



# COVID-19 BUSINESS IMPACT SURVEY WAVE 5

April 23, 2020

# TABLE OF CONTENTS

- Executive Summary
- Demographics
- Economic Sentiment
- Business Impacts
- Impact of Federal Stimulus Program
- Plans to Re-Open Offices
- Methodology
- Statistical Notes
- Appendix

# EXECUTIVE SUMMARY

# DEMOGRAPHICS

- The geographic location of respondents' organizations are statistically similar in all waves.
- Throughout all waves, roughly half of firms report fewer than 50 FTEs. The percentage of firms falling into higher FTE ranges has also remained constant.
  - The median number of FTEs in Waves 5 and 4 is 25 compared to 26.5 in Wave 3 and 23 in the first two waves. The difference between the waves is not statistically significant, so comparison between waves can be made accurately.
  - The largest organization in Wave 5 has 10,000 FTEs. This figure has fluctuated between 11,000 and 7,500 throughout the series.

# ECONOMIC SENTIMENT

- Although the vast majority of firms (87%) still feel the condition of the US Economy is worse compared to March 1, firms are less negative regarding their own finances and cash flow compared to previous waves.
  - Firms with 25 or fewer FTEs are more likely than other firms to say their finances (49%) and cash flow (53%) are worse today.
- Although more than one-third (37%) of firms think business will return to normal within six months, another 35% think it will take one or two years. One-fifth (21%) are either not sure or don't think things will ever be the same.

# BUSINESS IMPACTS

- The top actions firms have taken to shore up their finances since March 1 are freezing non-essential purchases (50%), speeding up collections (38%) and freezing salary/pay increases (30%).
  - Firms with more than 500 FTEs are much more likely to have taken all of these actions. For instance, 70% have frozen non-essential purchases and/or sped up collection of accounts receivable.
- About one out of twelve firms (8%) report working on new projects directly related to the COVID-19 pandemic response.
  - Larger firms are more likely to be working on new projects directly related to COVID-19.
    - 0 to 25 FTEs = 3%
    - 26 to 50 FTEs = 9%
    - 51 to 200 FTEs = 12%
    - 201 to 500 FTEs = 17%
    - 501 or more FTEs = 35%

# BUSINESS IMPACTS (CONT'D)

- About one out of eight firms (12%) report having business areas that are outperforming now.
  - Larger firms are more likely to have business areas that are outperforming.
    - 0 to 25 FTEs = 4% "Yes"
    - 26 to 50 FTEs = 13%
    - 51 to 200 FTEs = 20%
    - 201 to 500 FTEs = 23%
    - 501 or more FTEs = 50%

# IMPACT OF FEDERAL STIMULUS PROGRAM

- After the enthusiasm towards the CARES Act in Wave 4 surged, fewer firms now feel the federal stimulus package has had a positive impact on their firm (55% vs. 74%), while many more say it's had no impact (33% vs. 10%).
  - As firm size increases, so too does the percentage feeling the stimulus package has had a positive impact, with the exception of firms with 501+ FTEs, most of whom have felt no impact.
- More than eight out of ten firms (84%) applied for the Small business administration (SBA) Paycheck Protection Program (PPP).
  - Firms with 25 or fewer FTEs are the least likely to have submitted an application.
    - 0 to 25 FTEs = 76% "Submitted application"
    - 26 to 50 FTEs = 88%
    - 51 to 200 FTEs = 95%
    - 201 to 500 FTEs = 100%
    - 501 or more FTEs = Not Applicable



# IMPACT OF FEDERAL STIMULUS PROGRAM (CONT'D)

- Among firms submitting an application, nearly three-fourths (74%) were approved, although 16% do not yet know.
  - Firms with 25 or fewer FTEs were the least likely to receive approval.
    - 0 to 25 FTEs = 64% “Accepted & approved”
    - 26 to 50 FTEs = 80%
    - 51 to 200 FTEs = 85%
    - 201 to 500 FTEs = 90%
    - 501 or more FTEs = Not Applicable
- Among firms whose application was approved, seven out of ten (70%) have received the funds in their bank account.
- Among firms who either did not submit an application or did not receive approval, two-thirds (66%) plan to apply or re-apply for a PPP Loan once more funds are made available.
  - Firms with 25 or fewer FTEs are the least likely to apply / re-apply.
    - 0 to 25 FTEs = 63% “Yes”
    - 26 to 50 FTEs = 71%
    - 51 to 200 FTEs = 75%

# PLANS TO RE-OPEN OFFICES

- Although roughly one-third of firms (32%) indicate they did not close their offices, those that did are fairly split on when they will re-open. A plurality of firms (36%) say they will re-open their office(s) when they feel it is safe to do so, regardless of what their governor says.
  - Larger firms are more likely to re-open when they feel it is safe, not when the governor allows it.
    - 0 to 25 FTEs = 30% “When we feel it’s safe”
    - 26 to 50 FTEs = 37%
    - 51 to 200 FTEs = 38%
    - 201 to 500 FTEs = 43%
    - 501 or more FTEs = 70%
- Although 28% of firms say the question does not apply to them, one-fifth of firms (20%) say they have a plan to ensure worker safety when they re-open. An additional 41% say they are working on a plan.
  - After removing firms for whom this question does not apply, larger firms are more likely to either have a plan or to be working on one.
    - 0 to 25 FTEs = 73% “Have or working on one”
    - 26 to 50 FTEs = 87%
    - 51 to 200 FTEs = 94%
    - 201 to 500 FTEs = 100%
    - 501 or more FTEs = 100%

# PLANS TO RE-OPEN OFFICES (CONT'D)

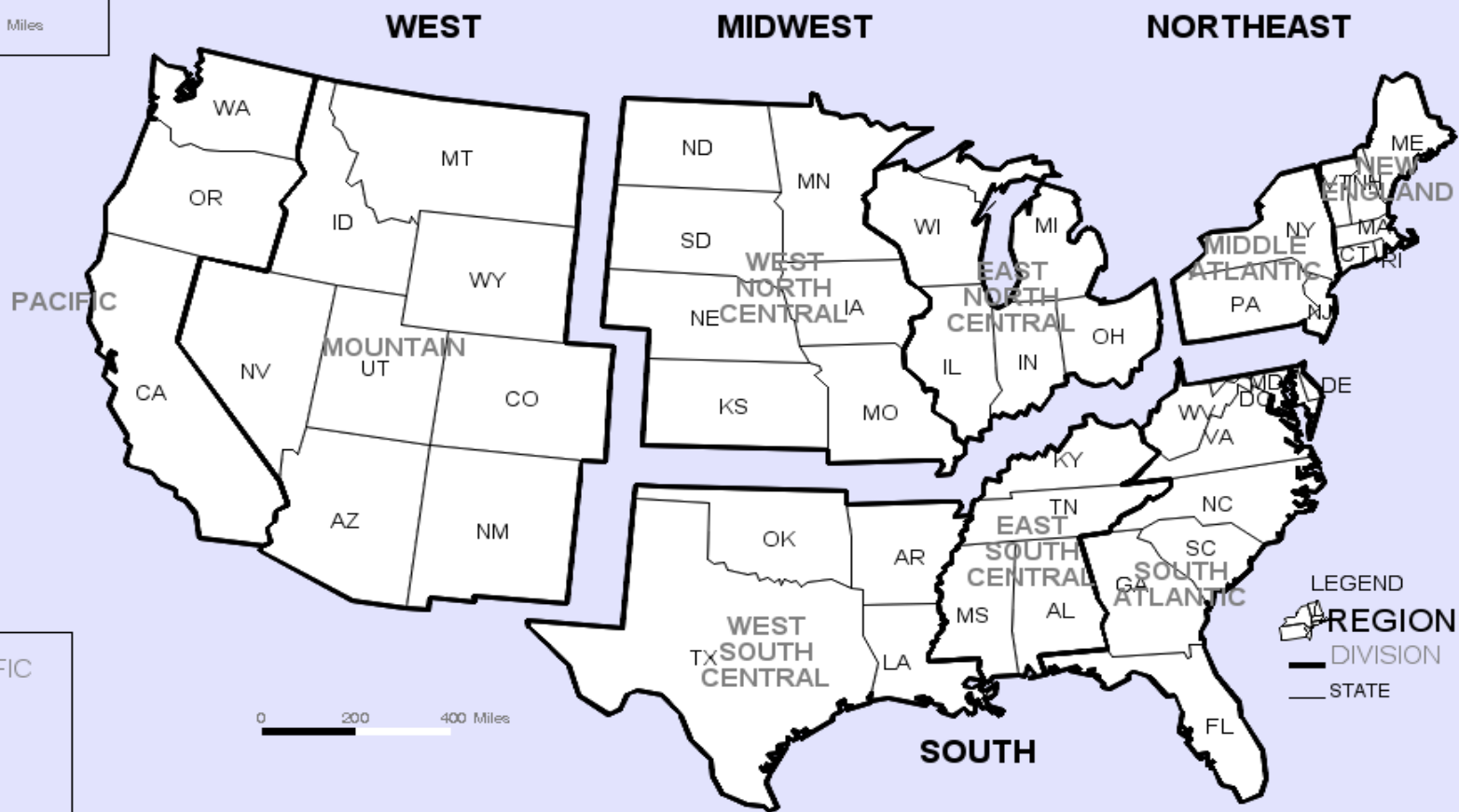
- Nearly half of firms (49%) say they will restrict or prohibit domestic travel for training/events/conferences after stay-at-home orders are lifted. Another fourth (28%) say they will restrict air travel.
  - Larger firms are more likely to restrict domestic travel for training/events/conferences.
    - 0 to 25 FTEs = 40%
    - 26 to 50 FTEs = 52%
    - 51 to 200 FTEs = 52%
    - 201 to 500 FTEs = 80%
    - 501 or more FTEs = 89%
- About one out of six firms (16%) say they will restrict or prohibit international travel for training/events/conferences after stay-at-home orders are lifted. Another 12% say they will restrict air travel.
  - Larger firms are more likely to restrict international travel for training/events/conferences.
    - 0 to 25 FTEs = 13%
    - 26 to 50 FTEs = 16%
    - 51 to 200 FTEs = 15%
    - 201 to 500 FTEs = 37%
    - 501 or more FTEs = 40%

## PLANS TO RE-OPEN OFFICES (CONT'D)

- The vast majority of firms plan to implement a large number of safety measures once they re-open their offices. Top among these are maintaining social distancing (87%) and allowing staff to work remotely to care for others (84%).

# DEMOGRAPHICS

# Census Regions and Divisions of the United States

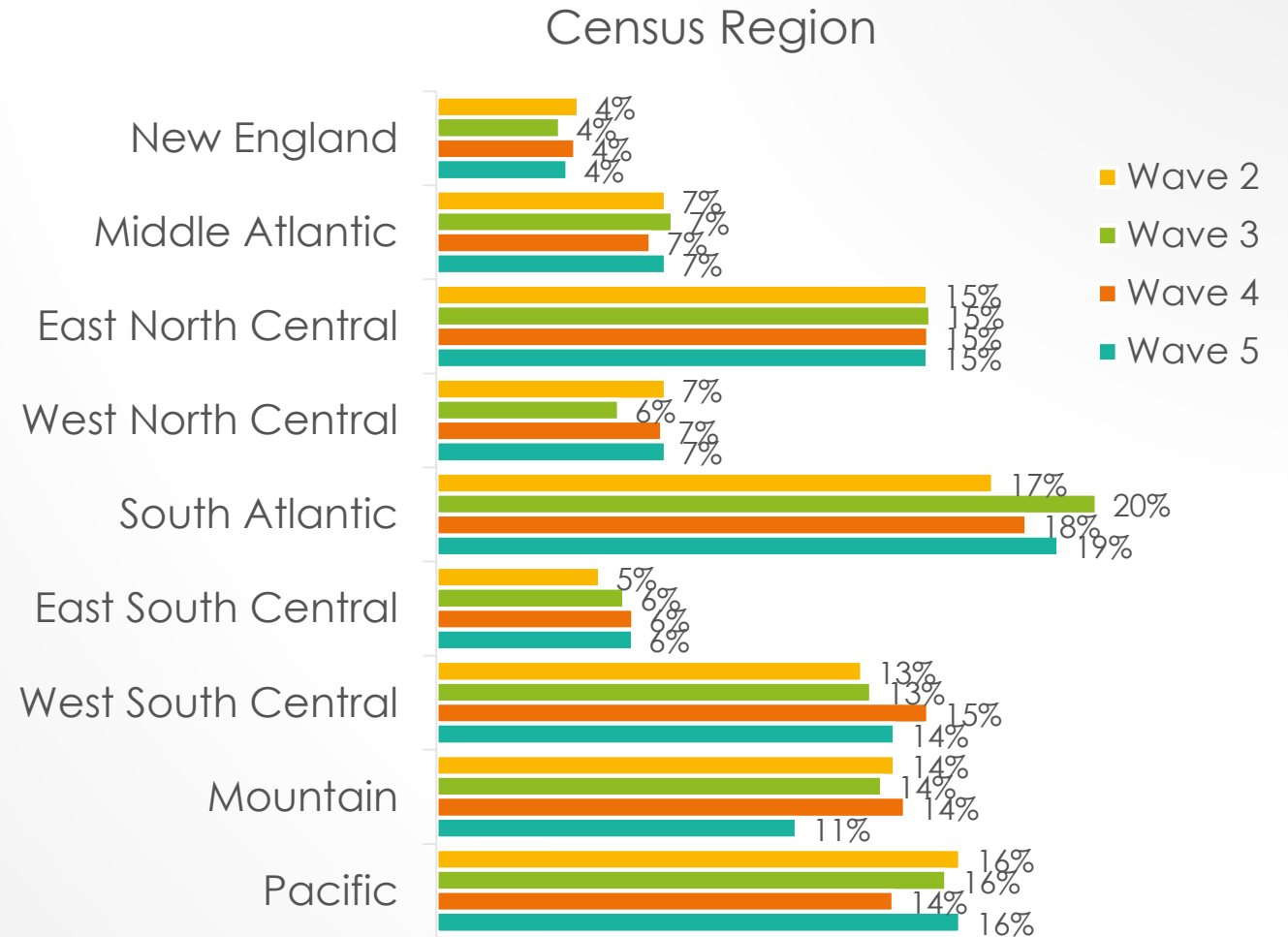


U.S. Department of Commerce Economics and Statistics Administration U.S. Census Bureau (Not) Prepared by the Geography Division

Imitation of [http://www.census.gov/geo/www/us\\_regdiv.pdf](http://www.census.gov/geo/www/us_regdiv.pdf)

# THE GEOGRAPHIC LOCATION OF RESPONDENTS' ORGANIZATIONS ARE STATISTICALLY SIMILAR IN ALL WAVES.

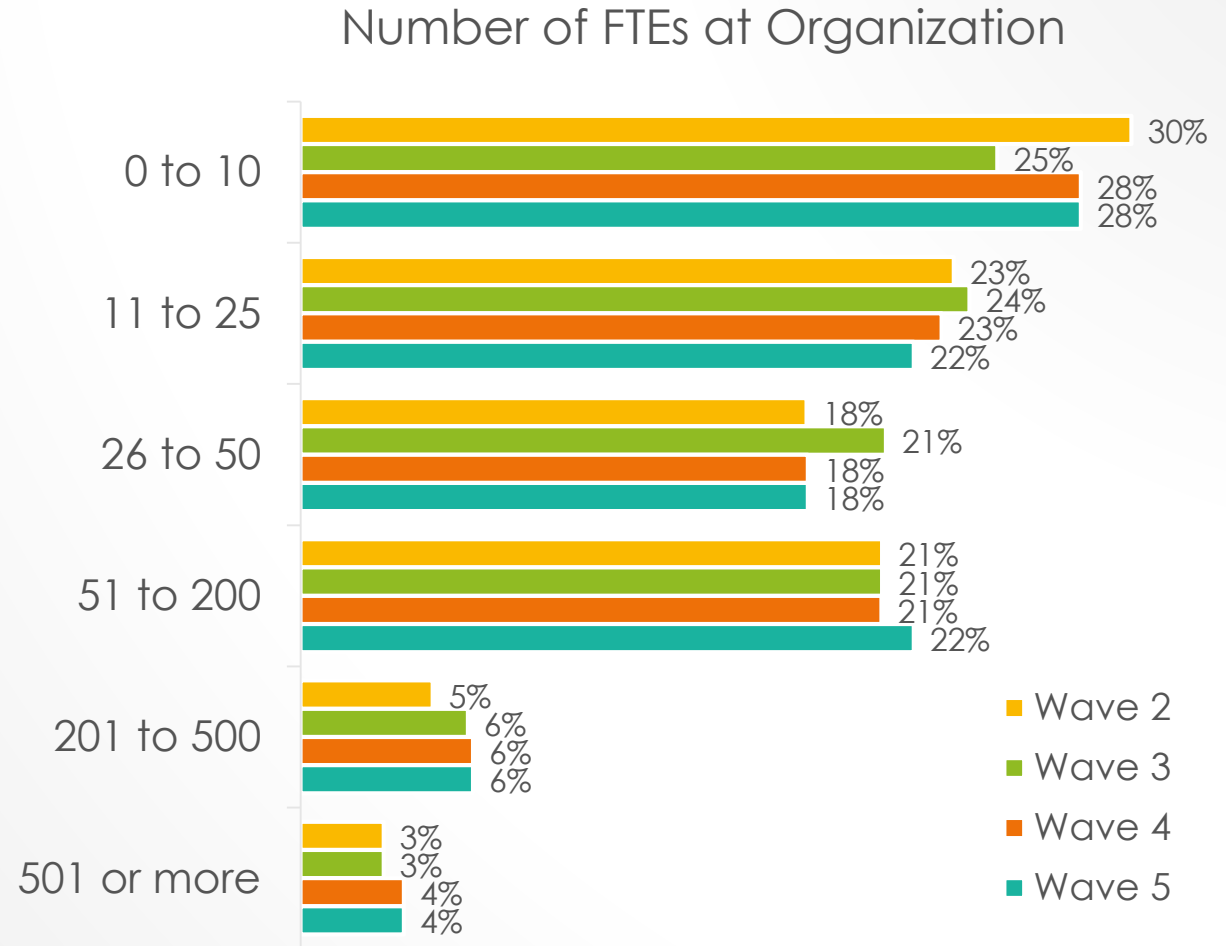
- Only the most recent four waves are shown in the graph.



Q2. In which state is your organization headquartered?  
 Wave 2 - n = 738, Wave 3 - n = 610, Wave 4 - n = 566, Wave 5 - n = 512

# THROUGHOUT ALL WAVES, ROUGHLY HALF OF FIRMS REPORT FEWER THAN 50 FTES. THE PERCENTAGE OF FIRMS FALLING INTO HIGHER FTE RANGES HAS ALSO REMAINED CONSTANT.

- Only the most recent four waves are shown in the graph.
- The median number of FTEs in Waves 5 and 4 is 25 compared to 26.5 in Wave 3 and 23 in the first two waves. The difference between the waves is not statistically significant, so comparison between waves can be made accurately.
- The largest organization in Wave 5 has 10,000 FTEs. This figure has fluctuated between 11,000 and 7,500 throughout the series.
- Throughout this report all questions are reported by firm size and statistically significant differences are noted.



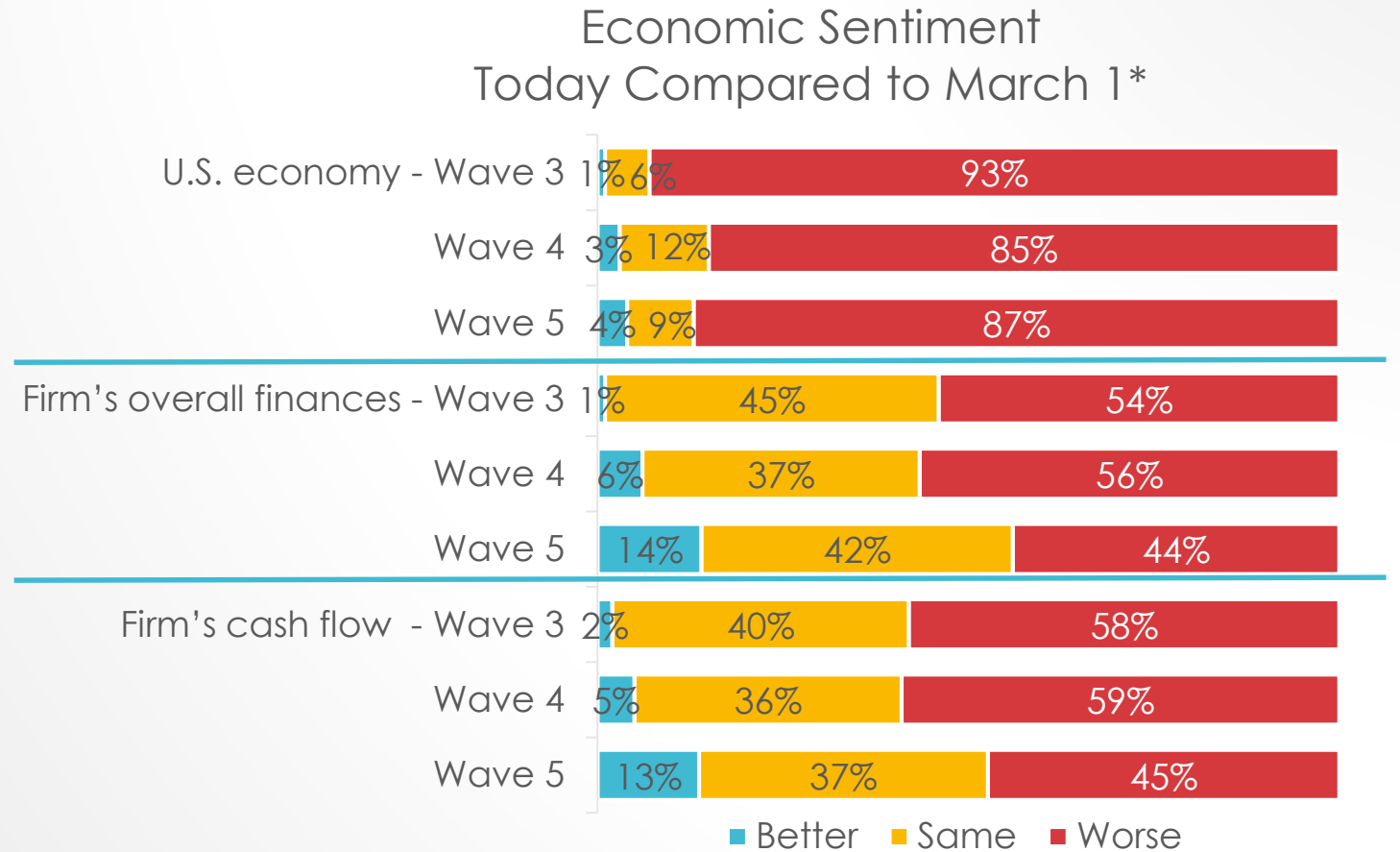
Q3. Including yourself, how many full-time equivalent employees (FTEs) do you have? If you are not sure, please provide your best estimate.  
 Wave 2 - n = 738, Wave 3 - n = 610, Wave 4 - n = 566, Wave 5 - n = 512



# ECONOMIC SENTIMENT

ALTHOUGH THE VAST MAJORITY OF FIRMS (87%) STILL FEEL THE CONDITION OF THE US ECONOMY IS WORSE COMPARED TO MARCH 1, FIRMS ARE LESS NEGATIVE REGARDING THEIR OWN FINANCES AND CASH FLOW COMPARED TO PREVIOUS WAVES.

- As has been the case in previous waves, there is one statistically significant difference by firm size:
  - Firms with 25 or fewer FTEs are more likely than other firms to say their finances (49%) and cash flow (53%) are worse today.



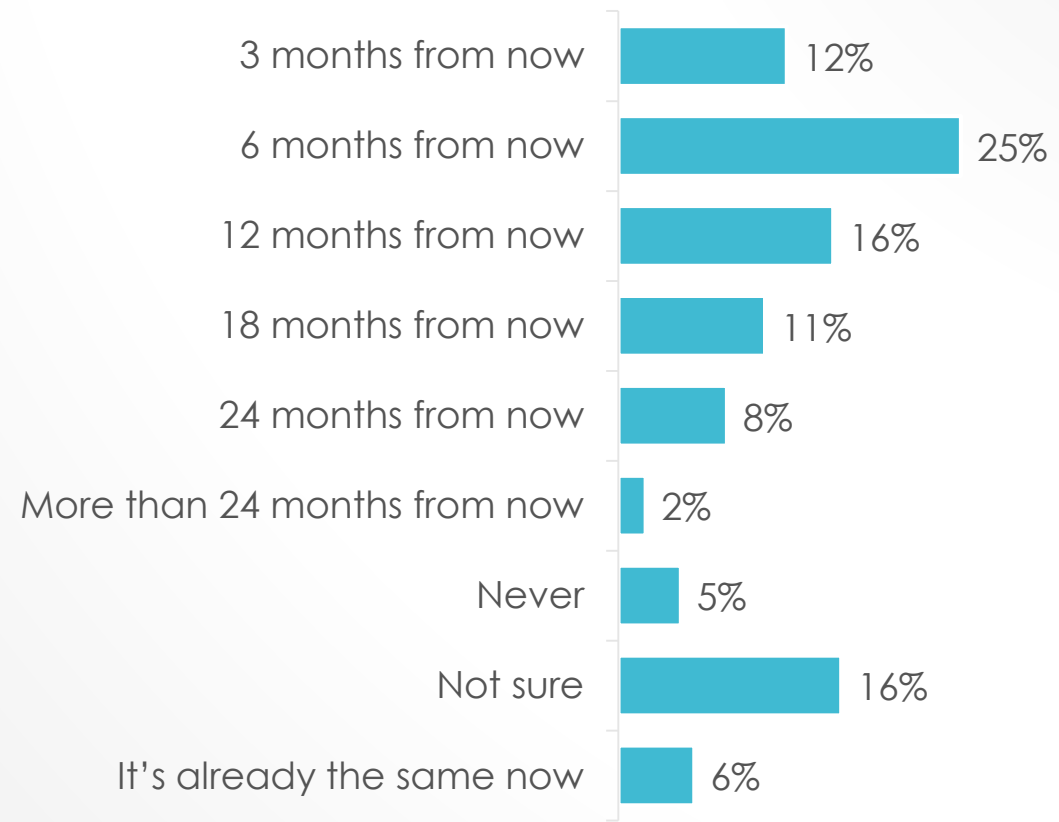
Q12. Compared to March 1, how do you feel about each of the following today?  
 "Not sure" responses omitted from calculations  
 Wave 3 - n = 592 - 585, Wave 4 - n = 557 - 555, Wave 5 - n = 510 - 504

\* Not asked in Waves 1 and 2

ALTHOUGH MORE THAN ONE-THIRD (37%) OF FIRMS THINK BUSINESS WILL RETURN TO NORMAL WITHIN SIX MONTHS, ANOTHER 35% THINK IT WILL TAKE ONE OR TWO YEARS. ONE-FIFTH (21%) ARE EITHER NOT SURE OR DON'T THINK THINGS WILL EVER BE THE SAME.

- There are no significant differences by firm size.

Anticipation of Business Returning to Normal\*



\* Not asked in previous Waves

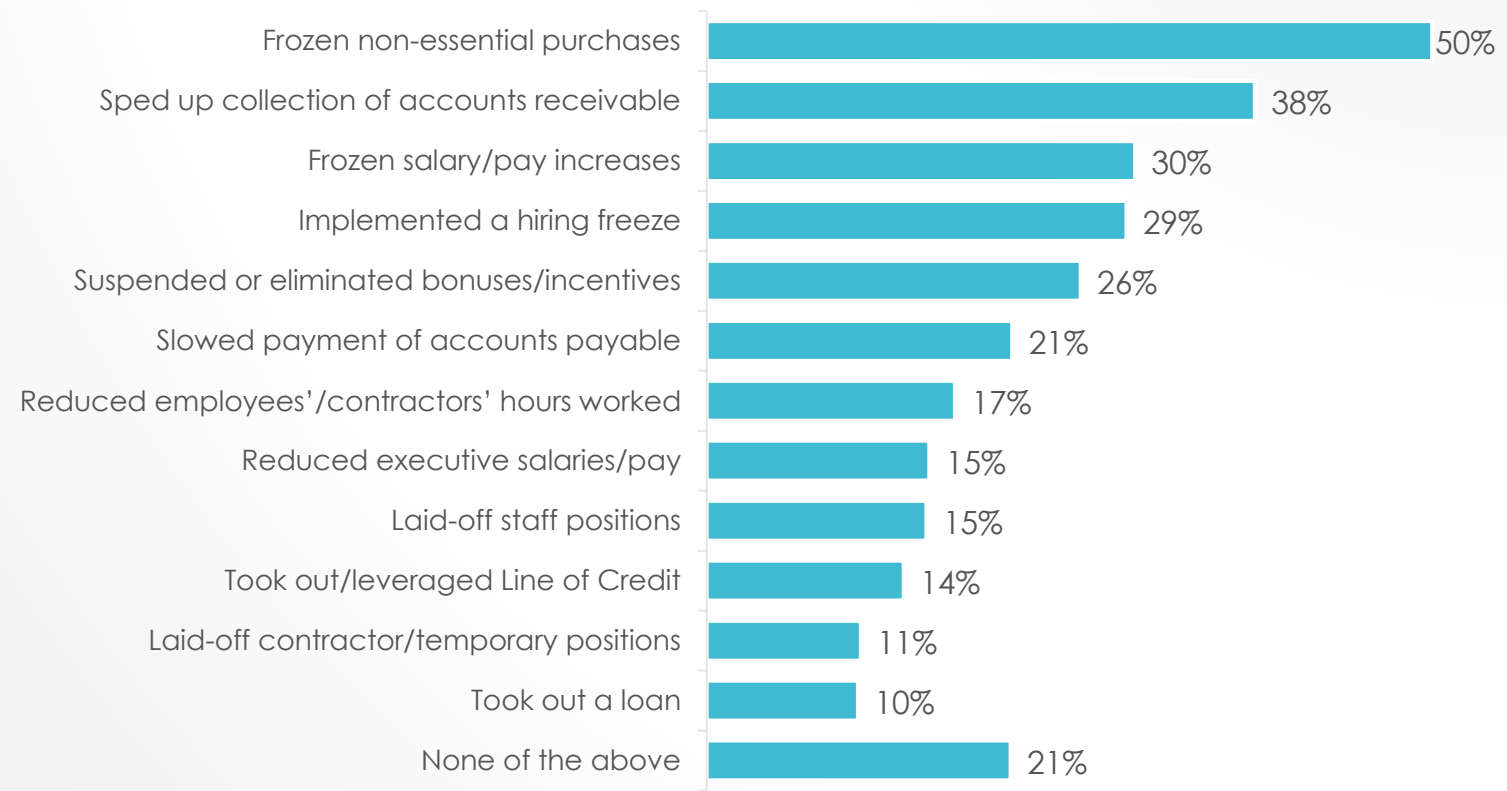
Q18. When do you anticipate your business will return to normal, meaning the way it was before the current pandemic?  
Wave 5 - n = 507

# BUSINESS IMPACTS

# THE TOP ACTIONS FIRMS HAVE TAKEN TO SHORE UP THEIR FINANCES SINCE MARCH 1 ARE FREEZING NON-ESSENTIAL PURCHASES (50%), SPEEDING UP COLLECTIONS (38%) AND FREEZING SALARY/PAY INCREASES (30%).

- Although the wording of this question changed slightly since Wave 4, the results are not significantly different.
- Firms with more than 500 FTEs are much more likely to have taken all of these actions. For instance, 70% have frozen non-essential purchases and/or sped up collection of accounts receivable.
- Few firms have taken the following actions:
  - Reduced staff salaries/pay 8%
  - Suspended or eliminated retirement benefit contributions (7%)
  - Paused/deferred stock buy-backs (4%)
  - Permanently closed office(s) (1%)

Most Common Actions Taken Since March 1 to Shore up Finances\*



Q5. Which of the following cost cutting/cash management actions, if any, has your firm taken since March 1, 2020?

Select All That Apply

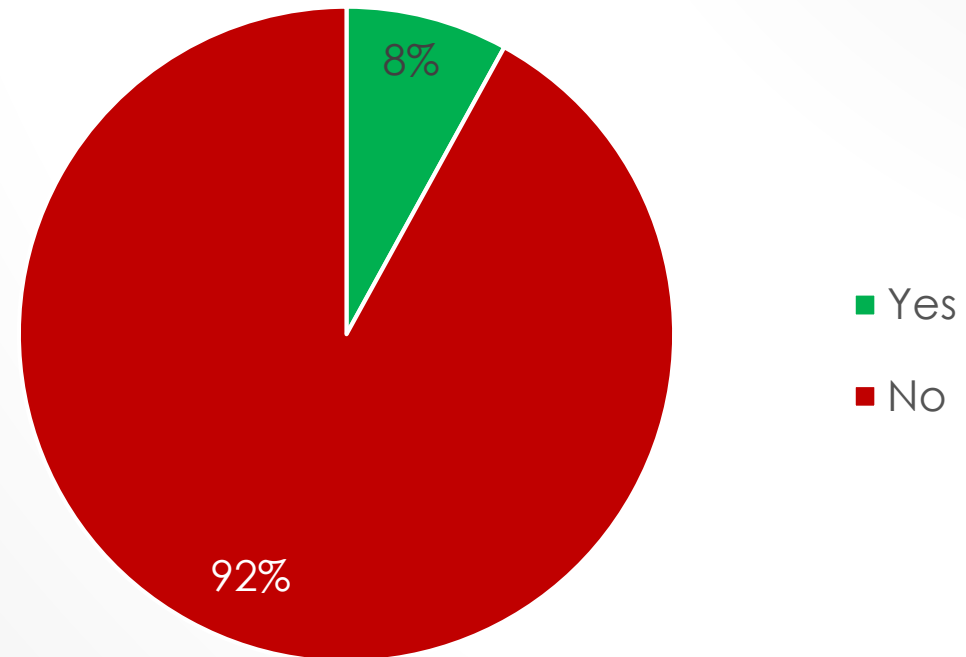
Wave 5 - n = 507

\* Not asked in Waves 1 and 2

# ABOUT ONE OUT OF TWELVE FIRMS (8%) REPORT WORKING ON NEW PROJECTS DIRECTLY RELATED TO THE COVID-19 PANDEMIC RESPONSE.

- Larger firms are more likely to be working on new projects directly related to COVID-19.
  - 0 to 25 FTEs = 3% "Yes"
  - 26 to 50 FTEs = 9%
  - 51 to 200 FTEs = 12%
  - 201 to 500 FTEs = 17%
  - 501 or more FTEs = 35%

Incidence of Working on New Projects Directly Related to COVID-19 Response\*



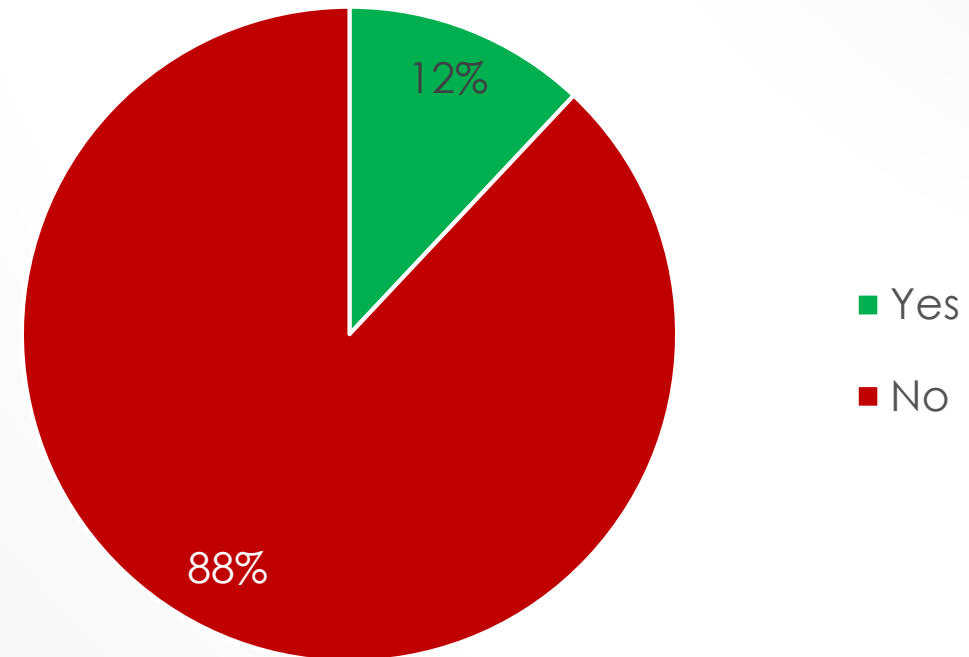
\* Not asked in previous Waves.

Q16. Is your firm working on, or has it worked on, any NEW projects or expanded projects directly related to supporting the COVID-19 pandemic response?  
n = 504

# ABOUT ONE OUT OF EIGHT FIRMS (12%) REPORT HAVING BUSINESS AREAS THAT ARE OUTPERFORMING NOW.

- Larger firms are more likely to have business areas that are outperforming.
  - 0 to 25 FTEs = 4% "Yes"
  - 26 to 50 FTEs = 13%
  - 51 to 200 FTEs = 20%
  - 201 to 500 FTEs = 23%
  - 501 or more FTEs = 50%

Incidence of Firms With Business Areas That Are Outperforming\*



\* Not asked in previous Waves.

Q17. Are there any areas of your business where you are outperforming (as opposed to seeing declines or holding steady)?  
n = 503

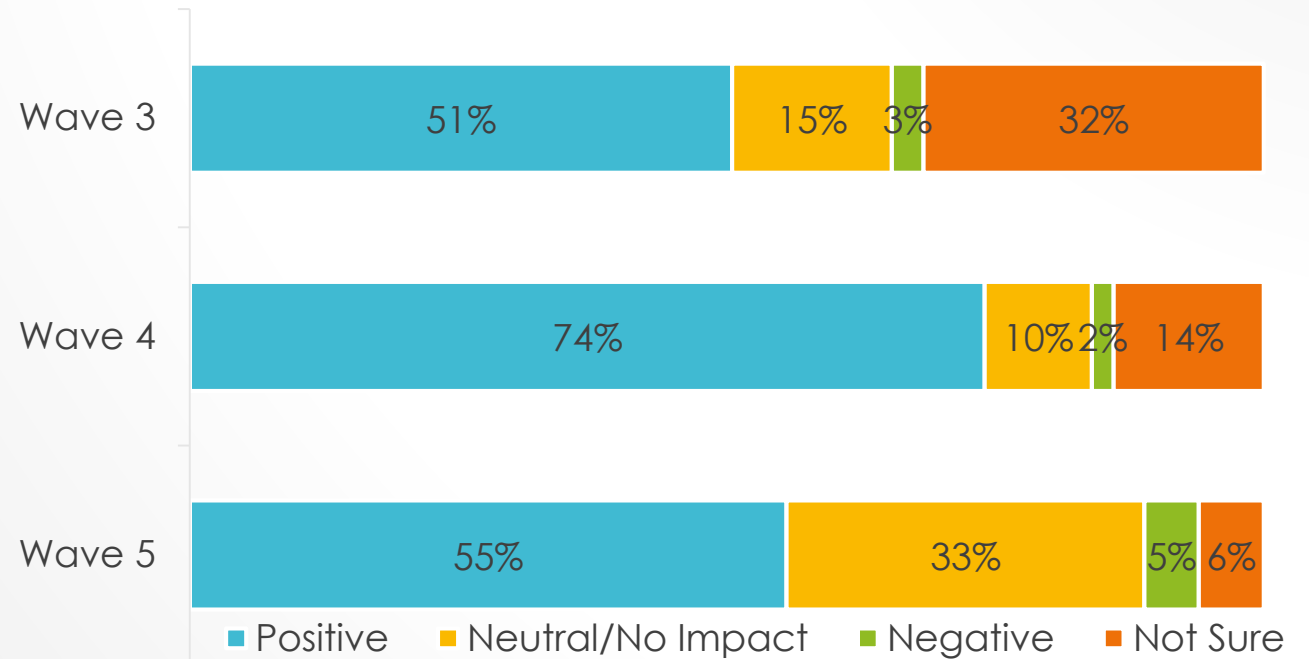
# IMPACT OF FEDERAL STIMULUS PROGRAM



AFTER THE ENTHUSIASM TOWARDS THE CARES ACT IN WAVE 4 SURGED, FEWER FIRMS NOW FEEL THE FEDERAL STIMULUS PACKAGE HAS HAD A POSITIVE IMPACT ON THEIR FIRM (55% VS. 74%), WHILE MANY MORE SAY IT'S HAD NO IMPACT (33% VS. 10%).

- In Waves 3 and 4, the question was asked slightly differently. It asked what impact the stimulus package “will have” as opposed to “has had.”
- Details of differences by firm size are found on the following slide.

Impact of Federal Stimulus Package on Firm\*



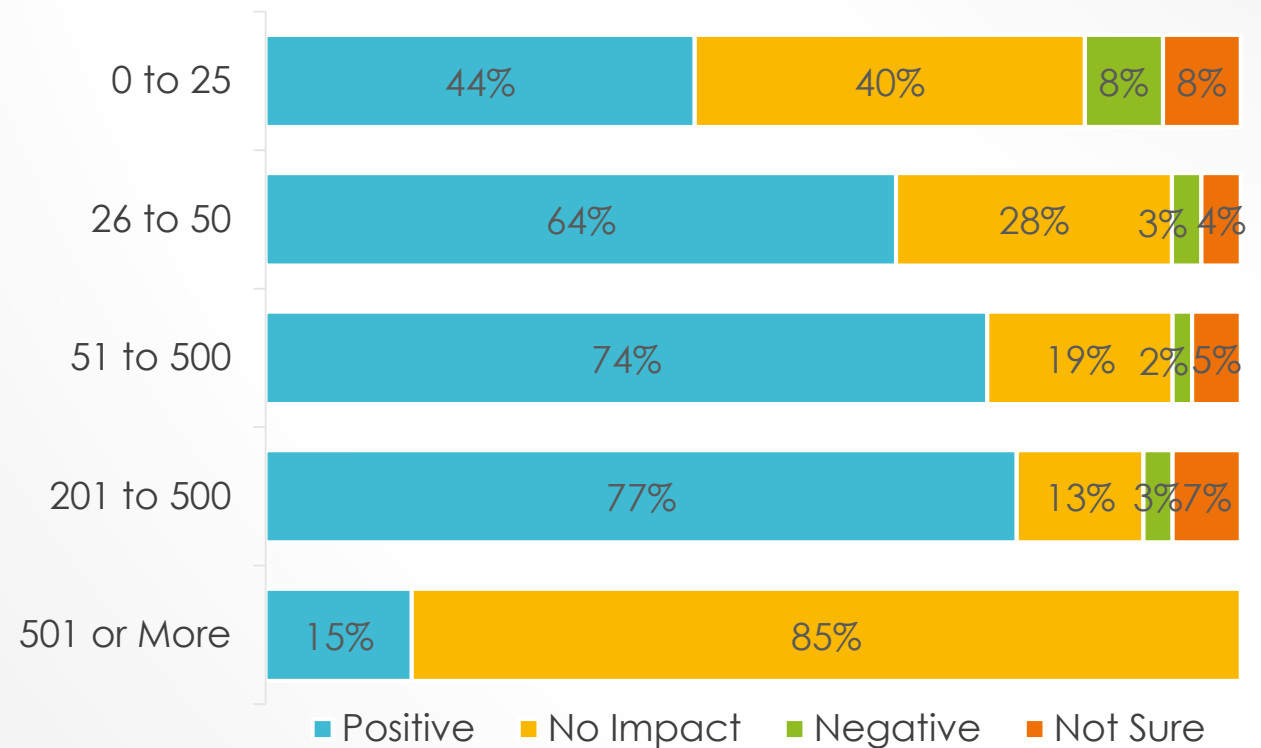
\* Not asked in Waves 1 and 2

Q6. How has the U.S. Government's coronavirus stimulus package (CARES Act) signed into law on March 27, 2020 affected your firm, if at all? Has the impact been...?  
 Wave 3 - n = 598, Wave 4 - n = 560, Wave 5 - n = 506

AS FIRM SIZE INCREASES, SO TOO DOES THE PERCENTAGE FEELING THE STIMULUS PACKAGE HAS HAD A POSITIVE IMPACT, WITH THE EXCEPTION OF FIRMS WITH 501+ FTES, MOST OF WHOM HAVE FELT NO IMPACT.

- Firms with more than 500 FTEs are *less likely* to say the stimulus package has had a positive impact (15%) and *more likely* to say it has had no impact (85%), probably due to the focus of the package being on smaller businesses.

Impact of Federal Stimulus Package on Firm\*  
By Firm Size



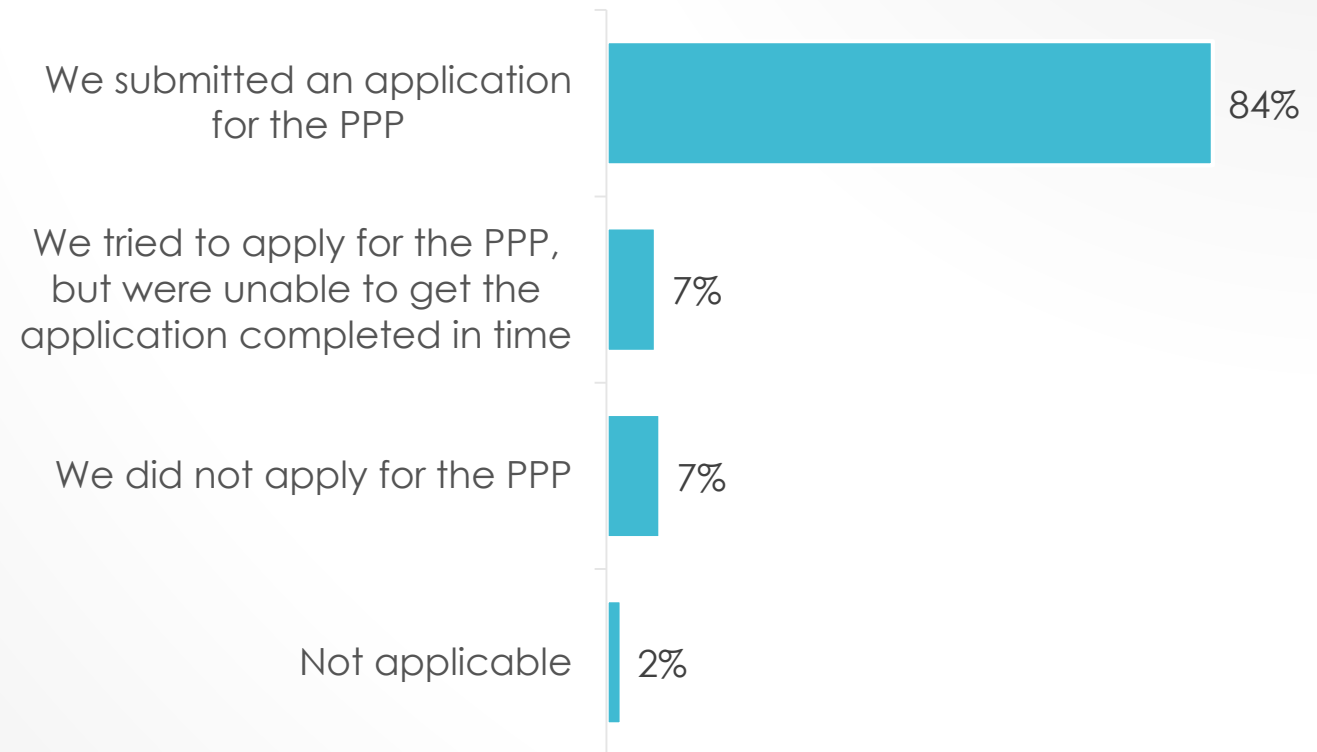
\* Not asked in Waves 1 and 2

Q6. How has the U.S. Government's coronavirus stimulus package (CARES Act) signed into law on March 27, 2020 affected your firm, if at all? Has the impact been...?  
Wave 5 - n = 506

# MORE THAN EIGHT OUT OF TEN FIRMS (84%) APPLIED FOR THE SMALL BUSINESS ADMINISTRATION (SBA) PAYCHECK PROTECTION PROGRAM (PPP).

- Firms with 25 or fewer FTEs are the least likely to have submitted an application.
  - 0 to 25 FTEs = 76% "Submitted application"
  - 26 to 50 FTEs = 88%
  - 51 to 200 FTEs = 95%
  - 201 to 500 FTEs = 100%
  - 501 or more FTEs = Not Applicable

Status of Applying for SBA PPP\*  
- Among Firms With 500 or Fewer FTEs -



\* Not asked in Waves 1, 2 or 3. Question asked in Wave 4 was too different to directly compare.

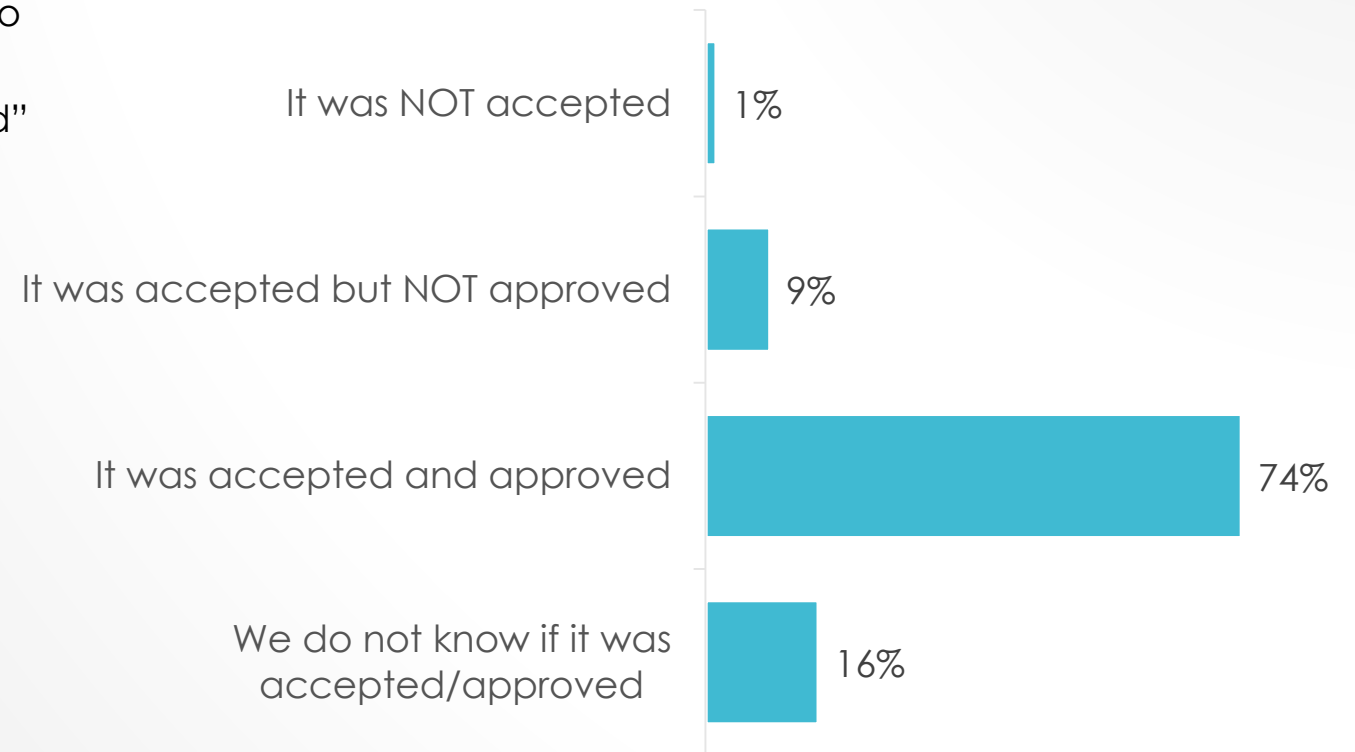
Q7. Which of the following best describes your firm's status regarding the Paycheck Protection Program (PPP) authorized by Congress as part of the CARES Act?

Wave 5 - n = 484

# AMONG FIRMS SUBMITTING AN APPLICATION, NEARLY THREE-FOURTHS (74%) WERE APPROVED, ALTHOUGH 16% DO NOT YET KNOW.

- Firms with 25 or fewer FTEs were the least likely to receive approval.
  - 0 to 25 FTEs = 64% "Accepted & approved"
  - 26 to 50 FTEs = 80%
  - 51 to 200 FTEs = 85%
  - 201 to 500 FTEs = 90%
  - 501 or more FTEs = Not Applicable

Status of PPP Application\*  
- Among Firms Submitting Application -



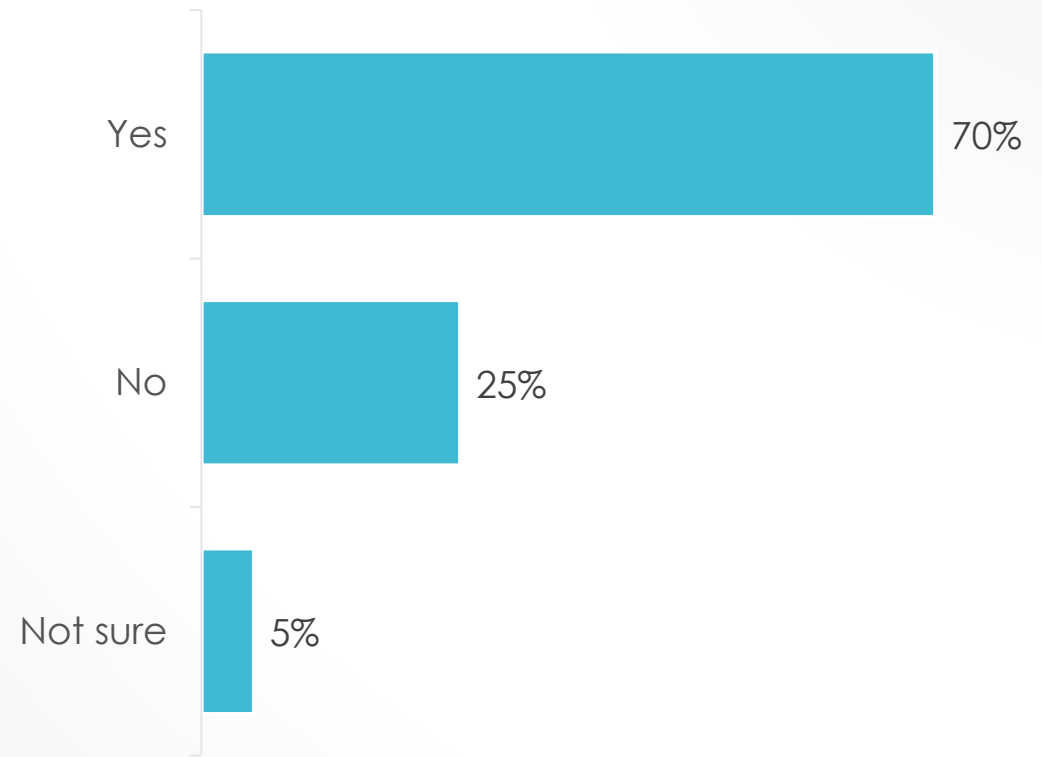
\* Not asked in previous Waves.

Q8. Which of the following best describes the status of your PPP application?  
Wave 5 - n = 404

# AMONG FIRMS WHOSE APPLICATION WAS APPROVED, SEVEN OUT OF TEN (70%) HAVE RECEIVED THE FUNDS IN THEIR BANK ACCOUNT.

- There are no significant differences between firm size on this question.

Received SBA PPP Funds\*  
- Among Firms With Approved Application -



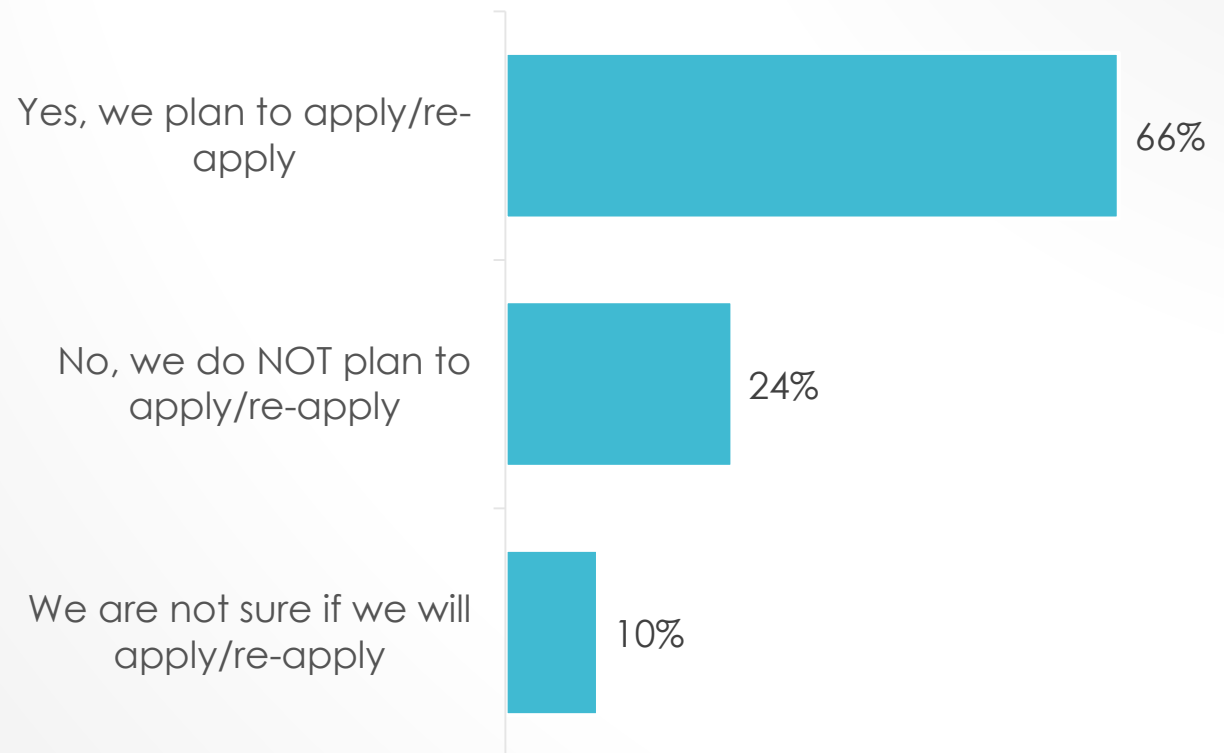
Q9. Have you received the PPP funds in your bank account?  
Wave 5 - n = 299

\* Not asked in previous Waves.

# AMONG FIRMS WHO EITHER DID NOT SUBMIT AN APPLICATION OR DID NOT RECEIVE APPROVAL, TWO-THIRDS (66%) PLAN TO APPLY OR RE-APPLY FOR A PPP LOAN ONCE MORE FUNDS ARE MADE AVAILABLE.

- Firms with 25 or fewer FTEs are the least likely to apply / re-apply.
  - 0 to 25 FTEs = 63% “Yes”
  - 26 to 50 FTEs = 71%
  - 51 to 200 FTEs = 75%
  - 201 to 500 FTEs = Not applicable
  - 501 or more FTEs = Not Applicable

Intent to Apply/Re-Apply for SBA PPP Funds\*  
- Among Firms Without Approved Application -



\* Not asked in previous Waves.

Q10. As you may know, the original \$349 billion approved for the PPP as part of the CARES Act has been completely allocated. If Congress approves additional funds, will your firm apply (or re-apply)?  
Wave 5 - n = 111

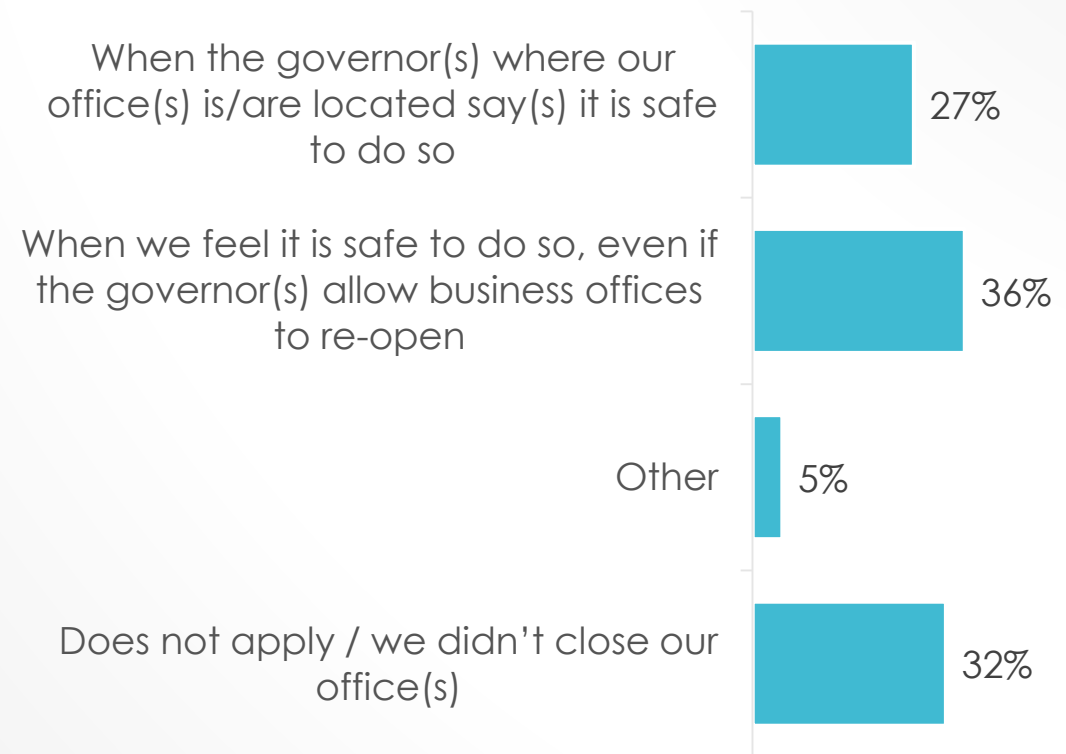
# PLANS TO RE-OPEN OFFICES

# ALTHOUGH ROUGHLY ONE-THIRD OF FIRMS (32%) INDICATE THEY DID NOT CLOSE THEIR OFFICES, THOSE THAT DID ARE FAIRLY SPLIT ON WHEN THEY WILL RE-OPEN.

- A plurality of firms (36%) say they will re-open their office(s) when they feel it is safe to do so, regardless of what their governor says.
- Larger firms are more likely to re-open when they feel it is safe, not when the governor allows it.
  - 0 to 25 FTEs = 30% “When we feel it's safe”
  - 26 to 50 FTEs = 37%
  - 51 to 200 FTEs = 38%
  - 201 to 500 FTEs = 43%
  - 501 or more FTEs = 70%

\* Not asked in previous Waves.

## When Firms Plan to Re-open Offices\*



Q11. Which of the following best describes when you will re-open your firm's offices?  
Wave 5 - n = 503

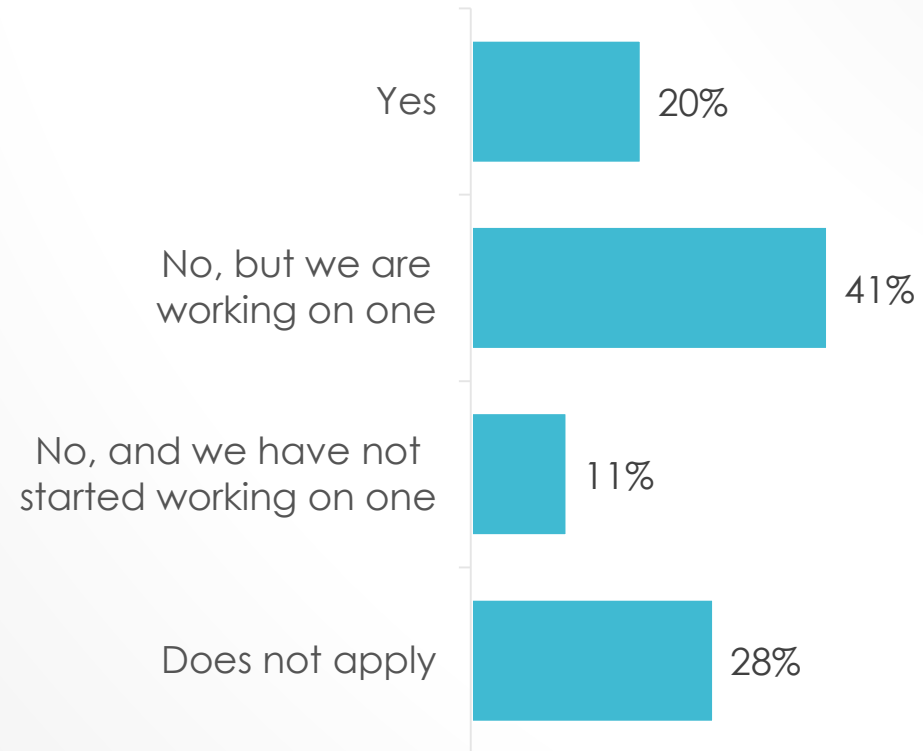


ALTHOUGH 28% OF FIRMS SAY THIS QUESTION DOES NOT APPLY TO THEM, ONE-FIFTH OF FIRMS (20%) SAY THEY HAVE A PLAN TO ENSURE WORKER SAFETY WHEN THEY RE-OPEN. AN ADDITIONAL 41% SAY THEY ARE WORKING ON A PLAN.

- After removing firms for whom this question does not apply, larger firms are more likely to either have a plan or to be working on one.
  - 0 to 25 FTEs = 73% “Have or working on one”
  - 26 to 50 FTEs = 87%
  - 51 to 200 FTEs = 94%
  - 201 to 500 FTEs = 100%
  - 501 or more FTEs = 100%

\* Not asked in previous Waves.

Have Plan for Re-Opening Office to Ensure the Safety of Staff\*



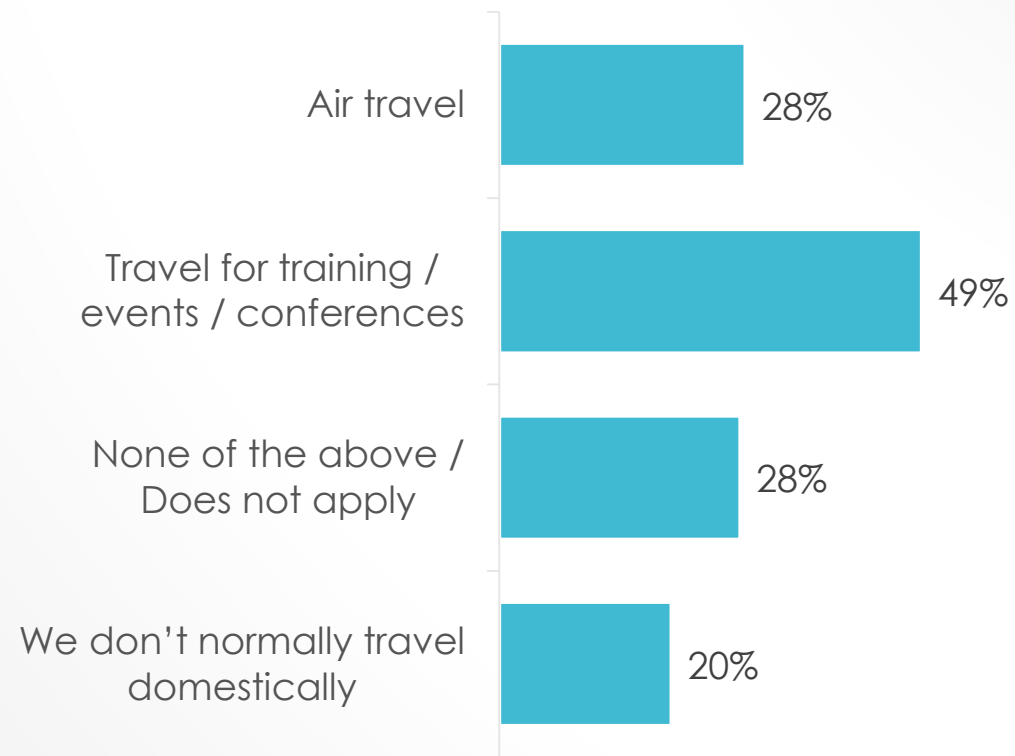
Q12. Has your firm developed a plan for re-opening its office(s) to ensure the safety of the staff?  
Wave 5 - n = 503

# NEARLY HALF OF FIRMS (49%) SAY THEY WILL RESTRICT OR PROHIBIT DOMESTIC TRAVEL FOR TRAINING/EVENTS/CONFERENCES AFTER STAY-AT-HOME ORDERS ARE LIFTED. ANOTHER FOURTH (28%) SAY THEY WILL RESTRICT AIR TRAVEL.

- Larger firms are more likely to restrict domestic travel for training/events/conferences.
  - 0 to 25 FTEs = 40%
  - 26 to 50 FTEs = 52%
  - 51 to 200 FTEs = 52%
  - 201 to 500 FTEs = 80%
  - 501 or more FTEs = 89%

\* Not asked in previous Waves.

### After Stay-At-Home Orders Are Lifted, What Domestic Travel Will Firm Restrict?\*



Q14. Once stay-at-home orders are lifted for your location(s), which of the following, if any, will your company restrict or prohibit when it comes to domestic travel? Select All That Apply

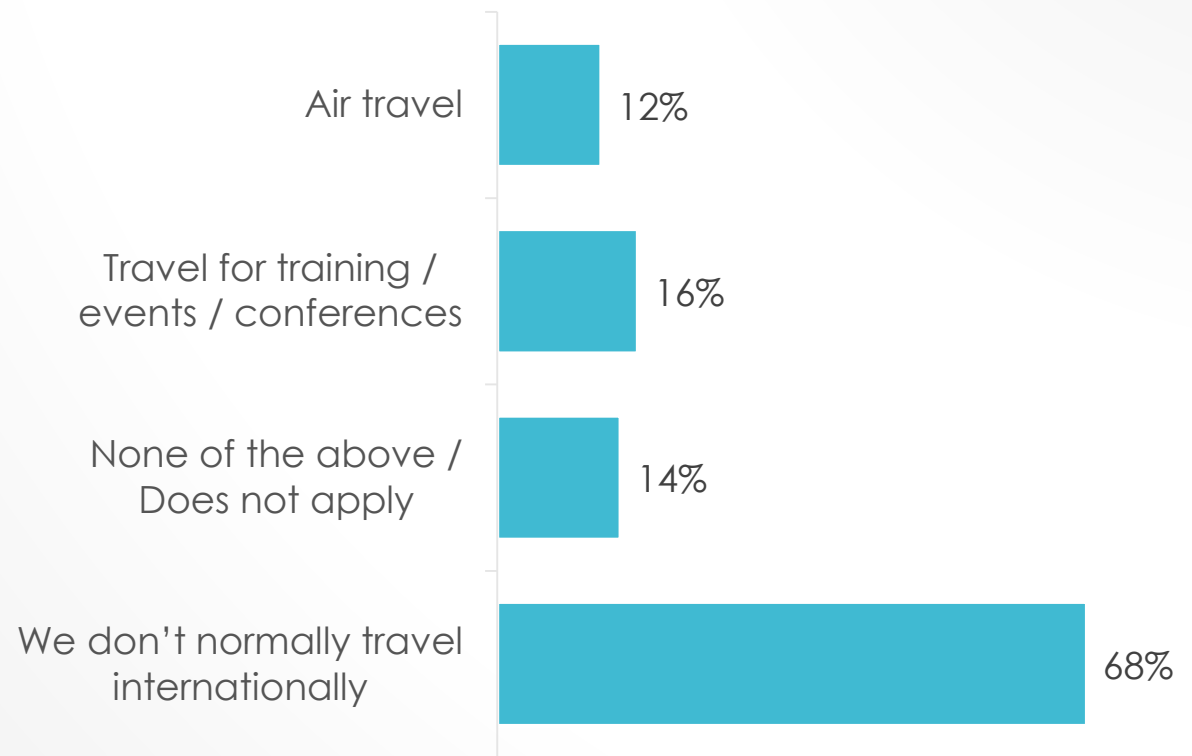
Wave 5 - n = 493

# ABOUT ONE OUT OF SIX FIRMS (16%) SAY THEY WILL RESTRICT OR PROHIBIT INTERNATIONAL TRAVEL FOR TRAINING/EVENTS/CONFERENCES AFTER STAY-AT-HOME ORDERS ARE LIFTED. ANOTHER 12% SAY THEY WILL RESTRICT AIR TRAVEL.

- Larger firms are more likely to restrict international travel for training/events/conferences.
  - 0 to 25 FTEs = 13%
  - 26 to 50 FTEs = 16%
  - 51 to 200 FTEs = 15%
  - 201 to 500 FTEs = 37%
  - 501 or more FTEs = 40%

\* Not asked in previous Waves.

## After Stay-At-Home Orders Are Lifted, What International Travel Will Firm Restrict?\*



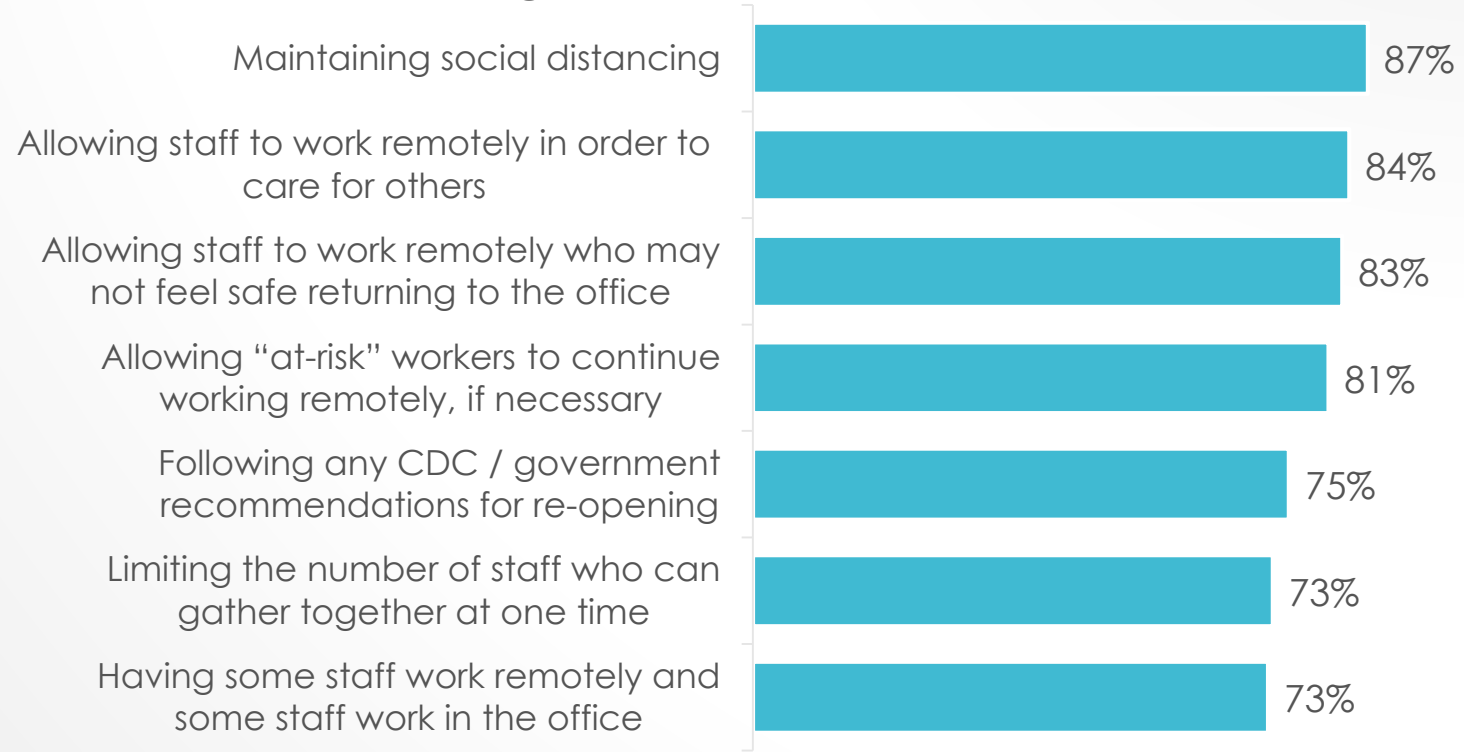
Q15. Once stay-at-home orders are lifted for your location(s), which of the following, if any, will your company restrict or prohibit when it comes to international travel? Select All That Apply

Wave 5 - n = 499

# THE VAST MAJORITY OF FIRMS PLAN TO IMPLEMENT A LARGE NUMBER OF SAFETY MEASURES ONCE THEY RE-OPEN THEIR OFFICES. TOP AMONG THESE ARE MAINTAINING SOCIAL DISTANCING (87%) AND ALLOWING STAFF TO WORK REMOTELY TO CARE FOR OTHERS (84%).

- Although the percentages may differ somewhat, the top safety measures that firms plan to take are the same regardless of firm size.
- The only significant differences are that firms with 25 or fewer staff are less likely to implement the following:
  - Allowing “at-risk” workers to continue working remotely, if necessary (72%)
  - Following any CDC/government recommendations for re-opening (64%)
  - Limiting the number of staff who can gather together at one time (60%)
  - Having some staff work remotely and some staff work in the office to ensure social distancing is maintained (60%)

Top Safety Measures Firms Plan to Take When Re-Opening Offices\*  
- Among Those Who Have/Will Have Plan -



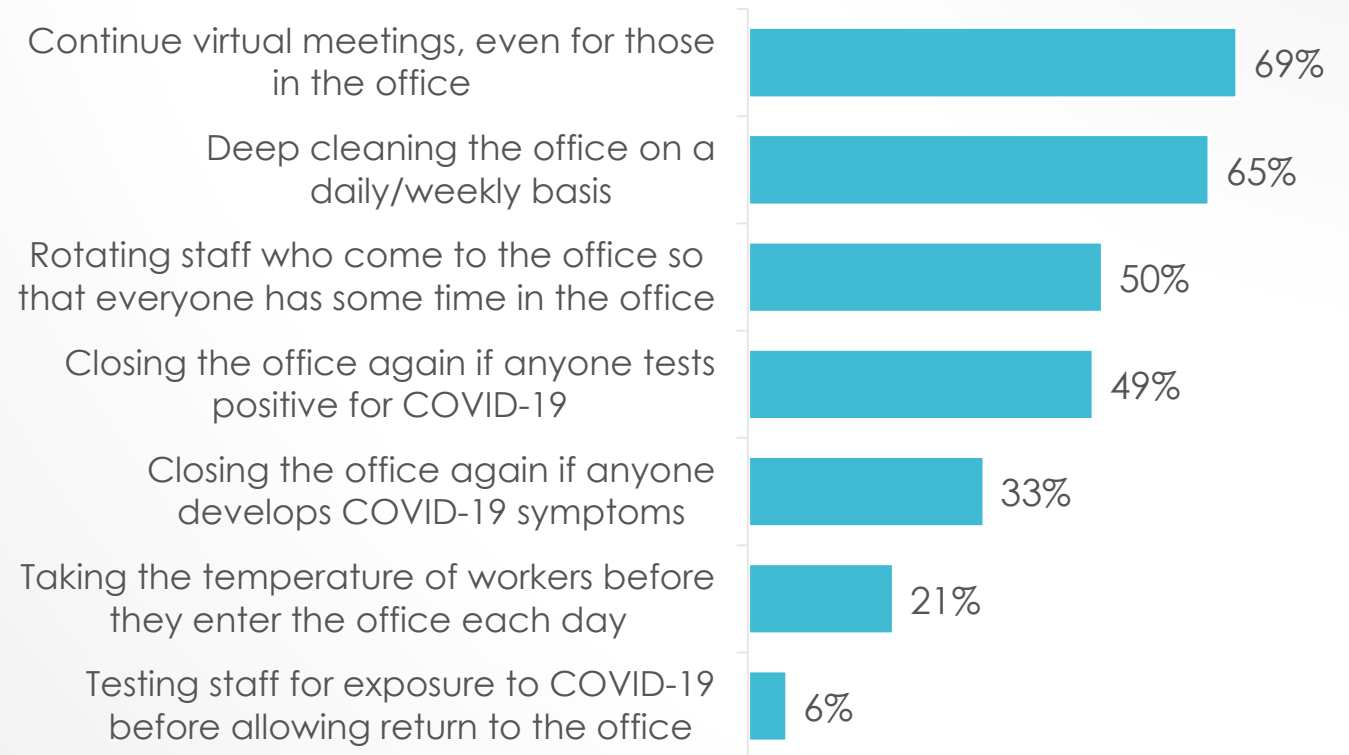
Q13. Which of the following safety measures are part of your plan to re-open office(s)? Select All That Apply  
Wave 5 - n = 306

\* Not asked in previous Waves

FEWER FIRMS ARE LIKELY TO IMPLEMENT THE SAFETY MEASURES ON THIS SLIDE, ALTHOUGH A MAJORITY PLAN TO CONTINUE VIRTUAL MEETINGS EVEN FOR THOSE IN THE OFFICE (69%) AND CONDUCT A DEEP CLEANING OF THE OFFICE ON A REGULAR BASIS (65%).

- The only significant differences are that firms with 25 or fewer staff are less likely to implement the following:
  - Continue virtual meetings, even for those in the office (59%)
  - Rotating staff who come to the office so that everyone has some time in the office (36%)

Other Safety Measures Firms Plan to Take When Re-Opening Offices\*  
- Among Those Who Have/Will Have Plan -



Q13. Which of the following safety measures are part of your plan to re-open office(s)? Select All That Apply

Wave 5 - n = 306

\* Not asked in previous Waves

# METHODOLOGY – WAVE 1

- The Institute for Association and Nonprofit Research (IFANR) invited individuals from among the database list of member companies provided by the American Council of Engineering Companies (ACEC) to participate in this survey. One invitation was sent per member company.
  - Data collection occurred on March 17 and 18, 2020.
  - A total of 3,456 invitations were emailed, although 294 bounced and 17 opted-out, resulting in a total of 3,145 potential respondents.
  - Individuals who did not respond to the first email were sent one follow-up reminder.
  - In all, 794 individuals responded to the email invitations for an overall **response rate of 25%**.
- Individuals could respond using a laptop/desktop computer, tablet or smartphone; 12% of respondents completed the survey using a mobile device.
- Throughout the report for Wave 1 meaningful, statistically significant differences are noted by geographic region.

# METHODOLOGY – WAVE 2

- The Institute for Association and Nonprofit Research (IFANR) invited individuals from among the database list of member companies provided by the American Council of Engineering Companies (ACEC) to participate in this survey. One invitation was sent per member company.
  - Data collection occurred on March 24 and 25, 2020.
  - A total of 3,438 invitations were emailed, although 298 bounced and 20 opted-out, resulting in a total of 3,120 potential respondents.
  - Individuals who did not respond to the first email were sent one follow-up reminder.
  - In all, 738 individuals responded to the email invitations for an overall **response rate of 24%**.
- Individuals could respond using a laptop/desktop computer, tablet or smartphone; 11% of respondents completed the survey using a mobile device.
- Throughout this report meaningful, statistically significant differences are noted by number of FTEs.

# METHODOLOGY – WAVE 3

- The Institute for Association and Nonprofit Research (IFANR) invited individuals from among the database list of member companies provided by the American Council of Engineering Companies (ACEC) to participate in this survey. One invitation was sent per member company.
  - Data collection occurred on March 31 and April 1, 2020.
  - A total of 3,417 invitations were emailed, although 298 bounced and 9 opted-out, resulting in a total of 3,110 potential respondents.
  - Individuals who did not respond to the first email were sent one follow-up reminder.
  - In all, 610 individuals responded to the email invitations for an overall **response rate of 20%**.
- Individuals could respond using a laptop/desktop computer, tablet or smartphone; 10% of respondents completed the survey using a mobile device.
- Throughout this report meaningful, statistically significant differences are noted by number of FTEs.



# METHODOLOGY – WAVE 4

- The Institute for Association and Nonprofit Research (IFANR) invited individuals from among the database list of member companies provided by the American Council of Engineering Companies (ACEC) to participate in this survey. One invitation was sent per member company.
  - Data collection occurred on April 7 and 8, 2020.
  - A total of 3,407 invitations were emailed, although 291 bounced and 9 opted-out, resulting in a total of 3,107 potential respondents.
  - Individuals who did not respond to the first email were sent one follow-up reminder.
  - In all, 566 individuals responded to the email invitations for an overall **response rate of 18%**.
- Individuals could respond using a laptop/desktop computer, tablet or smartphone; 10% of respondents completed the survey using a mobile device.
- Throughout this report meaningful, statistically significant differences are noted by number of FTEs.

# METHODOLOGY – WAVE 5

- The Institute for Association and Nonprofit Research (IFANR) invited individuals from among the database list of member companies provided by the American Council of Engineering Companies (ACEC) to participate in this survey. One invitation was sent per member company.
  - Data collection occurred on April 21 and 22, 2020.
  - A total of 3,395 invitations were emailed, although 301 bounced and 11 opted-out, resulting in a total of 3,083 potential respondents.
  - Individuals who did not respond to the first email were sent one follow-up reminder.
  - In all, 512 individuals responded to the email invitations for an overall **response rate of 17%**.
- Individuals could respond using a laptop/desktop computer, tablet or smartphone; 9% of respondents completed the survey using a mobile device.
- Throughout this report meaningful, statistically significant differences are noted by number of FTEs.

# STATISTICAL NOTES

- Statistically significant differences are evaluated at a 95% confidence interval (for a description of tests used, please see the Appendix).
- There is no margin of sampling error as this was a census of all individuals in the ACEC database.
- Although every effort was taken to minimize survey bias, there is no way to completely eliminate all sources of potential bias. Sources of potential bias include, but are not limited to, the following:
  - Non-response bias
  - Confounding bias
  - Question wording bias
  - Question order bias
  - Habituation
  - Sponsor bias
  - Confirmation bias

# APPENDIX

# TESTS OF SIGNIFICANCE FOR MEANS

## **F-test**

When the mean is displayed for a row variable, MarketSight first runs an Analysis of Variance (ANOVA) using an F-test. Doing so tests the hypothesis that the means of multiple normally distributed populations, all having the same variance, are equal.

MarketSight tests whether or not the row variable's means are equal to one another for all columns in the crosstab. Rejecting the test hypothesis implies that at least one of the column means is significantly different from the others.

## **Fisher's Least Significant Difference (LSD) test**

If the statistics option to "Correct for Type I errors in all comparisons" is disabled, MarketSight will run Fisher's LSD test for both Pairwise tests and Contrast tests of means. MarketSight only runs Fisher's LSD test if the ANOVA F-test first rejects the null hypothesis that all column means are equal to one another.

Fisher's LSD test is a relatively powerful test because it uses the pooled variance estimate from the F-test, thus taking advantage of the increased sample size of all columns in the crosstab. Pooling the variance is valid because MarketSight explicitly tests for equality of variance among all columns prior to running the associated F-test.

Although the test is more powerful than either the Tukey HSD or Scheffé tests, it is more susceptible to Type I error when running multiple simultaneous tests.

# TESTS OF SIGNIFICANCE FOR MEANS (CONT'D)

## **Scheffé test**

If the statistics option to "Correct for Type I errors in all comparisons" is enabled, MarketSight will run the Scheffé test for Contrast tests of means. MarketSight only runs the Scheffé test if the ANOVA F-test first rejects the null hypothesis that all column means are equal to one another.

The Scheffé test is a conservative test for running multiple Contrast tests of Means which controls the overall Type I error rate for all possible contrasts based on the selected Confidence Level.

## **Tukey-Kramer tests**

MarketSight will run Tukey-Kramer test for Pairwise tests of means. MarketSight only runs Tukey-Kramer test if the ANOVA F-test first rejects the null hypothesis that all column means are equal to one another.

Tukey-Kramer test is a conservative test for running multiple Pairwise comparisons of Means. It controls the overall Type I error rate across a number of related Pairwise tests based on the selected Confidence Level.

# TESTS OF SIGNIFICANCE FOR PROPORTIONS

## **Chi-squared**

When a Row Variable displays the Column % or Count option for individual Values, MarketSight runs a Chi-squared test. This test examines whether there is a relationship between the Column Variable(s) and the Row Variable.

Chi-squared tests involve a comparison of "actual" cell counts to "expected" cell counts in a crosstab.

The expected count for each cell is derived from a Row Variable's actual counts as follows: multiply the cell's row total by its column total, then divide by the sum total of all observations.

If the actual cell counts for one or more cells differ materially from their expected counts, the Chi-squared test may produce a statistically significant result which implies there is a relationship between the Column Variable(s) and the Row Variable.

A modified version of a Chi-Squared test is run for Multiple Response Variables.

# TESTS OF SIGNIFICANCE FOR PROPORTIONS (CONT'D)

## **Fisher's Exact**

For 2x2 crosstabs with small sample sizes, the Chi-squared test may be unreliable. Therefore, MarketSight runs an alternate test, Fisher's Exact Test, if more than 20% of the cells in a 2x2 crosstab have an expected cell count less than 5, or if any cells in a 2x2 cross-tab have an expected cell count less than 1.

Fisher's Exact Test calculates the true probability of observing a particular set of actual cell counts in a 2 x 2 crosstab, assuming that row and column totals are held constant.

Fisher's Exact Test is not run for Multiple Response Variables.

## **z-test**

MarketSight runs Z-tests for both Contrast and Pairwise tests of Column Proportions. A Z-test is used to test for a difference between two column proportions. The column proportions involved in the test are the cell counts divided by their respective column totals.

A Z-test is only run when the cells being compared have actual counts greater or equal to 5 and the column sample size minus the actual cell counts is greater than or equal to 5. If these data sufficiency conditions are not met, MarketSight runs Fisher's Exact Test instead.

A modified version of a Z-test is run for Multiple Response Variables.



# THANK YOU!



**Research conducted by Joseph Bates**

Research Consultant  
ACEC Research Institute  
[Institute@acec.org](mailto:Institute@acec.org)

