

Why is Manhattan So Expensive?

Regulation and the Rise in House Prices

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Abstract

Home building is a highly competitive industry with almost no natural barriers to entry. If home prices are significantly more expensive than the marginal cost of home production, then there must be barriers to new construction. We use the markups of home prices over production costs to estimate the impact of regulatory restrictions on housing prices. Our results suggest that barriers to construction represent a large component of housing prices in a number of primarily coastal markets. We also conduct a detailed study of Manhattan because marginal production costs can be more cleanly measured there, as the marginal cost of an extra apartment is the cost of making a new project a little bit taller. The cost of building apartments in Manhattan currently is no more than 50 percent of sales price, so that one-half of the cost of a Manhattan apartment should be understood as the result of barriers to new construction. We close the paper with a welfare analysis that suggests increased building activity in Manhattan will almost surely increase total social surplus, with the current gap between market values and construction costs being roughly three times larger than our estimates of the negative externalities generated by new development.

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I. Introduction

In some of America's great cities, real estate prices have soared over the past twenty years. In Boston, the median home price rose by 153 percent in constant dollars between 1980 and 2000. In the cities of New York and San Francisco, the real median home price rose by 88 and 81 percent respectively. In these places, as in various other cities in America and abroad, rising incomes and declining interest rates have increased the willingness to pay for proximity to productivity and amenities.

But increases in the demand for housing do not usually create such large price increases. Between 1980 and 2000, the population of Las Vegas almost tripled, but the real median housing price did not change. Census data show that real median housing prices fell in more than one-third of the larger American cities that added housing units at the national rate or faster since 1980. In the sprawling cities of the American heartland, land remains cheap, real construction costs are falling, and expanding supply keeps housing prices down. In older cities with limits on land development, building up kept housing prices down. As New York grew in the first 70 years of the 20th century, existing blocks of apartments and homes were demolished to make way for denser residences. But since 1980, despite skyrocketing prices, the housing stocks of each of the coastal cities noted above has grown by less than 10 percent.

Why has supply been unable to keep prices down in New York and elsewhere over the past 20 years? In this paper, we focus on New York City and explore the hypothesis that high housing prices are the result of the combination of increasing demand and government-created restrictions on new construction. We also ask whether the existing restrictions on new construction are socially optimal. After all, since the value of owner-occupied housing used as primary residences is \$9.4 trillion, according to the 1998 *Survey of Consumer Finances*, the social welfare losses due to inefficient regulation may be considerable.

The prevailing methodology for assessing the impact of government regulation on housing price is to compare housing prices in places with some observable form of regulation with prices in places without that form of regulation. Katz and Rosen (1987) provided one of the very first and best known such estimates, concluding that house prices were from 20-40 percent higher in San Francisco area communities that had enacted growth moratoria or imposed growth management control plans in the 1980s.¹ We admire this work greatly, but more widespread analysis of this type is very difficult to undertake because much regulation of the housing market is extremely challenging to quantify. The opponents of development have a striking array of weapons, ranging from environmental law suits to public demonstrations which extend far from the official rules that are supposed to influence the amount of construction. The difficulty of measuring the regulatory environment suggests that traditional difference-in-difference methods may radically underestimate the true impact of regulation on housing prices.

Consequently, we adopt a different approach that depends much more on basic economics. We focus on the gap between house prices and the marginal cost of producing a home. One of the strongest implications of free markets is that in an open, competitive, unregulated market, the price of a commodity will not be greater than the marginal cost of producing that good. Free competition among suppliers should ensure that prices are pushed down to marginal cost, so the presence of a large gap between market values and marginal production costs typically indicates some supply-side restriction.² As such, we can use the gap between prices and construction costs as our measure of the severity of building restrictions.

One benefit of this approach is that it generates a measure of the overall impact of all government restrictions taken together. This empirical strategy also permits the use of a variety of data from different sources spanning many markets. Hence, we can provide

¹ Speyer (1989) and Pollakowski and Wachter (1990) followed with confirmation of significant capitalization in two other metropolitan areas. There is also an extensive literature on zoning that is related to our research, as one way to restrict development is via zoning. The interested reader should see Fischel (1985) for an excellent review of that area and Hamilton (1978) for an early empirical study linking zoning restrictions to high house prices.

estimates of the strength of regulatory restrictions on housing development in a wide variety of markets, providing a national picture of market conditions.³

This approach has two obvious costs. First, our evidence is indirect, and we cannot measure the price impact of any specific policy. Different types of zoning restrictions or growth controls certainly could have different effects in the market.⁴ Second, unless we are confident that our cost numbers fully capture the marginal cost of housing and that the construction industry is perfectly competitive, our estimates may overestimate the impact of regulation either because of omitted costs or because we are mistaking monopoly power for government-created barriers to entry. Therefore, we will be wary about interpreting small gaps between prices and production costs as evidence for government regulation.

This suggests that the key task in our approach is to estimate the marginal cost of producing a house. In the case of single-family homes, this cost combines the cost of building the structure and the cost of buying and preparing the land. In the case of multi-family apartments, the marginal cost of an apartment is always the cost of expanding a new project upwards. Thus, to understand the marginal physical cost of building a new apartment we do not need to consider land purchase or preparation costs, as these are fixed costs which do not influence the marginal cost of building up.

In either case, we need to start with construction cost data, which is taken primarily from the R.S. Means Company. This firm surveys local developers and market conditions and reports construction costs per square foot of living area. Their data on construction costs

² There are exceptions to this, of course, including the mark-ups that can occur when monopoly power is present. We discuss this issue below where we show it is not relevant to the home building industry.

³ Given the rise of the so-called Smart Growth movement in particular and environmental sensitivities more generally, providing a broader geographic perspective is a useful exercise. The term Smart Growth typically refers to a variety of policies intended to deal with sprawl and other emerging points of debate and contention relating to the modern urban landscape.

⁴ See Fu and Somerville (2001) and Thornes (2000) for examples of studies of specific types of regulation. The goal of this type of research typically is to identify specific influences on developers or some particular type of development.

include material costs and labor costs, but not costs associated with land.⁵ While this data is imperfect, it is the best available and is widely used within the construction industry. We will augment this data with a number of different sources when we focus on New York City apartments.

Our work on single-family homes uses the 21 metropolitan areas tracked in the 1998-99 special Metropolitan files of the *American Housing Survey (AHS)*.⁶ Using building characteristics from the *AHS* and cost figures from the Means data, it is possible to estimate the marginal cost of constructing every house in the survey. To estimate the price of land, we perform a hedonic regression within each metropolitan area. Essentially, this measure prices land by comparing houses on small lots and houses on large lots. There are a number of potential biases in these regressions, so we perform sensitivity analyses using alternative estimates of the price of land. Using the land price, the quantity of land, and construction costs, we can estimate the gap between home prices and construction costs.

In twelve out of the twenty-one markets that we examine, on average home costs no more than ten percent more than the costs of the physical structure and the land. However, in Boston, New York, Newport News, Salt Lake City and Washington, D.C., the gap between construction costs and home prices is between ten and thirty-three percent. In Los Angeles, Oakland, San Francisco, and San Jose, the gap is from one-third to one-half of typical house value. Given that California is well-known as the epicenter of the restrictions on new construction, we found it gratifying that our measures suggested that California had the highest “regulatory tax.” In sum, the evidence for single-family markets across a diverse set of metropolitan areas suggests a significant role for regulation in accounting for high house prices in a select set of primarily coastal markets.

⁵ Two publications are particularly relevant for greater detail on the underlying data: *Residential Cost Data*, 19th annual edition, (2000) and *Square Foot Costs*, 21st annual edition (2000), both published by the R.S. Means Company.

⁶ This work closely follows Glaeser and Gyourko (2003).

Given the difficulties inherent in estimating the value of a standard unit of land, we then turn to the gap between construction costs and apartment prices in Manhattan. As mentioned above, additional land is not required on the margin to bring new units to market in an area dominated by multi-story residential buildings. Land shortages well may limit certain types of development in Manhattan, but builders always can add an extra floor if that would be profitable. Different data sources provide a range of estimates, from \$120-\$220 per square foot, for the physical costs of different types of residential building construction in Manhattan. These figures are meant to capture the purely physical costs of construction and do not include the potentially very large costs associated with assembling a site for construction. Still, we believe that an estimate at the upper end of this range is a reasonable estimate for the cost of building a slightly higher apartment building.

We conservatively estimate that market prices in Manhattan are at least double the marginal cost of production on a per square foot basis. In the most recent years, Manhattan condominiums have been selling for \$600 per square foot, which may be triple the marginal cost of building up. This gap is so large that it is hard to believe that measurement error in building costs could be responsible for the difference in any meaningful way.⁷ As such, the data indicate that today's high prices in Manhattan have more to do with regulation stifling the ability of developers to bring new units to market than with the economics of a free market in land and buildings. Other data on changes in permitting activity and heterogeneity in building heights is consistent with our regulation story for this market.

While welfare analyses of building restrictions are notoriously difficult to implement, the exercise is more straightforward in Manhattan because changes in density are unlikely to create large changes in the nature of the community. We make a back-of-the-envelope calculation indicating that the current level of regulatory restriction on development is inefficiently high—and by a wide margin. Our best guesstimate is that the current gap

⁷ The unit prices are from actual sales so there is not even the normal worry about biases from self-reporting by owners for those data.

between values and marginal costs is three times the plausible value of any negative externalities generated by new development on the island.

The plan of the paper is as follows. The next section discusses our basic measure of the gap between house price and housing production costs and how we use that to proxy for presence of distortions in the housing market. Section III then reports our 21 metropolitan area analysis using the *American Housing Survey*. This is followed in Section IV by our study of the Manhattan market. Section V describes our welfare analysis, and the paper concludes with a brief summary.

II. The Gap Between Prices and Production Costs: Implications for Regulatory Constraint

Our primary empirical strategy is to measure the gap between real estate prices and housing production costs, and use that differential to measure the distortions in the housing market.⁸ We will use the term “Regulatory Tax” to reflect the increase in costs imposed by regulatory restrictions which themselves could include quantity controls, myriad zoning rules, or taxes and fees. As such, we will define the tax as:

(1) Regulatory Tax = Market Price of a Housing Unit – Marginal Cost of that Unit
(absent government barriers)

This definition suggests three problems. First, the marginal cost of a unit absent government barriers may be hard to measure. Second, even if we do measure this marginal cost correctly, there may be other reasons for a gap between price and marginal cost other than regulation. Third, if there are negative externalities from new construction, then the optimal Regulatory Tax is positive. We will return to this third issue at the end of the paper, but it is important to remember throughout that a Regulatory Tax may actually be efficient in the presence of externalities.

⁸ Of course, as Glaeser and Gyourko (2003) emphasize, there is no reason why housing prices cannot fall below construction costs in declining areas. In those places, there will be no new building in the market.

The issues surrounding cost measurement are very different for single-family dwellings and large apartment buildings. In both cases, one component of cost is the physical cost of construction. Through sources such as the R.S. Means data, it is possible to obtain a reasonably good measure of these costs. Moreover, we also believe that these costs only differ modestly over space. As such, the price of housing in other markets where there is a significant amount of new construction provides us with an upper bound of construction costs because construction costs cannot be below prices in those other markets. In the case of apartment buildings where the cost of a new apartment is entirely the cost of building up (absent government intervention), we can readily estimate the marginal cost of a unit.

In the case of single-family dwellings, we must also estimate the cost of land, absent government intervention in this market. Ideally, one might think that existing land sales give us enough information to estimate land costs. However, there is only a very limited amount of information on land sales. More importantly, the price of traded land depends critically on the rights to develop that land. As such, there is no such thing as a free market for land that exists independent of government rules about development.

Thus, instead of using land prices, we will use housing price hedonics to estimate the amount that current homeowners “value” their own land. Ideally, a housing price hedonic compares identical houses on bigger and smaller parcels and thereby estimates how much the market values land. In a truly free market for land, this price would be the price of land (absent integer problems related to subdivision). However, if this market is not truly free, hedonic estimates can only be interpreted as estimating the extent to which consumers value attributes, which means that the price of land that is being estimated is the opportunity cost of land to current homeowners, not the free market price of land. Thus, a hedonic coefficient captures the social loss to current owners if their land was used to develop new homes.

The second problem with our regulatory tax definition is that a gap between prices and costs can arise because some firms have market power that they can exploit. However,

the housing production industry is extremely competitive, with no natural barriers to entry. The 1997 *Economic Census* reports that there were 138,850 establishments in the business of constructing single-family homes. While there are a huge number of small, ‘mom and pop’-type operations, there also are more than 1,700 establishments with revenues in excess of \$10 million. The multifamily housing industry is only slightly less concentrated. In 1997, there were 7,544 establishments in this industry and more than 1,000 in New York state alone. In the absence of some type of land use controls, it is hard to doubt that residential construction would come as close as possible to the economic ideal of a perfectly competitive industry.

Another potential source of distortions in the New York City housing market is rent control.⁹ New York is still renter-occupied and in some cases, rent control may limit the ability to tear down existing renter-occupied buildings. Nonetheless, this should still reflect a fixed cost that does not change the marginal cost of constructing an extra apartment in a new development.

III. The Regulatory Tax Across Major Metropolitan Areas

The housing price data used in this section come from the 21 metropolitan areas tracked in the 1998-99 special Metropolitan files of the *AHS*. We use observations on single unit residences that are owner occupied.¹⁰ Thus, the typical house in these samples is a single family, suburban unit. The *AHS* data include self-reported home values, lot size, and a

⁹ Rent control is the most widely-studied housing regulation. The rent control literature is a lengthy one that has built on Friedman and Stigler’s (1946) classic analysis (reprinted in Bloch and Olsen (1981)). De Salvo (1971) and Olsen (1972) produced the first modern, econometric analyses of New York City’s control regime, with Rydell, et. al. studying Los Angeles’ foray into controls. Linneman (1987) and Gyourko and Linneman (1989, 1990) followed with investigations of various equity and efficiency aspects of control regimes. This work continues with Moon and Stotsky (1993) using longitudinal data to estimate the impact of rent control on housing quality. Related work on how controls influence maintenance effort and long-term impacts of controls include Olsen (1988), Ault and Saba (1990), and Pollakowski (1999). Olsen and Early (1998, 2003) examine the relationship of rent controls with homelessness. More recently, Glaeser and Luttmer (2003) provide a new look at resource misallocation under controls. While most of this research effectively deals with the trade-off between equity and efficiency, Arnott (1995) has argued that rent control can be efficient in the presence of landlords with some type of monopoly power. However, that remains a minority view among scholars.

¹⁰ Condominiums and cooperatives in buildings with multiple units are excluded from this particular analysis.

number of other physical attributes of the housing unit including living area square footage. Because the *AHS* contains no information on building costs, we turn to the R.S. Means Company for data on that variable.

The Means data contain information on four qualities of homes—economy, average, custom, and luxury.¹¹ The data are broken down further by the size of living area (ranging from 600ft² to 3,200ft²), the number of stories in the unit, and a few other differentiators. In our comparisons with house prices from the metropolitan files of the *AHS*, we presume that construction costs are those associated with the mean of economy and average quality homes. Holding constant the size and other physical traits of the unit, construction costs for an average quality home are about 40 percent higher than those for an economy quality home according to the Means data. Thus, our estimates of

¹¹ Means does not produce true constant quality cost series, as the company relies on building code requirements to guide its cost estimation process. Since we will be working with data over a narrow time range in this section, economically significant code changes are unlikely. Nevertheless, these data have been criticized by Somerville (1999) for not reflecting actual builder experience or fully controlling for quality changes. While his attempt to develop a constant quality construction cost series via hedonic techniques certainly could be quite valuable for analysis over long time spans, we do not believe the results of that analysis warrant not using the Means data or making adjustments to it. Somerville's results are based on data from a single home builder operating in three markets (Baltimore, Cincinnati, and Houston) over a thirteen year period from 1979-1991, so it is not surprising that a single firm's experience does not match a market-wide average. Moreover, the sample size in Somerville (1999) works out to an average of just under 60 observations per market area per year. Given the very small number of subdivisions that must be involved, this only increases the chances of idiosyncratic factors driving the differences between his hedonic series and the Means data for his three markets. In addition, there is no indication that a standard confidence interval around his hedonic cost estimate would not encompass the Means series. [There is no direct evidence that it would, either. We cannot replicate his results without access to the confidential data supplied by his builder and the first-stage results. References to large standard errors on key year controls in his first-stage regression hint that the confidence interval could be relatively wide.]

Other factors also increase our confidence in the Means data. One is that it has passed a market test in the sense the firm has successfully sold its construction cost estimates for over 60 years. While we recognize the conceptual superiority of a true constant quality cost series, none has been developed yet that has passed such a test. Another is that the Means data have performed well in other contexts. Glaeser and Gyourko (2003) and Gyourko and Saiz (2003) have used their cost data in the construction of variables that work well (i.e., as the relevant theory would predicts) in regression analysis. While there is no doubt that Means measures construction costs with some error, we know of no reason to suspect a systematic bias. And, if the data largely reflected noise, then it is unlikely it would perform so well in the papers just cited. Finally, the cost estimates that Means produces for the Manhattan market are close to those we were able to gather from other independent sources for that market. We do not have independent sources for any of the other markets we study.

construction cost reflect modest quality, but not the lowest possible quality that meets building code requirements.¹²

While there are various adjustments that need to be made to the data before comparing house prices to construction costs, the biggest difficulty with this procedure is in inferring the free market cost of land.¹³ As discussed in the previous section, we use the *AHS* data to estimate of the marginal value of land via a standard housing hedonic that expresses the value of a house as a function of its various characteristics, including the amount of land on which it sits. The estimated coefficient on land area will reflect the degree to which the market valuation of a house increases with lot size. Of course, this estimate of the market valuation of land area may be biased, particularly if the amount of land is correlated with omitted housing characteristics. If houses on bigger lots tend to be of higher quality (in ways that we cannot explicitly control for), the resulting specification error will bias the coefficient upwards. Conversely, omitted characteristics will bias the coefficient downwards if houses on bigger lots are built where land is cheap.

Hedonic estimates of the value of land per square foot (in 2000 dollars) for the 21 metropolitan areas surveyed in the two most recent waves of the metropolitan files of the

¹² This assumption of modest, but not really low, quality is also reflected in our assumptions that the costs are for a one-story house with an unfinished basement and the average costs associated with four possible types of siding and building frame. In addition, we develop cost estimates for small ($<1,500\text{ft}^2$), medium ($1,550\text{-}1,850\text{ft}^2$), and large ($>1,850\text{ft}^2$) homes in terms of living area.

¹³ Two adjustments are made to the *AHS* data before comparing house prices to construction costs. These are to account for the depreciation that occurs on older homes and to account for the fact that research shows owners tend to overestimate the value of their homes. To account for the latter factor, we follow Goodman and Ittner (1992) and presume that owners typically overvalue their homes by 6 percent. Empirically, the more important adjustment takes into account the fact that the vast majority of homes are not new and have experienced real depreciation. Depreciation factors are estimated using the *AHS* as follows. First, house value per square foot (scaled down by the Goodman & Ittner correction) in the relevant year is regressed on a series of age controls and metropolitan area dummies. The age data are in interval form so that we can tell if a house is from 0-5 years old, from 6-10 years old, from 11-25 years old, from 25-36 years old, and more than 45 years old. As expected, the coefficients on the age controls are each negative and represent the extent to which houses of different ages have depreciated in value on a per square foot basis. We then adjust the reported values to account for the estimated depreciation so as to compare the value of a unit as if it were new with its replacement cost. On average, this adjustment results in about a 40 percent higher asset value for comparison with new construction costs. See our 2002 working paper for more detail on this procedure.

AHS are reported in Table 1 (see column 3).¹⁴ The metropolitan area files provide a relatively large number of observations, thereby allowing us to estimate attribute prices fairly precisely, while covering a fairly wide cross section of places in the most recent survey years.¹⁵

The results from column three of Table 1 indicate a wide range of prices across metropolitan areas, ranging from 13-15 cents per square foot in Birmingham and Houston to about \$4 per square foot in the Bay Area communities of San Francisco and San Jose. While there clearly are some high price places, these data suggest that consumers in most areas place a relatively low value on land on the margin. In 16 of the 21 metropolitan areas, the estimated price is below \$1 per square foot. In the two lowest price areas of Birmingham and Houston, the hedonic land values imply that a typical homeowner would be willing to pay no more than \$1,400-\$1,600 for an extra quarter acre of land.¹⁶ Even in the Baltimore and Salt Lake City metropolitan areas, in which we estimate the price of land to be from \$0.83-\$0.88 per square foot, a quarter acre of land is valued at no more than \$9,040. On the other hand, the hedonic price of land is much higher on the West Coast. Using the \$4 per square foot average of the prices in the two Bay Area metropolitan areas surveyed implies that a quarter acre is valued at well over \$40,000.

¹⁴ Four different hedonic specifications were estimated. Generally, the specifications are of the following form: $\text{House Price} = p * \text{Land Area} + z * \text{Other Controls}$, where the model is estimated separately for each metropolitan area. The other controls include the number of bedrooms, the number of bathrooms, the number of other rooms, an indicator variable that takes on a value of one if the home has a fireplace, an indicator variable that takes on a value of one if the home has a garage, an indicator variable that takes on a value of one if the home is in the central city of the metropolitan area, an indicator variable that takes on a value of one if the home has a basement, an indicator variable that takes on a value of one if the home has central air-conditioning, and the age of the home. Two of the specifications use the logged value of house price, while two are purely linear in nature. In addition, two of the models (one logged, the other not) use the data on interior square footage to capture the size of the home, while the other two use the detail on the number of bedrooms, bathrooms, and other rooms. In general, the results were quite consistent, although there is some variability in estimated land prices across the different hedonic models. The land prices in Table 1 are the mean of the values from the two specifications yielding the second and third highest prices (i.e., we rank the specifications from lowest to highest implicit land prices estimated and report the average of the prices from the second and third specifications). The key conclusions regarding the zoning tax are not sensitive to this choice. All the underlying results are available upon request.

¹⁵ Our 2002 paper performed a similar analysis using the 1999 national file of the *American Housing Survey*. The results are similar quantitatively, with the coastal metropolitan areas having much higher marginal prices of land. However, the estimates here tend to be smaller and much more precisely estimated. Given the far fewer number of observations at the metropolitan area level in the national file, we are much more confident of the reliability of the results reported in Table 1.

¹⁶ There are 43,560 square feet in an acre of land, so $\$0.13 * 10,890 = \$1,416$ and $\$0.15 * 10,890 = \$1,634$.

While these calculations obviously take some liberty with the meaning of a small change in the quantity of land, they do illustrate that the value of land as measured by these hedonic prices is not likely to constitute the bulk of the total value of the typical home in most of these metropolitan areas. This is evident by comparing the quarter acre land values discussed above with the mean home prices (in 2000 dollars) reported in column four of Table 1.

The final column in Table 1 reports our estimate of the Regulatory Tax as a percentage of average house value in the metropolitan area. Note that the tax is zero or negligible (defined as less than 10 percent) in over half the markets.¹⁷ However, the tax exceeds 10 percent of average home price in nine market areas (Boston, Los Angeles, New York, Newport News, Oakland, Salt Lake City, San Francisco, San Jose, and Washington, DC). While the 12 percent figure for the New York metropolitan area is interesting for comparison purposes with the results we find below for Manhattan, the impact of regulation on land values is much higher in other markets, especially those on the west coast. In Los Angeles, Oakland, San Francisco, and San Jose, the gap between prices on the extensive and intensive margins amounts to from one-third to one-half of home value at the mean. In Boston, Newport News, and Washington, DC, the gap constitutes about one-fifth of total property value.

Thus, the evidence for single-family housing markets across a diverse set of metropolitan areas recently tracked by the *American Housing Survey* suggests a big role for regulatory restrictions in accounting for high house prices in a select set of primarily coastal markets. While we have taken every possible precaution to guard against our Regulatory

¹⁷We assigned a value of zero for the Regulatory Tax if physical construction costs exceeded the average house price in the metropolitan area. We would not expect to see new construction in areas with production costs above market prices. In all areas but Philadelphia and Pittsburgh, a positive Regulatory Tax results if we assume construction costs associated with the lowest quality units (i.e., economy homes) tracked in the Means Company data. Effective house quality may, in fact, be lower than we presume in these areas, but we think it preferable to employ assumptions that lead our estimates to be conservative rather than aggressive.

Tax estimates from being biased upward¹⁸, it remains difficult to fully control for heterogeneity in the quality of land. To address this concern, we now turn to an analysis of apartments in Manhattan.

IV. Why Is Manhattan So Expensive?

To many, the high price of Manhattan real estate may seem like a universal constant. But this static view of the city is false. The past 20 years have seen a remarkable explosion in the price of Manhattan apartments. In 1980, according to the U.S. Census, the median value of an owner-occupied housing unit in Manhattan in 2002 dollars was \$245,633. In 2000, the median value was \$377,246, implying an average annual compounded real appreciation rate of 2.2 percent. This is roughly double the national average real appreciation rate on the widely-used Freddie Mac Repeat Sales Price Index. Figure 1 shows that such rapid price growth has not always been the norm, as real prices were relatively flat between 1950 and 1980.¹⁹

Why has Manhattan in particular become so expensive? Strong demand, of course, is a prerequisite for high prices. While there has not been much population growth, income growth has been very high over the past two decades. The decennial census reports that real per capita income in Manhattan increased by 74 percent from \$26,730 to \$46,349 (in 2002 dollars) between 1979 and 1999. Almost certainly, this reflects the influence of the financial services sector. In 2002, 40 percent of the wage payroll in Manhattan was generated by the financial sector, broadly defined. This industry has stayed in the city to a surprisingly large degree. Manhattan's comparative advantage has always been proximity and as information has become even more valuable, the benefits of being in this densely populated financial capital appear to have remained strong.

¹⁸For example, we restrict the underlying samples from the *AHS* to homes with no more than two acres of land (i.e., with less than 87,120 square feet of lot). Including observations with larger amounts of land reduces estimated land prices below those reported in Table 1, suggesting that there is some downward bias of the hedonic estimates associated with large lot residences being developed in parts of the metropolitan area with cheap land. In addition, as discussed above, the hedonic estimate of land value will overestimate the free market value in markets with binding regulatory constraints.

¹⁹ The price data plotted in Figure 1 are for the metropolitan area as a whole. See the notes to the figure for the details.

While the benefits of agglomeration help explain the robust demand for Manhattan residences, high prices do not just reflect higher demand. During an earlier era, economic expansion had a much smaller impact on housing prices. Indeed, throughout vast areas of the U.S., housing prices have remained moderate despite massive economic growth. The difference between New York in 1950 and New York today, or between New York today and the high growth areas of the Sunbelt today, is housing supply. The key to keeping housing prices down in a growing local economy is to allow developers to build new units.²⁰ As Figure 1 makes clear, during New York's earlier heyday tens of thousands of new units were built. Throughout the 1990s, there were only 21,000 new units permitted in Manhattan. In contrast, there were over 13,000 new units permitted in Manhattan in 1960 alone.

Given that Manhattan is an island, one is naturally tempted to wonder if a fundamental scarcity of buildable space has developed over time that, when coupled with strong recent demand, is responsible for today's high prices. However, even if vacant land is rare, new units could be supplied by 'building up'. Given the difficulties of accurately estimating the value of land, this makes Manhattan, a market dominated by multi-story residential buildings, a natural application for our analysis. Because additional land is not required on the margin, the production costs of an extra housing unit in this market can be approximated by the physical costs of adding an extra floor of space. Land shortages may limit certain types of development in Manhattan, but builders always can add one extra story if new housing units are needed. Thus, our primary test to distinguish between the classic free market model and the regulation model is to compare the price of Manhattan housing units with construction costs as reflected in the physical costs of building up.

Just How Expensive is Manhattan Real Estate?

²⁰ See Glaeser and Gyourko (2003) for evidence consistent with housing supply being very elastic in growing cities with new construction.

Our first set of information on prices comes from condominium sales records in Manhattan from the First American Real Estate Corporation. These originate from deeds records and represent actual transactions prices over the period 1984 to 2002. All sales prices reported in this section are converted into 2002 dollars using the Consumer Price Index. And, as our construction cost data are generally on a per square foot basis, we will also convert our price data into per square foot measures.

We have a large sample of 23,060 condominiums spread throughout Manhattan. While there is considerable variation in the data, the basic numbers suggest that Manhattan condo units have been selling for around \$460 per square foot over the past two decades. Prices are generally high, and the small difference between the median value of \$455 per square foot and the mean value of \$468 per square foot indicates relatively little skewness in the distribution (see the top row of Table 2). While there is a considerable upper tail reflecting apartments that cost much more than \$500 per square foot, the high mean value is not being driven by a few outliers.

The variation in prices reflects both differences in the physical infrastructure of the apartments and the difference in neighborhood amenities. As our goal is to compare condominium prices with construction costs, we obviously are concerned about our inability to measure all aspects of physical apartment quality. However, unless neighborhood attributes specifically impact construction costs, the variation in prices that is related to neighborhood amenities will not bias our results. Indeed, in a truly free market, these amenities would not create a gap between construction costs and prices. More attractive neighborhoods would simply end up having taller buildings.

In the second and third rows of Table 2, we report data from the *New York City Housing and Vacancy Survey* (NYCHVS) for comparison purposes. Our NYCHVS sample combines all independent observations in Manhattan from the years 1991-1999. This widely-used data set has two failings relative to our condominium sales data. First, it is much smaller. We have only 156 observations of condominiums in Manhattan and 165 for the outer boroughs. Second, the price data relies on self-reported market values, not

actual sales data. Even given these issues, the Manhattan data from the *NYCHVS* look remarkably similar to the condominium sales data. The mean price per square foot is \$500, which is only slightly higher than what actual transactions show (and which corresponds well with our priors and the literature on the upward bias of self-reported values). The median price per square foot is \$461, which is extremely close to the \$455 value that we observe in the condominium sales data.

However, the data on condominiums in the outer boroughs suggest that the housing market outside of Manhattan is extremely different (row 3, Table 2). The mean price per square foot in the outer boroughs is \$149/ft², with the median value even lower at \$120. These results do not call into question the Manhattan data, but they do remind us that New York's hot housing market is a very localized phenomenon. The outer boroughs are still full of much less expensive housing.

In the remaining panels of Table 2, we examine prices by apartment size, building height, number of units in the building, and over time. Interestingly, there is little relationship between apartment size and value per square foot except among the largest apartments, which are more expensive. All else equal, larger apartments should be somewhat cheaper to build on a square foot basis because they have a fixed amount of some forms of infrastructure. Of course, all else is not equal and we believe these differences reflect omitted quality factors. The largest apartments almost certainly are nicer along other dimensions, so that it is likely that higher prices also reflect higher quality.

Not surprisingly, there is a tendency of prices to rise in value with building height. The average price per square foot for condos in buildings with between 10 and 20 stories is \$400, while the average price per square foot in buildings with more than 40 stories is \$573. These price differences presumably reflect two factors. First, apartments in taller buildings have better views. Second, taller buildings will tend to be more modern and perhaps be of higher quality.

We also see a pattern whereby prices are higher in larger buildings. The price per square foot is around \$400 in the smaller buildings (i.e., those with <20 units), but rises to over \$500 for units in large buildings (i.e., those with >200 units). Again, it is unclear if this price differential reflects better views or other characteristics that might be related to building size.

Finally, examining the data over time finds large increases in the price per square foot during the last few years. Prices were high in the 1980s and fell a bit during the recession in the 1990s. They then recovered, rising steadily in the second half of the 1990s and ending up at a level more than \$100/ft² above the previous high in the 1980s.

In Table 3 we look at the distribution of condominium prices by geographic location within Manhattan. Eighty-three percent of our sales occur in four neighborhoods that are closest to the midtown business district: the Upper East Side, the Upper West Side, Turtle Bay/Stuyvesant and Midtown. Approximately 10 percent of our sales also occur in the Greenwich Village/Financial District neighborhood. Less than five percent of the sales occur in the Lower East Side, Harlem, Morningside Heights and Washington Heights.

The most expensive area in the data set is the Midtown area where prices per square foot averaged \$515, with the median unit selling for \$490/ft². The Upper East Side was the next most expensive area with a mean price of \$509/ft². The Upper West Side was only slightly less costly with a mean value per square foot of \$494. Stuyvesant/Turtle Bay had the biggest representation in our sample, with over 6,000 units. The mean price in that neighborhood was \$436 per square foot. Units in the financial district and Greenwich Village were somewhat cheaper with an average cost per square foot of \$416. The Lower East Side apartments were cheaper still, valued at an average of \$373 dollars per square foot, which is still expensive but almost one-third cheaper than the top price neighborhoods. The remaining three neighborhoods, Morningside Heights, Washington Heights and Harlem, appear to be quite different. In these neighborhoods, prices were generally below \$250/ft², and often well below \$200/ft². Indeed, values in these neighborhoods look more like the outer boroughs than the rest of Manhattan.

This neighborhood level evidence suggests that there is variation in prices across Manhattan, with the uptown areas being considerably cheaper. Nonetheless, there is a fair amount of uniformity across large parts of the borough. Prices are regularly above \$400 per square foot and, in many neighborhoods, almost one-half of the apartments cost more than \$500/ft².

Next, we turn to less exhaustive data sources to examine the prices of cooperative units. Within the owner-occupied sector, we have focused on condominiums rather than cooperatives because we are concerned that sales prices of cooperatives may not reflect the true cost of ownership due to their more complex ownership structures and allegedly high maintenance fees. Nevertheless, they do represent a significant fraction of the borough's housing stock so they clearly warrant study despite concerns about data quality.

Information on the distribution of self-reported market value per square foot using Manhattan coops in the *NYCHVS* is reported in Table 4. The mean value is \$382/ft², with the median sale price being \$310/ft². Holding unit and building quality constant, we would expect the absence of a straightforward, fee simple ownership status to result in lower values for cooperatives because property rights are valuable. Furthermore, the average reported monthly fee associated with these coops is \$600/month, which is about \$200 more than the average reported for condominiums in our sample, and at least partially reflects the fact that coop buildings have independent debt.²¹ Even with our concerns that reported values for cooperatives do not fully reflect the cost of owning the unit, these results clearly indicate that high prices are pervasive throughout the owner-occupied sector of the Manhattan real estate sales market, and are not confined solely to condominiums.²²

²¹ Thus, the fee differentials are not due entirely to different maintenance levels or requirements. See Schill, Voicu, and Miller (2003) for a recent analysis of the factors behind the pricing differences between condominium and cooperative units in Manhattan.

²² None of the prices reported in Tables 2-4 reflect values 'as if new'. Ideally, these prices should be adjusted (upward) to account for the depreciation that occurs on older units before any comparison with replacement costs, as was done for the single family units in the *AHS*. Unfortunately, the condo sales data from the First American Real Estate Corporation do not include any information on the age of the buildings in which the units are situated. The *NYCHVS* does report age in discrete form, including the following five

The Costs of Production

We now turn to our data on the costs of production. Our primary source for construction cost data is the R. S. Means Company, which surveys developers throughout the United States. Given that no data source is perfect, we supplement the information from Means with three other sources. One is Marshall & Swift, a rival construction cost service. Second, we use estimates from the New York University (NYU) Center for Real Estate and Urban Policy. The ultimate source of their data is Zaxon, a third construction cost service. Finally, we use data on condominium costs outside of New York City using the *American Housing Survey*. It should be emphasized that, in this section and throughout the remainder of the paper, these construction cost data pertain to condominium or cooperative-type product in multiple unit buildings (i.e., these are different from the single-family cost data discussed in a previous section).

The top panel of Table 5 reports construction costs for residential buildings by height that are specifically adjusted for the geographic area of Manhattan by the R.S. Means Company. Consistent cost data are available for structures of less than 25 stories. Physical construction costs range from \$140-\$160 per square foot for structures up to 24 stories tall. Taller buildings are modestly more expensive to build, although the Means data indicate that marginal costs are constant within a wide range of heights above seven stories.²³ If we interpret the Means data as applying to buildings shorter than 30 stories,

categories: (a) built in the 1990s; (b) built in the 1980s; (c) built between 1960-1979; (d) built between 1930-1959; and (e) built prior to 1930. To try to estimate the impact of depreciation on older structures, we regressed reported condo value in the *NYCHVS* on a set of age dummies to determine the average impact of age on value. Adjusting the reported prices to reflect the regression estimates of depreciation yielded a mean of \$625/ft² and a median of \$601/ft² for the 156 Manhattan condominiums in the *NYCHVS*, which is 20-25 percent higher than the reported values. However, the R^2 from the regression was only 0.04, not all the coefficients were statistically significant, and it was not the case that average values were monotonically lower the older the structure. Similar analyses with the cooperative unit observations for Manhattan from the *NYCHVS* yielded slightly higher upward adjustments (in percentage terms). However, these regression results also were somewhat imprecise. Given these uncertainties, we decided not to work with adjusted (i.e., higher) prices. While ‘as if new’ prices must be higher than the values we use, this decision is a conservative one in the sense that it guards against any upward bias in our estimates of the impact of regulatory constraints in the housing market.

²³ It is not clear from these data whether costs are higher or lower for taller buildings. The Means Company notes that larger buildings tend to have lower costs per square foot, primarily due to economies of scale and the decreasing contribution of the exterior walls. However, it is possible that buildings much

these estimates apply to 88 percent of the buildings in our condominium sample. The *NYCHVS* topcodes building height at 20 stories, with 80 percent of the observations in multifamily structures within Manhattan having fewer stories. Thus, the vast majority of Manhattan residences are in a building type that is comparable with the Means cost estimates, and it appears that the marginal cost of increasing the height of a typical residential structure is about \$160/ft².²⁴

As an initial check on the reliability of these data, we turn to a separate set of estimates provided by the Marshall & Swift Company (see the next panel in Table 5). These costs also are specific to Manhattan, but this firm provides a bit more detail with respect to the different qualities of residential buildings. Overall, these estimates span the results from the R.S. Means Company. Costs for an average or good quality apartment building are about \$50 per square foot less than the costs reported by Means; costs for what is termed an average quality, luxury apartment are about the same as Means reports; and costs for a high quality, luxury apartment are about \$50 per square foot higher than Means calculates. Using this data, the maximum construction cost per square foot is about \$220 per square foot for a high-end residential building in Manhattan.

Yet another source of construction costs comes from a report prepared by Salama, Schill and Stark for the NYU Center for Real Estate and Urban Policy in 1999. They report evidence from Zaxon Inc., another construction cost estimator. These estimates, adjusted to 2002 dollars, indicate a construction cost of about \$193 dollars per square foot for a 15-story apartment building, and \$134 per square foot for a six-story building. These data are very much in line with the Means numbers, although the marginal cost for an

taller than 24 stories could have higher costs since they may require stronger structural reinforcements and higher quality materials.

²⁴ One can obtain a slightly higher marginal cost by making different assumptions regarding the underlying cost function. For example, if we were to begin by assuming the average costs reported by Means pertain to the 2nd, 5th, and 15th floors (i.e., to the midpoints of the three height categories), and then presumed that the average cost function is quadratic and goes through those midpoints (i.e., \$142.2; \$144.5; \$160.15), the total and marginal cost functions can be derived. In this particular example, marginal costs rise from around \$140/ft² on the lower floors to about \$180/ft² for floors 10-15. To be conservative in our calculations below, we will use a value of \$200/ft² for construction costs in the analysis below.

extra floor appears to be somewhat higher in these data. In addition, the NYU numbers are slightly below the cost of a high quality unit according to Marshall & Swift.²⁵

Our final piece of evidence on construction costs relies on condominium prices from the *American Housing Survey* for areas outside of New York City. As long as the property market has not been trending downward (which is the case for most of the 1990s), sales prices should represent an upper bound on construction costs because developers also need to turn a profit.²⁶ The *AHS* data for Chicago indicate that the average price per square foot of condominiums is \$144/ft². In buildings with more than 10 stories, the price per square foot is \$148. In the rest of the United States, the price per square foot of condominiums equals \$129. This estimate rises to \$176/ft² if we look only at buildings with more than 10 stories.

Although part of the price differential across locations may be attributable to differences in construction costs, the R.S. Means data suggest that the difference in construction costs across metropolitan areas is relatively small. For example, Means estimates that construction costs are 19 percent higher in the New York area than in Chicago. As such, 1.19 times sales prices in Chicago represents yet another estimate of construction costs in New York. Of course, to the extent that there might be a “regulatory tax” in other areas as well, this method will overstate construction costs.²⁷ Taken together, these data

²⁵ As a point of reference, physical construction costs above \$150/ft² are at least as high as those pertaining to the highest quality single-family residences. In its single family construction cost files, the Means Company estimates that a large 2,200 square foot, custom quality home with an unfinished basement would have cost about \$132/ft² to build in the New York metropolitan area. The analogous figure for a luxury quality home, which is the highest quality category in the Means data, is \$159/ft². [No land costs are included in these figures.]

²⁶ There are too few observations on units in newly constructed buildings to create statistically meaningful samples.

²⁷ As another source, we also turned to data from the New York City permit office. This office reports an estimate of the total value of structures put in place by builders along with the total number of units. Dividing the value per unit by the average square footage per unit from our condominium data yielded an average cost of \$89/ft². While this price is not totally implausible, especially if many of the units were somehow controlled or stabilized, it seems quite low. One explanation for this low value is that builders must pay taxes based on the value of construction they report. Therefore, they have an incentive to underestimate true construction costs. In any event, we take the permit data as further confirmation of our view that \$200 per square foot is a reasonably generous estimate of the marginal cost of building higher for luxury apartment buildings in Manhattan.

strongly suggest that something near \$200/ft² is a reliable upper bound on the marginal cost of ‘building up’ for the vast majority of Manhattan apartments.

The Regulatory Tax in Manhattan

In computing the regulatory tax as the difference between marginal production costs and market price, we will use \$200 per square foot as our estimate of the former. We recognize that there will be a small number of apartments that actually cost more than this amount to build, but in most cases this value will overstate, not understate, the true cost. When combined with the fact that reported asset values of older units are not adjusted for depreciation (see footnote 22 above for those details), these assumptions make it likely that our estimate of the regulatory tax will be a lower bound.

Figure 2 begins the comparison by plotting the distribution of price-to-marginal cost ratios for condominiums in Manhattan. Note that very few units have ratios below one. In fact, price is above marginal production costs for 93 percent of the sample, with nearly two-thirds (63 percent) being worth more than twice marginal costs. For an overwhelming majority of Manhattan condominium owners, this suggests that some form(s) of regulatory constraints has meant that their cost of housing is more than double what it would be under a free development policy. Figure 3 charts the same information for our smaller sample of cooperative units. Nearly three-quarters of these units have price-to-marginal cost ratios above one, and one-third of this group is valued at more than double marginal construction costs. Thus, it is clear that the regulatory tax is meaningfully positive for this segment of the housing stock in Manhattan as well.²⁸

²⁸ Our longer working paper version includes plots for the distribution of price-to-construction costs for rental units. While those results are less reliable because we must impute asset values for rental units (which is why do not report them here), it is noteworthy that for free-market apartments, 78 percent of the units are valued above construction costs. Despite the fact that rent stabilized apartments are much cheaper, it still is the case that 40 percent of them have implied asset values in excess of construction costs. This result is particularly striking given that our estimate of construction costs is almost surely an overestimate for older, lower quality buildings.

For the median Manhattan condominium in our sample, the regulatory tax amounts to well over half of the total price of the unit.²⁹ Even for a condo from the 25th percentile of the price distribution, the tax makes up just over 40 percent of the \$339/ft² total cost. For cooperative units, the measured tax is smaller on average, but still is economically significant. It is \$182/ft² at the mean, which amounts to 48 percent of average coop value in Manhattan. Thus, some type of regulatory constraints in the housing market appear to be responsible for at least 50 percent of overall unit value for the mean owned apartment.

Translating these figures into annual cost terms can help illuminate the economic relevance of these results. For simplicity, we presume the annualized cost can be approximated by the multiple of the real cost of capital (or the real interest rate) and the component of housing prices that we estimate to be the result of regulation.³⁰ While real rates of interest currently appear to be quite high by some calculations³¹, we use a more conservative estimate of 3 percent for the real cost of capital to current borrowers. The top panel of Table 6 reports the distribution of the annual regulatory costs for owners in our condominium sample. For half of the sample, this estimate of the annual flow cost of regulation exceeds \$5,500 per year, or about 9 percent of mean annual wages in Manhattan. A quarter of the sample is paying at least \$9,668 per year, with the mean flow value of the tax being \$7,382. At a more detailed level, the value of the tax appears to lie between \$5,000 and \$10,000 per year for 31 percent of our sample. For another 12 percent, the burden lies between \$10,000 and \$15,000 per year. Yet another 8 percent of the sample pays between \$15,000 and \$25,000 per year. Finally, 3 percent of the sample has a tax amount that is greater than \$25,000 per year.³²

²⁹ From the top row of Table 2, we know that the median condominium price is \$455/ft². Assuming \$200/ft² in construction costs, the implied tax is \$255/ft². The ratio of 255/455 equals 56 percent.

³⁰ A more sophisticated analysis might compute the user cost of owning (e.g., see Poterba (1984) for example). This term includes factors such as local property taxes and maintenance expenses (along with a liquidity premium possibly) that also are thought to influence the cost of owning. For simplicity alone, we assume these costs are orthogonal to the regulatory tax and exclude them from our analysis. To the extent they are positively correlated, our annual estimates are lower bounds.

³¹ As we write, the current interest rate on 30-year, fixed rate mortgages is approximately 5.6 percent (depending upon factors such as points paid and the like) while inflation over calendar year 2002 was only 1.4 percent according to the annual average personal consumption expenditures chain-price index published by the Bureau of the Economic Analysis. The simple difference between these two figures is 4.2 percent.

³² These results are sensitive to the values of the real cost of capital and true construction costs used in the calculation. However, absent much higher construction costs (e.g., \$100 per square foot higher) or much

Is Other Data Also Consistent With a Zoning Explanation?

In this section, we examine two additional pieces of data to see if they exhibit patterns consistent with our regulation-based explanation of the gap between market prices and marginal production costs. First, we investigate the relationship between changes in prices and changes in quantities in the housing market. Second, we look to the degree of homogeneity in the heights of buildings constructed in the same neighborhood of Manhattan within a given decade.

Permitting and Prices

In a free market, one would expect increases in housing prices to lead to more new construction, but this need not be the case in a regulated market where regulation of various types can choke off new supply. Figure 1 already suggests that there has been a marked drop off in permitting in Manhattan over the past two decades, a period over which real house prices rose in excess of 2 percent per annum. In order to look at the relationship between prices and quantities a bit more closely, we regressed the number of permits issued in Manhattan in a given year on the change in prices during the previous year.³³ Figure 4 then plots the data and the regression line for four different time periods dating back to 1955.

The 1955-1969 period was a time of relatively modest real price changes, but any meaningfully positive appreciation typically was associated with a high level of permitting activity the following year. A similar, but less strongly positive correlation is

lower real interest rates (e.g., Japanese levels of near zero), the annual cost to condominium owners is substantial. In addition, housing prices in part reflect expectations about future prices. If future prices are expected to rise dramatically, then this might explain some of the high prices in New York and would suggest that our simple calculation of multiplying the gap between housing prices and construction costs with the cost of capital overstates the true impact of regulatory constraints. Of course, if by chance, New York City apartment prices were expected to fall (a not totally implausible possibility) then our calculation understates the true effect.

³³ We use lagged prices on the right-hand side on the assumption that it takes some time for developers to be able to respond to price changes, even in an unregulated market. The house price series is for the New York metropolitan area. See the notes to Figure 4 for the details. There is not an analogous price series for Manhattan proper (i.e., for New York County).

observed for the 1970s in the adjacent plot. The variability in real price changes was greater between 1970-1979, but the association of larger price appreciation with higher future permitting activity is still clearly evident.³⁴ Were this pattern to hold during the 1980s and 1990s, it clearly would be at odds with our conclusions that this is a market in which regulation is constraining builders from bring new units to market. However, the bottom two graphs in Figure 4 document that changes in prices are not correlated with future permitting activity in the 1980s and 1990s.³⁵

Although these simple regression plots obviously do not concretely identify a supply-demand framework (something that is well outside the scope of this study), they do strongly suggest that the supply side of the housing market was able to respond much more flexibly to higher demand in earlier decades. We know from above that real income per capita skyrocketed in Manhattan during the 1980s and 1990s. Thus, an examination of changes in prices and quantities is consistent with rising housing demand that was not met by changes in supply. These conditions could easily have led to the present situation in Manhattan in which the market price of the typical unit is at least double its production cost.

Heterogeneity of Building Heights

Our final piece of supporting evidence comes from an examination of the heterogeneity of heights of buildings in Manhattan. Consider the starkly simplified problem of a developer facing a fixed price at which he can sell each square foot of living space.³⁶ The total living space that is built by the developer will equal the base of the property (again measured in square feet) times the height of the building. The cost of construction is a function of height times the square footage of interior space. This maximization problem

³⁴ Both of the regression-line slopes are significantly different from zero at the 95 percent confidence level. However, the estimation error is large enough that we cannot confidently conclude the slope is greater for the 1955-69 period. All regression results are available upon request.

³⁵ While both slopes are slightly negative, we cannot reject the null that each is zero.

³⁶ The assumption of a fixed price for each square foot of space is purely for analytical convenience. All our key conclusions hold if (say) price is an increasing function of building height (which one might reasonably expect), as long as price is the same function of height for all buildings in the same neighborhood.

is fundamental to the basic Alonso-Muth-Mills model (as in Brueckner (1986)) and takes the form:

$$(3) \text{ Profits} = \text{Price} * \text{Base} * \text{Height} - \text{Land Cost} * \text{Base} - C(\text{Height}) * \text{Base} * \text{Height} ,$$

where the cost of construction per square foot, $C(\text{Height})$, is function of height. Profit maximization implies that the developer will choose base and height to satisfy the following two conditions:

$$(4) \begin{aligned} \text{Price} &= \frac{\text{Land Cost}}{\text{Height}} + C(\text{Height}) \\ \text{Price} &= C(\text{Height}) + C'(\text{Height}) * \text{Height} \end{aligned} .$$

These conditions equate the marginal returns to new space (i.e. the price) with the marginal cost of that space. There are two ways of increasing the amount of space: building up or building out, and profit maximization requires that the marginal cost of the two should be equal.³⁷ If this were not true, and (say) the construction costs associated with developing a slightly taller building were less than the costs associated with expanding horizontally (e.g., buying the land and putting up a series of short structures), then profit-maximizing developers would begin bringing taller high-rises to market.

Equating the two conditions implies that $\text{Land Cost} = C'(\text{Height})$. This result implies that developers facing the same land prices and physical cost function will construct their buildings to roughly the same height. Stated differently, if it makes economic sense to build to 20 stories on one block, it typically will make good economic sense to build to the same height on the adjacent block—at long as one is not near some fabulous amenity like Central Park, of course.

While features such as Central Park certainly make an analysis of building height heterogeneity problematic in Manhattan, Table 7 shows that there was an extremely wide

³⁷ This will not be exactly true if people have a taste for views, in which case, developers will build up beyond the degree that would be predicted by this condition.

distribution of building height by neighborhood for condominiums that were constructed during the 1980s.³⁸ For example, our sample contains eight buildings that were erected in Midtown during the 1980s (see column two). The heights of these buildings range from 4 stories to 70 stories. In the Upper East Side, there were seven buildings put up during this time period, and they range from 1 to 32 stories.

The heterogeneity of building heights we observe is hard, but admittedly not impossible, to square with a pure free market view of housing supply. Even so, the extensive variation in height within fairly narrowly defined areas is at least consistent with the outcome to be expected in a highly regulated market. Moreover, this heterogeneity makes it clear that developers were building small and mid-size buildings that could certainly have been taller.

V. Land Use Controls: A Simple Welfare Analysis

In the preceding section, we have documented the existence of a large gap between the market prices and construction costs of condominium and cooperative units in Manhattan that suggests an important role for regulation in preventing new supply from coming to the market. However, we should emphasize that the existence of such a gap between price and marginal cost is not necessarily inefficient. Indeed, much of the literature on zoning (see Fischel, 1985) has argued that land use controls are absolutely necessary to get developers to internalize the social costs of their actions.

In Manhattan, the zoning tax should incorporate at least three elements in order to reflect the marginal social cost of a new resident to the community. First, and most obviously, the zoning tax should reflect the fact that a new apartment may eliminate views of existing apartments. Indeed, most current height restrictions exist for exactly that reason. Second, the new development should be taxed for the externalities created by extra crowding or agglomeration economies. Pure wage effects (i.e., the fact that more

³⁸ We focus on recently built structures because it is primarily since the 1980s that we believe limits on supply to have had a significant effect. The dataset includes too few structures that were built in the 1990s,

workers can depress wages) are pecuniary, not real, externalities and the usual economic logic suggests that these effects should not be part of the zoning tax. Third, the zoning tax should reflect the fiscal burden of the new resident. The fiscal burden should be defined as the difference between government expenditures on the new resident and the taxes that the resident will face. We will address all of these components of the ideal zoning tax in turn.

While welfare analyses of zoning are inherently difficult to perform, Manhattan provides perhaps the best possible laboratory. Adding even a large number of housing units and people will not change the basic nature of the place, a factor that makes the evaluation much more straightforward. That said, our results are most properly viewed as educated guesses, not precise estimates.

Estimating the Value of Views Destroyed by New Construction

The view-related externality is perhaps the most straightforward to estimate. For each new apartment, the view-related externality equals the number of views blocked by a new apartment times the welfare cost of blocking a view. The number of views blocked should reflect the marginal impact of a single new apartment given the existing structure of apartments in New York.

In a world with homogeneous consumers, the welfare value of a view should equal the current market price of a view, which can be estimated by comparing apartments with or without views.³⁹ Benson, et. al. (1998) have recently reviewed the existing literature on hedonic estimates of the price of a view. Estimates vary, but a typical result suggests that a good view raises the value of the property by about 10 percent. However, most of this literature uses cross sectional data on single family homes and often estimates the value

so we cannot reliably use that time period.

³⁹In principle, this will be true with heterogeneous consumers as well as long as there are enough apartments of differing types. If a new apartment blocks the view of someone who values his view more than the market does, this person can just move apartments and acquire a new (identical) apartment with a view paying the market cost of a view. Of course, we recognize that urban housing markets are rarely that fluid.

of a view associated with some type of natural resource such as the ocean or a mountain range. Hence, the relevance for our problem of the value of an urban view is somewhat limited.

Consequently, we decided to compare the prices of condominiums in the upper and lower floors of the same building using our sample of Manhattan condos, which covers 20,426 units in 518 apartment buildings. We regressed price (in log form) on the square footage of the unit (also in log form) and a series of dummy variables controlling for the floor of the unit and a measure of unit size. Specifically, we included a dummy variable (I_{11-20}) that takes on a value of one if the unit is on floors 11-20, another dummy variable (I_{21-30}) that equals one if the unit is on the 21st-30th floors, and yet another (I_{31+}) for units on or above the 31st floor of their buildings. The regression results were as follows

$$(5) \quad \text{Log(Price)} = .08 \bullet I_{11-20} + .16 \bullet I_{21-30} + .23 \bullet I_{31+} + 1.00 \bullet \text{Log(Square Footage)} \\ (.006) \quad (.009) \quad (.01) \quad (.008)$$

The regression also includes building-specific fixed effects and year-of-sale fixed effects that are not reported here. Standard errors are in parentheses and the $R^2=0.59$.

We are most interested in the coefficient on the I_{31+} indicator variable that effectively captures the difference in the prices of condos on the bottom ten floors of the building relative to those above the 30th floor. Fully recognizing that this coefficient of 0.23 is likely to overstate the value of a view⁴⁰, the results suggest that the difference in value

⁴⁰ Unit quality is not fully captured by controlling for unit size (and we do not have other variables in our data set). If interior quality is superior on higher floors, as we suspect is the case, our estimate of view is biased upward. We are largely unconcerned by this because our goal is not to provide a precise measure, but to determine whether views and other externalities could reasonably justify the gap between values and costs that we currently see in Manhattan. An overly generous estimate of the value of a view serves that purpose well.

between being really high up in a building and being on the first ten floors is about 25 percent of unit price, which we use as our estimate of the value of a view.⁴¹

How many apartments' views does a new apartment block? No economic literature on this topic exists. One should be an upper bound on this number. After all, the worst outcome possible is that no apartments have any views, and this would mean that on average each apartment blocks one other apartment's view. Of course, it is easy to contemplate lower numbers. For example, it is possible to imagine tall buildings spaced far enough from one another (perhaps in the Corbusier Radiant City) so that no views are blocked. We take 0.5 as a reasonable middle ground and we will use this value as our estimate.

Given the assumptions, each new apartment destroys one-half of a view of some other apartment. Since the loss of one complete view would reduce the value of the apartment by 25 percent, each extra dollar of tall building will lead to about 12.5 cents of lost view.⁴² This finding suggests that lost views are not likely to amount for more than 10-15 percent of the total value of new housing. As such, views alone suggest that apartments should face a construction related regulatory tax equal to approximately 12.5 percent of their value.

Congestion Externalities

The second possible source of externalities that could justify a large regulatory tax on development is crowding. If people find living in a crowded place distasteful or more costly, then it is sensible to tax new residents for the costs they impose on current residents. This is a difficult issue to analyze for a number of reasons. First, there is research in urban and transportation economics which suggests that tall buildings actually

⁴¹ Because the indicator variable is not continuous, the derivative relating price to floor is not well defined. Using the adjustment suggested by Halvorsen and Palmquist (1980) for such cases yields the 25 percent figure.

⁴² The upper bound on the loss occurs when a new apartment blocks one view completely. In that case, the value of lost views accounts for 25 cents per dollar of new construction.

help internalize congestion because trips can be shortened or the number reduced.⁴³ If that effect is dominant, then building up should be subsidized, not taxed. A related question is whether the appropriate tax should be based on gross or net congestion. Gross congestion can be thought of as the social costs imposed on New Yorkers created by one more apartment in New York. Net congestion is the social costs imposed on New Yorkers by having one more apartment minus the social costs alleviated by having the apartment located somewhere else. Perhaps in an ideal system, all localities would charge fully for the gross congestion cost to that locality. However, if some localities are not charging (as Table 1 suggests is the case) then it seems like the appropriate tax should be based on net congestion costs.

Indeed, the net congestion cost imposed by an extra apartment in New York might be positive. Given New York's specialization in high density, we suspect that congestion externalities might actually be lower in Manhattan than anywhere else in the country. First, the island does not have a bucolic, rural character that would be spoiled by new residents. Second, residents of Manhattan overwhelmingly take public transportation or walk. Only 11 percent of Manhattan residents in the 2000 census reported driving alone or carpooling to work. Congestion does matter on the sidewalks or the subways, but it is far less important than when driving, mostly because people without cars take up so much less room than people with automobiles. Congestion also could be reduced if the number of overall trips is reduced by building to greater densities, per the discussion just above. If one accepts these arguments, then it seems quite likely that the relative congestion effect of moving to New York (versus whatever alternative locale) is likely to be negative. By turning a car driver into a subway rider, congestion on net is reduced rather than increased. Moreover, urban residents of Manhattan move there in part to be around other people. This reflects a congestion amenity, not a disamenity.

While we suspect the net congestion externality may be positive, we do not try to estimate it, especially since it would be determined by the relevant alternative locale. Instead, we will attempt to estimate the size of gross congestion externalities, which

⁴³ See Wheaton (1998) for a recent analysis of this issue.

should be thought of as the cash value of the total loss of utility on everyone in Manhattan created by a new resident. The natural means of estimating this value is to see whether rents, holding income constant, rise or fall with city population. If people demand a compensating wage differential for living in a more densely populated city, then a natural measure of urban amenities is the real income in the metropolitan area. In this case, income will be low in cities where amenities are high and high where amenities are low. As such, if the distaste for crowding is large, then we should expect to see a strong relationship between real income and city size.

Using the 193 cities in 1990 with population levels greater than 100,000, we estimate the following regression: ⁴⁴

$$(6) \text{Log(Median Rent)} = -3.4 + 1.04 * \text{Log(Per Capita Income)} - .05 * \text{Log(City Population)}$$

$$(.64) \quad (.06) \quad (.016)$$

Standard errors are in parentheses, and the $R^2 = 0.58$.⁴⁵ The -0.05 coefficient on log population indicates that rents fall only modestly with increases in population, income held constant. The fact that a one percent increase in population causes a .05 percent decrease in rents suggests that people are paying less (holding income constant) in more populated places. This supports the idea that there is a small gross congestion externality.⁴⁶

While there certainly are reasons to question these estimates (e.g. the endogeneity of the variables discussed just above in footnote 46), they strike us as reasonable benchmarks

⁴⁴ This sort of specification will generate the elasticity that we are interested in if, for example, $\underline{U} = W / P + A$ across cities, where \underline{U} is reservation utility, W is wages, P is the price level (which will be proxied for with rents) and A equals the amenity level.

⁴⁵ The regression also included a control for the percent of residents over the age of 25 with less than 9 years of schooling.

⁴⁶ That said, other specifications indicated a smaller negative or even positive effect of population. For example, controlling for land area turns the population coefficient positive, although not statistically significantly so. [The coefficient on land area is significantly negative, as expected.] We also tried controlling for density directly and found denser areas had higher prices. At face value, this suggests that crowding is good. However, this probably reflects omitted variables having to do with supply constraints or local amenities. In addition, attempts to instrument for population and density in the crowding

for the value of the gross congestion externality in New York. Using this estimate, a one percent increase in city population reduces the utility level (measured as a share of housing costs) by one-twentieth of one percent. Another way to interpret this value is that with an extra percent of population in New York, the value of all homes will drop by one-twentieth of one percent due to congestion externalities. This argues for an additional five percent zoning tax on new apartments due to these congestion externalities.

Wage Effects

An additional issue involves the impact of new apartments on wages in New York. There are some reasons to think that this impact should be ignored. First, if it is driven through standard labor market effects, then these are pecuniary rather than real externalities. Second, in many cases, new apartments will lead to a redistribution of population from the suburbs to the central city and will not change the total size of New York's labor force.

The very direction of the impact of additional workers on wages in Manhattan is not at all clear. Although standard estimates in the labor economics literature find the slope of the demand curve to be steeply downward-sloping⁴⁷, those estimates do not pertain to our analysis because they hold output and capital constant. In our case, it is not reasonable to assume that more workers simply would be dumped into Manhattan with no reallocation of capital or additional local output.⁴⁸ Effectively, adding more people to the area will cause the demand for labor to shift out. Furthermore, urban agglomeration theory suggests that productivity also may increase, with firms passing on some of the gains to workers. Thus, the diminishing marginal productivity of labor notwithstanding, wages might well rise with city population.

regressions yielded slightly positive coefficients on population. In any event, all the analyses we have done indicates that -5 percent is an upper bound on this particular externality.

⁴⁷ In a comprehensive survey of the literature, Hamermesh (1993) concludes that the elasticity of employment with respect to wages lies in the range of -0.15 to -0.75. These values imply an elastic response of wages with respect to employment.

In fact, empirical work by Ciccone and Hall (1996) and Glaeser and Mare (2001) finds that increasing population levels are associated with increasing – not decreasing – wage rates when one looks at the relationship across cities. If agglomeration economies were dominant as these results indicate, then zoning restrictions would impose an additional cost in terms of limiting city size. Our experimentation with a number of models sometimes yielded a negative impact on wages, but it never was large (in absolute value) or statistically significant.⁴⁹ Given this and the fact we cannot be sure that this reflects a real, not a pecuniary, externality, we include no labor market effects in the welfare analysis.

Fiscal Externalities from New Construction

The third and final category of social costs due to new construction comes through government taxation and expenditure. If new residents require far more in local government expenditures than they pay in taxes, then this would be yet another reason for potentially taxing new construction. Of course, one could argue that a sensible response to these fiscal externalities is just to charge new residents directly for the services that they use, instead of relying on some type of development tax. Still, it is worthwhile asking whether new residents in Manhattan condominiums create a net fiscal drain on New York City.

While compelling statistics do not exist, there are a number of good reasons to believe that new residents in Manhattan condominiums would represent a considerable fiscal transfer to, not from, the city. First, these residents tend to be rich. People living in apartments that cost more than \$500,000 will tend to be far richer than the average New

⁴⁸ One would have to make an extreme assumption about the share of tradeable goods across areas to get no local output effects.

⁴⁹ Empirical work in this area is fraught with various potential specification biases, so accurately pinning down an impact is very difficult. For example, regression estimates of the population-wages relationship using cross-sectional variation may be upwardly biased because more productive places (with higher incomes) end up attracting more people and, therefore, have larger populations. Regressions using changes in population and income may also be biased if increases in urban population are driven by increases to the productivity of the metropolitan area.

Yorker. As such, they are likely to increase the average income in the city. Second, these residents tend to have small numbers of children. On average, 23 percent of the residents of Manhattan are enrolled in school, as opposed to 27 percent for the city as a whole. The residents of expensive condominiums are also disproportionately likely to have smaller families and to enroll their children in private schools. These individuals are paying taxes for the use of schools and not using them, to the benefit of the government's budget. Finally, a number of government expenditures entail large fixed costs. For these expenditures, new population is an unqualified improvement since it allows those expenditures to be spread over a larger base. Altogether, we are quite confident that the residents of new condominiums in Manhattan, even if those apartments were priced at \$200/ft² rather than \$500/ft², are likely to be a fiscal boon, not a fiscal drain on the city. In a conservative spirit, we will just ignore these effects rather than put a dollar value on this effect.

The Net Effect

On net, our estimate is that the appropriate development tax for Manhattan condominiums should be about 17.5 percent--12.5 percent from blocking views plus 5 percent from crowding. The current zoning tax in Manhattan is roughly three times that amount, and there are a number of urban economists who would not agree with our crowding figure in particular because they believe that greater density helps internalize valuable congestion externalities on the roads. Even if one believes we have grossly underestimated social costs in some way, the current level of the implied regulatory tax still is inefficiently high. And, when one further recalls that we have been very conservative in not adjusting market values for depreciation, it is hard to escape the conclusion that regulatory constraints on building in Manhattan are far too restrictive.

Why is this so? We can only speculate as to why the city has built too few apartment units, but there are at least three motivations for excessive regulation. First, existing residents may behave like monopolists. Current homeowners have a strong incentive to reduce supply to boost their own home values. They are local monopolists over the

place-specific amenities of their own locale. This will always lead localities to provide too few housing units.⁵⁰ Second, there may not be a mechanism for new builders to compensate current homeowners for any negative effects of construction. Even if the surplus created by a new home is positive, it still might not be possible for new buildings to compensate the losers from the construction in an appropriate manner. Third, there might be very poorly defined property rights that make it impossible to strike bargains that would get construction closer to the Pareto frontier. Hopefully, future work will help us to understand why the zoning tax in New York City is so much higher than it should be.

VI. Conclusion

Home building is an enormously competitive industry with virtually no natural barriers to entry. Price markups over construction costs, therefore, are a strong indication of artificial barriers to new construction. In the bulk of the United States, the costs of producing housing are hard to estimate because of the lack of reliable data on the cost of land. Nevertheless, the data that are available strongly suggest that in expensive coastal areas especially, there often is a substantial gap between the price of housing and construction costs. This gap suggests the power of land use controls in limiting new construction.

There is similar evidence of an important regulatory impact for Manhattan. Not only is this market interesting in its own right, but since the cost of building an apartment is always the cost of building up, construction costs for apartments are much easier to estimate. Because building up does not involve using more land, we can use the physical costs of construction to determine the costs of building an extra apartment without knowing the underlying cost of land. After examining several sources, we find that \$200 per square foot is about the maximum conceivable value of those construction costs in Manhattan. This level is high, but it is far below most condominium prices in Manhattan,

⁵⁰ Of course, this begs the question of why we do not see big gaps between price and marginal cost in all markets. Clearly, something else is influencing the propensity to act like monopolists. That is a subject of

which are now routinely two times that amount. As such, perhaps one half or more of the price of most condominiums in Manhattan can be thought of as the result of some type of regulatory constraint preventing the construction of new housing. Other evidence also supports the importance of regulation. Over the past 40 years in Manhattan, we have seen a substantial contraction in the number of residential building permits. And, the remarkable heterogeneity of heights of new buildings within neighborhoods in the city is consistent with a strong role for regulation.

In principle, regulations limiting building need not be economically inefficient. However, our calculations imply that the “regulatory tax” (i.e., the gap between housing prices and construction costs) is at least three times greater than the social costs generated by new development in Manhattan.

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**Table 1: Hedonic Land Prices and Zoning Taxes,
Select Metropolitan Areas from American Housing Survey Metropolitan Files**

Metropolitan Area	Year	Hedonic Price of Land (\$/square foot)	Average House Value	Zoning Tax/House Value
Baltimore	1998	\$0.88	\$154,143	0.018
Birmingham	1998	\$0.13	\$114,492	0
Boston	1998	\$0.68	\$236,231	0.186
Chicago	1999	\$1.62	\$187,669	0.057
Cincinnati	1999	\$0.40	\$133,050	0
Detroit	1999	\$0.37	\$144,686	0
Houston	1998	\$0.15	\$103,505	0
Los Angeles	1999	\$2.59	\$260,744	0.339
Minneapolis	1998	\$0.38	\$144,719	0
New York	1999	\$1.38	\$253,232	0.122
Newport News (VA)	1998	\$0.48	\$127,475	0.207
Oakland	1998	\$2.34	\$284,443	0.321
Philadelphia	1999	\$0.81	\$135,862	0
Pittsburgh	1995	\$0.70	\$100,060	0
Providence	1998	\$0.56	\$148,059	0
Rochester	1998	\$0.21	\$109,050	0
Salt Lake City	1998	\$0.83	\$167,541	0.119
San Francisco	1998	\$4.10	\$418,890	0.531
San Jose	1998	\$3.92	\$385,021	0.469
Tampa	1998	\$0.37	\$103,962	0
Washington, DC	1998	\$0.64	\$213,281	0.219

Notes:

1. Hedonic prices of land were estimated using data from 1998 and 1999 metropolitan area surveys of the *American Housing Survey*. In some cases, areas were over sampled and included in the 1999 national file of the AHS. Four hedonic models were estimated. See the text and footnote 12 for those details. The prices reported here reflect the average of the prices associated with the second and third highest estimates across all four specifications (i.e., we discarded the highest and the lowest estimates and report the mean of the two remaining estimates).
2. The house price for each metropolitan area is the mean for the sample of single-unit homes with lot sizes less than two acres.
3. The computation of the zoning tax as a fraction of mean house value is as follows for each area j :

$$\frac{ZoningTax_j}{MeanHouseValue_j} = \frac{\left(\frac{MeanHouseValue_j - CC_j}{MeanLotSize_j} - HedonicLand PricePerSqft_j \right) * MeanLotSize_j}{MeanHouseValue_j}$$

Mean House Value and Mean Lot Size are metropolitan area-specific and pertain to the sample of single-unit, owner-occupied residences with less than two acres of land. See the first note for more on the hedonic price of land.

Table 2: Distribution of Price Per Square Foot for Condominiums in Manhattan

	# Obs.	Mean	25 th Percentile	Median	75 th Percentile
Manhattan ¹	23,060	468	339	455	572
Manhattan ²	156	500	271	461	664
Other Boroughs ²	165	149	89	120	177
By Unit Size ¹					
=600 sq.ft.	5,460	434	311	432	534
600=sq.ft. =800	6,722	445	339	439	542
800=sq.ft. =1200	6,729	472	346	460	580
1200=sq.ft.	4,149	542	378	519	680
By Building Height ¹					
=10 Stories	3,686	377	252	365	474
10<Stories=20	5,760	400	269	385	500
20<Stories=30	3,199	497	396	482	577
30<Stories=40	5,227	498	384	489	589
40<Stories	4,788	573	438	543	678
By Building Size ¹					
<20 Units	1,063	406	256	380	526
20=Units<100	5,548	415	285	398	513
100=Units<200	5,729	458	338	447	562
200=Units	10,720	506	383	488	603
By Year ¹					
1984	700	373	221	359	488
1985	982	451	305	450	550
1986	1105	467	371	482	584
1987	1616	507	420	505	591
1988	2032	518	419	498	586
1989	1535	515	391	484	586
1990	911	443	340	434	516
1991	722	421	310	383	499
1992	755	363	273	343	426
1993	41	385	284	379	463
1994	87	369	279	341	431
1995	232	354	267	342	408
1996	1044	353	272	331	409
1997	952	384	284	357	433
1998	2114	410	315	392	476
1999	2484	460	366	446	533
2000	1873	557	451	553	652
2001	1642	601	503	592	696
2002	972	621	529	606	706

1. Source: Condominium sales records from First American Real Estate Corporation. Nominal sales prices are converted to real 2002 dollars using the Consumer Price Index.

2. Source: New York City Housing and Vacancy Survey. Price is the reported market value for owner-occupied condos. Unit square feet is imputed from the number of rooms using the average square feet/room from condos in the New York MSA of the American Housing Survey.

Table 3: Distribution of Price Per Square Foot by Geographic Area

	# Obs.	Mean	25 th Percentile	Median	75 th Percentile	Average Height ¹
NYC Condos						
Manhattan	23,060	468	339	455	572	27
By Neighborhood in Manhattan						
Greenwich Village/ Financial District	2,703	416	309	405	501	16
Lower East Side / Chinatown	711	373	240	378	474	7
Chelsea / Clinton / Midtown	4,086	515	355	490	648	34
Stuyvesant Town/ Turtle Bay	6,534	436	330	443	539	31
Upper West Side	3,913	494	361	476	592	24
Upper East Side	4,759	509	372	490	611	29
Morningside Heights / Hamilton Heights	18	162	130	141	190	5
Harlem	131	277	191	245	371	6
Washington Heights / Inwood	128	169	91	162	210	6

Source: Condo sales records. All nominal values are converted to real 2002 dollars using the CPI.

1. Average number of stories.

Table 4: Distribution of Cooperative Prices in Manhattan

	# Obs.	Mean	25 th Percentile	Median	75 th Percentile
Owned Cooperatives					
Value per Square Foot	794	382	176	310	501

Source: New York City Housing and Vacancy Survey.

Table 5: Construction Costs

	Cost/sq.ft.
RS Means: Apartments in New York City	
8-24 story	160
4-7 story	144
1-3 story	142
Marshall & Swift: Apartments in Manhattan¹	
High-quality luxury apartments	218
Average-quality luxury apartments	156
Good-quality apartments, 3+ stories	123
Average-quality apartments, 3+ stories	96
NYU Center for Real Estate and Urban Policy²	
15 story luxury high-rise	193
6 story mid-rise	134
AHS Condos in Apartment Buildings³	
Chicago	144
10<Stories	148
US excl. NY MSA	129
10<Stories	176

1. Costs per square foot are from the Marshall & Swift Commercial Cost Estimator. Values are the average of reported costs for building classes A, B, C and D in November 2002.

2. Cost estimates are from Zaxon, Inc and converted to real 2002 dollars using the CPI.

3. Reported values are average price per square foot. Price is reported market value of owner-occupied units. Values are converted to real 2002 dollars using the CPI.

**Table 6: The Distribution of Estimated Zoning Taxes in Manhattan,
Annual Flow Cost Estimates for Condominium Owners**

	# Obs.	Mean	25 th Percentile	Median	75 th Percentile
Manhattan Condos ¹					
	23,060	7,382	2,927	5,554	9,668

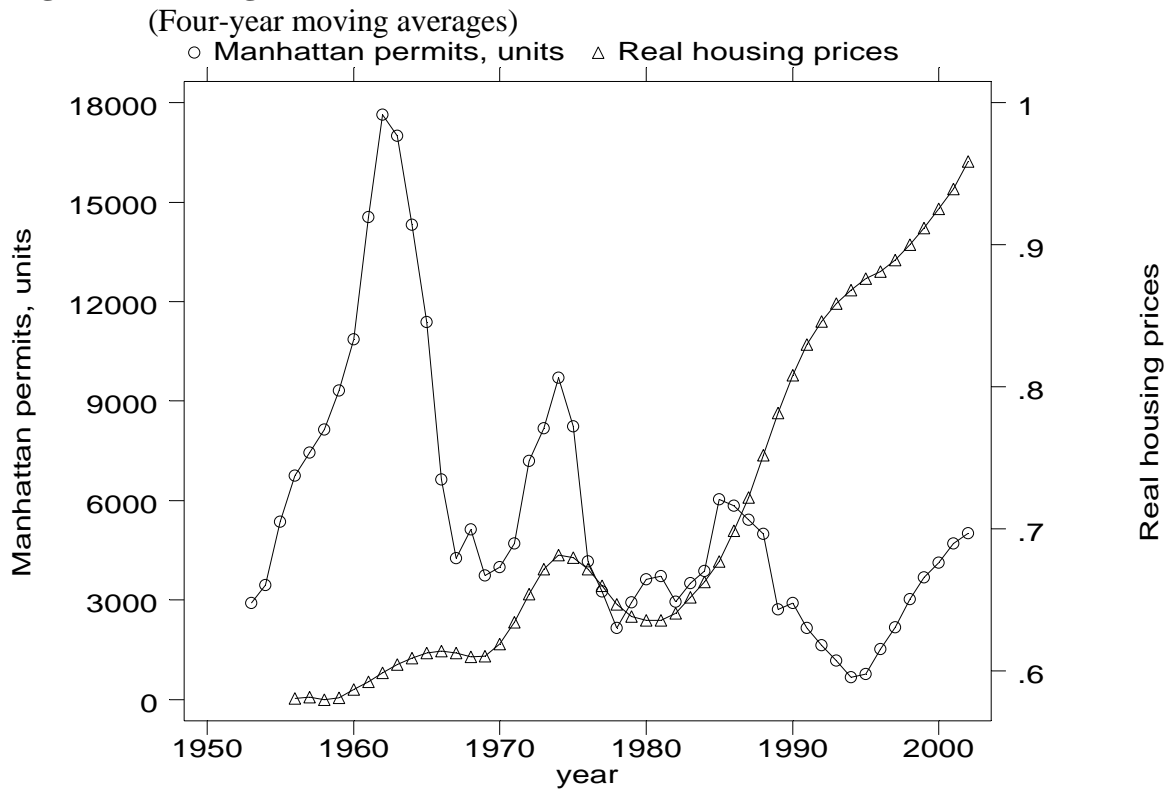
1. Source: Condo sales data from First American Real Estate Corporation. The zoning tax is calculated as the cost of capital times the difference between the sales price of a unit and estimated construction costs, where the cost of capital equals .03 and constructions costs equal \$200/square foot times the size of each unit.

Table 7: List of Buildings by Height in Neighborhoods of Manhattan, 1980s

Greenwich Village / Financial District	Chelsea / Clinton / Midtown	Stuyvesant Town/ Turtle Bay	Upper West Side	Upper East Side
6	4	5	4	1
16	21	13	5	4
18	30	21	9	5
44	35	24	11	12
	42	27	31	14
	53	29	35	15
	56	30		15
	70	35		18
		44		19
				31
				32

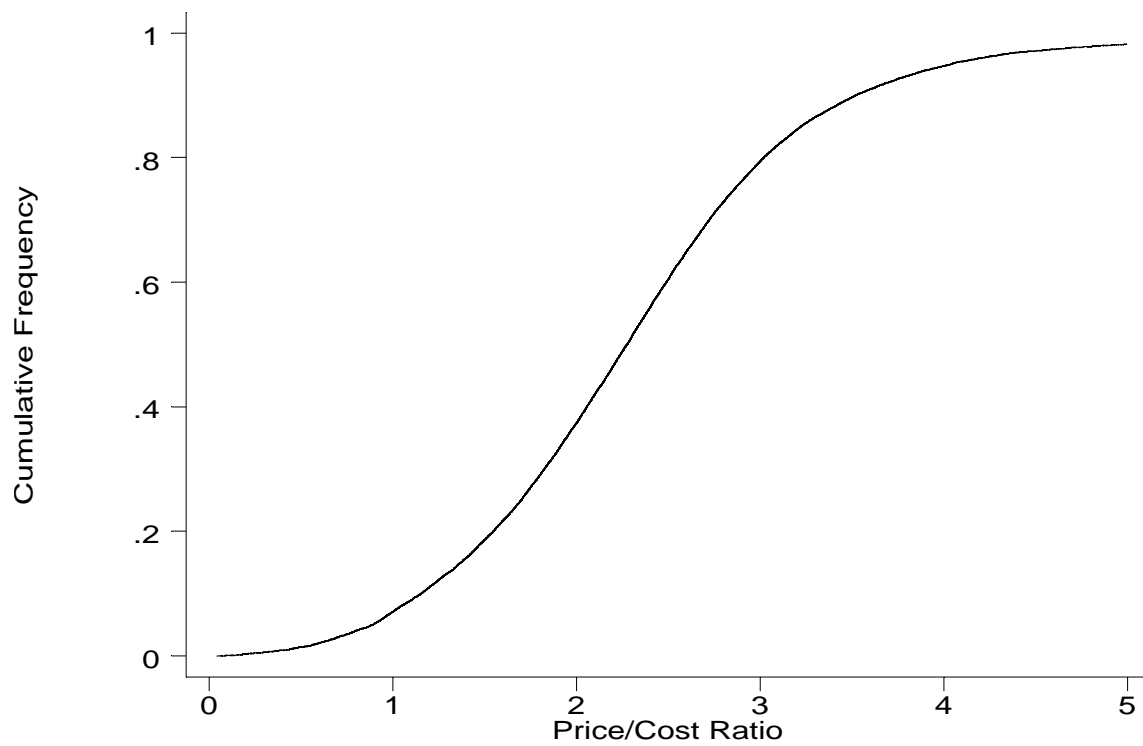
Source: Condo sales data from First American Real Estate Corporation.

Figure 1: Housing Permits in Manhattan and Prices



Source: Building permits are combined single- and multi-family permits for Manhattan from the US Department of Commerce. Real housing price series is the NY-NJ-LI MSA Consumer Price Index for Shelter, deflated by the GDP deflator from the National Income and Product Accounts and rescaled to equal 1 in 2002.

Figure 2: Distribution of Price-to-Cost Ratio, Manhattan Condominiums



Source: Prices are from condo sales records and costs are \$200 per square foot.

Figure 3: Cumulative Distribution of Price/Cost Ratio for Coops in Manhattan

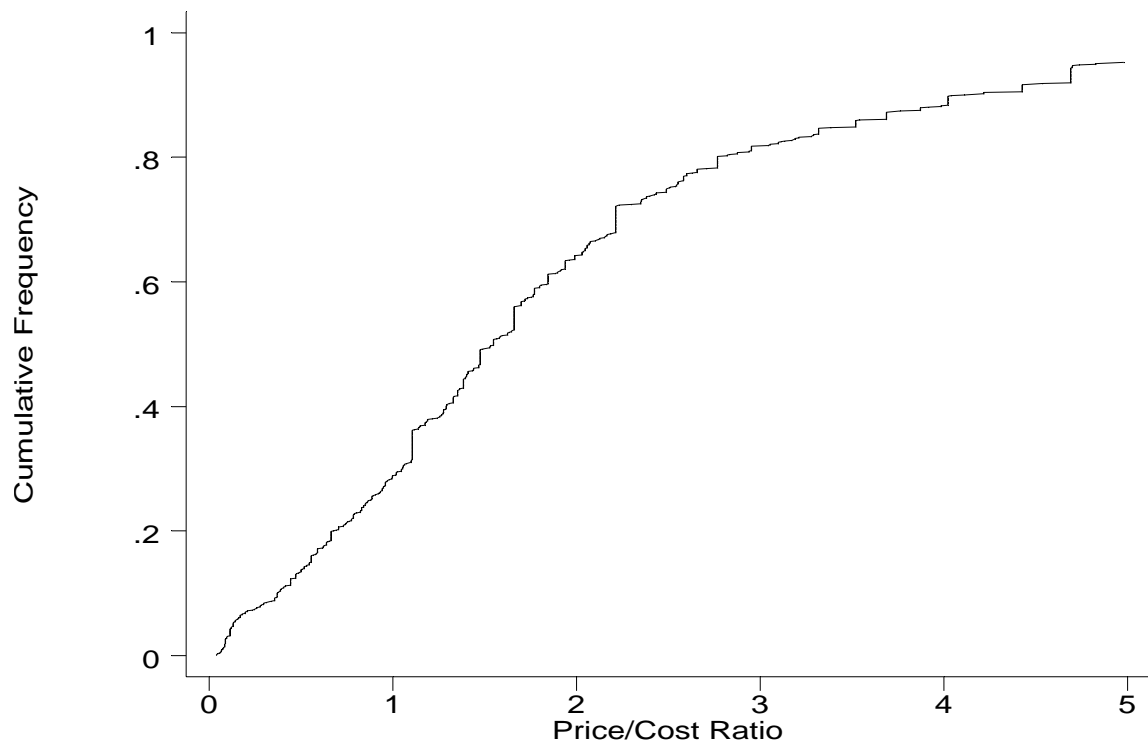
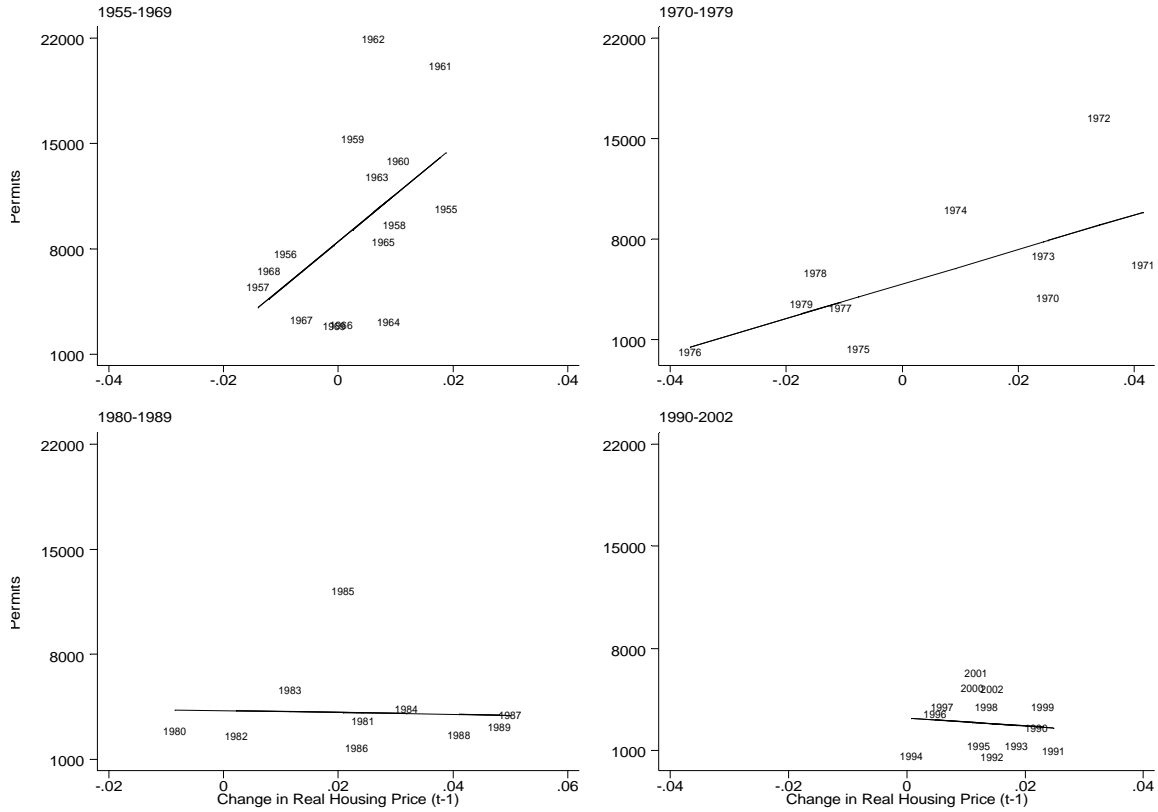


Figure 4: Changes in Manhattan Permits and (Lagged) House Prices, by Decade



Source: Building permits are combined single- and multi-family permits for Manhattan from the US Department of Commerce. Real housing price series is the NY-NJ-LI MSA Consumer Price Index for Shelter, deflated by the GDP deflator from the National Income and Product Accounts and rescaled to equal 1 in 2002.