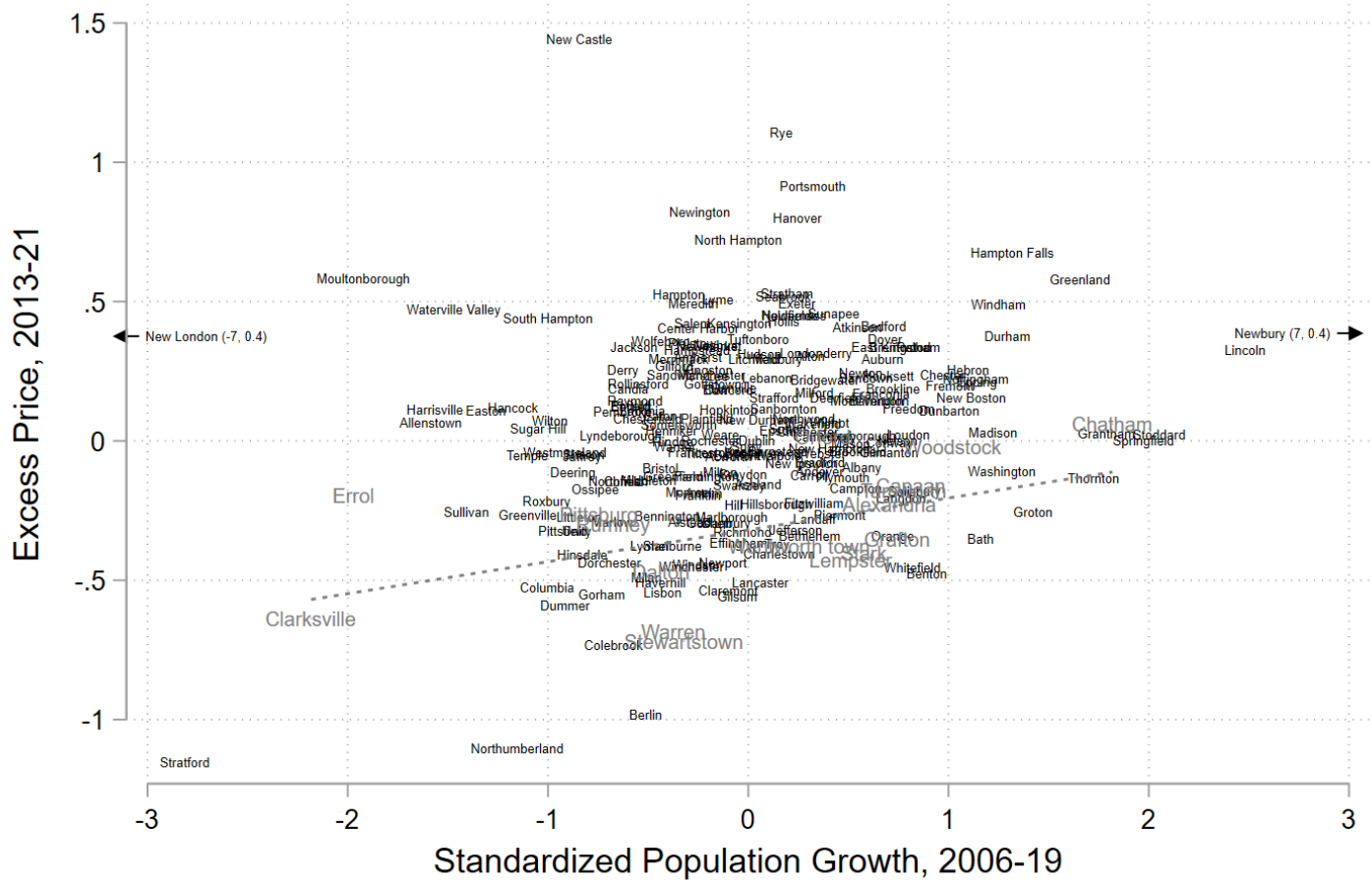


Figure 6: Excess Price and Population Growth by New Hampshire Town; Towns Without Zoning in Light Gray Typeface

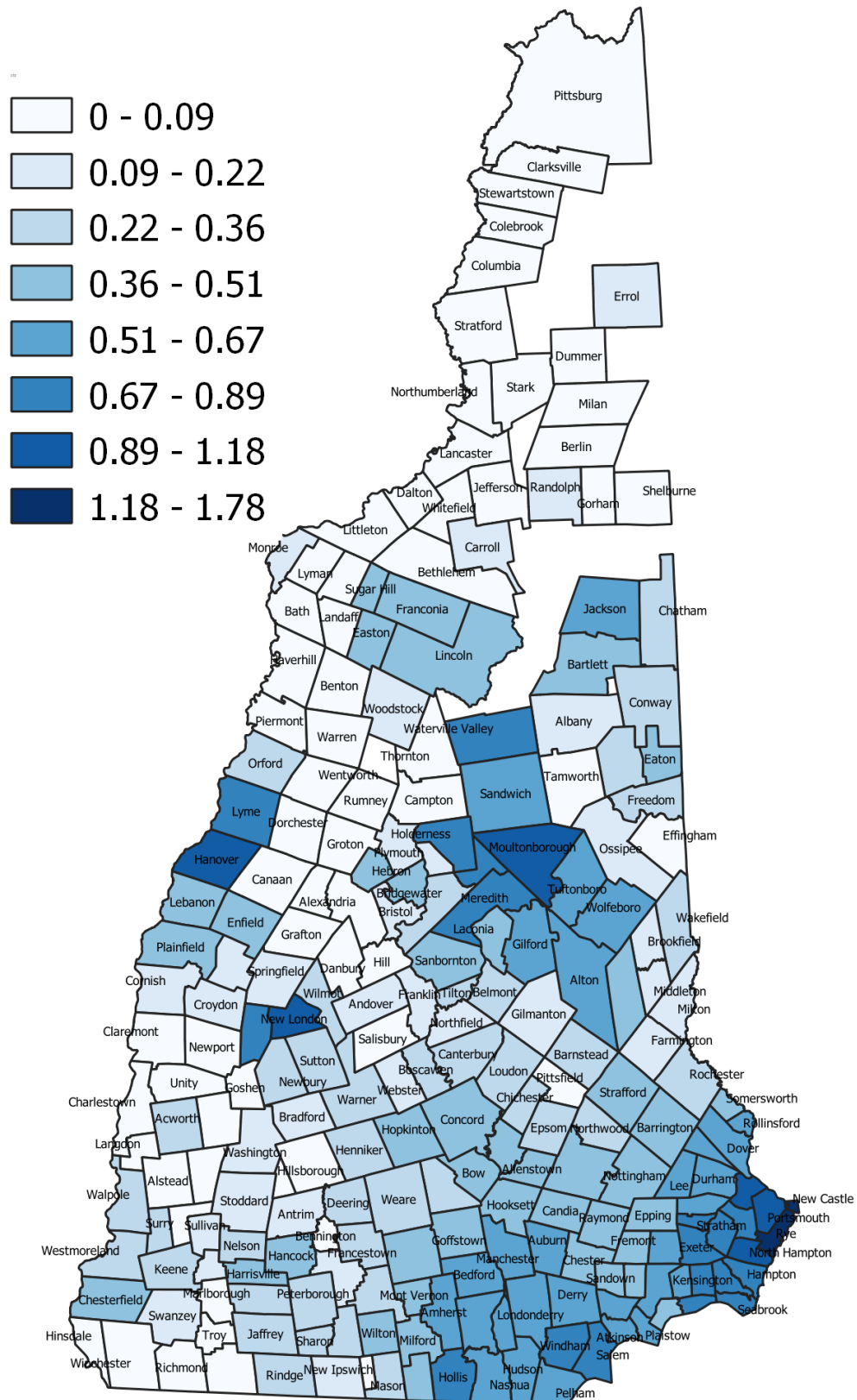


Figure 7: Map of Housing Regulation by New Hampshire Town, 2013–2021

observed in Figure 5 are apparent here. Regulation is most stringent in the southeast, Lakes Region, Dartmouth College area, and White Mountains. It is least stringent in the southwest, especially Sullivan County, and the north, especially Coös County. Note that regulation may be slightly overstated in those communities where there are

geographic barriers to building, such as steep slopes or extensive public land, especially the White Mountain National Forest. On the other hand, public land ownership could be considered a type of residential land-use restriction.

Appendix Table A1 shows all the jurisdictions in New Hampshire with data, displaying their housing regulation score, change in regulation since the 1997–2006 period, excess price, ratio of 2019 to 2006 population, and 2015 median household income from the Census Bureau’s American Community Survey. The “regulation change” measure should be taken with a grain of salt, especially for smaller communities that might have had only a few home sales in each period, because the figures could be sensitive to outliers.

The least regulated jurisdictions for homebuilding tend to be rural, but that is not universally the case. Towns like Andover, Salisbury, Springfield, Webster, Grafton, Canaan, and Grantham are desirable bedroom communities near employment centers, but have managed to accommodate population growth without escalating house prices. Tamworth in the Lakes Region and Fitzwilliam in the Monadnock Region each have more than 2,000 people, are growing significantly, and have maintained less regulation than their neighbors. The suburbs of Manchester and Nashua tend to be pricey and regulated, but even here we can point to Weare and Dunbarton, and to a lesser extent Hooksett and Milford, as communities that have accommodated more housing. In Rockingham County, Northwood is by some distance the least regulated community. It maintains reasonable affordability compared to the rest of the state while growing.

Among municipalities that are more densely populated than the state average, Hinsdale, Claremont, Greenville, and Franklin are the least regulated for housing. These are generally considered “blue-collar” towns. After all, places that do not expect strong housing demand have no reason to try to limit new housing supply. But some relatively well-to-do, densely populated communities, like Belmont, Pembroke, and Hooksett, have still been relatively open to housing, compared to the cities of Concord, Manchester, and Nashua, to say nothing of places like Portsmouth, Hanover, Exeter, Salem, Windham, Bedford, and Hollis.

In the next section, I investigate the causes and consequences of residential building restrictions in New Hampshire.

3.3 The Causes and Consequences of Residential Building Restrictions in New Hampshire

3.3.1 Income Segregation

As a cursory perusal of Table A1 reveals that towns with stricter housing regulations have higher median household income. This correlation fits with the prior economic research that has found a relationship between zoning and income and racial segregation (Rothwell & Massey 2010; Rothwell 2011).

But correlation does not necessarily imply causation. Does regulation change household income, or does household income change regulation? Perhaps richer towns are more likely to adopt new planning and zoning codes to keep their towns the way they are.

To investigate causation, I looked at how regulation in the earliest period correlates with *change* in household income, and how household income in the earliest period correlates with change in regulation.

Taking the former relationship first, Figure 8 plots change in median household income from 2000 to 2015 against regulation in the 1997 to 2006 period. The relationship is strong and positive. The regression coefficient is highly statistically significant.

By comparison, Figure 9 plots change in regulation against initial median household income. This relationship is weaker but still discernible, and the weakness of the relationship may have something to do with the noise in the “regulation change” variable already discussed. It is a statistically significant relationship once municipalities are weighted by population to deal with small-population outliers.

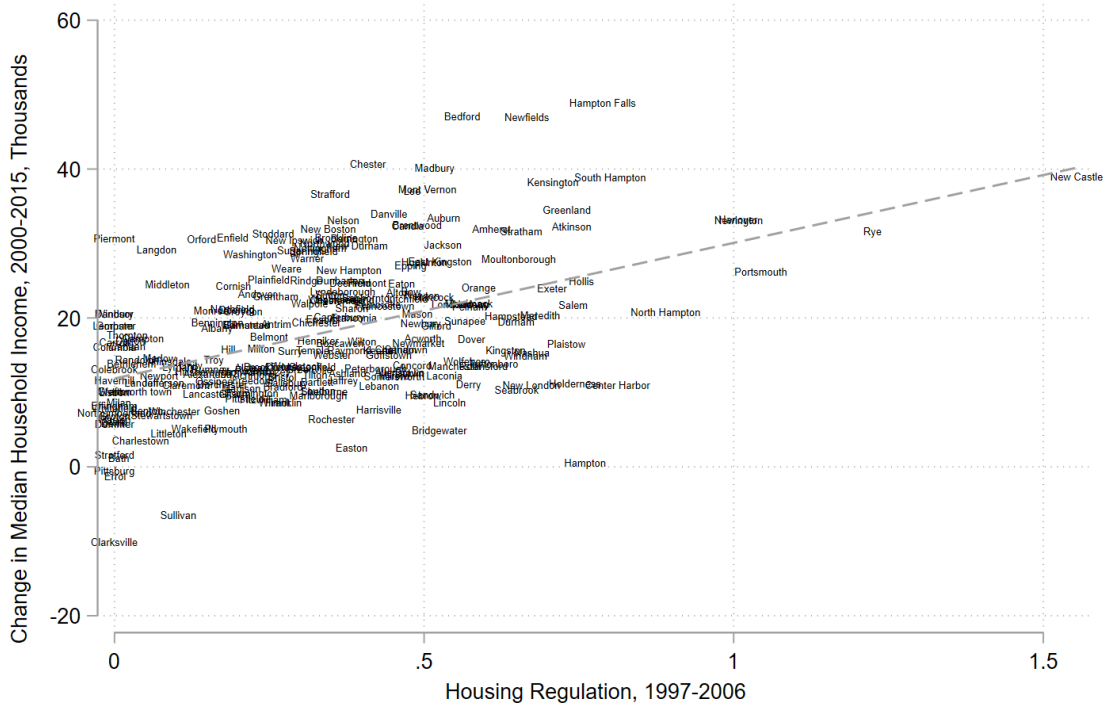


Figure 8: Housing Regulation and Change in Median Household Income by Town

These findings are consistent with the hypothesis that richer towns are more likely to tighten zoning regulations but especially confirm that tight zoning regulations drive out lower-income households, making a town appear richer.

A more sophisticated approach to this question is multiple regression analysis controlling for other factors that may influence change in household income. The first factor we may wish to control for is the previous level of median household income. If towns are already in the process of segregating by income, then towns that are richer in 2000 will tend to become even richer over the next 15 years, while towns that are poorer in 2000 will tend to become even poorer over the next 15 years. We may also want to control for population density in a town and in its neighbors. If richer residents tend to flee central cities for suburbs, perhaps own-town population density would be negatively associated with income change, while nearby-town density would be positively associated with income change. A final factor we may want to control for is politics. Perhaps more Republican or more Democratic towns tend to change in income due, for instance, to local policies that prevail in different areas, such as property taxes and school spending.

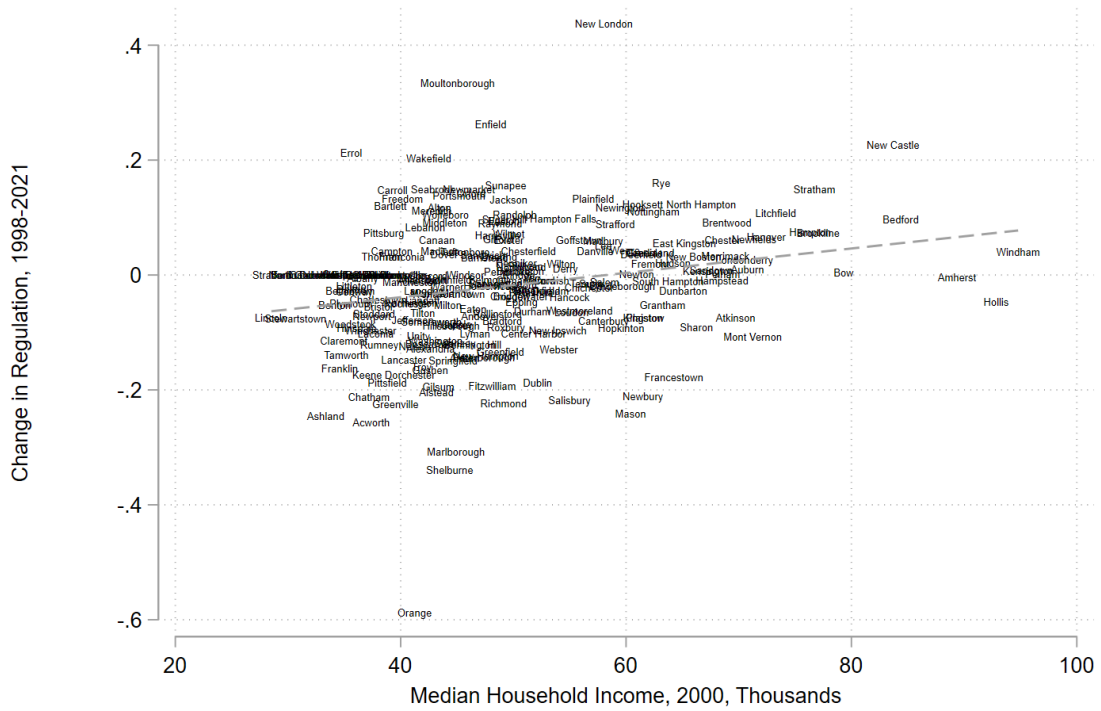


Figure 9: Median Household Income and Housing Regulation Change by Town

The multiple regression model of change in household income therefore looks like this:

$$\Delta Income_{15-00} = \alpha + \beta_1 Income_{00} + \beta_2 Regulation_{9706} + \beta_3 Density_{00} + B_4 \mathbf{W} Density_{00} + \beta_5 Republican_{0002},$$

where \mathbf{W} is a row-standardized, inverse-distance-weighted spatial weights matrix with a 20-mile cutoff.¹¹ *Republican* represents the towns' average percentage of the vote for Republican candidates for Governor and President in 2000 and U.S. Senate in 2002 (there was no U.S. Senate race in 2000). The dependent variable is measured in thousands. The estimates presented below are derived from *spatial error models*, in which the residuals are assumed to be spatially dependent.

Appendix Table A3 shows results of multiple regressions with different sets of control variables. No matter what variables are controlled for, initial housing regulation remains strongly statistically significant in a model of change in median household income by town. The coefficient estimate from the model with full controls implies that a standard-deviation increase in regulation is associated with a more than \$2,000 increase in median household income over the next 15 years.

¹¹ Intuitively, this means that $\mathbf{W}Density$ is a weighted average of nearby towns' population densities, where the weights are each town's distance to the "own town," measured as distance between geographic centers ("centroids"), and towns with centroids greater than 20 miles away are not included.

Meanwhile, richer towns continue to get richer. For every additional \$1,000 in median household income in 2000 (“Lag income” in the table), a town gained \$293 in additional median household income over the next 15 years. Land-use regulations appear to be exacerbating income segregation by driving low- and middle-income households out of richer towns.

In the next section, I turn to an investigation of the causes of home-building regulations in New Hampshire towns. If it is not simply a matter of richer towns more, what is going on? This analysis us gain a better understanding of how to excessive regulation at the local level.

3.3.2 The Politics of Land-Use in New Hampshire

3.3.2.a Partisanship and Land-Use

Land-use regulations appear to be exacerbating income segregation by driving low- and middle-income households out of richer towns.

regulating could help fight

Regulation

Regulation

One of the first hypotheses we might investigate is the effect of politics in the partisan sense on land-use regulation. Are Republican or Democratic towns more likely to intensify restrictions on home-building?

wish to

Figure 10 shows the relationship between Republican statewide candidates’ vote share in the 2016 presidential election year and housing regulation in the most recent period. It is a noisy but obvious, negative correlation.

Still, correlation does not necessarily imply causation. Did strict zoning regulations affect which party’s voters tend to live in a municipality, or did partisanship drive the adoption of zoning regulations?

We cannot run an experiment to answer this question, but we can look at the timing of changes in zoning restrictiveness and partisan voting to see which variable is more likely to drive the other. Figure 11 shows the relationship between Republican vote share in the early 2000s and subsequent *change* in zoning restrictiveness, while Figure 12 shows the relationship between zoning restrictiveness in the late 1990s and early 2000s and subsequent *change* in Republican voting.

There appears to be slight, positive relationship between Republican partisanship early on and subsequent tightening of regulation, but it is weak and noisy. There is a much stronger relationship between initial zoning restrictiveness and subsequent shifts toward Democratic voting, consistent with prior research using more sophisticated statistical techniques that finds that regulation tends to make a town more Democratic (Sorens 2018). (The explanation is that non-college-educated voters, who are more Republican, disproportionately move away from more regulated locales.)

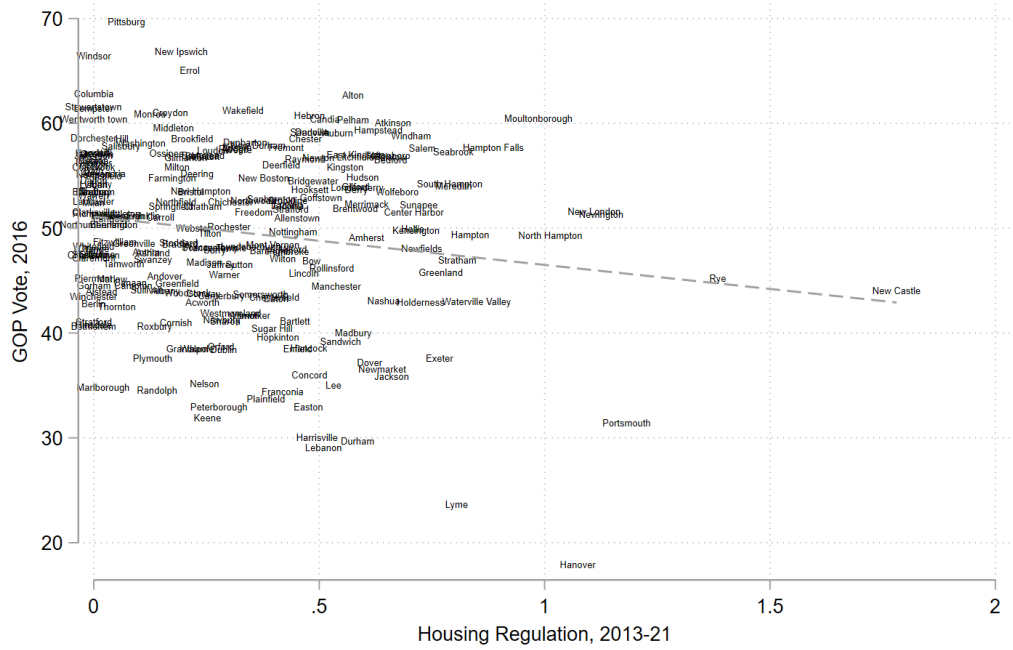


Figure 10: Present-Day Housing Regulation and Republican Voting

3.3.2.b Density and Land-Use Regulation

Previous research suggests that restrictive zoning laws are most likely in suburban areas dominated by a homevoter coalition (Fischel 2001). Center cities and, especially, rural areas are less likely to have restrictive regulation, the former because of developer influence and the latter because of landowner influence.

How does this hypothesis hold up in the New Hampshire context? Some of the towns that implemented tighter regulations over the 2000s and 2010s were quite small and rural (Carroll, Randolph, Wakefield), but this is misleading since municipalities with fewer home sales are also more subject to outlier problems in estimating excess price and regulatory stringency. Otherwise, the list of towns tightening regulation over the last two decades does indeed feature many municipalities of “middling” population density: Enfield, Portsmouth, Rye, Newmarket, Stratham, and Seabrook, for example.

Since the regulation change variable is noisier than the regulation level variables, it may be better to approach the question first using the latter. Figure 13 plots the *level* of present-day housing regulation against population density. Instead of a linear fit line, the figure includes a lowess local regression line. The expected upside-down U-shaped curve does appear in the data, but there is a lot of noise. Part of the problem is that New Hampshire has only two jurisdictions with enough density to qualify as “center cities” in the broader U.S. context.

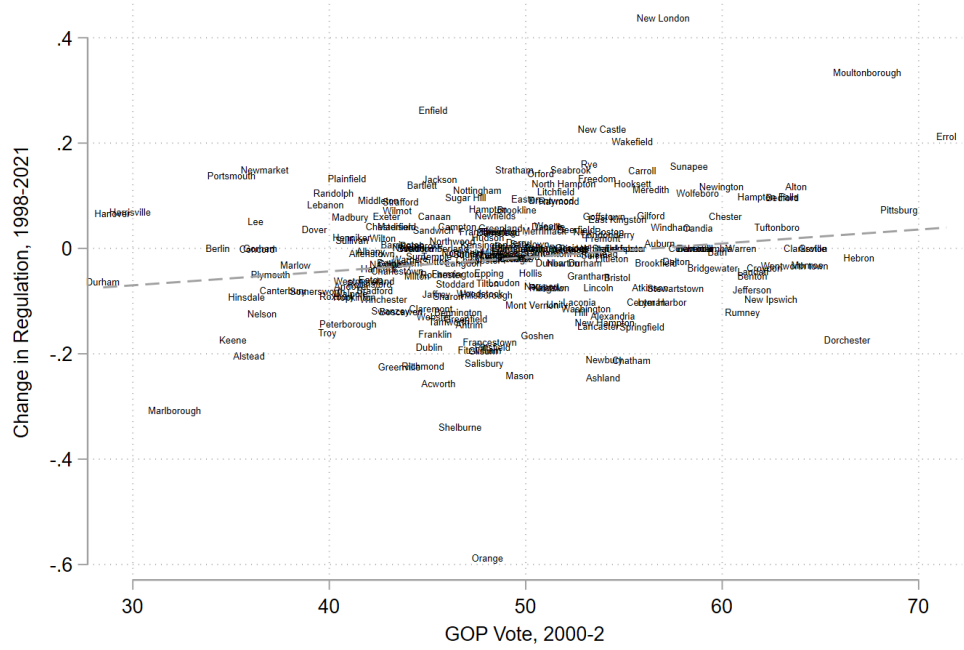


Figure 11: Partisanship and Housing Regulation Change by Town

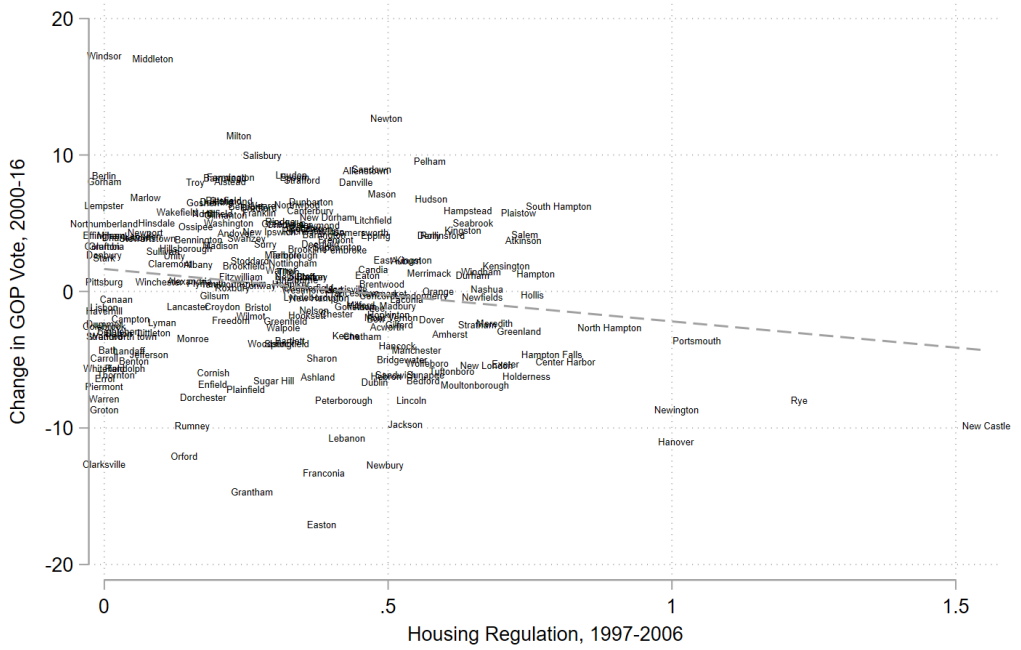


Figure 12: Housing Regulation and Partisan Change

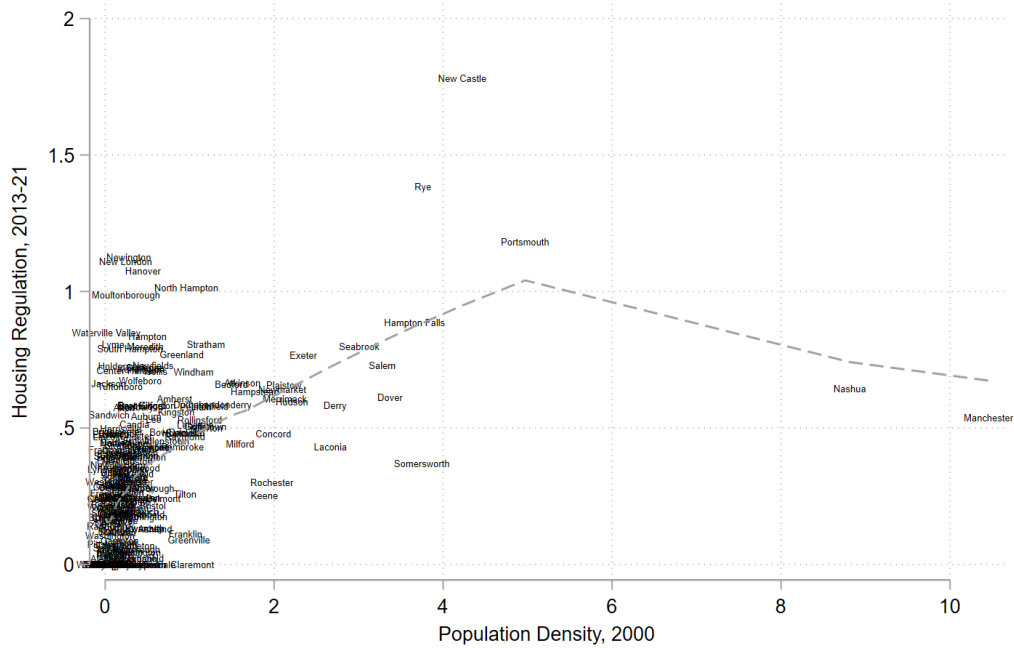


Figure 13: Population Density and Housing Regulation by Town

We can dig further into the hypothesis that density encourages stricter zoning up to a medium level and then discourages it thereafter by looking at the history of zoning in New Hampshire.

New Hampshire first authorized municipalities to zone in a 1926 statute. Three cities immediately adopted zoning: Portsmouth, Manchester, and Keene. Some years later, Concord, Nashua, and Hanover followed. Seventeen municipalities in the dataset still have not adopted zoning. Figure 14 plots the distribution of New Hampshire municipalities by the date when they adopted zoning, in years since 1926.

Interestingly, the biggest wave of new zoning adoptions occurred between 1966 and 1976. Fischel (2016) has noted a similar phenomenon around the United States. In his view, a wave of environmental concern during this period encouraged local governments to try to control population growth through land-use regulation. Prior to this time, zoning was more about separating commercial, industrial, and residential uses. It is easy to see how greater population density would create demand for that kind of zoning. But starting in the late 1960s, local zoning ordinances seemed to be designed to limit home-building. Exclusionary zoning became particularly popular in the suburbs.

Are zoning ordinances adopted in the 1960s and 1970s particularly restrictive of new housing? Figure 15 plots present-day housing regulation against years until zoning was adopted. (Municipalities without zoning are given an arbitrary value of 110 on “years until zoning.”) It turns out that the earlier a municipality adopted zoning, the higher on average is its regulation of new housing today. However, there is a kink in the lowest curve around 1955, indicating that municipalities that resisted adopting zoning until well after 1955 are increasingly less regulated for new housing today.

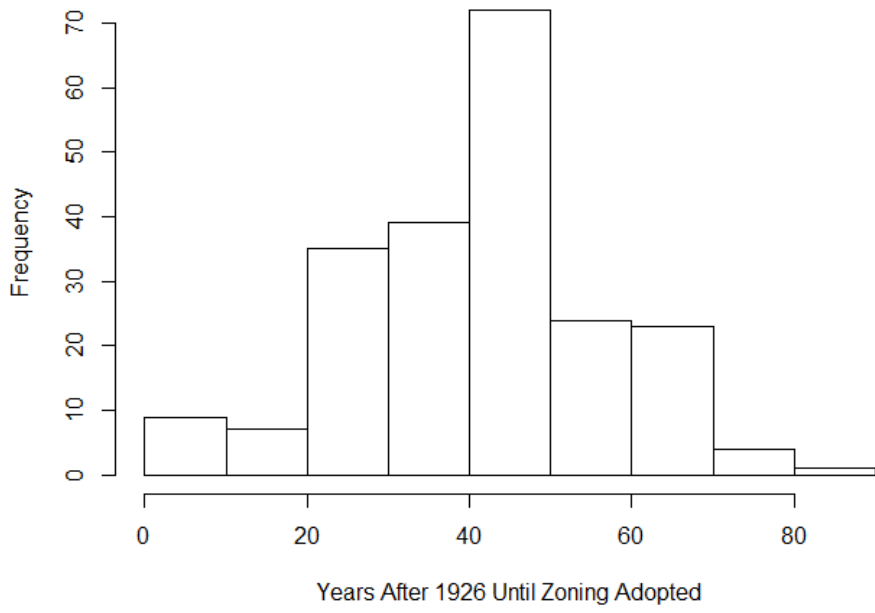


Figure 14: Distribution of Municipalities on Years Until Zoning

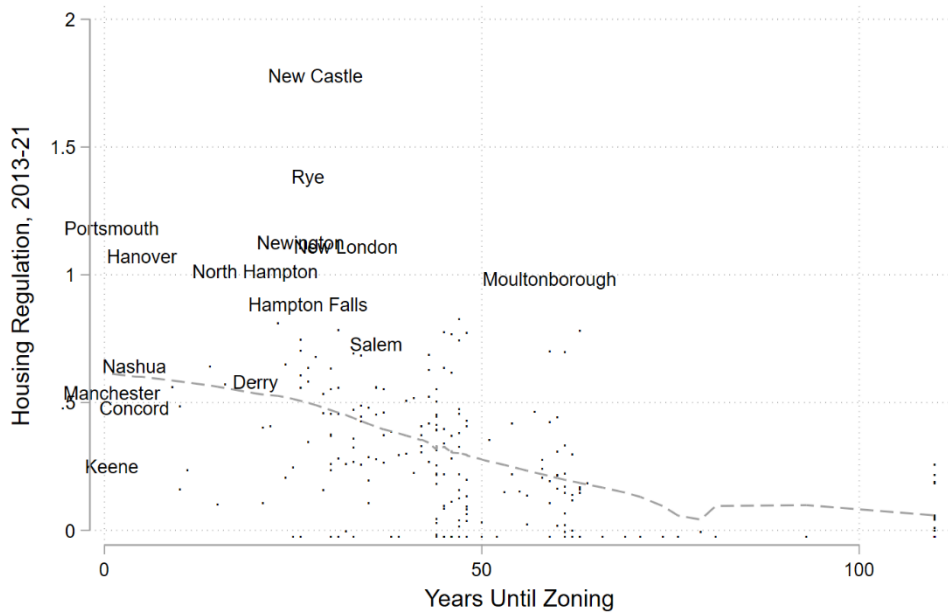


Figure 15: Years Until Zoning and Present-Day Housing Regulation

Did early population density trigger the adoption of zoning ordinances and, in turn, greater risk for growth-control zoning in later decades? To investigate this possibility, I plot “years until zoning” against population density in 1930 in Figure 16.

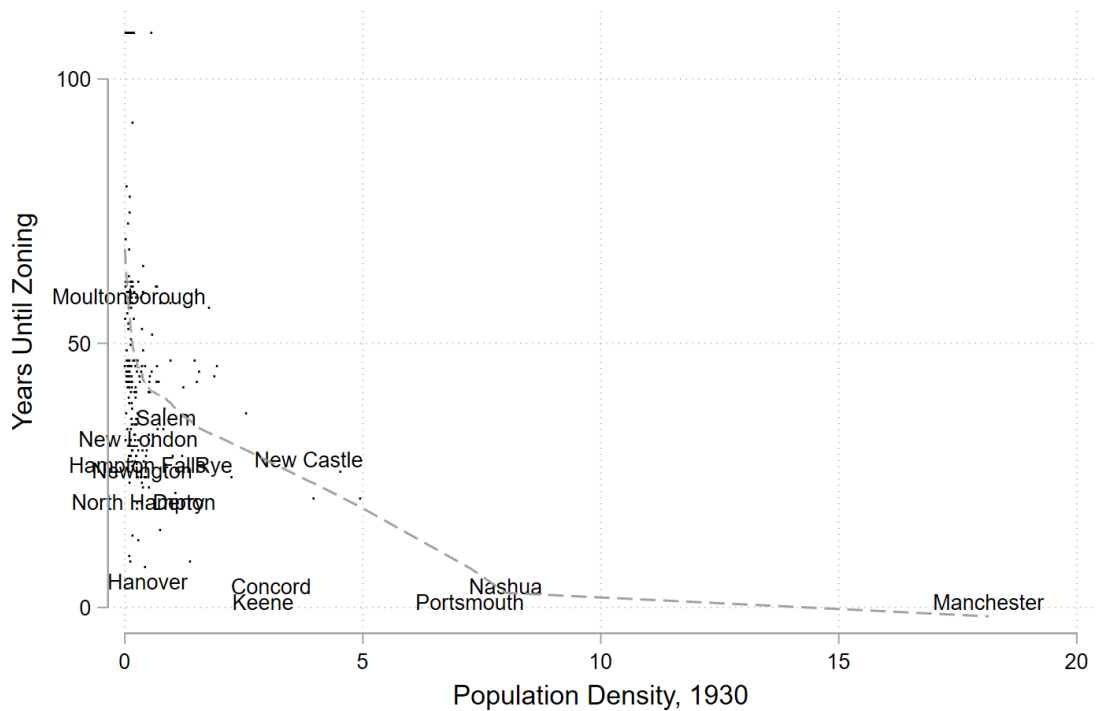


Figure 16: Early Population Density and Zoning Adoption

The densest municipalities in New Hampshire did indeed entirely adopt zoning within the first 25 years of its availability, but quite a few rural towns did so as well. It seems that dealing with congestion may have been an important reason to adopt zoning in the first place, but not the only reason – and many of the less dense communities that adopted zoning enthusiastically are now using it to limit housing (Hanover, North Hampton, Hampton Falls, Newington, and so on). Many of these less-dense towns that now restrict growth are geographically close to bigger employment centers and thus have the potential to grow more if they were to deregulate home-building. Exclusionary zoning is more common in suburbs than in remote rural areas.

3.3.2.c The Land-Use Regulation Arms Race

Another hypothesis suggested by the literature is that a history of population growth due to in-migration incentivizes housing regulation as a way of creating rents for homeowners. I investigate this hypothesis by looking at how each town’s history of population growth during the booming 1970s and 1980s correlates with regulation today in a multiple regression model.

Finally, it is important to consider the role of spatial spillovers. Perhaps towns are more likely to tighten building regulations when nearby towns have done the same. The idea here is that towns are in a “Prisoner’s Dilemma” when it comes to land-use regulation: they are all better off with looser regulations, but no town wants to be the one with the loosest regulation, because then it will attract all the growth in the region. Acting individually, each town will adopt stricter than optimal regulation. If this is the case, then New Hampshire towns could be better off giving an external actor like state government or regional commissions the power to compel towns to stop the zoning arms race.

To sum up, I use multiple regression analysis to estimate how present-day home-building restrictions and recent *change* in restrictiveness at the town level correlate with prior partisanship, population density (testing an upside-down U-shaped relationship), nearby towns’ density, historical adoption of zoning, historical population growth, and nearby towns’ regulatory policies. While the multiple regression approach cannot fully nail down causality, the pattern of results could make some causal interpretations more plausible than others.

Appendix Table A4 presents estimates for two models. The first has the level of regulation in 2013–2021 as the dependent variable and a spatial autoregressive parameter *lambda* (intuitively, the weighted average of nearby towns’

regulation scores). The second has change in regulation as the dependent variable and includes the starting level of regulation as one of the independent variables and a spatial error parameter ρ .¹²

The results strongly support the “arms race” or “Prisoner’s Dilemma” model of local housing restriction in New Hampshire. Nearby towns’ regulatory stringency is strongly correlated with own-town regulatory stringency, and nearby towns’ regulatory stringency in 1998 to 2006 is strongly correlated with own-town increase in regulatory stringency from the turn of the millennium to the present day.

Next, the results suggest that towns with a recent history of growth are more likely to tighten regulations, as the rent-seeking zoning model would predict. Towns with more historical growth still have less housing restriction today, but that finding could reflect reverse causation: having few restrictions on building in the 1970s and 1980s probably allowed for more growth, and those towns on average still have less building restriction today than those that were already restricted in the 1970s.

Surprisingly, the coefficient on initial regulation in model (2) suggests that towns that start out with more regulation continue to increase regulation more than towns that start out with less regulation, even controlling for everything else. Presumably this tendency reflects some underlying anti-growth orientations that some towns possess that drive them to continue to ratchet regulation higher.

Finally, there is not much support for an effect of partisanship on zoning change, and the results on population density and historical zoning adoption are weak or inconsistent.

In the end, it is fair to say we know more about the consequences of residential building restrictions in New Hampshire than the causes. It certainly seems that the places where people would prefer to move tend to enact restrictions. It is no surprise that jurisdictions that fall within the Greater Boston metropolitan area are more regulated, while remote Coös County is less regulated. Most importantly for public policy, New Hampshire municipalities seem to be trapped in an arms race wherein their regulatory moves tend to spread to nearby towns.

4 Conclusions

4.1 Findings

This study has reviewed the nationwide and evidence on the causes and consequences of building homes. In much of the country, including local jurisdictions have used planning, zoning, use codes and decisions to limit new housing, incumbent homeowners, and drive out lower-

New Hampshire towns with a recent history of growth are more likely to tighten regulations.

New Hampshire legal restrictions on New Hampshire, building, and land transfer wealth to income households.

Nationwide evidence strongly suggests that residential land-use regulation raises the cost of housing, especially house prices, raises per capita and median income indicators by driving out lower-income households, increases income and racial segregation, limits educational opportunity, and reduces gross domestic product.

The New Hampshire evidence is consistent with the nationwide evidence. The more populous areas of New Hampshire have some of the strictest regulations on building houses in the country, and these regulations have choked off the population growth and economic dynamism that characterized the state in the 1960s, 1970s, and 1980s. Today, New Hampshire’s cost of living is one of the highest in the country, and net migration is only slightly positive.

Housing regulation is largely a local responsibility in New Hampshire and accordingly varies substantially over the state’s territory. Towns and cities with more regulation of housing supply see their median incomes rise faster but their populations grow less quickly, implying that they are repelling middle- and lower-income families. In general, the household income gap between rich and poor towns is rising in New Hampshire, and it is plausible that housing regulation is responsible for this phenomenon.

Historically, towns that adopted zoning earlier, perhaps to manage the challenges of density, found it easier to turn their regulatory tools toward restricting home-building. In general, places where people tended to move during New Hampshire’s boom decades have been the ones that try most to put new limits on construction. The most productive

¹² For this estimation, two towns with missing data on initial-period regulation are assumed to have had no change in regulation between initial and final periods.

and amenity-rich areas of the state – Boston border towns and the Seacoast, the Dartmouth College area, the Lake Sunapee area, the Lake Winnepesaukee area, and White Mountain ski towns – have tightened regulations the most recently. But when one town tightens its regulations, its neighbors tend to follow suit, perhaps to avoid having to take on more of the growth that occurs in the region.

4.2 Policy Implications

The negative consequences of the current regulation in New Hampshire suggest a need for local and state levels. Restrictive planning and potentially threaten the rights and interests of:

- Landowners in the regulating town, who property rights as rules are tightened;
- Employers and the employees they are to the regulating town, who have to salaries to compensate for the higher cost
- Residents in nearby towns, who may regulations in response to population regulating town;
- New Hampshire’s construction industry, which is called upon to build fewer homes due to regulations;
- People who suffer from respiratory illnesses due to air pollution caused by the longer commutes necessitated by the need to find affordable housing in far-away locations;
- Children who suffer from educational inequalities and social immobility due to being locked out of better-performing school districts with expensive housing.

New Hampshire’s strict land-use regulations harm landowners, employers, new employees, towns nearby especially strict towns, home builders, people who suffer from air pollution, and children from families of modest income.

level of housing policy action at the zoning decisions

lose valuable

seeking to recruit demand higher of living; tighten their own spillovers from the

Local voters have the power to make the necessary changes to allow for more opportunity and growth in their communities. They can elect planning boards that allow for more single-family homes on small lots, more mixed-use zoning, more multifamily development, and taller buildings, especially in neighborhoods that are already dense. They can abolish minimum parking requirements and other barriers to dense, valuable development in urban cores. They can elect zoning boards that are willing to grant variances whenever public health or safety is not at issue. Externalities like traffic impacts can easily be addressed through impact fees.

When local governments overregulate, should the state government get involved?

It is unlikely that the General Court would consider doing away with local control of planning and zoning, and some degree of local control may be desirable for purposes of “good housekeeping” and fiscal zoning. To date, the legislature has largely been content with modest fixes, such as a 2017 law requiring towns to authorize accessory dwelling units and a housing appeals board to expedite resolution of land-use disputes.

Policy Recommendations

Fischel (1985; 2015) recommends reforms that align homevoters' incentives toward rational development. One example is a regulatory takings compensation requirement. Enacted at the state level, this law would require local governments to compensate landowners when a new regulation reduces the value of their property by a specified amount, such as 30 percent. Arizona and Florida have enacted two of the most far-reaching regulatory takings compensation laws in the country, and they have helped keep regulation in check despite large immigration over the years. The most attractive feature of a regulatory takings compensation law is that it would put a price on new regulation, allowing towns to enact but incentivizing them to adopt only regulations that essentially "pay their own way" by creating more value for the town than the required compensation.

In a similar spirit, another reform that could obtain some of the benefits of regional government while respecting local control would be to allow municipalities to form binding regional compacts for planning and zoning. At present, professional regional planning commissions simply play an advisory role for local governments. Elected regional planning and zoning boards might be less sensitive to rent-seeking pressure and they could help towns escape the regulatory arms race. Since joining a regional compact would be voluntary, these compacts would be fully consistent with the ideal of "local control."

Some housing advocates have argued for making planning and zoning *more* local than the town (Robare 2018). Neighborhood or street-by-street zoning might open a range of possibilities and approaches, creating more diversity, innovation, and beneficial competition. Combining these last two suggestions could result in a regime in which some planning and zoning functions are delegated higher and some lower than the municipal level.

Alternatively, the legislature could continue with the ADU-law approach and directly intervene to protect property owners from the most egregious property rights violations. For instance, the state could ban towns from implementing hard building permit caps or repeal minimum lot size requirements within compact urban areas. The latter reform could also alleviate the air pollution problem caused by lengthy commutes into commercial districts.

Educational inequality has alternative remedies, such as school choice. Allowing open enrollment across public school districts for all New Hampshire children would be one way of addressing one of the negative consequences of expensive housing in higher-quality school districts. But this solution addresses only one of the negative consequences of exclusionary zoning rather than tackling the problem at the source.

Finally, we need more research on how the provisions of local zoning ordinances and maps either strangle or allow new housing that is adequate to meet the needs of workers. This research could then be used to point to specific changes in ordinances and maps that could help alleviate the housing crisis. For instance, the state already has data on employment by municipality. It would be straightforward to use geographic information systems (GIS) tools to see how much *land per worker* each town's zoning map allocates to multifamily housing and to

1. Relax minimum lot size, setbacks, single-family only, minimum parking, and maximum height requirements.
2. Use impact fees, not red tape, to address externalities.
3. Enact a regulatory takings compensation law.
4. Allow regional compacts for planning and zoning.
5. Allow towns to decentralize authority to neighborhoods and blocks.
6. Directly preempt the most egregious forms of exclusionary zoning.
7. Enact statewide open enrollment in public schools.
8. Conduct further research on the extent to which municipal zoning ordinances either limit or allow Granite Staters to live where we work.

single-family housing with minimum lot sizes below one acre. Towns with especially low values have zoning rules that are especially inadequate to the needs of those who work there.

Piecemeal reforms may help to soften some of the harshness of New Hampshire's current land-use regime. Ideally, when voters and policymakers can see the harm caused by overly restrictive land use regulations, they will make adjustments and roll back the regulations that cause the most harm. If local governments don't make changes, the pressure for state-wide solutions will only grow, and lawmakers undoubtedly will take up more fundamental, far-reaching reforms.

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Appendix

Town	County	Excess Price, 2013–21	Median Income, 2015	Pop Ratio, 2019/2006	Regulation, 2013–21	Change in Regulation
New Castle	Rock.	1.44	122692	0.95	1.78	0.23
Rye	Rock.	1.10	94757	1.05	1.38	0.16
Portsmouth	Rock.	0.91	71392	1.07	1.18	0.14
Newington	Rock.	0.82	92604	1.01	1.13	0.12
New London	Merr.	0.40	68981	0.50	1.11	0.44
Hanover	Graf.	0.80	105670	1.06	1.07	0.07
North Hampton	Rock.	0.72	87413	1.03	1.01	0.12
Moultonborough	Carr.	0.58	72966	0.85	0.99	0.33
Hampton Falls	Rock.	0.68	103309	1.18	0.89	0.10
Waterville Valley	Graf.	0.47	87500	0.89	0.85	N/A
Hampton	Rock.	0.52	76836	1.00	0.83	0.07
Stratham	Rock.	0.53	108306	1.05	0.81	0.15
Lyme	Graf.	0.51	111607	1.02	0.81	N/A
Meredith	Bel.	0.49	63028	1.00	0.80	0.11
Seabrook	Rock.	0.52	53179	1.05	0.80	0.15
South Hampton	Rock.	0.44	102614	0.93	0.79	-0.01
Greenland	Rock.	0.58	96685	1.23	0.77	0.04
Exeter	Rock.	0.49	73519	1.06	0.77	0.06
Salem	Rock.	0.42	79755	1.00	0.73	-0.01
Newfields	Rock.	0.45	118333	1.05	0.73	0.06
Holderness	Graf.	0.45	59079	1.06	0.72	-0.02
Sunapee	Sull.	0.46	68981	1.08	0.72	0.16
Kensington	Rock.	0.42	105547	1.03	0.72	0.01
Center Harbor	Bel.	0.41	62768	1.01	0.71	-0.10
Hollis	Hills.	0.43	117708	1.05	0.71	-0.05
Windham	Rock.	0.49	109726	1.17	0.70	0.04
Wolfeboro	Carr.	0.36	58204	0.99	0.67	0.10
Atkinson	Rock.	0.41	102018	1.09	0.66	-0.07
Jackson	Carr.	0.34	79412	0.97	0.66	0.13
Bedford	Hills.	0.41	131490	1.11	0.66	0.10
Plaistow	Rock.	0.35	78191	1.00	0.66	-0.07
Tuftonboro	Carr.	0.37	59565	1.04	0.65	0.04
Nashua	Hills.	0.34	67246	1.01	0.64	-0.03
Newmarket	Rock.	0.34	62688	1.01	0.64	0.15
Hampstead	Rock.	0.33	88699	1.00	0.63	-0.01
Dover	Straff.	0.36	61008	1.11	0.61	0.04
Amherst	Hills.	0.30	121349	1.01	0.61	0.00
Merrimack	Hills.	0.29	90708	1.00	0.61	0.03
Hudson	Hills.	0.31	86024	1.04	0.60	0.02
Durham	Straff.	0.37	71190	1.18	0.59	-0.06
Londonderry	Rock.	0.31	92264	1.07	0.58	0.03

Derry	Rock.	0.25	65723	0.97	0.58	0.01
East Kingston	Rock.	0.33	92760	1.11	0.58	0.06
Gilford	Bel.	0.27	67643	0.99	0.58	0.06
Litchfield	Hills.	0.29	95833	1.03	0.58	0.11
Brentwood	Rock.	0.34	101390	1.12	0.58	0.09
Madbury	Straff.	0.29	98125	1.05	0.58	0.06
Pelham	Hills.	0.34	90077	1.13	0.58	0.00
Alton	Bel.	0.30	66823	1.07	0.58	0.12
Kingston	Rock.	0.26	77115	1.01	0.56	-0.07
Sandwich	Carr.	0.24	57000	0.99	0.55	0.03
Auburn	Rock.	0.29	104231	1.11	0.54	0.01
Manchester	Hills.	0.24	54282	1.01	0.54	-0.01
Lee	Straff.	0.23	95000	1.02	0.53	0.05
Rollinsford	Straff.	0.21	62130	0.97	0.53	-0.07
Candia	Rock.	0.19	93792	0.97	0.51	0.04
Lebanon	Graf.	0.23	53004	1.04	0.51	0.08
Goffstown	Hills.	0.20	70870	1.01	0.50	0.06
Newton	Rock.	0.24	83945	1.09	0.50	0.00
Harrisville	Ches.	0.11	56313	0.88	0.50	0.07
Bridgewater	Graf.	0.22	55500	1.07	0.49	-0.04
Danville	Rock.	0.19	91250	1.02	0.48	0.04
Bow	Merr.	0.18	102847	1.01	0.48	0.00
Sandown	Rock.	0.23	83281	1.10	0.48	0.01
Hooksett	Merr.	0.23	83908	1.11	0.48	0.12
Concord	Merr.	0.18	56093	1.02	0.48	0.00
Hebron	Graf.	0.25	57222	1.16	0.48	-0.02
Hancock	Hills.	0.12	77788	0.91	0.48	-0.04
Easton	Graf.	0.11	51667	0.90	0.48	0.09
Chester	Rock.	0.24	109286	1.14	0.47	0.06
Raymond	Rock.	0.14	64490	0.97	0.47	0.09
Lincoln	Graf.	0.33	37095	1.34	0.47	-0.08
Enfield	Graf.	0.13	78713	0.97	0.45	0.26
Allenstown	Merr.	0.07	54634	0.88	0.45	-0.01
Bartlett	Carr.	0.12	50536	0.97	0.45	0.12
Nottingham	Rock.	0.22	91821	1.16	0.44	0.11
Milford	Hills.	0.17	64576	1.07	0.44	-0.01
Strafford	Straff.	0.15	95707	1.05	0.44	0.09
Brookline	Hills.	0.18	107833	1.11	0.43	0.07
Epping	Rock.	0.21	77750	1.16	0.43	-0.05
Pembroke	Merr.	0.10	71316	0.97	0.43	0.01
Laconia	Bel.	0.11	50000	0.98	0.43	-0.10
Fremont	Rock.	0.20	86875	1.15	0.43	0.02
Wilton	Hills.	0.07	71066	0.93	0.42	0.02
Franconia	Graf.	0.17	60109	1.11	0.42	0.03
Deerfield	Rock.	0.15	86011	1.08	0.42	0.04
Hopkinton	Merr.	0.11	87083	1.02	0.41	-0.09
Eaton	Carr.	0.09	71000	0.99	0.40	-0.06
Chesterfield	Ches.	0.08	73715	0.98	0.40	0.04
Mont Vernon	Hills.	0.14	108472	1.10	0.40	-0.11
Sugar Hill	Graf.	0.04	78281	0.93	0.40	0.10
Sanbornton	Bel.	0.12	71125	1.05	0.39	-0.02

Barrington	Straff.	0.14	81326	1.10	0.39	0.01
Plainfield	Sull.	0.08	82250	1.01	0.38	0.13
New Boston	Hills.	0.15	97951	1.16	0.38	0.03
Somersworth	Straff.	0.06	54868	1.00	0.37	-0.08
New Durham	Straff.	0.08	82000	1.04	0.36	-0.03
Freedom	Carr.	0.11	51750	1.12	0.36	0.13
Northwood	Rock.	0.08	80709	1.06	0.35	0.01
Henniker	Merr.	0.04	67197	0.99	0.35	0.02
Lyndeborough	Hills.	0.02	83173	0.97	0.35	-0.02
Dunbarton	Merr.	0.11	90083	1.15	0.34	-0.03
Wakefield	Carr.	0.06	47568	1.07	0.33	0.20
Wilmot	Merr.	0.06	58194	1.08	0.33	0.07
Sutton	Merr.	0.04	74044	1.05	0.32	-0.03
Weare	Hills.	0.02	86552	1.02	0.32	0.04
Epsom	Merr.	0.04	70493	1.05	0.32	-0.02
Rindge	Ches.	0.00	75490	0.99	0.31	0.00
Temple	Hills.	-0.05	72143	0.92	0.31	-0.02
Westmoreland	Ches.	-0.04	78355	0.94	0.30	-0.06
Chichester	Merr.	0.03	76056	1.06	0.30	-0.02
Rochester	Straff.	0.00	46979	1.01	0.30	-0.05
Sharon	Hills.	-0.05	87500	0.95	0.29	-0.09
Warner	Merr.	-0.02	72174	0.99	0.29	-0.02
Dublin	Ches.	0.00	64688	1.04	0.29	-0.19
Newbury	Merr.	0.39	80795	2.03	0.28	-0.21
Canterbury	Merr.	0.02	78182	1.07	0.28	-0.08
Orford	Graf.	0.01	76771	1.07	0.28	0.14
Jaffrey	Ches.	-0.06	56618	0.95	0.28	-0.09
Peterborough	Hills.	0.02	60529	1.09	0.28	-0.14
Surry	Ches.	-0.02	72500	1.03	0.27	-0.02
Loudon	Merr.	0.02	65417	1.12	0.26	-0.07
Francestown	Hills.	-0.04	85833	1.01	0.26	-0.18
Tilton	Bel.	-0.05	54276	1.01	0.26	-0.07
Keene	Ches.	-0.04	52636	1.03	0.25	-0.17
Mason	Hills.	-0.01	80938	1.09	0.25	-0.24
Nelson	Ches.	0.00	74375	1.11	0.25	-0.12
Madison	Carr.	0.03	54000	1.17	0.25	0.04
Boscawen	Merr.	-0.04	59167	1.04	0.24	-0.12
Conway	Carr.	0.00	49250	1.11	0.24	-0.03
Barnstead	Bel.	-0.04	66516	1.05	0.24	0.03
Chatham	Carr.	0.06	52969	1.25	0.24	-0.21
Acworth	Sull.	-0.05	54667	1.02	0.24	-0.26
Belmont	Bel.	-0.05	65150	1.03	0.24	-0.01
New Hampton	Bel.	-0.03	74009	1.08	0.24	-0.14
Walpole	Ches.	-0.05	66613	1.05	0.23	-0.09
Deering	Hills.	-0.11	69792	0.94	0.23	0.03
Webster	Merr.	-0.05	69000	1.07	0.22	-0.13
Brookfield	Carr.	-0.04	65536	1.09	0.22	-0.03
Bristol	Graf.	-0.10	50080	0.99	0.22	-0.06
Errol	Coos	-0.20	34375	0.84	0.21	0.21
Woodstock	Graf.	-0.02	49063	1.15	0.21	-0.09
Grantham	Sull.	0.02	86111	1.24	0.21	-0.05

Gilmanton	Bel.	-0.04	69545	1.11	0.20	-0.01
New Ipswich	Hills.	-0.08	84332	1.06	0.19	-0.10
Bradford	Merr.	-0.08	59783	1.07	0.19	-0.08
Stoddard	Ches.	0.02	68929	1.28	0.19	-0.07
Milton	Straff.	-0.11	60000	1.02	0.18	-0.05
Greenfield	Hills.	-0.13	62273	0.99	0.18	-0.13
Northfield	Merr.	-0.15	65536	0.96	0.18	-0.01
Cornish	Sull.	-0.14	77708	0.97	0.18	-0.01
Middleton	Straff.	-0.14	68385	0.98	0.18	0.09
Farmington	Straff.	-0.13	50821	1.01	0.17	-0.05
Springfield	Sull.	0.00	73625	1.27	0.17	-0.15
Croydon	Sull.	-0.12	70556	1.03	0.17	-0.04
Ossipee	Carr.	-0.17	46203	0.95	0.16	0.00
Albany	Carr.	-0.10	55208	1.09	0.16	-0.01
Andover	Merr.	-0.11	70323	1.07	0.16	-0.07
Carroll	Coos	-0.12	55972	1.07	0.15	0.15
Randolph	Coos	-0.34	64500	0.74	0.14	0.10
Roxbury	Ches.	-0.22	62375	0.93	0.14	-0.09
Swanzy	Ches.	-0.16	57632	1.03	0.13	-0.12
Plymouth	Graf.	-0.13	40745	1.08	0.13	-0.05
Ashland	Graf.	-0.16	45938	1.04	0.13	-0.25
Monroe	Graf.	-0.18	63375	1.00	0.13	-0.03
Sullivan	Ches.	-0.26	44531	0.89	0.12	0.02
Antrim	Hills.	-0.19	64830	1.01	0.12	-0.14
Franklin	Merr.	-0.19	43237	1.01	0.11	-0.16
Washington	Sull.	-0.11	71667	1.18	0.11	-0.11
Greenville	Hills.	-0.27	52602	0.92	0.09	-0.22
Campton	Graf.	-0.17	56429	1.09	0.09	0.04
Canaan	Graf.	-0.16	59375	1.12	0.08	0.06
Pittsburg	Coos	-0.26	37986	0.95	0.07	0.07
Littleton	Graf.	-0.27	40380	0.95	0.07	-0.02
Tamworth	Carr.	-0.18	48002	1.12	0.07	-0.14
Hill	Merr.	-0.23	64028	1.02	0.06	-0.12
Salisbury	Merr.	-0.18	66289	1.12	0.06	-0.22
Hillsborough	Hills.	-0.23	57312	1.05	0.05	-0.09
Thornton	Graf.	-0.13	56058	1.23	0.05	0.03
Fitzwilliam	Ches.	-0.22	57143	1.07	0.05	-0.19
Bennington	Hills.	-0.27	65481	0.99	0.04	-0.12
Marlow	Ches.	-0.29	59615	0.96	0.04	-0.03
Langdon	Sull.	-0.20	71250	1.12	0.04	-0.03
Rumney	Graf.	-0.30	51250	0.96	0.03	-0.12
Pittsfield	Merr.	-0.32	47959	0.94	0.02	-0.19
Alexandria	Graf.	-0.23	55066	1.11	0.02	-0.13
Marlborough	Ches.	-0.27	54491	1.02	0.02	-0.31
Alstead	Ches.	-0.29	56534	1.00	0.02	-0.20
Unity	Sull.	-0.32	55208	0.94	0.02	-0.11
Goshen	Sull.	-0.29	50167	1.01	0.01	-0.17
Danbury	Merr.	-0.30	58810	1.02	0.00	0.00
Groton	Graf.	-0.26	43846	1.20	0.00	0.00
Piermont	Graf.	-0.27	69219	1.08	0.00	0.00
Landaff	Graf.	-0.28	53281	1.07	0.00	-0.04

Jefferson	Coos	-0.32	52337	1.06	0.00	-0.08
Richmond	Ches.	-0.33	61477	1.03	0.00	-0.22
Orange	Graf.	-0.34	65313	1.11	0.00	-0.59
Bethlehem	Graf.	-0.34	49329	1.07	0.00	-0.03
Grafton	Graf.	-0.35	48750	1.11	0.00	0.00
Bath	Graf.	-0.35	44219	1.16	0.00	-0.01
Effingham	Carr.	-0.37	44141	1.03	0.00	0.00
Troy	Ches.	-0.37	56211	1.05	0.00	-0.16
Shelburne	Coos	-0.38	54432	0.99	0.00	-0.34
Lyman	Graf.	-0.38	60000	0.98	0.00	-0.10
Wentworth	Graf.	-0.38	54306	1.06	0.00	-0.03
Stark	Coos	-0.40	44000	1.10	0.00	0.00
Charlestown	Sull.	-0.40	41471	1.05	0.00	-0.04
Hinsdale	Ches.	-0.41	50217	0.95	0.00	-0.09
Lempster	Sull.	-0.43	59423	1.09	0.00	0.00
Dorchester	Graf.	-0.44	51875	0.96	0.00	-0.17
Newport	Sull.	-0.44	49663	1.02	0.00	-0.07
Windsor	Hills.	-0.44	66250	1.00	0.00	0.00
Winchester	Ches.	-0.45	44760	1.00	0.00	-0.10
Whitefield	Coos	-0.45	42454	1.12	0.00	0.00
Dalton	Coos	-0.47	52550	0.99	0.00	-0.03
Benton	Graf.	-0.48	41719	1.13	0.00	-0.05
Milan	Coos	-0.49	49583	0.98	0.00	-0.01
Haverhill	Graf.	-0.51	48405	0.99	0.00	0.00
Lancaster	Coos	-0.51	50044	1.04	0.00	-0.15
Columbia	Coos	-0.53	53036	0.93	0.00	0.00
Claremont	Sull.	-0.54	45859	1.02	0.00	-0.12
Lisbon	Graf.	-0.55	47946	0.99	0.00	0.00
Gorham	Coos	-0.55	51190	0.96	0.00	0.00
Gilsum	Ches.	-0.56	53125	1.03	0.00	-0.19
Dummer	Coos	-0.59	38472	0.94	0.00	0.00
Clarksville	Coos	-0.64	30096	0.82	0.00	0.00
Warren	Graf.	-0.68	40769	0.99	0.00	0.00
Stewartstown	Coos	-0.72	37625	1.00	0.00	-0.08
Colebrook	Coos	-0.73	45375	0.96	0.00	0.00
Berlin	Coos	-0.98	35523	0.98	0.00	0.00
Northumberland	Coos	-1.10	38750	0.92	0.00	0.00
Stratford	Coos	-1.15	30139	0.77	0.00	0.00
Hale's Location	Carr.	0.58	58750	N/A	N/A	N/A
Hart's Location	Carr.	-0.01	37917	N/A	N/A	N/A
Ellsworth	Graf.	-0.31	50625	N/A	N/A	N/A

Table A1: Housing Regulation and Selected Indicators, New Hampshire Jurisdictions

Variable	Coef.	(S.E.)
House age	-0.070	(0.003)
Bedrooms	0.008	(0.013)
Bathrooms	0.315	(0.019)
Square feet	0.508	(0.011)
Lot size	0.035	(0.005)
>10-acre lot	0.167	(0.011)
R ²	70.3%	
N	190,267	

Town-clustered standard errors.

Table A2: House Price Model Estimates

Variable	Coef. (<i>p</i>)	Coef. (<i>p</i>)	Coef. (<i>p</i>)	Coef. (<i>p</i>)
Lag income				0.293 (<0.001)
Regulation (std.)	4.58 (<0.001)	4.56 (<0.001)	3.96 (<0.001)	2.29 (0.003)
Density			-1.62 (0.001)	-0.82 (0.066)
WDensity			1.66 (<0.001)	0.49 (0.254)
Republican		-0.004 (0.966)	-0.03 (0.689)	-0.05 (0.493)
R ²	4.9%	22.1%	30.2%	35.0%
N	230	230	230	230

Table A3: Regression Results, Regulation and Household Income Change

	(1)	(2)
	D.V.: Regulation	D.V.: Regulation Change
GOP Vote, 2000	0.0036 (0.0023)	0.0022* (0.0012)
Log density, 2000	-0.018 (0.019)	0.022* (0.012)
W Log density, 2000	-0.007 (0.028)	-0.053*** (0.020)
Density, 2000	-0.009 (0.021)	-0.007 (0.008)
W Density, 2000	0.003 (0.014)	0.014 (0.009)
Log years until zoning	-0.097*** (0.032)	0.0008 (0.014)
Pop. growth, 1970-90	-0.059*** (0.019)	0.013 (0.010)
Regulation, 1998-2006		0.026 (0.057)
W Regulation, 98-06		0.17* (0.09)
Constant	0.21 (0.16)	-0.24*** (0.08)
lambda	1.17*** (0.11)	
rho		0.46*** (0.16)
Observations	232	232

Robust standard errors in parentheses

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

Table A4: Spatial Models of Regulatory Stringency in New Hampshire



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