Hurricane Harvey: Three Years Later

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After the onslaught of Hurricane Harvey in August 2017, the Hobby School of Public Affairs at the University of Houston initiated a five-year panel survey to understand the long-term experiences of people impacted by the hurricane. This report presents results from the third wave of the Hobby School Harvey Survey. Our aim is to understand the experiences of people impacted by Hurricane Harvey and the decisions made by individuals, community, government and private sector leaders to mitigate, rebuild and prepare for addressing the effects of severe weather events affecting our region.

The survey was in the field between May 20 and June 23, 2020. We collected responses from a representative sample of residents of Brazoria, Fort Bend, Harris and Montgomery counties aged 18 and above. In total 1,065 individuals responded to our survey, which covered questions about their experience during Hurricane Harvey, the extent of their recovery, support for policies aimed at mitigating future impact of severe weather events in the region, environmental concerns, and trust in elected officials' abilities to prevent future flooding in the Houston area.

Experience and Recovery

2.1 Property and Residence Damage

Hurricane Harvey caused damage to the residences of about two-fifths (41.9%) of the respondents (see Figure 1). Of those whose residences were damaged, 41.6% had to move from their homes as a result of the damages inflicted by Hurricane Harvey, while 58.4% did not (see Figure 2).

Figure 1: Did your residence receive any damages during Hurricane Harvey?

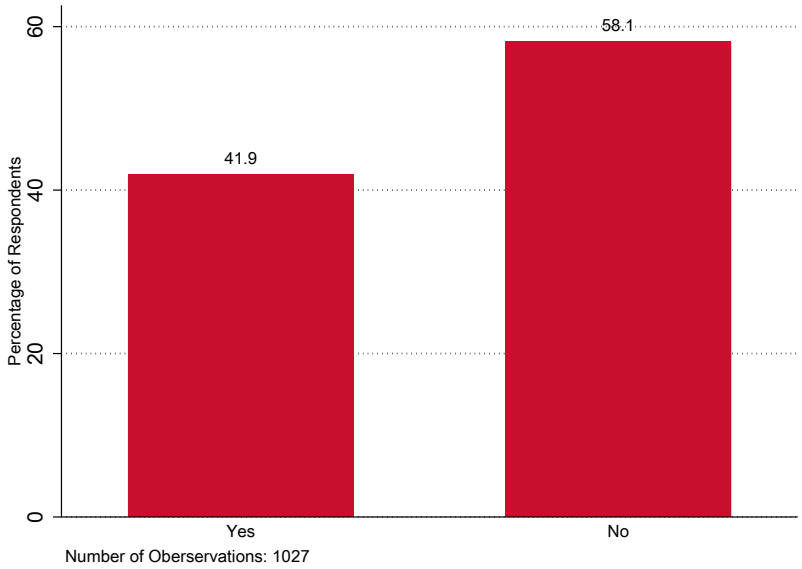
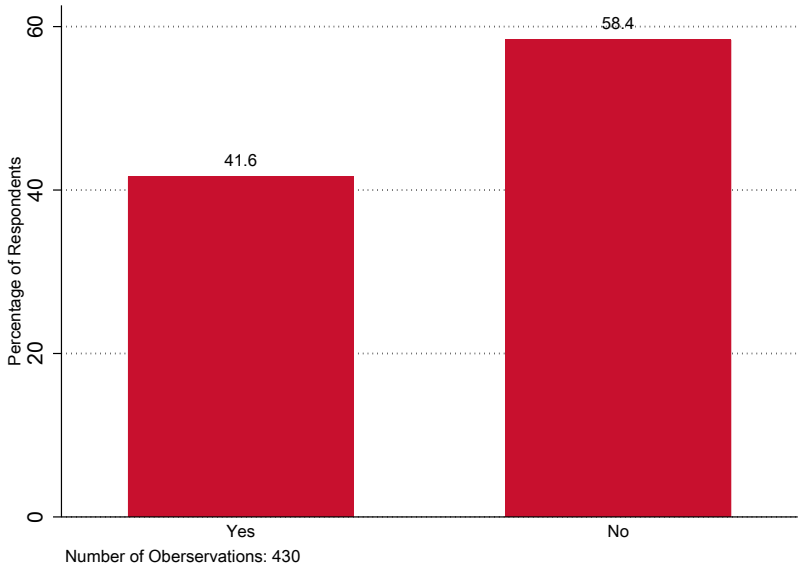
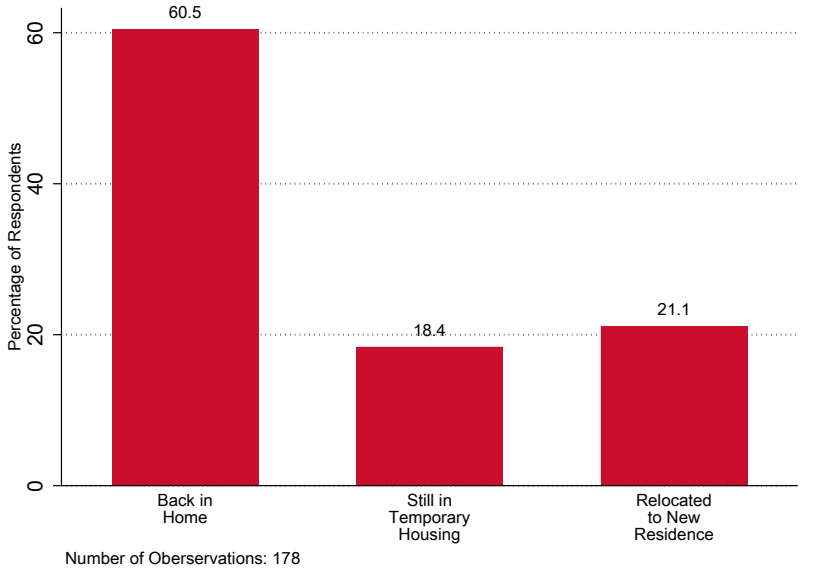


Figure 2: Did you have to move from your residence because of Hurricane Harvey?



At the time respondents were asked in June 2020, of those 178 respondents who had to move because of Hurricane Harvey, about three-fifths (60.5%) were able to move back into their original residence. However, about two-fifths (21.1%) indicated that they had relocated to a new residence, and about a fifth of respondents found themselves still residing in temporary housing almost two years after Hurricane Harvey devastated Houston (see Figure 3).

Figure 3: Have you moved back into your residence, are you still living in temporary housing, or have you relocated to a new residence?



Among the two-fifths of respondents whose residence was damaged by Hurricane Harvey, two-thirds (67.7%) needed to rebuild or modify part or all of their property, while one-third (32.3%) did not (see Figure 4).

Figure 4: Did you need to rebuild or modify your property or part of your property as a result of Hurricane Harvey?

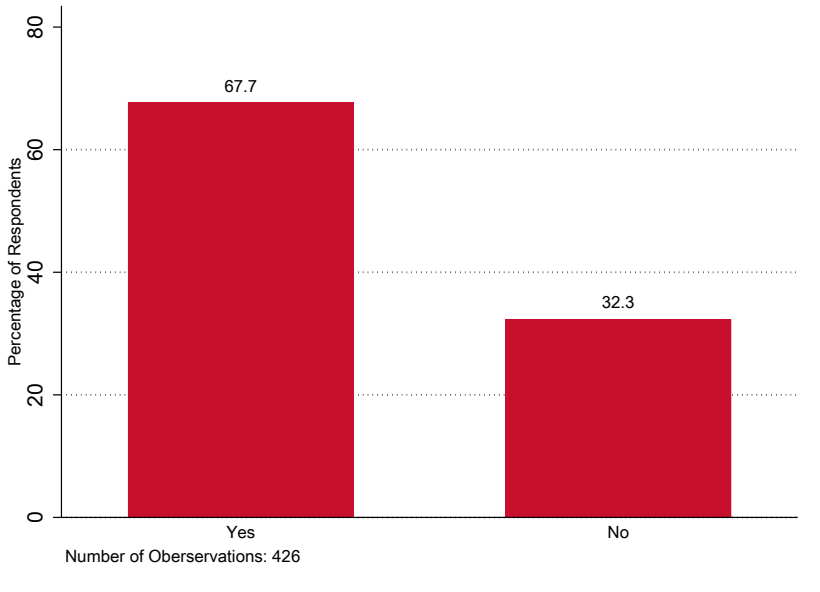


Figure 5 underscores that the two most common modifications were to rebuild their original home (31.7%) and elevate their home (30.4%), followed by mitigation (26.3%), other modifications (21.7%), and building a completely new home (15.7%).

Figure 5: What type of modifications did you make on your property after Hurricane Harvey?

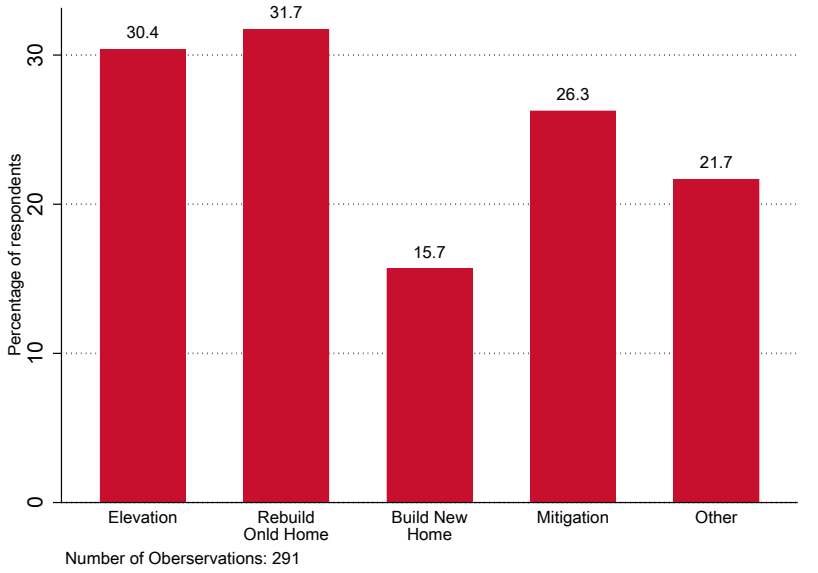
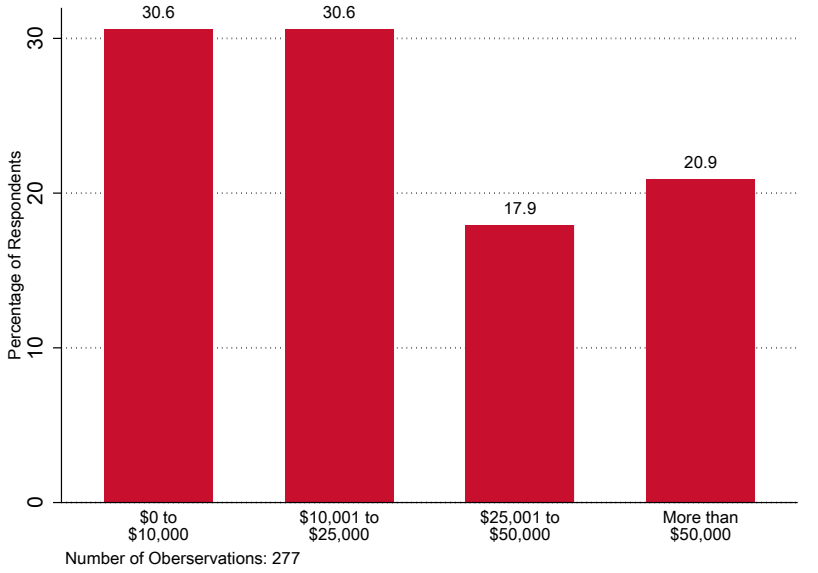


Figure 6 underscores the amount spent by those who engaged in modifications to their property as a result of Hurricane Harvey. The median respondent spent between $10,001 and $25,000, with roughly one-third (30.6%) spending between $0 and $10,000, one-third spending between $10,001 and $25,000 (30.6%), one-fifth (17.9%) spending between $25,001 and $50,000, and one-fifth (20.9%) spending more than $50,000.

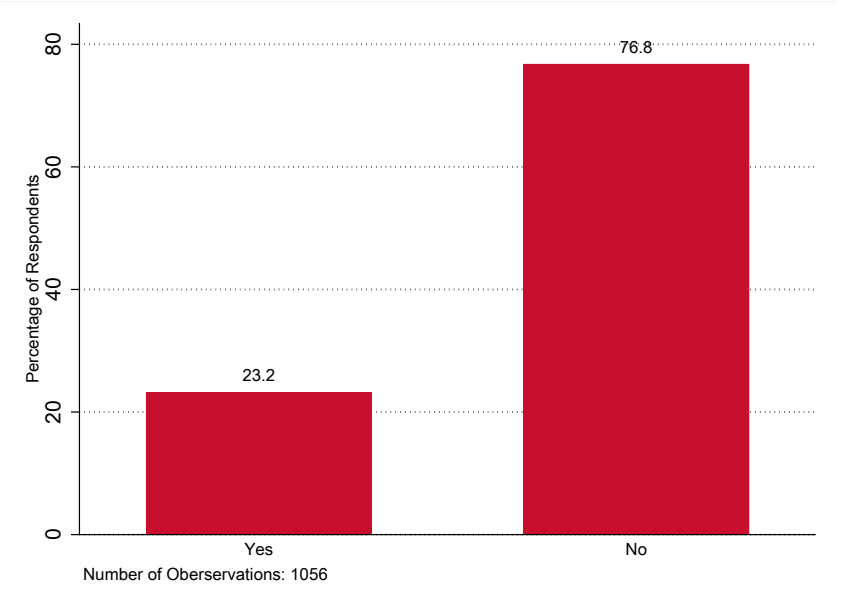
Figure 6: What is the approximate amount of money you spent on the modifications to your property?



2.2 Impact on Employment

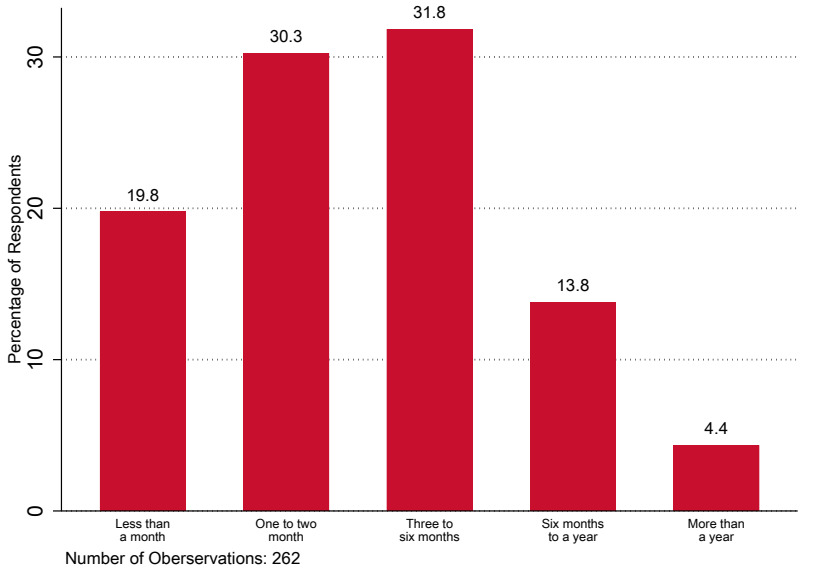
In addition to property losses, Hurricane Harvey had a strong impact on other aspects of the livelihood of Houston area residents. Figure 7 presents the effect on employment: 23.2% of the respondents claimed that either they or a member of their household experienced a job loss due to Hurricane Harvey.

Figure 7: Did you or any member of your household experience a job loss due to Hurricane Harvey?



One-fifth (19.8%) reported that their unemployment situation lasted for less than a month; for 30.3% unemployment extended to one or two months. Approximately 31.8% replied that their situation lasted between three and six months, wheres 18.2% said that their unemployment spell was longer than six months.

Figure 8: How long were you or a member of your household unemployed as a result of Hurricane Harvey?



Dealing with the Consequences of Hurricane Harvey

To understand how respondents prepared and responded to the consequences of Hurricane Harvey, we asked about their support network and other forms of assistance.

3.1 Insurance Coverage

Figure 9 shows the proportion of respondents who had flood, homeowner, or rental insurance coverage. More than one-fifth (22.4%) responded that they had no insurance at all, while 46.7% answered that they had flood insurance, and 58% reported that they had homeowners or rental insurance. Among those who had insurance, approximately two-thirds said that their insurance covered all or a significant portion of their losses from Hurricane Harvey, 21% said that their insurance covered just a small piece, while 12.3% that their insurance did not cover any of their losses (see Figure 10).

Figure 9: Did you have flood insurance, homeowners, or rental insurance to cover the costs of repair caused by Hurricane Harvey?

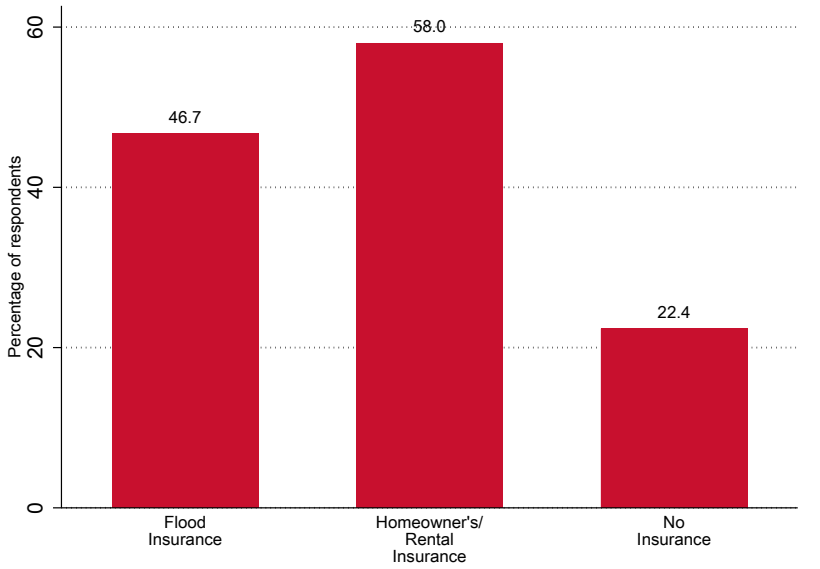
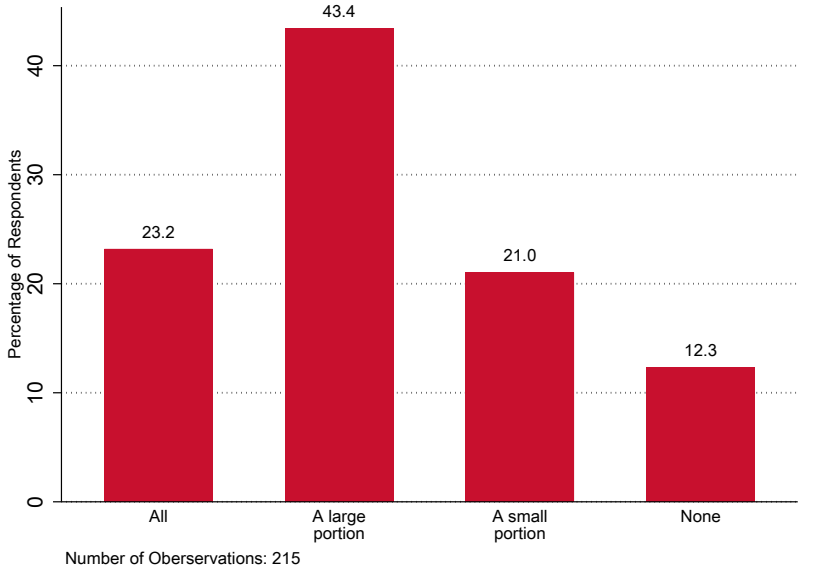


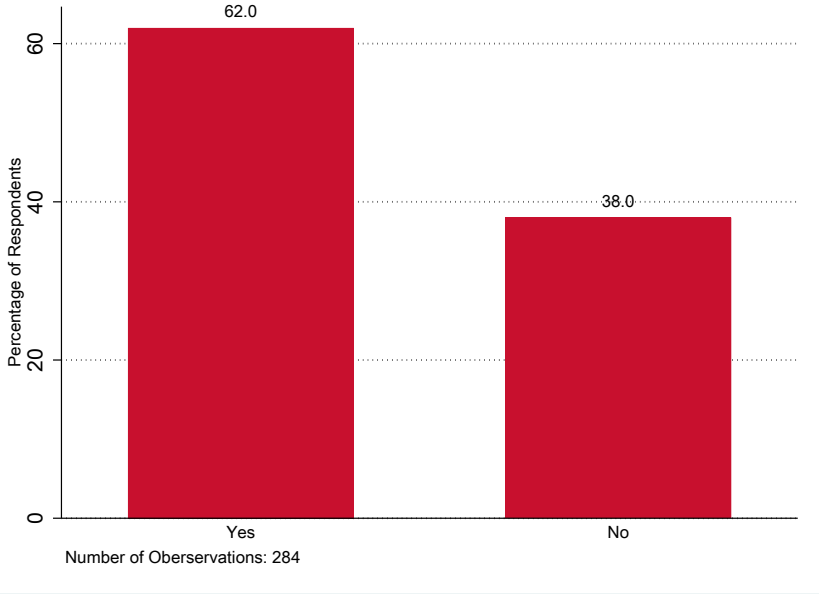
Figure 10: Did your insurance payment cover all, a large portion, or a small portion of your losses from Hurricane Harvey?



3.2 Assistance from the Federal Emergency Government

One of the most importants sources of assistance for recovery after Hurricane Harvey was the Federal Emergency Management Agency (FEMA). Figure 11 shows that among those who suffered losses due to Hurricane Harvey, 62% requested money from FEMA, while 38% of them did not.

Figure 11: To rebuild, repair or modify your property after Hurricane Harvey, did you or a member of your household request FEMA money?



Close to four-fifths (78.6%) of those who sought FEMA money did receive the funds they requested (see Figure 12).

Figure 12: Have you received the funds that you or a member of your household requested from FEMA to cover the cost of rebuilding your property after Hurricane Harvey?

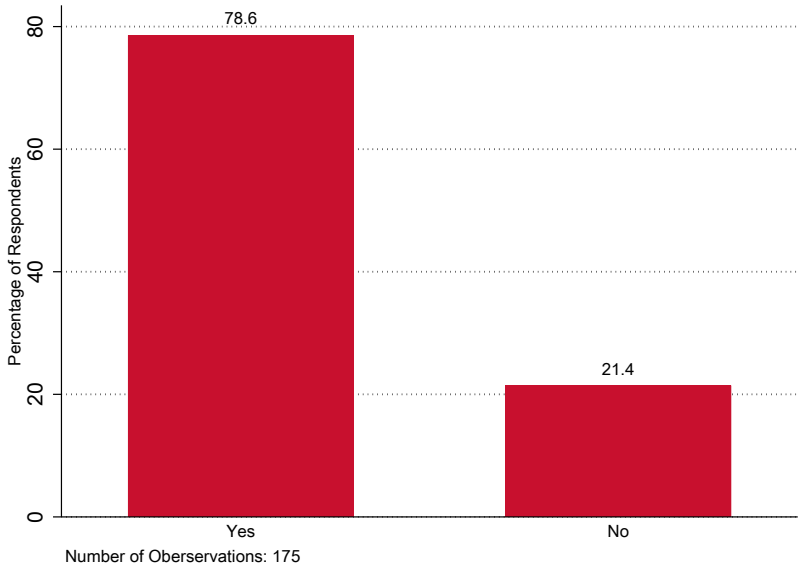
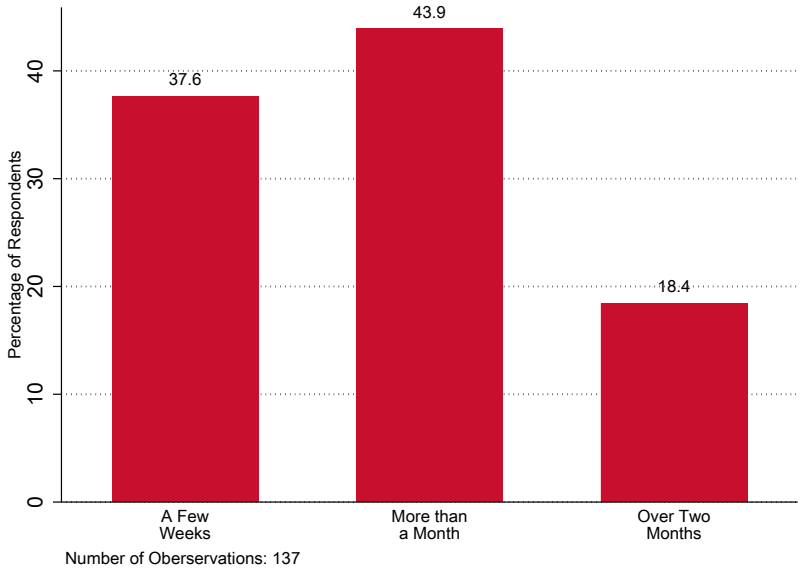


Figure 13 depicts how long it took for individuals to receive FEMA support after Hurricane Harvey. The majority of respondents (43.9%) indicated that it took one to two months to receive their funds, and it took almost one-fifth of respondents (18.4%) more than two months to receive federal funding. However, just over one-third of respondents (37.6%) said that they received their FEMA funds within a few weeks.

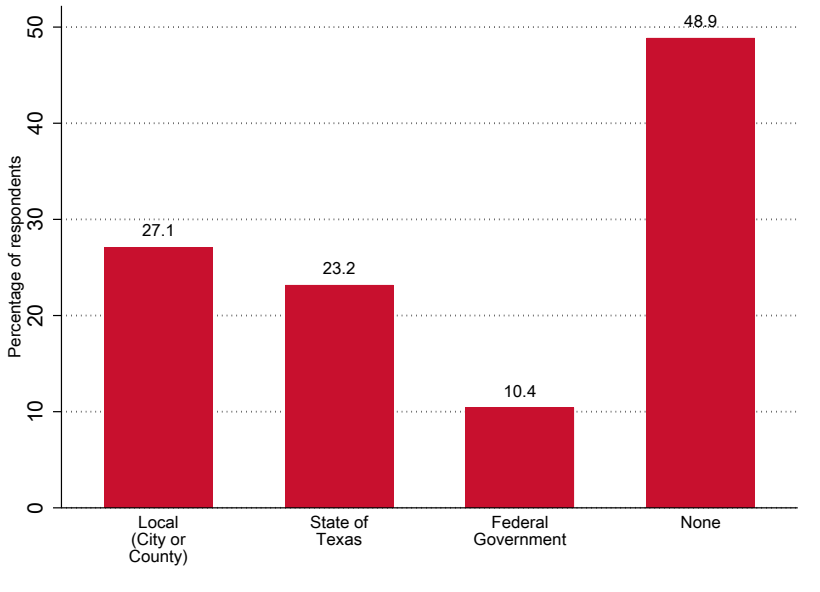
Figure 13: How long did it take to receive FEMA funds after Hurricane Harvey?



3.3 Other Forms of Government Assistance

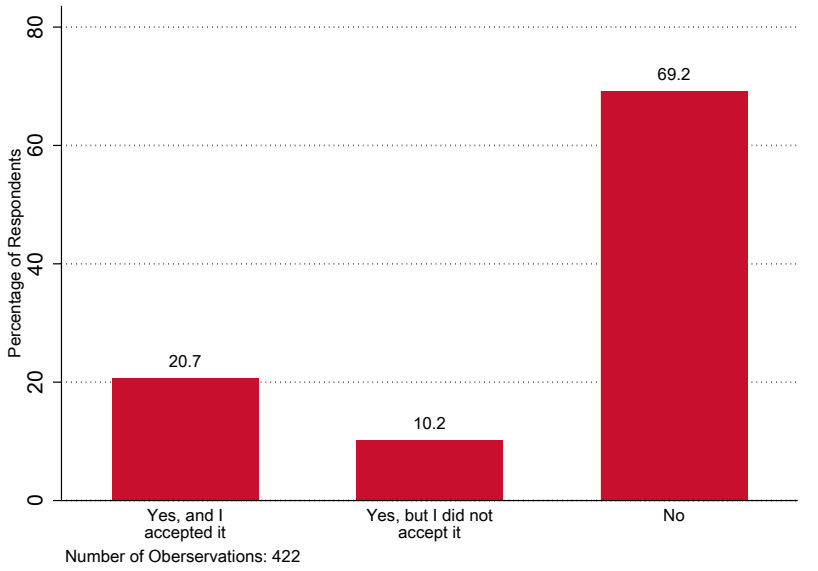
Besides FEMA, Houston residents reached out to the local, state, or federal government agencies for support in the aftermath of Hurricane Harvey. Close to half of the respondents in our survey said that they did not receive any government assistance. More than a quarter of the respondents (27.1%) received support from their local government, 23.2% responded that they received help from the state of Texas, while just 10.4% told us that they received support from the Federal Government (see Figure 14).

Figure 14: Did you receive help from local (city or county), State of Texas, and/ or Federal Government members in the aftermath of Hurricane Harvey?



Additionally, Figure 15 shows that 20.7% of the respondents received and accepted a buyout offer from the government, 10.2% received an offer but did not take it, while 69.2% of them did not receive a buyout offer.

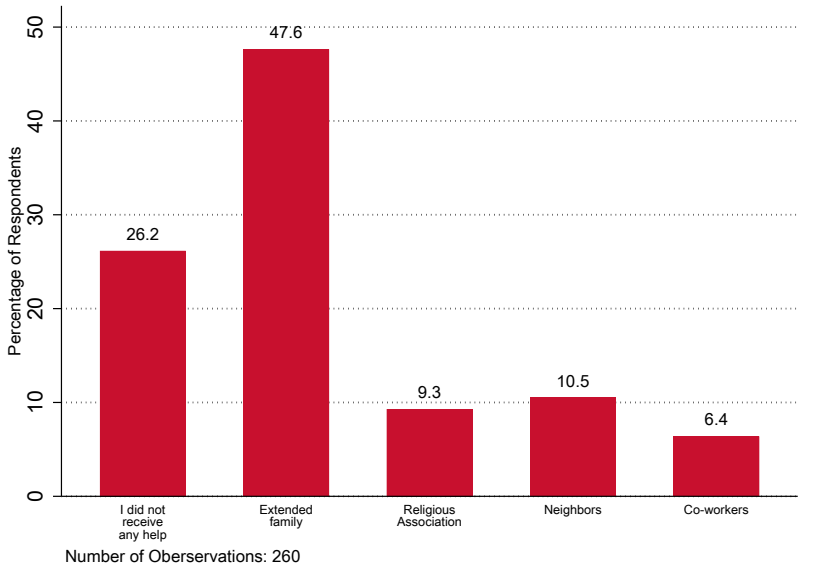
Figure 15: Have you received an offer for buyout of your property from the government due to Hurricane Harvey?



3.4 Financial Support

As shown in Figure 7, 23% of respondents said that they or a member of their household experienced a job loss due to Hurricane Harvey. Figure 16 shows respondents' support networks during the unemployment spells. Almost half of them (47.6%) received help from family. Just 9.3% received support from their religious associations, 10.5% said that their primary aid came from their neighbors, while 6.4% responded co-workers. Finally, 26.2% replied that they did not receive any help from their networks.

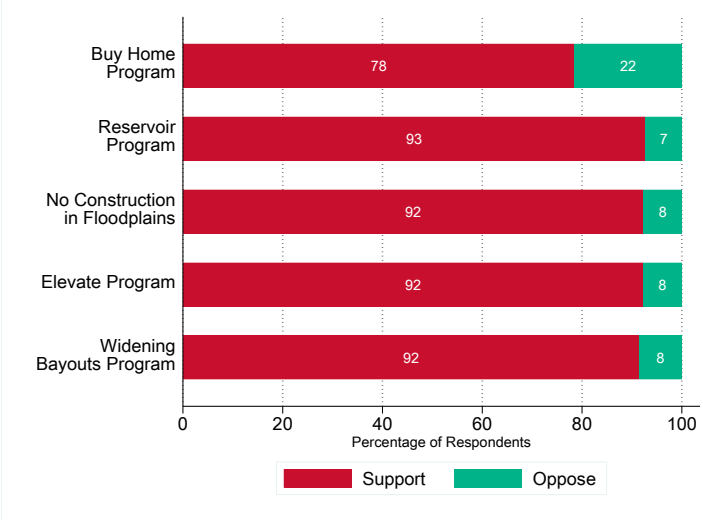
Figure 16: What was your main aid network during the time you or a member of your household were unemployed?



Preferences for Natural Disaster Recovery and Prevention Policies

Respondents were very supportive of the implementation of policies aimed at supporting the recovery, and to prevent future losses from flooding and natural disasters. Figure 17 shows the overwhelming support of respondents to different policies proposed and enacted by local governments to mitigate future flooding. To highlight the level of support, the least backed policy was a Home Buyback Program for those who were affected by Hurricane Harvey. This policy proposal received an astounding seventy-eight percent of support. The most supported policy, with 93% of approval, was the creation of a reservoir program. We also found that programs for elevating homes in flood prone areas, widening bayous, and banning construction in floodplains had overwhelming support from survey respondents (92%). It is worth noting that support for all of these policies was higher than those recorded in previous waves of the Hobby School Harvey survey.

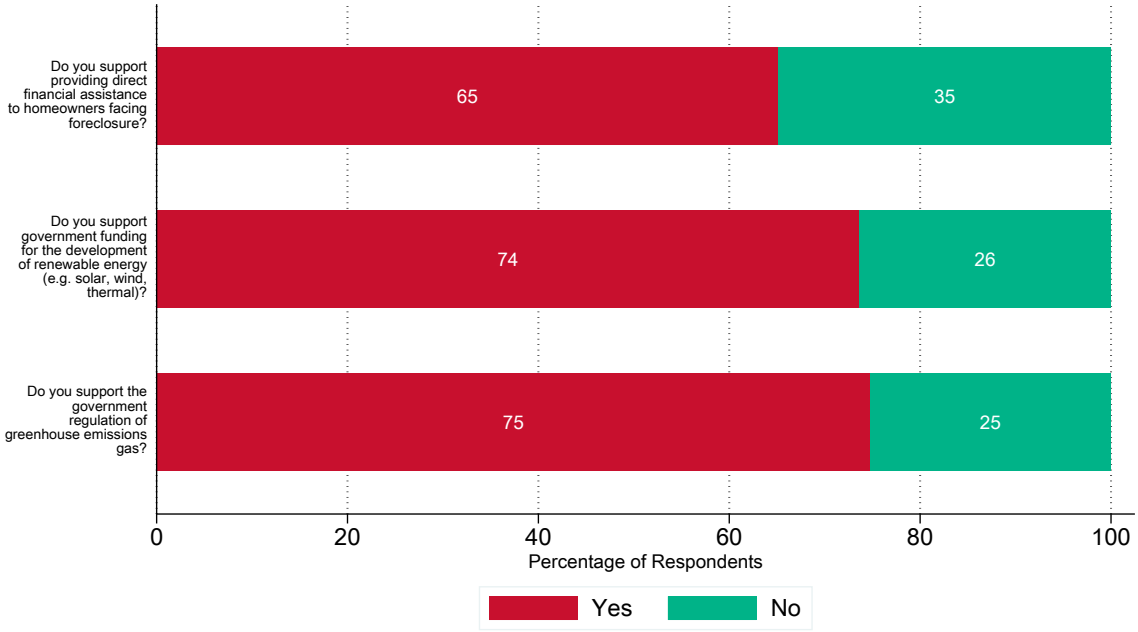
Figure 17: A number of policies have been both proposed and adopted by local governments. Which of the following do you support?



Respondents were also asked whether they supported different policy initiatives (see Figure 18). First, respondents were presented with the following statement: "Do you support providing direct financial assistance to homeowners facing foreclosure?" Close to two-thirds of respondents (65%) agreed, whereas 35% disagreed. This result suggests that in contrast to traditional laissez-faire attitudes attributed to Texans, Houston area residents are supportive of government assistance to those facing problems paying their mortgages. The level of support likely reflects the negative economic environment created by the COVID-19 pandemic at the time when our survey was in the field.

When presented with the statement, "Do you support government funding for renewable energy (e.g., solar, wind, thermal)?" three-quarters (75%) respondents that they agreed, and one in four (25%) disagreed. When asked to consider the the statement, "Do you support the government regulation of greenhouse emissions of gas?" three-quarters (75%) of them agreed, while the other quarter (25%) disagreed.

Figure 18: Do you agree or disagree with the following statements:



In sum, there seems to be a strong consensus among Houston area residents that the government should provide financial assistance to promote alternative and renewable energies, and should enact regulations aimed at reducing greenhouse gas emission.

4.1 Policy Priorities and Willingness to Pay

Using a different empirical strategy, we analyzed how respondents react when they have to choose between different policies and decide how much they are willing to pay for the costs of enacting those policies. Each respondent was asked to choose between two policy profiles. Each profile had three attributes: the specific policy[1];

[1] The levels for the policy profiles were the following: 1) road infrastructure recovery; 2) loans to rebuild housing affected by Hurricane Harvey; and 3) build infrastructure to prevent new flooding.

the target of the policy[2]; and a tax option [3], which described how the policy would be funded. We analyzed their responses using a statistical technique called conjoint analysis [4].

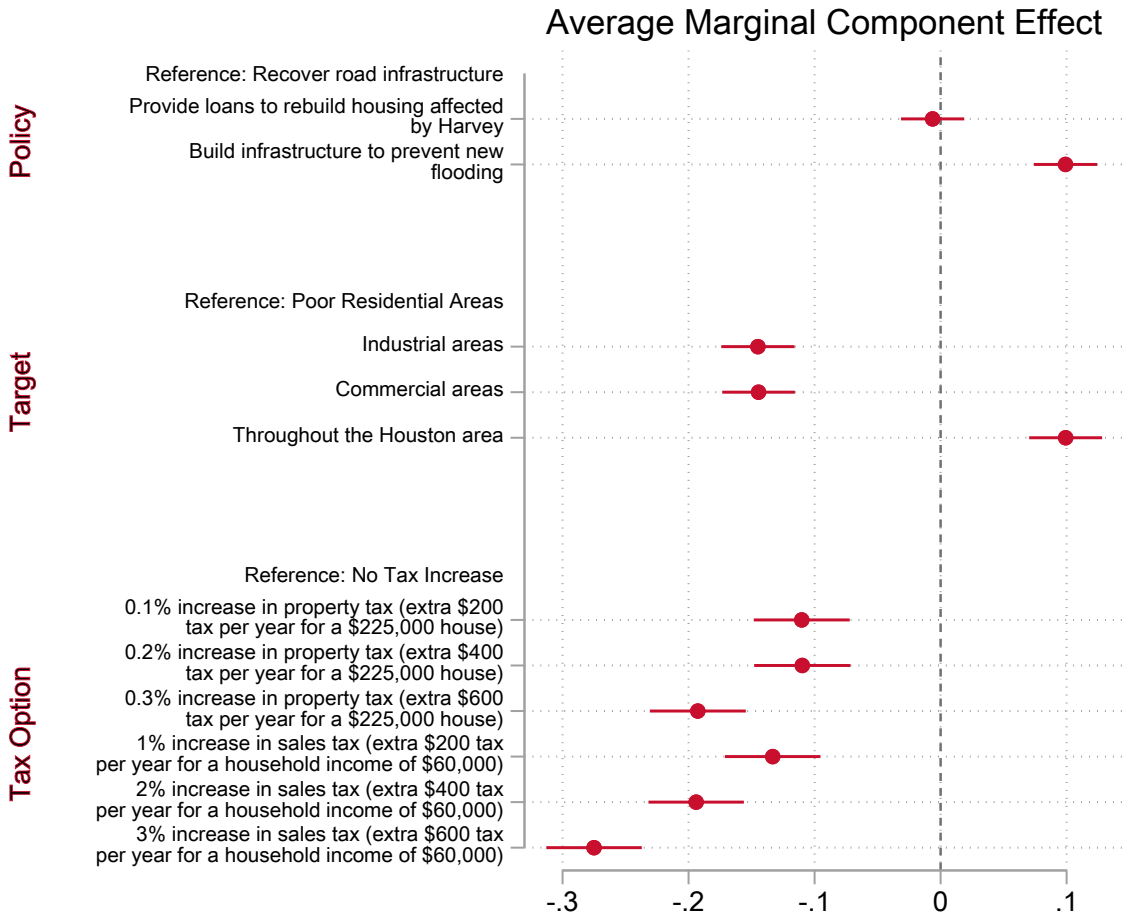
Figure 19 shows the results from the conjoint analysis. The reference level for the policy was the road infrastructure recovery policy option. The probability of choosing the second level, the provision of loans to rebuild housing affected by Hurricane Harvey, is not different from the probability of choosing the reference category (i.e., respondents support both programs equally). In contrast, respondents were more likely to choose the construction of infrastructure to prevent new flooding. This result suggests that respondents are more supportive of prospective and preventive policies than retrospective and recovery policies.

[2]The levels we shown for the target of the policy were: 1) poor residential areas; 2) industrial areas, 3) commercial areas; and 4) throughout Houston.

[3]The tax option had seven levels: 1) no tax increase; 2) 0.1% increase in property taxes (equivalent to an extra $200 tax per year for a $225,000 house); 3) 0.2% increase in property taxes (extra $400 tax per year for a $225,000 house); 4) 0.3% increase in property taxes (extra $600 tax per year for a $225,000 house); 5) 1% increase in sales taxes (extra $200 tax per year for a household income of $60,000); 6) 2% increase in sales taxes (extra $400 tax per year for a household income of $60,000); 7) 3% increase in sales taxes (extra $600 tax per year for a household income of $60,000).

[4]Each individual responded to four rounds of a pairwise comparison of two profiles with randomly populated policy, target and tax options. In each trial respondents had to choose their preferred policy profile from the pairwise comparison.

Figure 19: Conjoint Experiment on Policy Preferences



Regarding the second attribute, the target of the policy, we set poor residential areas as the reference category. Respondents were significantly less likely to choose industrial or commercial areas than poor residential areas, and much more likely to support programs targeting all areas in Houston. Finally, we set no tax increases as the reference category. As expected, this was the top option for respondents. Yet it is worth noting that respondents were more sensitive to increases in sales taxes than increases in property taxes. The exercise allows us to identify respondents' policy priorities and their relative willingness to pay for them depending on their costs to taxpayers.

Overall, results suggest that respondents prefer spending on infrastructure to prevent future flooding over loans to rebuild homes damaged by Hurricane Harvey, or investment in road recovery impacted by the flood. Additionally, respondents are more likely to prefer policies implemented throughout the Houston area instead of geographically targeted policies. Their second preference is for poor neighborhoods, and the least preferred target of policies is tied between the industrial and commercial areas. Finally, results show that respondents preferred lower taxes, and were more sensitive about raising sales taxes than property taxes to finance any of these projects.

We also explored differences in preferences among those who were directly affected by Hurricane Harvey, and those who were not. Using the results of the conjoint experiment, we calculated predicted probabilities for the **support for the construction of infrastructure to prevent new flooding throughout the Houston area** at different tax options levels. We divided the data into two sub-samples: one for **individuals affected** by Hurricane Harvey and **those who have not suffered any damage** during Hurricane Harvey. Both groups were very supportive of the policy with **no tax increase**, however, when the policy had a **0.1% increase in property tax**, the support decreases by 7% for those affected, and by 15% for the individuals who were non-affected by Harvey. As property taxes increase, individuals affected by Hurricane Harvey are less supportive of the policy. For a **0.2% increase in property tax**, the support for the policy decreases by 9%, and for a **0.3% increase in property tax**, support decreases by 18% with respect to no tax increase. In contrast, for non-affected individuals, a **0.2% increase in property tax** decreases their support by 13% (2% more than the 0.1% increase), while a **0.3% increase in property tax** reduces their support 21%.

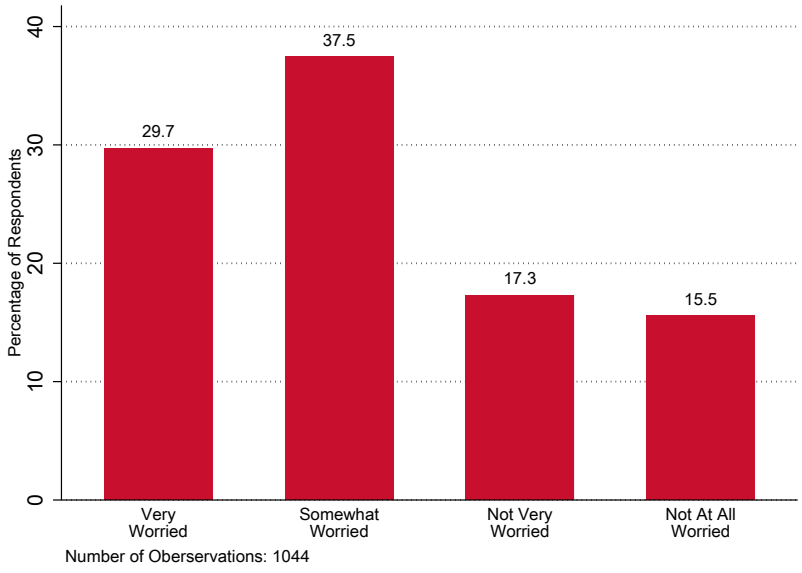
On average, individuals are less likely to prefer the policy when funded with **sales taxes** instead of **property taxes**. A **1% increase in sales tax** would decrease the support of the respondents who suffered damages during Hurricane Harvey by 8%, and 17% for those who were not affected. Also, a **2% increase in sales taxes** would sharply decrease the support among the non-affected respondents by 24%, and 14% for those affected. Finally, a **3% increase in sales tax** would lead to a 34% decrease in support for the policy for those non-affected and a 20% decrease for individuals affected by Hurricane Harvey.

Tax Option	Change respect to No Tax Increase Affected by Hurricane Harvey	 Not-Affected by Hurricane Harvey
0.1% increase in property tax (extra $200 tax)	-0.07	-0.15
0.2% increase in property tax (extra $400 tax)	-0.09	-0.13
0.3% increase in property tax (extra $600 tax)	-0.18	-0.21
1% increase in sales tax (extra $200 tax)	-0.08	-0.17
2% increase in sales tax (extra $400 tax)	-0.14	-0.24
3% increase in sales tax (extra $600 tax)	-0.20	-0.34

Attitudes Toward Global Warming

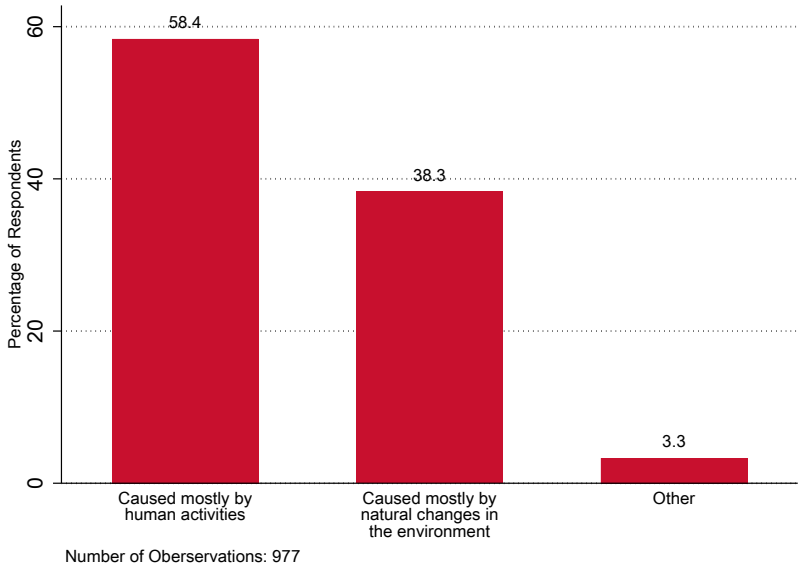
In the survey, respondents were asked about a variety of global warming related issues. Figure 20 displays the respondents' responses to a question about how worried they were about global warming. Two-thirds (67.2%) of the respondents were notably worried about global warming, with 29.7% very worried and 37.5% somewhat worried, respectively. In contrast, only about a third (32.8%) were either not very worried (17.3%) or not at all worried (15.5%).

Figure 20: How worried are you about global warming?



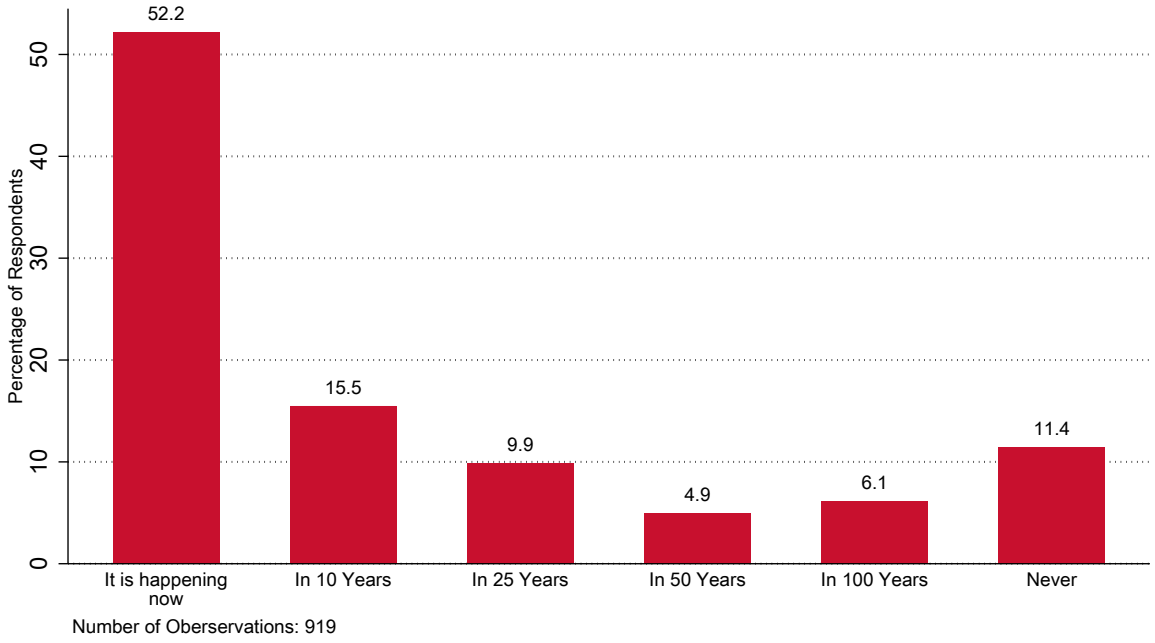
Respondents were then asked about what they consider the main cause of global warming to be (see Figure 21). Three-fifths (58.4%) believe that global warming is caused mostly by human activities while two-fifths (38.3%) believe global warming is caused mostly by natural changes in the environment.

Figure 21: What do you think is the main cause of global warming?



When asked when they believe global warming will start to harm people in the United States, over half of all respondents (52.2%) think it is already happening now (see Figure 22). Another 15.5% believe global warming will start to harm Americans in 10 years, 9.9% in 25 years, 4.9% in 50 years, and 6.1% in 100 years. However, one in ten respondents (11.4%) think that global warming will never harm people in the United States.

Figure 22: When do you think global warming will start to harm people in the United States?



Finally, the respondents were asked whether or not they agreed with three statements related to flooding (see Figure 23).

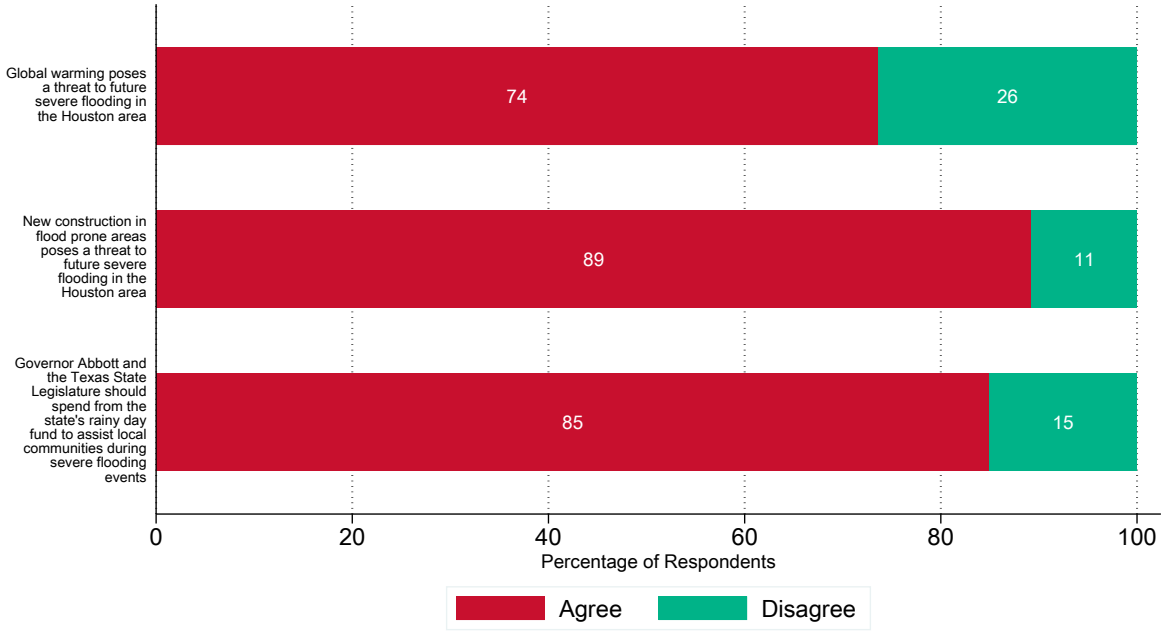
When presented with the statement that "Global warming poses a threat of future severe flooding in the Houston area," three-fourths (74%) of respondents agreed and one-fourth (26%) disagreed. In sum, there is a strong consensus among Houston area residents that global warming poses a clear and present threat to the Houston area in the form of future severe flooding.

When presented with the statement that "New construction in flood prone areas poses a threat of future severe flooding in the Houston area," nine out of ten (89%) respondents agreed and one in ten (11%) disagreed. Generally speaking, there is a strong consensus among Houston area residents that new construction in flood prone areas, like Meritage Homes' post-Harvey construction of new homes (Spring Brook Village) on the site of the old Pine Crest Golf Club, has an adverse impact on the Houston area by increasing the likelihood of future severe flooding

in the Houston area.

When presented with the statement that "Governor Abbott and the Texas Legislature should spend from the state's rainy day fund (the Economic Stabilization Fund) to assist local communities during severe flooding events," 85% agreed and 15% disagreed. In sum, an overwhelming majority of Houston area residents believe that when severe flooding occurs in Texas communities, the state should tap into the rainy day fund to aid the adversely affected localities; that is, the state should tap into the rainy day fund when Texas experiences severe weather which causes widespread flooding.

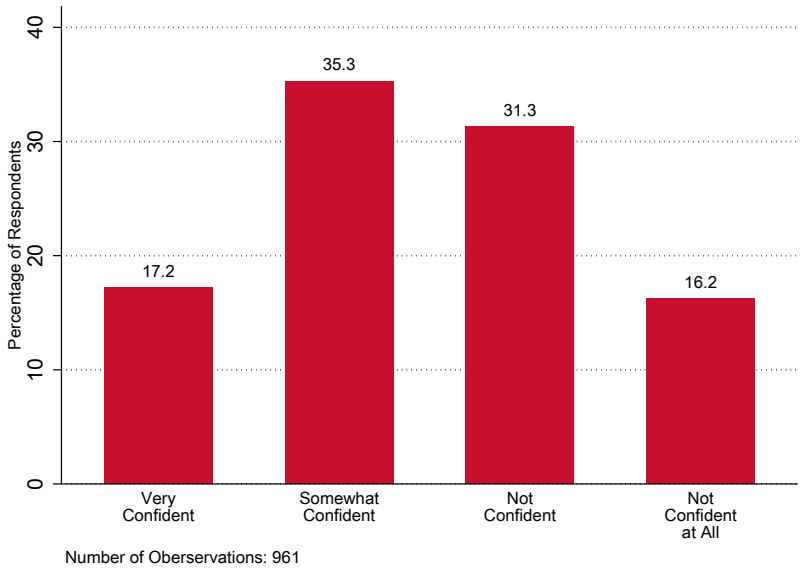
Figure 23: Do you agree or disagree with the following statements:



Confidence in and Support for Elected Officials

A majority of respondents (52%) stated that they are somewhat or very confident that elected county and city officials know how to prevent future flooding in the Houston area. On the other hand, 31% and 16% are not confident or not confident at all about their elected officials' abilities to deal with future flooding events, respectively (see Figure 24).

Figure 24: How confident are you that your elected county and city officials know how to prevent the negative impact of future flooding in the Houston area?



The impact of Hurricane Harvey is also reflected in patterns of political participation among respondents. Table 1 shows that among those who reported not

having suffered property losses due to Hurricane Harvey 77% reported having voted in recent local elections in 2019; 87% of respondents those who experienced severe property damage due to Hurricane Harvey reported having voted last year.

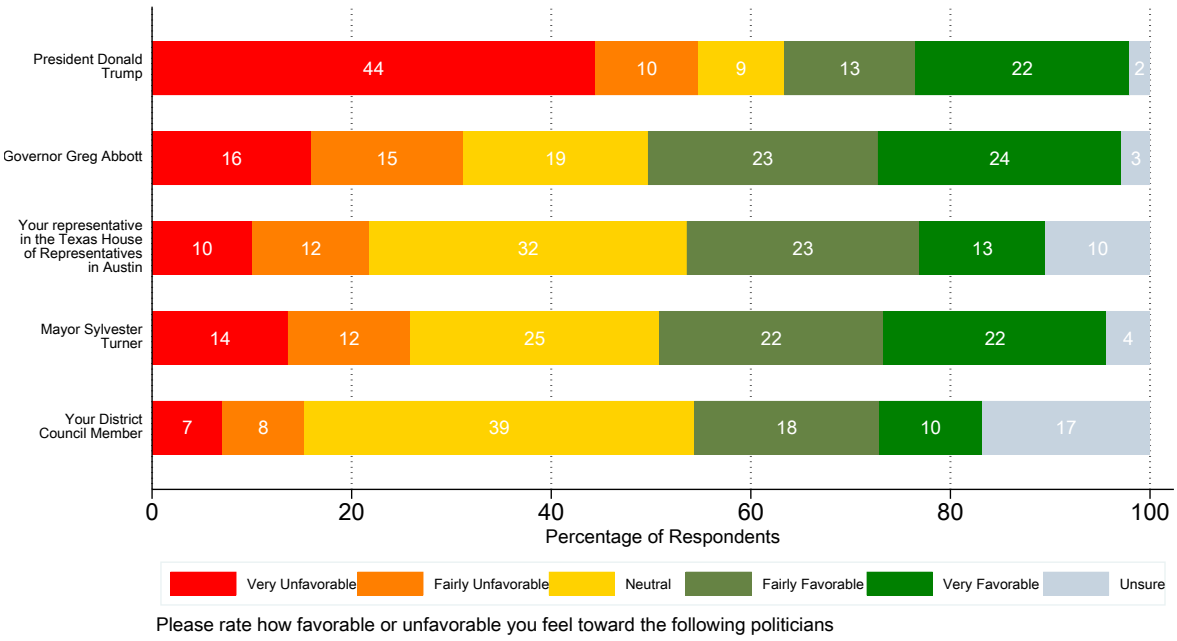
Table 1: Did you vote during the last local elections? (By Property Damage during Hurricane Harvey)

	Voted in Last Local Elections	
Property Damage	**Yes**	**No**
	%	%
Not At All	77.4	22.6
Somewhat	79.2	20.8
Severe	87.0	13.0
Total	78.6	21.4

We also polled respondents about their favorability of elected officials at the local, state, and federal levels. President Trump is not very popular among Houston residents: a majority of survey respondents (54%) have a fairly or very unfavorable feeling towards the President. On the other hand, 34% expressed a fairly or very favorable feeling towards President Trump, and 9% are neutral (see Figure 25).

Governor Greg Abbott and Mayor Sylvester Turner get better marks: 47% and 44% of respondents hold a fairly or very favorable sentiment of the Governor and Mayor, respectively. Mayor Turner's unfavorable ratings (26%) are slightly lower than Governor Abbott's (31%). Texas state representatives and local council members have higher favorable than unfavorable ratings among respondents. About 36% view their state representatives favorably, and 22% are fairly on very unfavorable. The proportion of holding favorable feelings towards their local council members is 28%. Additionally, 15% view council members unfavorably, and 39% hold neutral feelings.

Figure 25: Please rate how favorable or unfavorable you feel toward the following politicians?



There are stark differences in President Trump's favorability rating across racial and ethnic groups. A majority of white respondents (51%) have a favorable feeling towards Trump. About 79% of Black or African American respondents have an unfavorable feeling towards the President, including 68% who hold a very unfavorable sentiment. Among Hispanic respondents, 52% have a very unfavorable perception and 10% a had fairly unfavorable perception of the President. A majority of Asian Americans (56%) also express unfavorable feelings towards President Trump (see Table 2).

As expected, President Trump's favorability ratings vary significantly among respondents who identify as Republican, Democrat, or Independent.
Around 47% of Republicans hold a very favorable view of President Trump while about 24% have a fairly favorable view of him. However, it is important to note that about 20% of Republicans in the Houston area hold a very unfavorable (12%) or fairly unfavorable (8) view of President Trump. Among Democrats the figures are reversed. About 83% hold fairly or very unfavorable sentiments towards President Trump and 9% are favorable. Among Independents 67% feel unfavorable towards

President Trump, and 19% are favorable (see Table 3).

Table 2: Please rate how favorable or unfavorable you feel toward the following politicians (Donald Trump)? (By Race or Ethnicity)

	Very Unfavorable	Fairly Unfavorable	Neutral	Fairly Favorable	Very Favorable
	%	%	%	%	%
White	31.9	9.8	7.5	18.6	32.1
Black or African American	68.3	10.7	9.3	6.0	5.8
Hispanic/ Latino(a)	51.6	9.9	10.1	10.2	18.2
Native American	43.6	12.4	0.0	0.0	44.0
Asian/ Pacific Islander	39.0	17.3	15.5	15.6	12.5
Other	44.7	8.1	9.7	19.0	18.5
Total	45.4	10.5	8.8	13.4	22.0

Note: Unsure responses were excluded for this table.

Table 3: Please rate how favorable or unfavorable you feel toward the following politicians (Donald Trump)? (By Party)

	Very Unfavorable	Fairly Unfavorable	Neutral	Fairly Favorable	Very Favorable
	%	%	%	%	%
Democrat	73.2	10.1	7.2	5.6	3.8
Republican	11.7	7.7	9.1	24.3	47.2
No preference	44.7	22.0	14.9	8.2	10.2
Total	45.4	10.5	8.8	13.4	22.0

Note: Unsure responses were excluded for this table.

Governor Abbott's favorability percentages are stronger among white respondents. About 59% have fairly or very favorable sentiments towards the Governor. Hispanics, Asian Americans, and African Americans are less favorable at 43%, 41%, and 43% respectively. Mayor Turner received stronger favorability ratings among African Americans (62%), followed by Hispanics (45%), and whites (41%); Asian Americans' favorability of the Mayor is 36% (Table 4).

Table 4: Please rate how favorable or unfavorable you feel toward the following politicians (Greg Abbott)? (By Race)

	Very Unfavorable	Fairly Unfavorable	Neutral	Fairly Favorable	Very Favorable
	%	%	%	%	%
White	14.2	15.3	11.7	25.6	33.1
Black or African American	21.1	17.8	27.3	17.2	16.6
Hispanic/ Latino(a)	17.3	13.7	24.9	28.6	15.6
American Indian or Alaska Native	12.1	0.0	24.8	0.0	63.1
Asian/ Pacific Islander	14.0	20.0	25.0	24.8	16.2
Other	11.7	36.1	5.9	6.3	40.0
Total	16.4	15.7	19.1	23.7	25.2

Note: Unsure responses were excluded for this table.