

THE UN-ZONED CITY AND UNPLANNED DISASTER: A CASE
STUDY OF HURRICANE HARVEY’S IMPACT ON HOUSTON,
TEXAS

NOTE

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In the aftermath of Hurricane Harvey, scholars, journalists, and local residents sharply criticized the City of Houston for its lack of preparation in advance of the storm and its poor responsiveness during the eight days of heavy rain. This paper asks: what obligations did the City of Houston owe to Houston landowners with respect to hurricane preparedness and disaster response? The paper answers the question by considering, 1) whether Houston had an obligation to use Euclidean zoning to mitigate flooding, 2) whether Houston should have improved disaster-readiness infrastructure prior to the storm, 3) whether the free market can pseudo “zone” city development to improve disaster preparedness, and 4) whether government interventions hindered free-market “zoning.” Throughout, I argue for reduced government intervention and increased, accurate information in the real estate marketplace.

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I. INTRODUCTION

A. *Factual Circumstances*

As the so-called Bayou City, Houston built its economy and culture on the low-lying plains of the Gulf Coast. The region's geography is its boon in many respects. The Houston business community benefits from the Port of Houston and the Houston Ship Channel, both of which are key sites in the international oil trade. With a historically prosperous, if mercurial, energy market and growing medical and airline industries, Houston enjoyed better levels of employment during the first decades of the twenty-first century compared to national averages, despite the 2008 financial crisis.¹ In this good economic climate, the City of Houston has experienced considerable population growth.² In this growth climate,

¹ CITY OF HOUSTON PLANNING & DEV. DEP'T, UNEMPLOYMENT 2005 – 2015: CITY OF HOUSTON & THE US (Dec. 2016), https://www.houstontx.gov/planning/Demographics/docs_pdfs/updates/Unemployment-Rate_2005-2015.pdf (graphing the Houston and US unemployment rates using data provided by the Texas Workforce Commission 2005-2010); see also BARBARA J. SCHOTT, HARRIS COUNTY, TEXAS, POPULAR ANNUAL FINANCIAL REPORT FOR THE FISCAL YEAR ENDED FEBRUARY 29, 2016, at 8 (2016) (recording that in 2016, the Houston-Woodlands-Sugar Land statistical metropolitan area had an unemployment rate of 4.8%, and contained the headquarters of twenty-four Fortune Five Hundred companies); BUREAU OF LAB. STAT., LABOR FORCE STATISTICS FROM THE CURRENT POPULATION SURVEY (2017), <https://data.bls.gov/timeseries/LNU04000000> (reporting that the 2016 national unemployment rate averages to 4.9%).

² See Lomi Kriel, *Harris County Drops to No. 2 Nationally in Population Growth*, HOUS. CHRON. (Mar. 23, 2017), <http://www.houstonchronicle.com/news/houston-texas/houston/article/Harris-County-drops-to-No-2-nationally-in-11024290.php> (providing charted U.S. Census Bureau data of Houston's population estimates that shows a population

real estate developers have ample opportunity to turn flat, readily available land into master-planned communities.³ While this development met a market demand,⁴ many have criticized the sprawl as a threat to the fragile coastal plain environment.⁵

When the eye of Hurricane Harvey was centered over Houston in August 2017, the gaze of the American people followed. The city suffered torrential downpours, with some areas receiving nearly 50 inches of rain in a four-day period⁶—an amount equal to Harris County’s annual expected precipitation.⁷ As a result, an estimated 154,170 homes were flooded in Harris County alone.⁸ In one respect, the outcome was unexpected: floodplain maps underestimated the total number of flood-prone homes.⁹ On the other hand, even before Harvey approached the Gulf, experts warned: Houston was a “sitting duck,” waiting for the perfect storm.¹⁰

Houston is an interesting case study for commentators on urban planning and land use law because it is the only major U.S. city that does not use Euclidean zoning.¹¹ In the aftermath of Hurricane Harvey, many claimed that a comprehensive zoning plan would have mitigated

growth rate of roughly 9.5% between 2010 and 2017 and arguing that Houston’s growth is fueled by migration patterns and high birth rates, and that the recent slow in growth is correlated to a drop in oil prices).

³ See PWC & URBAN LAND INST., EMERGING TRENDS IN REAL ESTATE 2020 27-29 (2019), <https://ulidigitalmarketing.blob.core.windows.net/emergingtrendspdfs/ET2020FallMeeting.pdf>.

⁴ See *Life in the Sprawl*, THE ECONOMIST (Mar. 12, 2015), <https://www.economist.com/news/united-states/21646221-americas-fastest-growing-metropolis-faces-up-cheaper-oil-life-sprawl> (“Unlike most other big cities in America, Houston has no zoning code, so it is quick to respond to demand for housing and office space. Last year authorities in the Houston metropolitan area, with a population of 6.2m, issued permits to build 64,000 homes. The entire state of California, with a population of 39m, issued just 83,000.”).

⁵ Neena Satija, Kiah Collier, Al Shaw & Jeff Larson, *Hell and High Water*, PRO PUBLICA (Mar. 3, 2016), <https://www.propublica.org/article/hell-and-high-water-text> (“[E]xperts say the explosive economic and population growth that’s happened since Hurricane Ike has made the region far more vulnerable to storms – and the general public has little idea of the risk.”).

⁶ Memorandum from Jeff Lindner, Dir. of Hydrologic Operations, to the Harris Cty Flood Control Dist. 3–4 (June 4, 2018), <https://www.hcfc.org/Portals/62/Harvey/immediate-flood-report-final-hurricane-harvey-2017.pdf>.

⁷ HOUSTON EXTREMES, NORMALS AND ANNUAL SUMMARIES, https://www.weather.gov/hgx/climate_iah_normals_summary (last visited Sept. 30, 2020)

⁸ *Id.* at 13.

⁹ HOUS. CMTY. DATA CONNECTIONS, KINDER INST. FOR URBAN RSCH., HURRICANE HARVEY, <https://ricegis.maps.arcgis.com/apps/Cascade/index.html?appid=6ea5082d69484c7a922bd18705afb85> (last visited Apr. 16, 2020) (“The number of homes that likely were affected by flooding that were inside the 500-year floodplain, 100-year floodplain and the floodway make up only 59 percent of the total number homes expected to have experienced flooding.”).

¹⁰ Satija et al., *supra* note 5.

¹¹ Patrick J. Kiger, *The City with (Almost) No Limits*, URBAN LAND INST. (Apr. 20, 2015), <https://urbanland.uli.org/industry-sectors/city-almost-no-limits/>.

the storm's impact.¹² While these critics are correct that some municipal planning may have mitigated the severity of flooding in discrete regions, it is wrong to allege that the absence of Euclidean zoning is a defective governance strategy.

B. Theoretical Framework

This paper leans heavily on two critical, and often criticized, assumptions. First, that in the absence of government regulation, property owners will act according to their rational self-interest in the marketplace. And, given that real property is usually a homeowner's most significant asset, individuals are likely even more attentive to the value of their homes than that of other possessions. The second assumption is that property owners' self-imposed regulations create a nimble marketplace that is highly responsive to residents' concerns and demands.

The limitations of the first assumption are well reviewed. I will address the two most common criticisms. First, even if all actors are self-interested, this does not mean that they are rational,¹³ and irrationality compromises the inference that selfish behavior is economically efficient. However, in the case of reactions to natural disaster, there is reason to believe that irrational behavior will protect property values. The more frequent and salient a natural hazard is, the more likely individuals are to take the concern seriously.¹⁴ Hurricane Harvey was at the extreme end of salience: the event drew national attention and a protracted period of cleanup has made all Houstonians aware of the event's severity. Predictions that such events will be more frequent in coming years,¹⁵ and memories of Hurricanes Ike and Katrina, make flooding a matter of considerable concern. To the extent that homeowners are irrational, then, we can expect this irrationality to favor flood resiliency.

¹² See Shawn Boburg & Beth Reinhard, *Houston's 'Wild West' Growth*, WASH. POST (Aug. 29, 2017), https://www.washingtonpost.com/graphics/2017/investigations/235arvey-urban-planning/?utm_term=.976b44eab6e1 (citing experts as saying that Houston's clay-based soil and coastal location should have prompted city officials to regulate construction of new houses, requiring heightened elevation and an absolute prohibition in flood-prone areas).

¹³ See Richard Schragger, *Consuming Government*, 101 MICH. L. REV. 1824, 1826 (2003) (book review) ("[I]t is not clear that most homeowners act like rational property-value-maximizing agents all the time, or that most local governments can or do cater to their desires. The political economy of local government is complex.").

¹⁴ Christine Jolls, Cass R. Sunstein, & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV., 1471, 1519 (1998).

¹⁵ See *Weather Related Disasters Are Increasing*, THE ECONOMIST (Aug. 29, 2017), <https://www.economist.com/blogs/graphicdetail/2017/08/daily-chart-19>.

Secondly, policies that incentivize self-interested actors are, for many, problematic. Academics, religious commentators, and politicians alike have alleged that maximizing individual property values undermines the common good. This criticism is especially acute in the land use context, where the property owner is already more advantaged than the renter. Allowing uncoordinated land owners to regulate the market would seemingly exacerbate the poor's inability to influence politics and society. To borrow the words of Reinhold Niebuhr,

[S]ocial life, when not consciously managed and manipulated, does not develop perfect equilibria of power. Its capricious disproportions of power generate various forms of domination and enslavement.¹⁶

In other words, the free market incentivizes individuals to maximize their private property values, leaving others behind and resulting in great inequities. But although this is an important criticism, the present paper need not examine the goodness of the free market. Only its functionality in developing a weather-resilient Houston is in question.

C. Legal Framework

The City of Houston does not have a legal obligation to utilize Euclidean zoning to mitigate flooding. Two sources of authority define a city's obligation to its residents. First, the state constitution, which defines the scope of the city's powers. Second, the city municipal charter, which sets out the content of the city's powers. An examination of both documents is essential to defining Houston's obligations to its residents.

Under the Texas State Constitution, a chartered municipality with more than 5,000 residents has expansive "home rule" powers. Article eleven, section five of the state constitution provides: "no charter or any ordinance passed under said charter shall contain any provision inconsistent with the Constitution of the State, or of the general laws enacted by the Legislature of this State."¹⁷ With an estimated current population of 2.3 million, Houston qualifies to exercise home rule authority.¹⁸ As interpreted by the Texas Supreme Court, this provision means that "accepting cities and towns of more than 5000 population [have] full power of self-government, that is, full authority to do

¹⁶ REINHOLD NIEBUHR, REINHOLD NIEBUHR: THEOLOGIAN OF PUBLIC LIFE 187 (Larry Rasmussen ed., 1991).

¹⁷ TEX. CONST. art. 11, § 5.

¹⁸ U.S. CENSUS BUREAU, QUICK FACTS: HOUSTON CITY, TEXAS, <https://www.census.gov/quickfacts/fact/table/houstoncitytexas,houstoncountygeorgia,US/PST045217> (Last visited Sept. 30, 2020).

anything the legislature could theretofore have authorized them to do.”¹⁹ The state constitution therefore grants considerable legislative power to Houston but does not create affirmative obligations that the municipality must fulfill.

The home rule doctrine is one example of municipal legislative power. Home rule is a delegation of the state’s power, not a federalist reservation of an inherent municipal right. In a federalist structure, the powers not expressly reserved for the state government would be given to the city. Although the underlying concepts differ between a federalist construction and delegation doctrine, the delegation doctrine fulfills the effect of a federalist construction: municipalities define the content of their obligations toward residents.

The home rule delegation theory differs markedly from the Dillon’s Rule delegation theory. Dillon’s Rule constricts municipal powers to express grants by the state legislature, and actions taken to fulfill those express grants or actions essential to the municipality’s declared objects and purposes.²⁰ Zoning occurs in both home rule and Dillon’s Rule states.

As a home rule state, Texas cities do not need state authorization to zone. Even so, the state legislature passed the Standard Zoning Enabling Act (SZE).²¹ This Act follows the federal model first published in 1922, which formatted the SZE in nine sections: a grant of power, districts, purposes in view, method of procedure, changes, zoning commission, board of adjustments, enforcement and remedies, and conflict with other laws.²² The SZE is seemingly superfluous but actually valuable. It standardizes state zoning by specifying the structure of local zoning boards and boards of appeals and by establishing conflict of laws rules.²³ The drafting of the federal model act and passage of the SZE indicate that state and federal governments tend to approve of zoning.

The federal government’s support of zoning did not create an obligation for Houston to zone. The SZE presented municipal zoning as a substitute for traditional nuisance claims. An argument was made early on that this policy demonstrated an overreach of federal power and influence.²⁴ This policy shift coincided with the development of the

¹⁹ Forwood v. City of Taylor, 214 S.W.2d 282, 286 (Tex. 1948).

²⁰ BARLOW BURKE, UNDERSTANDING THE LAW OF ZONING AND LAND-USE CONTROLS 6 (2d ed. 2009) (citing *Smith v. City of New Bern*, 70 N.C. 14, 18-19 (1874)).

²¹ See TEX. LOC. GOV’T CODE ANN. Ch. 211 Subch. A (West 2003).

²² U.S. DEP’T OF COMMERCE, A STANDARD STATE ZONING ENABLING ACT UNDER WHICH MUNICIPALITIES MAY ADOPT ZONING REGULATIONS 4-13 (1926).

²³ TEX. LOC. GOV’T CODE ANN. Ch. 211 Subch. A (West 2003).

²⁴ Bernard H. Siegan, *Non-Zoning in Houston*, 13 J.L. & ECON. 71, 144 (1970).

Federal Housing Administration (FHA). In a 1939 report, the FHA examined the construction of American cities and took seriously the impact of coinciding and separated land uses.²⁵ The FHA, and thereby the federal government, now had a stake in development patterns, because:

If the value of any single home is affected by the condition, type, and value of surrounding homes, then it is of the utmost importance to the mortgage lender that patterns of residential areas be prepared, showing the relationship of sections of different types to each other.²⁶

In this assertion, the federal government's interest in the organization of cities becomes clear: insofar as the layout of cities affects the investment-backed expectations of home buyers, it also affects the interests of the federal government in providing and securing loans for those buyers. Arguably, then, one can stabilize or control the real estate market by superimposing regulatory controls on what can be built and where.

The people of Houston have also rejected zoning—despite the marketplace predictability promised by zoning. Houstonians voted down ballot referenda that would have allowed zoning on three occasions: in 1948, 1962, and 1993.²⁷ This clear expression of the people's will, three times over, indicates that the citizens do not believe the city is obligated to enforce zoning regulations.

The referenda and Texas Constitution indicate the City of Houston is defying neither the will of the people nor the dictates of the state government in refusing to implement Euclidean zoning. Furthermore, twentieth century pressures from the federal government are best understood in light of the FHA's investment activities, and should not be construed to indicate that Houston has failed a federal mandate in its non-use of its regulatory ability.

Importantly, though, Houston does owe obligations to its citizens, and these are set forth in the municipal charter, which empowers City Council to exercise broad police powers. Article two, section two grants City Council the power to:

[. . .] enact and to enforce all ordinances necessary to protect life, health and property; to prevent and summarily abate and remove nuisances; to preserve and promote good government,

²⁵ HOMER HOYT, *THE STRUCTURE AND GROWTH OF RESIDENTIAL NEIGHBORHOODS IN AMERICAN CITIES* 3 (1939).

²⁶ *Id.* at 27.

²⁷ John Mixon, *Four Land Use Vignettes from Unzoned Houston*, 24 NOTRE DAME J.L. ETHICS & PUB. POL'Y 159, 159 n.2 (2010).

order, security, amusement, peace, quiet, education, prosperity and the general welfare of said City and its inhabitants.²⁸

This power to “preserve and promote” the “general welfare” could be read broadly, possibly to include aesthetic regulations. Such regulations would come near to comprehensive planning, given that zoning, like nuisance litigation, safeguards “the proper regulation and use of property.”²⁹ But the city does not flex its power to its limit. Instead, the city takes a circumscribed view of its nuisance-abatement powers. The city delegated its authority to the Department of Neighborhoods, which enforces the city’s minimal nuisance standards to rid the city of conditions “dangerous to human health or welfare” and other enumerated ills.³⁰ Absent government regulation, private individuals and associations coordinate both the separation of uses and regulation of aesthetics, absent city guidance.

II. FEATURES OF THE REGULATORY STRUCTURE AT STATUS QUO

A. *Voluntary Self-Regulation Structure*

In the absence of central planning, Houston has self-organized into neighborhoods, many of which are governed by homeowners’ associations (HOAs). HOAs both apply restrictions and provide amenities that city governments traditionally do not. These restrictions and benefits have succeeded in securing higher home values in Houston subdivisions regulated by HOAs. The marketplace, then, allows property owners to select the location of real property, the kind of housing structure (subject to deed restriction), and a variety of amenities provided by the community. By expanding the number of options in the marketplace and allowing buyers to vote with their mortgages, this market structure incentivizes HOAs to meet consumer expectations.

Deed restrictions carry the weight of law because the City has the power to enforce them.³¹ This enlarges the government’s role in planning, insofar as the city has the power to intervene in matters of enforcement. At the same time, it highlights the deference of municipal authorities to the will of private actors as expressed in land transactions, *e.g.*, deeds, civic organizations, and HOAs.

²⁸ HOUS., TEX. MUN. CHARTER art. II, § 2.

²⁹ Comment, *Zoning and the Law of Nuisance*, 29 FORDHAM L. REV. 749, 750 (1961).

³⁰ *E.g.*, HOUS., TEX. CODE §§ 2-268, 2-624, 10-451 (defining nuisance), 10-453 (enabling the Department of Neighborhoods to respond to abatement), 30-2 (regulating noise) (2017).

³¹ ALEXIUS MARCANO, MATTHEW FESTA, & KYLE SHELTON, KINDER INST. FOR URBAN RSCH., DEVELOPING HOUSTON: LAND-USE REGULATION IN THE “UNZONED CITY” AND ITS OUTCOMES 6 (2017).

B. Central Planning at the Municipal Level

It must be acknowledged: Houston is not an “unzoned” city. Though the Houston Planning Commission does not act with reference to a comprehensive plan,³² the city does have regulatory mechanisms, including a Land Development Ordinance and numerous development regulations in the city code. The Kinder Institute, a leading research institution in Houston, describes the city as having “loose development regulation . . . rather than none at all.”³³ The land use regulations Houston imposes do affect the scope and shape of urban and suburban development within the city.

The Houston Land Development Ordinance regulates features of land use such as lot sizes, parking requirements, setback requirements, street widths, and block sizes.³⁴ This regulatory power effectively gives the municipality the authority to control population density and to affect traffic patterns and urban walkability.³⁵ The power to shape new development projects is especially relevant, given that Houston’s population grew by nearly 20% between 1990 and 2000, and the population is expected to grow by an additional 2,200,000 people by 2030.³⁶

Parking regulations are one highly contentious example of the city’s power to influence development. Minimum parking space requirements are based on the usage of the property and the neighborhood in which the land sits.³⁷ These requirements make development difficult, especially in high-demand areas. Consider the re-development of the Westheimer Flea Market. To redesign the market, the developer had to tear down a portion of the structure *and* acquire an adjacent property to build enough parking to satisfy city regulations.³⁸ Underground parking is a commonly touted solution, but underground structures cost roughly two-and-a-half times more than ground parking: \$25,000, rather than

³² Mixon, *supra* note 27, at 164.

³³ Marcano et al., *supra* note 31, at 18.

³⁴ See generally HOUS., TEX. CODE Ch. 42 (2017) (“Subdivisions, Developments and Platting”).

³⁵ See, e.g., *Walkable Places Committee, Planning & Development*, CITY OF HOUSTON, http://www.houstontx.gov/planning/Commissions/committee_walkable-places.html (2020).

³⁶ U.S. CENSUS BUREAU, CENSUS 2000 BRIEF C2KBR/01-2, POPULATION CHANGE AND DISTRIBUTION tbl. 5 (2001), <https://www.census.gov/prod/2001pubs/c2kbr01-2.pdf>; Leah Binkovitz, *Projections Show How Houston, and the Country, Will Change by 2030*, KINDER INST. FOR URBAN RSCH.: URBAN EDGE (Dec. 18, 2017), <https://kinder.rice.edu/2017/12/18/projections-show-how-houston-and-the-country-will-change-by-2030>.

³⁷ HOUS., TEX. CODE Ch. 26 §§ 510–520 (2017).

³⁸ Nancy Sarnoff, *Why Houston Has So Much Parking, Part I*, HOUSTON CHRONICLE, at 8:30 (Jul. 14, 2017), <https://www.houstonchronicle.com/business/real-estate/looped-in/article/Does-Houston-need-so-much-parking-11288834.php>.

\$10,000 per space.³⁹ Where parking minimums are in place, each business has a larger footprint, contributing to sprawl. But perhaps a new trend will emerge in Houston. The City Council rolled back parking minimums in the East Downtown (EaDo) neighborhood and parts of Midtown in 2019.⁴⁰ The long-term impact of this plan remains to be seen; in the meantime, most Houstonians continue to live with the effects of the older policies.

There is an open and on-going conversation as to how much these municipal regulations have affected Houston's development patterns.⁴¹ Municipal setback requirements, for example, stymie market demands for public transit by making various shopping centers further from a given public transit stop.⁴² Consider, too, that Houston's development does not differ markedly from peer cities such as Dallas and Los Angeles. Parallel development in these major cities indicate that "sprawl" is not unique to Houston, and non-zoning is not a necessary condition for its occurrence.

C. Practical Outcome of Voluntary v. Central Regulation

The effect of Houston's non-Euclidean zoning is little different from the patterns of development one would expect under formal zoning. Bernard Siegan made this argument first and most forcefully.⁴³ Siegan concluded that economic forces segregate land uses in the absence of formal controls. He further observed that Houston was exceptional from peer cities only with respect to its available stock of apartment housing, the usage of land near to major thoroughfares for commercial and multi-family purposes, and the relatively high prevalence of non-home uses in "interior" single-family areas.⁴⁴ These development differences, at the time of Siegan's writing, were not thought to be significant. According to Siegan, the marketplace regulation of land

³⁹ Donald C. Shoup, *The Trouble with Minimum Parking Requirements*, 33 TRANSP. RSCH. PART A 549, 556, 571-72 (1999), <http://shoup.bol.ucla.edu/Trouble.pdf> [<http://perma.cc/UH2T-HATP>].

⁴⁰ Leah Binkovitz, *Houston Extends Minimum Parking Exemptions into East End, Midtown*, KINDER INST. FOR URBAN RSCH.: URBAN EDGE (July 17, 2019), <https://kinder.rice.edu/urbanedge/2019/07/17/houston-extends-minimum-parking-exemptions-east-end-midtown>.

⁴¹ See, e.g., Michael E. Lewin, *How Overregulation Creates Sprawl (Even in a City Without Zoning)*, 50 WAYNE L. REV. 1171, 1188 (2004) ("In sum, Houston's wide streets, like that city's setbacks and minimum parking requirements, make Houston less walkable and more auto-oriented—both by making pedestrian journeys more difficult and dangerous, and by reducing density.").

⁴² See *id.* at 1180.

⁴³ Bernard H. Siegan, *Non-Zoning in Houston*, 13 J.L. & ECON. 71 (1970).

⁴⁴ *Id.* at 128–29.

usage was roughly equivalent to the centralized planning in a zoned city.

Real estate values animate discussions of land usage in Houston. The presence of government regulation changes the marketplace. As Siegan wrote, “[w]hen a zoning ordinance is superimposed on the supply, new price relationships are necessarily created.”⁴⁵ Houston’s analogue to the zoning ordinance, with respect to the imposition of a new price relationship, is the restrictive covenant. These covenants are “more likely [than zoning ordinances] to preclude any use of property which might be harmful to values.”⁴⁶ That is, they are sensitive to a property’s economic value rather than other considerations of social value or utility. If there is an economic incentive for housing development, it will be built.⁴⁷ There is limited friction in this marketplace.

The self-regulation of communities through HOAs and deed restrictions facilitates the best aspects of Tieboutian thinking. To summarize Tiebout’s seminal 1965 analysis, “[t]he greater the number of communities and the greater the variance among them, the closer the consumer will come to fully realizing his preference position.”⁴⁸ Tiebout theorizes about the “consumer voter,” who is able to move between communities with full knowledge of the benefits and amenities afforded by each.⁴⁹ Community governments, for their part, seek to provide the amenities expected by current residents at the lowest cost per person, in order to attract sufficient residents to attain optimal size.⁵⁰

This theory applies neatly to the Houston context of private deeds. In this context, home buyers choose at the outset which neighborhoods, and thereby which associations, to buy into. And while the controls may change over time, in practice they preserve the general character of the neighborhood. Where HOAs are established, Houstonians self-consciously “vote with their feet” when purchasing a home. Empirical evidence supports this claim, demonstrating that Houston residents are sensitive to guarantees of land use restrictions. Indeed, one study suggests that communities with restrictive covenants command a higher market value than similarly situated, but non-restricted homes.⁵¹ This is possible in part because codes governing various communities are not

⁴⁵ *Id.* at 127.

⁴⁶ *Id.* at 130.

⁴⁷ *Id.* at 142.

⁴⁸ Charles M. Tiebout, *A Pure Theory of Local Expenditures*, 64 J. POL. ECON. 416, 418 (1956).

⁴⁹ *Id.* at 419.

⁵⁰ *Id.*

⁵¹ Janet Furman Speyrer, *The Effect of Land-Use Restrictions on Market Values of Single-Family Homes in Houston*, J. REAL EST. & ECON. 117, 125 (1989).

hidden in municipal codices, but rather made readily available by HOAs.

In the aftermath of Hurricane Harvey, Houston has an opportunity to reflect on the municipality-imposed regulations and how they interact with the marketplace. There is also an opportunity to test marketplace sensitivity and reactivity by posing the question: how do housing prices respond to the incidence of flooding and the increased probability of a future natural disaster?

D. Taxes: Uniting Voluntary Action and Central Regulation

In addition to private contracts and city regulations, state and municipal taxes have played a supplemental role in Houston's development process. Municipal management districts (MMDs) and tax increment reinvestment zones (TIRZs) do not impose government regulation on Houston businesses, but they do facilitate growth and indicate the breadth of governmental influence.

MMDs are creatures of state law. Local business owners are able to self-organize and petition for an MMD, under which they can levy assessments for the improvement and maintenance of their business district.⁵² This is an example of non-municipal, state-sanctioned, self-organization in the marketplace. Twenty-two MMDs overlay about one-third of Houston's area.⁵³

TIRZs, administered by the Houston City Council, are another example of self-organized business activity. In a TIRZ, any taxes attributable to new improvements are set aside to fund public improvements. This is a distinction from MMDs, since an MMD is able to levy assessments. Also, unlike MMDs, TIRZs are reserved for neighborhoods that are blighted, substandard, or otherwise in need of significant improvement.⁵⁴ Most of Houston's twenty-six TIRZs are located inside the 610 Loop (the "Inner Loop"), which roughly defines Houston's urban core.⁵⁵ This is because these tax incentive programs respond to the mid-twentieth century criticism of Houston's downtown as having "sprawled and spread and left obsolescence and blight behind."⁵⁶ TIRZs present an opportunity to draw new businesses into the "blight" left behind by structuring taxation in the form of an investment

⁵² TEX. LOC. GOV'T CODE § 375.111 (West 2005).

⁵³ Kiger, *supra* note 11.

⁵⁴ *Economic Development, THE CITY OF HOUSTON* (2020), <http://www.houstontx.gov/ecodev/tirz.html>.

⁵⁵ Marcano et al., *supra* note 31, at 7.

⁵⁶ AM. SOC'Y OF PLAN. OFF., RESEARCH REPT. NO. 2: PROBLEMS OF ZONING AND LAND USE REGULATION 5 (1968).

opportunity, *i.e.*, the taxes paid will be returned to the community vis-à-vis the tax increment fund or tax increment bonds or notes.⁵⁷

In establishing a TIRZ, a neighborhood has the opportunity to forgo self-regulation of land usage and invite the city to exercise zoning authority. So, in Houston, TIRZs have taken on a regulatory role. The Saint George Place TIRZ, for example, was the first to implement “extensive land-use restrictions” including requirements for “setbacks, height, use” and other regulations common under a municipal zoning structure.⁵⁸ Saint George Place is an excellent case study in the dynamics at play in Houston’s land use regulation environment. Saint George Place is located near to the Galleria—a thriving commercial center—and the property owners expected commercial development to boost their property values.⁵⁹ Commercial development never materialized, and the neighborhood’s economic value deteriorated.⁶⁰ A developer entered the community with the idea to redevelop it under the TIRZ structure. In 1990, the City Council created the TIRZ, and the neighborhood thrived under the restrictions it imposed.⁶¹ Between 1992 and 2006, the zone’s tax base increased from about \$12 million to more than \$160 million.⁶²

The TIRZ is a creature of municipal regulation, but it affords the Saint George Place residents a greater role in determining local land usage than is typical under a zoning regime. For example, when a developer requested zoning changes to accommodate a new project, 326 residents signed a petition in protest, ultimately leading to the request’s failure.⁶³ This scenario indicates that Houstonians do see a rational economic interest in imposing land use controls. Notably, however, the imposition of zoning came after the business owners and residents decided to end deed restrictions for the purpose of allowing mixed land usage. So, it is not clear that zoning under the TIRZ provided an advantage over the original schematic.

Still further, the reaction of local residents to the prospect of a change to the zoning code indicates that Houstonians are willing to exercise the full extent of their individual influence in the neighborhood decision-making process. While the zoning power in St. George Place may not

⁵⁷ TEX. TAX CODE § 311.014 (2013).

⁵⁸ Marcano et al., *supra* note 31, at 7.

⁵⁹ Mike Snyder, *Houston’s Zoned Neighborhood Fights Change*, HOUS. CHRON. (Dec. 18, 2006), <https://www.chron.com/news/244ouston-texas/article/Houston-s-zoned-neighborhood-fights-change-1632327.php>.

⁶⁰ *See id.*

⁶¹ *Id.*

⁶² *Id.*

⁶³ *Id.*

provide an advantage beyond that offered by deed restrictions, the TIRZ does. The tax base in St. George Place has increased thirteen-times over. That is an astounding growth rate for any community. The unique structure of the tax, which reinvests taxes into the community from which they are derived, means that the economic development of a neighborhood is rewarded by an increased opportunity for economic development. Normally, taxes represent a transaction cost or a pseudo wage garnish, but in the case of a TIRZ, the taxes are an opportunity to generate investment income. That is a marked shift from traditional taxation and a real advantage to the residents of a TIRZ, especially where, as in St. George Place, they are able to effectively mobilize political will to maintain control over zoning decisions. This case study indicates that property owners are rational actors who make decisions in the interest of maximizing their property values, even if that means ceding some control to the city.

In sum, one can think of MMDs and TIRZs as government incentives to self-organize for the benefit of a defined geographic area. HOAs serve this purpose in intentionally developed residential areas. However, not every Houston neighborhood was developed in this fashion, and some deed restrictions were allowed to expire,⁶⁴ so MMDs and TIRZs provide analogous means to the same end of self-organization to meet market demand.

Reliance on private structures, *e.g.*, HOAs, to govern local matters is often criticized because there is a lack of innovation and a disincentive to upset homeowner expectations in order to create positive change. On this front, too, the MMDs and TIRZs offer an advantage, as they clearly motivate businesses to generate economic activity in otherwise unproductive areas. Even in “un-zoned” Houston, city regulators influence land-use decisions.

III. TESTING THE FUNCTIONALITY OF NON-ZONING: PLANNING FOR NATURAL DISASTER

In the aftermath of Hurricane Harvey, media outlets and academics posited that Houston’s lack of Euclidean zoning and the severity of flooding were more than coincidentally related. The generic argument ran that if Houston had centrally planned the city, it could have better regulated building in low lying areas and mitigated flooding.⁶⁵ The argument seems cogent as a matter of common sense: if low-lying areas

⁶⁴ Siegan, *supra* note 42, at 142.

⁶⁵ See, *e.g.*, Boburg & Reinhard, *supra* note 12.

flooded, and the city could have regulated development in those areas, then central planning may be a solution to flooding.

This argument fails to account for the ways in which Houston's existing quasi-regulatory bodies serve as a proxy for zoning, and how these regulations have worsened the city's weather-related disaster-readiness. But Hurricane Harvey should not have surprised Houstonians, and given the limited role of city government, the private sector should have planned for the inevitable. Why did it not? Analyzing the homebuyer marketplace reveals the distortions that prevented appropriate planning. By analyzing these distortions, one can work to promote good information and the proper marketplace incentives.

A. Using Case Studies to Evaluate Marketplace Reliability

In the Houston real estate market, natural disaster has the potential to distort the homebuyer's understanding of gains and losses that are likely to accrue from the property. Unstable weather patterns increasingly appear to be the "new normal" for low-lying coastal regions such as Houston, so the marketplace's sensitivity to weather-resilient versus flood-prone areas will be of increasing concern in coming years. At present, markets seem inconsistently responsive to Mother Nature's cues. Two case studies, New Orleans after Katrina and Miami after Andrew, demonstrate the weaknesses and strengths of real estate markets in accounting for natural disasters and contextualize the reactions of the Houston real estate market to Hurricane Harvey. The lessons drawn from these case studies, and the indicia of the nine months since Harvey, will inform recommendations for promoting marketplace transparency.

1. Miami and Hurricane Andrew

In 1992, Hurricane Andrew hit the Florida coast, causing significant flooding and severe damage to the Miami-Dade County community.⁶⁶ Immediately following Hurricane Andrew's landfall, the county saw a 28 percent decline in home purchase transactions relative to the preceding trimester.⁶⁷ Even accounting for a seasonal dip, this drop was considered substantial.⁶⁸ Subsequently, the market stabilized, with home

⁶⁶ Ed Rappaport, *Preliminary Report: Hurricane Andrew, 16-28 August, 1992*, NAT'L HURRICANE CTR. (Dec. 10, 1993), <https://www.nhc.noaa.gov/1992andrew.html>.

⁶⁷ FED. HOUSING FIN. AGENCY, HIGHLIGHTS: HOME PRICES AND HURRICANES 8 (2005), https://www.fhfa.gov/DataTools/Downloads/Documents/HPI_Focus_Pieces/2005Q3_HPIFocus_N508.pdf.

⁶⁸ *Id.*

values returning to pre-Hurricane levels.⁶⁹ So, the market did not account for the area's likelihood of flooding in the long-term, but only responded to the short-term disruption. Indeed, Miami-Dade property values increased relative to the rest of urbanized Florida. Prior to Hurricane Andrew, Miami-Dade's appreciation rates outpaced peer cities by an average of 2.7 percentage points, but after the Hurricane, that difference rose to 4.8 percentage points.⁷⁰

The marketplace is filled with incentives and disincentives, such that the likelihood of flooding might be offset by the convenience of a low-traffic commute to work or another daily amenity. This demonstrates that the singular fact of previous flooding was not sufficient to derail the development of Miami-Dade County and prompts the analyst to look for countervailing incentives to build in flood-prone areas.

2. New Orleans and Hurricane Katrina

In New Orleans, the competing incentives at play in property values were illustrated by the rate of return to flooded homes. Immediately following Hurricane Katrina, "flood exposure [wa]s the single most important factor in determining the decision to return," but it was not the only factor.⁷¹ Many evacuees experienced no flooding; thirty-six percent of non-flooded evacuees did not return.⁷² This anecdote from Katrina indicates that the risk of flooding is only one of many factors contributing to a property's desirability and thereby its value.

Economic intervention can change the calculus. The City of New Orleans incentivized the economic growth of areas with depressed occupancy rates by relaxing building restrictions and regulation processes for incoming businesses. A premier example of this strategy is the Freret neighborhood. In the aftermath of Katrina, roughly one-third of Freret's housing stock was "vacant, blighted, trashed and ruined."⁷³ The city intervened with a strategy to implement "street improvements" and "projects to enhance security."⁷⁴ Seemingly, the

⁶⁹ *Id.* at 9.

⁷⁰ *Id.*

⁷¹ Christina Paxson & Cecelia Elena Rouse, *Returning to New Orleans After Hurricane Katrina*, 98 AM. ECON. REV. 38, 38-42 (2008) (examining "the determinants of returning to New Orleans in the 18 months after the hurricane.").

⁷² *Id.*

⁷³ Greg Allen, *Some Moved On, Some Moved in and Made a New New Orleans*, NPR (Aug. 26, 2015), <https://www.npr.org/2015/08/26/434288564/some-moved-on-some-moved-in-and-made-a-new-new-orleans>.

⁷⁴ BILLES ARCHITECTURE, LLC, FRERET NEIGHBORHOOD PLANNING DISTRICT 3 NEIGHBORHOOD REBUILDING PLAN 14 (2006),

strategy was effective: housing prices there have more than doubled since Katrina.⁷⁵ This example indicates that an injection of capital may improve the desirability of a neighborhood. This can be done by municipal funding, as in Freret, or by private investors.

Where government intervention did not incentivize for rebuilding, demand for unflooded properties increased.⁷⁶ This behavior affected home values in less flood-prone cities. In Baton Rouge, for example, evacuees created a demand for homes that significantly raised residential property values. In 2004, residential sales were at \$788 million, and by the close of 2005, they were at \$1.2 billion.⁷⁷ The most significant event in this yearlong timeframe was Hurricane Katrina. This may indicate that homeowners and renters displaced by that event made the risk-averse decision to move to higher ground in the aftermath of the storm. Granted the housing bubble was near its peak, so the market was poised for inflation.

There is some indication that when the “high-and-dry” properties were bought up, demand resumed for real estate in New Orleans’ flooded interior. KB Home builders, for example, made an early move to acquire lots in New Orleans and in nearby Jefferson Parish.⁷⁸ The re-entry of this real estate developer into the marketplace powerfully signaled investment-backed expectations of profitability in the post-hurricane consumer environment.

Similar signs of profitability also arose in the floodplains of a post-hurricane Houston. Much like KB Home Builders, “We Buy Ugly Houses” and other franchises in Houston bought low-value homes and made improvements to sell at a significant profit. Such franchises incentivize homeowners with large outstanding mortgages to walk away from them.⁷⁹ This is a perfect climate for short-term opportunistic investment activity. Yet the quick profits may contribute to a volatile real estate market that is not adequately responsive to the risk of buying a previously flooded home.

https://nolaplans.com/plans/Lambert%20Intermediate/District_3_Plan_FINAL%20PLAN%20RE-PORT%20Freret%2009-29-06.pdf.

⁷⁵ Allen, *supra* note 73.

⁷⁶ *Post Katrina Real Estate Booming*, ASSOCIATED PRESS (May 9, 2006), http://www.nbcnews.com/id/12707604/ns/business-real_estate/t/post-katrina-real-estate-booming/#.WvUcL9PwbaY.

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ See Hansi Lo Wang, *Real Estate Investors Rush to Buy Houston Homes Damaged by Flooding*, NPR (Nov. 8, 2017), <https://www.npr.org/2017/11/08/562903267/some-real-estate-investors-eager-to-buy-houston-homes-damaged-by-flooding>.

3. *Lessons Learned*

The real estate market is not, then, singularly reactive to a flooding incident. Instead, property values in the aftermath of a storm are informed by the economic capacities of the original landowners and the intervening actions of government regulators. Given these variables, it is no surprise that real estate values do not respond consistently to all flooding scenarios. Despite the discrete instances of real estate value fluctuation described above, some reports in the aftermath of Katrina asserted that overall market strength was not affected by the hurricane.⁸⁰ The variety of inputs in each neighborhood generated different outcomes. This indicates that concern about future flooding events does not drive the homeowner's buying or selling behaviors. After a review of the pertinent literature, the Federal Reserve Bank of Dallas aggregated data from U.S. coastal cities and concluded that "the typical hurricane strike raises real house prices for a number of years, with a maximum effect of between [three to four percent] three years after occurrence."⁸¹ A hurricane proves the risk of home flooding, but seemingly it does not permanently affect home values. The lessons of New Orleans and Miami-Dade County indicate that disruptive events, such as Hurricanes Katrina and Andrew, create an opportunity for a generation of new development, which can be stimulated by the government and private investment. The interference of government regulation, however, deserves a hard look and closer examination, especially with respect to federal funding.

B. Outlook for Houston's Real Estate Market

Hurricane Harvey made landfall in August 2017. The housing market stagnated.⁸² But in 2018 later, home sales were up 7.2% over 2016.⁸³ One Houston-based real estate valuation firm, Deal, Sikes & Associates, attributes this to better-than-expected job growth in 2017.⁸⁴ Job growth

⁸⁰ *Real Estate in the Aftermath of Hurricane Katrina*, ILL. BUS. L.J. (Oct. 30, 2005), <https://publish.illinois.edu/illinoisblj/2005/10/30/real-estate-in-the-aftermath-of-hurricane-katrina/>.

⁸¹ ANTHONY MURPHY AND ERIC STROBL, FED. RSRV. BANK OF DALLAS, WORKING PAPER 1009, *THE IMPACT OF HURRICANES ON HOUSING PRICES: EVIDENCE FROM US COASTAL CITIES* 4 (2010).

⁸² Nancy Keates, *How Harvey Transformed House-Hunting in Houston*, WALL ST. J. (Oct. 24, 2018, 11:10 AM), <https://www.wsj.com/articles/how-harvey-transformed-house-hunting-in-houston-1540393824>.

⁸³ *Id.*

⁸⁴ Katherine Feser, *Report: Houston Real Estate to Benefit from Better Job Growth*, HOUS. CHRON. (Mar. 20, 2018), <https://www.chron.com/business/real-estate/article/Report-Houston-real-estate-to-benefit-from-12767470.php>.

is another variable that can create demand for real estate and complicates the analysis of marketplace reactions to a natural disaster. A representative of the Greater Houston Partnership summarized the real estate climate in Houston by saying:

Across the board, the demand for land is healthy. Builders are seeking smaller sites for Inner Loop residential and boutique retail. In suburban areas, developers are actively acquiring land for industrial, distribution, retail and residential projects.⁸⁵

Although the market in Houston is rebounding to pre-Hurricane Harvey growth levels, the risk posed by extreme weather is still present, and it demands attention. This response should take place on three levels. The federal government should provide reliable flood map information, the local government should exercise its police powers to preserve natural wetlands or incentivize the marketplace to do the same, and private actors should insulate themselves from harm by building protective measures into their HOA and deed restriction agreements.

IV. INCENTIVIZING A MORE WEATHER-RESISTANT HOUSTON

A. Market Incentives for Non-governmental Controls Are a Functional Alternative to Central Planning

In the absence of central land use planning by the city government, a mixture of municipal and private controls regulates Houston's land usage. As discussed above, the municipal government explicitly defines set-back requirements, parking lot minimums, and street widths.⁸⁶ Furthermore, the city utilizes tax incentives to encourage the development of deteriorated and under-utilized areas.⁸⁷ The remainder of powers is left to individual property owners, who frequently develop community norms using the restrictions imposed by master planned communities and/or HOAs.

HOAs limit each individual property owner's development rights in the interest of preserving the aesthetic of the neighborhood, the character of the community, and, perhaps most determinatively, the value of the properties. At present, these agreements only regulate the aesthetic features of the neighborhood. Given that HOA agreements, deed restrictions, and restrictive covenants in Houston are designed to protect property values, and given that natural disasters pose a

⁸⁵ *Id.*

⁸⁶ HOUS., TEX. CODE OF ORDINANCES § 42 (2017).

⁸⁷ See Zhu Qian, *Without Zoning: Urban Development and Land Use Controls in Houston*, 27 CITIES 31, 35 (2010).

tremendous threat to these values, it seems neighborhoods should utilize the agreements to improve their resilience to natural disaster. HOAs could require wind-resistant roofing, permanent storm shutters, and the like.⁸⁸ In some cases, hurricane preparation may improve aesthetic appeal, as in a gutter cleaning requirement. Such requirements may improve hurricane resiliency and normalize hurricane preparedness.

While HOAs are generally found in more urban areas, master planned communities dominate suburban development. These communities are able to meet the home buyer's willingness to "pay for the amenities that a larger subdivision allows a developer to provide."⁸⁹ Communities located "inside the Loop," an expression that refers to the urban core, have organized their HOAs to realize similar goals. River Oaks, a tiny Houston neighborhood, states its aim as producing "a complete residential community in the most advantageous locality" for the "Houston citizen of discriminating taste."⁹⁰ These HOA agreements and master planned communities function as an analogue to Euclidean zoning. HOAs are a powerful force in shaping land usage decisions.⁹¹ One would expect them to play a role in insulating Houston from the harms of flooding if the market so demanded.

Working from the assumption that HOAs are a functional equivalent to a zoning board, it is reasonable to suggest that HOAs impose regulations on their membership in order to insulate the homes from declining valuation. Returning to the example of the River Oaks HOA, the organization exists to "intelligently locate shopping centers, schools, churches, parks and play-grounds, so as to protect the home owners from the accidents of neighborhood changes," and to ensure that the neighborhood is held to "a most rigid and thoroughgoing maintenance."⁹² These goals would seemingly be achieved by enacting regulations to make the neighborhood more resilient to natural disasters.

⁸⁸ See *Hurricane Safety*, RED CROSS, <https://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/hurricane.html> (last visited Aug. 6, 2020) (describing hurricane preparedness measures).

⁸⁹ Paul Thornses, *Internalizing Neighborhood Externalities: The Effect of Subdivision Size and Zoning on Residential Lot Prices*, J. OF URBAN ECON. 397, 413 (2000).

⁹⁰ *River Oaks Aim and Ideal*, RIVER OAKS PROP. OWNERS, INC., <http://www.ropo.org/> (last visited Jun. 29, 2020).

⁹¹ Texas courts will enforce restrictive covenants in "instances where purchasers of real property buy 'with actual or constructive knowledge of the scheme, and the covenant was part of the subject-matter of his purchase.'" *Tarr v. Timberwood Park Owners Ass'n, Inc.*, 556 S.W.3d 274, 281–82 (Tex. 2018) (quoting *Curlee v. Walker*, 112 Tex. 40, 244 S.W. 497, 498 (1922)). The enforcement power is considerable, given that Houston's Code of Ordinances requires the seller to ensure that each buyer receives notice of deed restrictions and "[t]he failure of any seller to comply with this section shall constitute a misdemeanor." HOUSTON, TEX. CODE OF ORDINANCES §§ 10-556(c)(2017).

⁹² *River Oaks Aim and Ideal*, *supra* note 89.

HOAs, however, are not incentivized to impose regulations with respect to insulation from natural disaster because, as demonstrated above, the marketplace does not uniformly respond to the effects of natural disaster. As a case study of Katrina in New Orleans showed, affluent areas had the resources to rebuild and repair homes affected by flooding, and therefore saw a rebound in property values.⁹³ Suburban developments and well-organized HOAs are similarly positioned: there is an expectation that homeowners would independently calculate the risk and decide whether or not to rebuild in order to maintain and improve their property values in the aftermath of flooding. There is not, then, a marketplace incentive to impose new restrictions in order to mitigate the damage caused by flooding. To the extent that homeowners are interested in weather-proofing their homes, this must be done on an individual level, by opting for home repairs that improve resilience to flood waters. It will not be done by the HOA or the community developer because there is not a market push for such regulation.

B. The Inaccuracy of Flood Risk Estimates Undermines the Success of Non-governmental Controls

The market price of a given property depends on the accuracy of information known about the property. Past flooding is one source of information, as discussed above. In new developments and yet-unflooded communities, flood maps are an essential second source.

Flood mapping is undertaken by the federal government under the auspices of the Federal Emergency Management Agency (FEMA), a subdivision of the Department of Homeland Security. The federal government is involved in the flood mapping process because it is the national leader in flood insurance. The federal government uses FEMA flood maps to evaluate the relative likelihood of flooding between zip codes and imposes flood insurance mandates. Homes within a “100-year-flood plain” must carry flood insurance in order to receive federal funding (e.g. a FHA loan).⁹⁴ Private actors regularly use the FEMA flood maps to evaluate the relative risk of developing new homes or purchasing existing homes in a given zip code. The reliability of these maps, then, is an essential facet of the homebuyer marketplace. Unfortunately, there is increasingly reason to be skeptical of these maps.

⁹³ Ariel Moyal, *Lasting Damages: Measuring New Orleans' Property Value Recovery Rate*, A STUDY OF INTERSECTIONS (Apr. 7, 2017), <https://arielcamille.wordpress.com/2017/04/07/lasting-damages-measuring-new-orleans-property-value-recovery-rate/> [<http://web.archive.org/web/20200719150845/https://arielcamille.wordpress.com/2017/04/07/lasting-damages-measuring-new-orleans-property-value-recovery-rate/>].

⁹⁴ National Flood Insurance Reform Act of 1994, § 524.

With respect to Texas specifically, the FEMA flood maps have repeatedly failed to provide reliable guidance as to which areas of town are likely to flood. In fact, between 1999 and 2009, FEMA flood maps did not include 75 percent of flood damages from five serious floods.⁹⁵ These five major events were: Hurricane Ike (2008), Tropical Storms Erin (2007) and Allison (2001), and two rainstorms that caused flooding in 2006 and 2009.⁹⁶ As the last major event was in 2009, FEMA had at least six years to process the information gathered from these events before Harvey arrived. The flooding caused by Hurricane Harvey indicates, however, that the agency did not learn its lesson. During Harvey, more than 200,000 homes and apartments were damaged within Harris County, and nearly three-out-of-four of these were outside of the 100-year flood plain.⁹⁷ This data tracks with that of the preceding flooding events in which the supermajority of flooded homes were not within the mandatory flood insurance zone as depicted on the FEMA flood maps.

The obvious solution to poor mapping is a map update. As Houston continues to develop, there is less and less permeable land, making previously low-risk areas prone to inundation. One expert, Samuel Brody, explained this phenomenon in saying, “[p]avement, rail lines and other structures trap water in a city that’s relentlessly flat.”⁹⁸ These dynamics of development affect the reliability of the flood maps, making regular updates essential.

Just as changes in the city affect the reliability of flood estimates, so too do changes in weather patterns. The estimates used by FEMA are based on rainfall data compiled up to 1994.⁹⁹ Although this data is industry standard, it does not reflect recent trends. The National Oceanic and Atmospheric Administration (NOAA) estimates that big storms in Houston drop between 30 and 40 percent more rainfall than they did previously.¹⁰⁰ This increase has affected the severity and location of

⁹⁵ Jade Boyd, *Decade of Data Shows FEMA Flood Maps Missed 3-in-4 Claims*, RICE UNIV. (Sept. 11, 2017), <http://news.rice.edu/2017/09/11/decade-of-data-shows-fema-flood-maps-missed-3-in-4-claims-2/>.

⁹⁶ *Id.*

⁹⁷ David Hunn et al., *Harvey’s Floods: Most Homes Damaged by Harvey Were Outside Flood Plain*, *Data Show*, HOUS. CHRON. (Mar. 30, 2018), <https://www.houstonchronicle.com/news/article/In-Harvey-s-deluge-most-damaged-homes-were-12794820.php>.

⁹⁸ Christopher Joyce, *Scientists Glimpse Houston’s Flooded Future in Updated Rainfall Data*, NPR (Nov. 20, 2017), <https://www.npr.org/sections/thetwo-way/2017/11/20/564941990/scientists-glimpse-houstons-flooded-future-in-updated-rainfall-data>.

⁹⁹ *Id.*

¹⁰⁰ *Id.*

flooding, yet the flood maps do not reflect the likely increase in the volume of rainfall.

The unreliability of FEMA maps is furthered by opportunistic behaviors on the part of developers. Developers are incentivized to build on as much of their land as possible, by creating subdivided plots, building houses, and selling them in the marketplace. However, once the majority of their land is developed and sold, developers may still attempt to further increase the return on their investment in the general amenities of the neighborhood. For example, in The Woodlands, the community has built a brand for the neighborhood, and constructed many amenities for homeowners, including waterparks and nature trails. Still further, development has attracted retailers to the area. Having built on much of the land, The Woodlands developers opportunistically raised the elevation of land designated as within the 100-year flood plain, meeting the minimum elevation by as little as 1.2 inches in order to build and sell more.¹⁰¹ The developers then petitioned for a remapping of the land in order to excluded it from the 100-year flood plain.¹⁰² Having successfully achieved this end, the developer built and sold homes, without alerting home buyers to the recently raised elevation.¹⁰³ This information was uncovered when, in the aftermath of Harvey, some of the purchasers of these homes found themselves with flooded homes and no insurance.¹⁰⁴ The developer legitimately improved the property to meet the federal standards and yet created a danger to residents. This gamesmanship demonstrates the fallibility and unreliability of the mapping system.

Beyond skepticism of the maps' accuracy, there is a real concern about the home buyer's ability to understand the terminology used to describe the maps. For instance, the term "100-year floodplain" is frequently used. On its face, this term indicates that a home located within that space would flood once every 100 years. However, in actuality, the term means that the area has a 1 percent chance of flooding each year. FEMA set this as the threshold for mandatory insurance, defining it as the "1 percent annual exceedance probability (AEP)."¹⁰⁵ While that value may have a technical meaning for FEMA

¹⁰¹ John Schwartz et al., *Builders Said Their Homes Were Out of a Flood Zone. Then Harvey Came.*, N.Y. TIMES (Dec. 2, 2017), <https://www.nytimes.com/2017/12/02/us/houston-flood-zone-hurricane-harvey.html>.

¹⁰² *Id.*

¹⁰³ *Id.*

¹⁰⁴ *Id.*

¹⁰⁵ Robert R. Holmes, *Floods and Recurrence Intervals*, U.S. GEOLOGICAL SURV., <https://www.usgs.gov/special-topic/water-science-school/science/floods-and-recurrence-intervals> (last visited Jun. 30, 2020).

and the FHA, it is difficult for the home buyer to understand. Where the likelihood of flooding over a thirty-year mortgage period is internalized as 1 percent each year and not a gamble of one per century, a homeowner's purchasing decision may reflect a misunderstanding of relevant information.

Not only does the unreliability of FEMA maps have the real potential to distort homeowner expectations, but it also misleads the FHA in deciding how to distribute loans. The investment of federal dollars in the flood insurance business should be informed by accurate, up-to-date information. Insofar as the federal government has failed to achieve this end—and academics have criticized the flood maps and proposed solutions—it may be appropriate to turn over both the flood mapping and the flood insurance programs to the free market.

C. FHA Loans Distort the Real Estate Market in Flood Prone Areas

Given the unreliability of flood plain maps and the FHA's reliance on these maps, a correlation between FHA lending and the purchase of homes in flood prone areas is unsurprising. As a consequence of this risky lending, the federal government faces considerable financial loss. In the case of Hurricane Harvey, this loss was multi-faceted, involving multiple federal departments and including transaction costs associated with the actual outlay of funding and forgiveness of debt. Consider that the Department of Housing and Urban Development (HUD) instituted a temporary moratorium, halting foreclosures on federally insured home mortgages.¹⁰⁶ This policy decision has its merits, but it also comes at a fiscal cost. When the government bears the cost, market feedback is likely less reliable. The moratorium applied to any homeowner who met one of the three following criteria:

1. You or your family live within the geographic boundaries of a Presidentially-declared disaster area, you are automatically covered by a 90-day foreclosure moratorium.
2. You are a household member of someone who is deceased, missing or injured directly due to the disaster, you qualify for a moratorium.

¹⁰⁶ Press Release, U.S. DEP'T. OF HOUSING & URBAN DEV., *HUD Announces Disaster Assistance for Victims of Hurricane Harvey: Foreclosure Protection Offered to Displaced Families* (Aug. 28, 2017), <https://archives.hud.gov/news/2017/pr17-068.cfm>.

3. Your financial ability to pay your mortgage debt was directly or substantially affected by a disaster, you qualify for a moratorium.¹⁰⁷

In effect, this moratorium provided a federal subsidy to those who bought homes on federal credit. Given that the federal government is also responsible for the drawing of flood maps, and that these maps are demonstrably inaccurate, it would be in the federal government's best interest to improve the quality of these maps and provide them to potential homeowners before the time of purchase. This would discourage building and purchasing in low-lying areas, and avoid federal spending to remedy the problem after the fact.

In addition to new construction, rebuilding in flood plains is a further concern. Since 1998, the federal government has subsidized taxpayers' flood insurance.¹⁰⁸ This insurance allows homeowners to rebuild in flooded areas with limited risk.¹⁰⁹ According to one report, previously-flooded properties compose "1 percent of the policies but account for 30 percent of the payout As a result, the National Flood Insurance Program was nearly \$25 billion in debt before a single drop of rain fell from Hurricane Harvey."¹¹⁰ These statistics indicate that the flood insurance program is not sustainable. It is advisable, then, that the program incentivize building on higher ground. Where the risk of flooding is so easily quantified, as it is in this case, the argument for more strategic, or reduced, federal involvement is at its strongest.

D. The Municipal Government's Role

Even absent zoning, there is a role for the municipal government in the improvement of Houston's resilience to flooding. This comes in two forms: the prioritization of flood plain protection through existing regulatory means and the infrastructure maintenance. Neither of these goals need grow the size of the municipal government; existing mechanisms can fulfill these goals.

Wetland loss is a major concern in Houston. Since 1992, the Greater Houston Area has seen a 5.5 percent decrease in wetland areas, with

¹⁰⁷ *Disaster Relief Options for FHA Homeowners*, U.S. DEP'T OF HOUSING & URBAN DEV., https://www.hud.gov/program_offices/housing/sfh/nsc/qaho0121#:~:text=FHA%20lenders%20will%20automatically%20stop,you%20are%20an%20affected%20borrower (last visited Sept. 10, 2020).

¹⁰⁸ Chris Tomlinson, *Time for Houston to Plan for Warmer Water*, HOUS. CHRON. (Sept. 3, 2017), <https://www.houstonchronicle.com/business/columnists/tomlinson/article/Time-for-Houston-to-plan-for-warmer-water-12166815.php>.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

Harris County losing almost thirty percent of its wetland areas.¹¹¹ Development caused 64 percent of the wetland destruction.¹¹² Harris County was among the hardest hit by Hurricane Harvey, with more than 200,000 single-family homes and apartments damaged during the storm.¹¹³ To curb the problem, the government should utilize its existing powers to sensitize the real estate market to the correlation between the development of wetland areas and flooding.

The City of Houston presently operates Wastewater Operations and Storm Water Maintenance, two services that can make efficient use of wetlands. According to one survey of the Houston area, freshwater wetlands decrease flooding, improve water filtration, replenish groundwater supplies, reduce erosion, and protect coastal areas and shorelines by weakening the force of storms.¹¹⁴ Houston's wetlands "are the principal means of cleaning polluted runoff that enters Galveston Bay."¹¹⁵ Without the wetlands, the cost of water treatment may fall to the city, which monitors Houston's streams and bayous through its Storm Water Maintenance Branch and Storm Water Quality Enforcement Section.¹¹⁶ Absorbing this cost would prove a considerable burden, estimated at \$50,000 per acre-foot of stormwater detention.¹¹⁷ Harris County lost an estimated 7,000 acre-feet between 1992 and 2010—compensating for that loss would cost about \$350 million.¹¹⁸ The benefits of wetland preservation, then, accrue to the taxpayer both by way of savings in the water filtration process and by mitigating the effects of natural disaster. There are also ancillary benefits to wetland preservation, including the promotion of biodiversity¹¹⁹ and enjoyment of natural beauty.¹²⁰

The City of Houston can further insulate its residents from the effects of flooding by improving infrastructure. In the immediate aftermath of Harvey, Houston Mayor Sylvester Turner admitted as much in saying:

We've been very stingy on infrastructure. We need more financial support on mitigating flooding. I'll accept that. You

¹¹¹ John S. Jacob et al., *Houston-Area Fresh Water Wetland Loss, 1992-2010*, TEXAS A&M UNIV. 8 (2014), <https://tcwp.tamu.edu/files/2015/06/WetlandLossPub.pdf>.

¹¹² *Id.* at 10.

¹¹³ David Hunn et al., *supra* note 97.

¹¹⁴ Jacob et al., *supra* note 111, at 12.

¹¹⁵ *Id.*

¹¹⁶ *Storm Water Maintenance Branch, CITY OF HOUS.*, <https://www.publicworks.houstontx.gov/row/drainage.html> (last visited Jul. 19, 2020).

¹¹⁷ Jacob et al., *supra* note 111, at 12.

¹¹⁸ *Id.*

¹¹⁹ BLAKE ROBINSON ET AL., UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME (UN-HABITAT), *URBAN PATTERNS FOR A GREEN ECONOMY: WORKING WITH NATURE 9* (2012).

¹²⁰ Jacob et al., *supra* note 111, at 12.

cannot significantly mitigate flooding and drainage on the cheap. And a lot of people don't want to pay. But you're going to pay sooner or later.¹²¹

Mayor Turner was correct in his assessment: government funds must either be expended for mitigation in the first instance or for repair after the fact. Arguably, however, it is much more expensive to pay for repair, given the implications for federally funded agencies such as FEMA and state funded programs such as those provided through the Texas Department of Emergency Management (TDEM).¹²² These effects on public institutions ripple out into the general marketplace as other lenders, such as the U.S. Small Business Association, offer low interest loans in order to assist property owners in financing the repair or replacement of “damaged, uninsured real and personal property at homes and businesses.”¹²³ Reduced interest rates on business repairs are not a feature of optimal economic activity. Instead, it would be better to have weather-resilient storefronts, and to see the funds supporting low-interest loans allocated toward the growth or expansion of businesses.

Theoretically, then, the cost of hurricane repairs is greater than the cost of hurricane resiliency. Data support this claim, as Hurricane Harvey cost an estimated 125 billion dollars in damages.¹²⁴ To cover this enormous clean-up cost, Mayor Turner initially proposed an 8.9 percent municipal tax hike in order to generate \$113 million dollars in additional revenue.¹²⁵ Mayor Turner revoked the request when Texas Governor Abbott allocated 50 million dollars from the Texas Disaster Relief Fund for the purpose of covering “debris cleanup efforts.”¹²⁶ Although the state's action is reasonable under the circumstances, it is difficult to understand why the buck is continually passed to higher levels of government in response to natural disasters. Such behavior is not sustainable, especially when one considers that the bill will eventually be paid, and paid with the additional transaction costs associated with the redistribution of funds. Again, prevention at the outset is preferable to repair costs at the back end.

Present proposals from the Mayor of Houston do not, however, seem sufficient to prepare Houston for the next major natural disaster. At

¹²¹ Tomlinson *supra* note 108.

¹²² KINDER INST. FOR URBAN RSCH., RECOVERY FUNDING PRIMER: HARVEY RELIEF AND RECOVERY 6-8, 10 (2017), https://kinder.rice.edu/sites/g/files/bxs1676/f/documents/Kinder_ShortPrimer_02.26.18.pdf.

¹²³ *Id.* at 7.

¹²⁴ NAT'L HURRICANE CTR., *Costliest U.S. Tropical Cyclones Table Updated* (Jan. 26, 2018), <https://www.nhc.noaa.gov/news/UpdatedCostliest.pdf>.

¹²⁵ KINDER INST. FOR URBAN RSCH., *supra* note 122, at 9.

¹²⁶ *Id.*

present, Houston's municipal codes require that buildings be constructed "one foot above the flood level in a 100-year storm."¹²⁷ Mayor Turner has proposed stricter requirements such that "all new buildings outside the floodplain [must] be elevated two feet above the ground, and all new construction within the 500-year floodplain [must] be lifted two feet above the projected flood level during a 500-year storm."¹²⁸ These regulations look like the pseudo-zoning regulatory controls previously discussed, which created ample room for gamesmanship by opportunistic developers. Such building codes are not the sort of infrastructure improvements that may create lasting change in the City of Houston.

CONCLUSION

The City of Houston does not owe an affirmative legal obligation to landowners with respect to land use and hurricane preparedness, but it is in the best interest of all involved parties to mitigate the harm posed by hurricanes. This does not necessarily mean that the City of Houston should regulate more. Instead, homebuyers need reliable information about the likelihood of flooding in a given community. Updating FEMA's flood maps would improve the quality of information available to real estate purchases, allowing them to make more reasonable decisions. Helpful, too, is Senate Bill 339. Governor Greg Abbott signed the bill into law in June 2019. The law requires sellers to disclose whether (1) they currently carry flood insurance on the property, (2) the property previously flooded, (3) the property is located in the 100- or 500-year floodplain, a floodway, flood pool or reservoir.¹²⁹ It remains to be seen if this information changes consumer behaviors. Moving to high ground is not the only way to create a change. Homeowners also have an opportunity to improve flood resiliency in their existing neighborhoods. They should work through their HOAs to undertake disaster-readiness development. For example, homeowners could improve neighborhood drainage, implement standards for wind-resistant roofing, and otherwise allocate their HOA resources toward sustainable maintenance. Finally, the City should use its existing regulatory structure to incentivize sustainable development. Houston has demonstrated a willingness to discard old policies in favor of new

¹²⁷ Rebecca Elliott & Mike Morris, *Turner Proposes Stricter Development Rules to Boost Flood Control in Houston*, HOUS. CHRON. (Jan. 25, 2018), <https://www.chron.com/news/politics/houston/article/mayor-turner-flooding-development-rules-harvey-12521357.php>.

¹²⁸ *Id.*

¹²⁹ Tex. Prop. Code § 5.008(b).

realities, as in the elimination of parking requirements in EaDo. Now is the time to double down on development standards. Houston simply cannot wait until the next storm is in the Gulf.