# Entrepreneurs' facial trustworthiness, gender, and crowdfunding success

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# Background

- Traditional corporate financing solutions, such as professional venture capital and commercial business loans, can be accessed by only a small number of ventures that are relatively more mature.

- Crowdfunding platforms (e.g., Kickstarter) allows individuals to provide funds directly to the entrepreneurs who initiate their start-up businesses without standard financial intermediaries (limited product information or a short track record).

- According to Statista (2019), the total amount of reward-based crowdfunding reached $848 million in the United States and $ 4.795 billion globally in 2019.

# Motivation

- Due to the opaque information environment of crowdfunding and the lack of monitoring from financial intermediaries, crowdfunding practices may suffer from severe **information asymmetry** issues.

- Kromidha (2016) argue that entrepreneurs who have higher social capital tend to be perceived as more **trustworthy** and are more likely to achieve successful crowdfunding campaigns.

- The psychology and neuroscience literature suggests that people may efficiently judge the **facial appearance** of another individual and rapidly develop perceptions of facial trustworthiness of others.

- We wonder whether entrepreneurs' appearance-based trustworthiness may affect the success of crowdfunding campaigns.

# Motivation

- García (2013) found the existence of gender stereotypes, which are advantageous to male entrepreneurs but disadvantage female entrepreneurs.

- Seidman and Miller (2013) find that individuals tend to pay more attention to the physical appearance of females than to males when browsing information on social networking sites.

- Men are often evaluated based on a combination of different personal traits, whereas women's appearance tends to be the focal point of the evaluation (Brownmiller, 1984).

- We wonder whether the association between entrepreneurs' facial trustworthiness and crowdfunding success is different in gender.

# Related Literature

- Perceptions of facial trustworthiness tend to be highly correlated with one another and may achieve high consensus, regardless of perceivers' cultural background (Rule et al., 2013).

- Managers with a trustworthy facial appearance are more likely to achieve higher positions in corporate hierarchies (Linke et al., 2016).

- Moreover, firms with CEOs who appear more trustworthy tend to have higher IPO valuations (Blankespoor et al., 2017).

- Hsieh et al., 2020 utilize machine-learning technology to generate a computer-rated facial trustworthiness measure for corporate CFOs and find that auditors charge lower audit fees to firms with trustworthy-looking CFOs.

# Research Design

- We hypothesize that trustworthy-looking entrepreneurs are more likely to achieve crowdfunding success.
  - $$SUCCESS/PLEDGED/PLEDGED\_GOAL/BACKER = \beta_0 + \beta_1{*}TRUST + \beta_2{*}GENDER + \beta_3{*}GOAL + \beta_4{*}DURATION + \beta_5{*}PAST\_EXPERIENCE + \beta_6{*}VEDIO + \beta_7{*}SOCIAL\_CAPITAL + \beta_8{*}GDP\_PER\_CAPITA + \beta_9{*}READABILITY + \beta_{10}{*}LENGTH + \beta_{11}{*}TONE + \beta_{12}{*}UNCERTAINTY + \Sigma\ Country\ Fixed\ Effects + \Sigma\ Year\ Fixed\ Effects + \Sigma\ Category\ Fixed\ Effects + \varepsilon$$

- We further hypothesize that the positive association between entrepreneurs' facial trustworthiness and crowdfunding success is more prominent for female entrepreneurs.
  - $$SUCCESS/PLEDGED/PLEDGED\_GOAL/BACKER = \gamma_0 + \gamma_1{*}TRUST + \gamma_2{*}TRUST{*}GENDER + \gamma_3{*}GENDER + \gamma_4{*}GOAL + \gamma_5{*}DURATION + \gamma_6{*}PAST\_EXPERIENCE + \gamma_7{*}VEDIO + \gamma_8{*}SOCIAL\_CAPITAL + \gamma_9{*}GDP\_PER\_CAPITA + \gamma_{10}{*}READABILITY + \gamma_{11}{*}LENGTH + \gamma_{12}{*}TONE + \gamma_{13}{*}UNCERTAINTY + \Sigma\ Country\ Fixed\ Effects + \Sigma\ Year\ Fixed\ Effects + \Sigma\ Category\ Fixed\ Effects + \varepsilon$$
  - Partition our sample and perform a sub-group analysis.
  - Adopting a gender-based matching approach

- Robust tests

# Research Conclusion

- We find that entrepreneurs who look more trustworthy are more likely to succeed in the crowdfunding market.

- Specifically, trustworthy-looking entrepreneurs receive a 13.1% greater pledge amount and attract 4.8% more backers in their crowdfunding campaign as compared to those who are untrustworthy-looking.

- We also find that the facial trustworthiness of female entrepreneurs plays a more prominent role in determining project success than that of male entrepreneurs. Our results are robust to a series of additional analyses and sensitivity checks.

- Overall, the results of our study suggest that entrepreneurs' facial trustworthiness is an important factor that affects funders' decision-making process in reward-based crowdfunding

# Sample selection

- We collect our sample of **technology-related** projects on **Kickstarter**.
  - We extract 1770 projects containing frontal faces from 17 countries/regions.
  - Time: October 2009 to September 2017
  - We also extract country-specific characteristics that may affect project development. These include annual gross domestic product per capita and social capital.

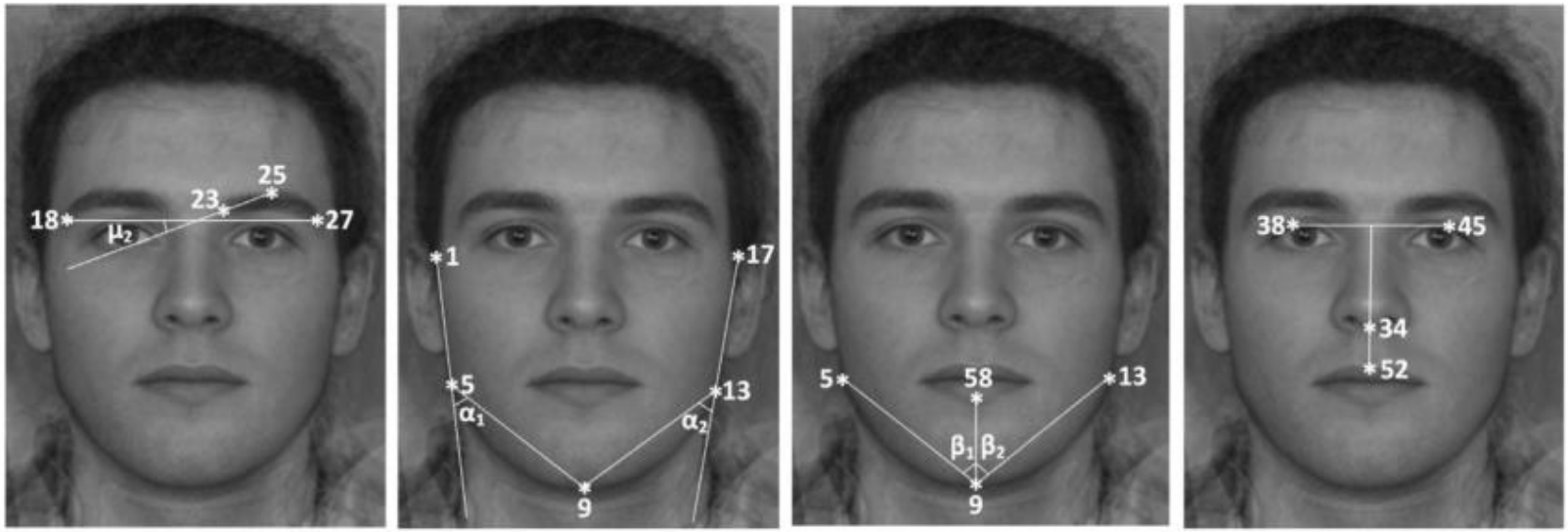
Panel A: Number of Kickstarter technology projects and successful rate by year

| Year | Project no. | Percentage of total projects | Success number | Success rate |
|---|---|---|---|---|
| 2009 | 6 | 0.34% | 4 | 66.67% |
| 2010 | 19 | 1.07% | 2 | 10.53% |
| 2011 | 46 | 2.60% | 17 | 36.96% |
| 2012 | 106 | 5.99% | 45 | 42.45% |
| 2013 | 192 | 10.85% | 73 | 38.02% |
| 2014 | 386 | 21.81% | 121 | 31.35% |
| 2015 | 339 | 19.15% | 126 | 37.17% |
| 2016 | 270 | 15.25% | 108 | 40.00% |
| 2017 | 406 | 22.94% | 56 | 13.79% |
| Total | 1770 | 100.00% | 552 | 31.19% |

# Face Factors Construction

- We first preprocess the analysts' photos to standardize the **size** and **head location** and then apply the facial recognition software, **IBUG**, to each photo to delineate the **68** fiducial landmark points.

- TRUST = [ B_rstd + C_std + D_std + E_rstd ] / 4




(B) (C) (D) (E)

# Dependent Variables

- SUCCESS: A dummy variable that equals 1 if the fundraising is successful
- PLEDGED: Logarithm of amount pledged
- PLEDGED_GOAL: Logarithm of amount pledged (plus 1) divided by the goal amount
- BACKER: Logarithm of number of funders (plus 1)

| Variable | *N* | Mean | 25% | 50% | 75% | Std. Dev. |
|---|---|---|---|---|---|---|
| SUCCESS | 1770 | 0.312 | 0.000 | 0.000 | 1.000 | 0.468 |
| PLEDGED | 1770 | 6.365 | 4.535 | 6.621 | 8.667 | 3.174 |
| PLEDGED_GOAL | 1770 | −3.011 | −5.303 | −2.672 | 0.078 | 3.531 |
| BACKER | 1770 | 2.926 | 1.386 | 2.708 | 4.304 | 1.921 |
| TRUST | 1770 | 0.000 | −0.397 | −0.002 | 0.413 | 0.607 |
| GENDER | 1770 | 0.898 | 1.000 | 1.000 | 1.000 | 0.302 |

| Variable | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. SUCCESS | | | | |
| 2. PLEDGED | **0.638** | | | |
| 3. PLEDGED_GOAL | **0.730** | **0.867** | | |
| 4. BACKER | **0.695** | **0.905** | **0.819** | |
| 5. TRUST | 0.040 | **0.063** | **0.052** | **0.052** |

# Hypothesis 1 Testing

- We estimate the following regression model to test Effect of entrepreneurs' facial trustworthiness on crowdfunding success:

- $$SUCCESS/PLEDGED/PLEDGED\_GOAL/BACKER = \beta_0 + \beta_1{*}TRUST + \beta_2{*}GENDER + \beta_3{*}GOAL + \beta_4{*}DURATION + \beta_5{*}PAST\_EXPERIENCE + \beta_6{*}VEDIO + \beta_7{*}SOCIAL\_CAPITAL + \beta_8{*}GDP\_PER\_CAPITA + \beta_9{*}READABILITY + \beta_{10}{*}LENGTH + \beta_{11}{*}TONE + \beta_{12}{*}UNCERTAINTY + \Sigma\ Country\ Fixed\ Effects + \Sigma\ Year\ Fixed\ Effects + \Sigma\ Category\ Fixed\ Effects + \varepsilon$$

| Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 0.139** | 0.152*** | 0.157*** | 0.058** |
| | | (0.06) | (0.04) | (0.04) | (0.02) |
| GENDER | − | −0.463*** | −0.480*** | −0.487*** | −0.164*** |
| | | (0.13) | (0.09) | (0.10) | (0.05) |
| GOAL | − | −0.655*** | −0.008 | −1.007*** | −0.080*** |
| | | (0.04) | (0.03) | (0.02) | (0.02) |
| DURATION | + | 0.071 | 0.194*** | 0.194*** | 0.101*** |
| | | (0.10) | (0.04) | (0.04) | (0.03) |
| PAST_EXPERIENCE | + | 1.399*** | 0.817*** | 0.824*** | 0.736*** |
| | | (0.11) | (0.18) | (0.18) | (0.12) |
| VIDEO | + | 1.322*** | 1.495*** | 1.496*** | 0.828*** |
| | | (0.27) | (0.33) | (0.33) | (0.22) |
| SOCIAL_CAPITAL | + | −0.921 | −2.274 | −2.505 | 2.777 |
| | | (10.78) | (9.96) | (10.70) | (5.51) |
| GDP_PER_CAPITA | ? | 0.025 | −0.014 | −0.013 | −0.102 |

# Hypothesis 1 Testing

- We further analyze the four individual measures of facial features to evaluate the results focused on specific facial features.

Panel A: Separate facial features and successful fundraising

| Variable[a,b] | Sign | *SUCCESS*[c] | | | |
|---|---|---|---|---|---|
| | | *EYEBROW* | *FACE* | *CHIN* | *PHILTRUM* |
| | | (1) | (2) | (3) | (4) |
| Separate measure | +/− | −0.018 | 0.059** | 0.032 | −0.194*** |
| | | (0.05) | (0.03) | (0.05) | (0.06) |
| *N* | | 1770 | 1770 | 1770 | 1770 |
| Pseudo $R^2$ | | 0.259 | 0.260 | 0.259 | 0.263 |

Panel B: Separate facial features and amount pledged

| Variable[a,b] | Sign | *PLEDGED*[c] | | | |
|---|---|---|---|---|---|
| | | *EYEBROW* | *FACE* | *CHIN* | *PHILTRUM* |
| | | (1) | (2) | (3) | (4) |
| Separate measure | +/− | −0.028 | 0.080** | 0.029 | −0.272*** |
| | | (0.05) | (0.04) | (0.03) | (0.05) |
| *N* | | 1770 | 1770 | 1770 | 1770 |
| Adj. $R^2$ | | 0.333 | 0.333 | 0.333 | 0.339 |

# Hypothesis 2 Testing

- We predicts that the positive relationship between an entrepreneur's facial trustworthiness and crowdfunding success will be moderated by the entrepreneur's gender.

- $$SUCCESS/PLEDGED/PLEDGED\_GOAL/BACKER = \gamma_0 + \gamma_1{*}TRUST + \gamma_2{*}TRUST{*}GENDER + \gamma_3{*}GENDER + \gamma_4{*}GOAL + \gamma_5{*}DURATION + \gamma_6{*}PAST\_EXPERIENCE + \gamma_7{*}VEDIO + \gamma_8{*}SOCIAL\_CAPITAL + \gamma_9{*}GDP\_PER\_CAPITA + \gamma_{10}{*}READABILITY + \gamma_{11}{*}LENGTH + \gamma_{12}{*}TONE + \gamma_{13}{*}UNCERTAINTY + \Sigma\ Country\ Fixed\ Effects + \Sigma\ Year\ Fixed\ Effects + \Sigma\ Category\ Fixed\ Effects + \varepsilon$$

| Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 0.562*** | 0.845*** | 0.839*** | 0.343** |
| | | (0.13) | (0.26) | (0.26) | (0.14) |
| TRUST*GENDER | − | −0.463*** | −0.751** | −0.739** | −0.310* |
| | | (0.15) | (0.27) | (0.28) | (0.15) |
| GENDER | − | −0.528*** | −0.593*** | −0.599*** | −0.211*** |
| | | (0.15) | (0.08) | (0.08) | (0.05) |
| GOAL | − | −0.657*** | −0.010 | −1.008*** | −0.081*** |
| | | (0.03) | (0.02) | (0.02) | (0.02) |
| DURATION | + | 0.072 | 0.197*** | 0.197*** | 0.102*** |
| | | (0.10) | (0.04) | (0.04) | (0.02) |
| PAST_EXPERIENCE | + | 1.391*** | 0.810*** | 0.817*** | 0.733*** |
| | | (0.11) | (0.18) | (0.17) | (0.12) |
| VIDEO | + | 1.327*** | 1.502*** | 1.503*** | 0.831*** |
| | | (0.27) | (0.33) | (0.33) | (0.22) |
| SOCIAL_CAPITAL | + | −1.272 | −2.509 | −2.736 | 2.681 |
| | | (10.74) | (9.77) | (10.54) | (5.44) |

# Hypothesis 2 Testing

- To further explore the role of gender in crowdfunding success, we partition our sample into male(1590) and female(180) groups and perform a sub-group analysis.

Panel A: Male entrepreneurs' facial trustworthiness and Kickstarter project-application outcome

| Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 0.155*** | 0.161*** | 0.167*** | 0.073** |
| | | (0.06) | (0.05) | (0.05) | (0.03) |
| *N* | | 1590 | 1590 | 1590 | 1590 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.270 | 0.346 | 0.474 | 0.348 |

Panel B: Female entrepreneurs' facial trustworthiness and Kickstarter project-application outcome

| Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 1.223*** | 1.278*** | 1.270*** | 0.668*** |
| | | (0.12) | (0.31) | (0.32) | (0.12) |
| *N* | | 180 | 180 | 180 | 180 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.373 | 0.396 | 0.466 | 0.463 |

# Hypothesis 2 Testing

- An alternative explanation for this gender difference is that the venture projects' intrinsic characteristics may be different between male and female entrepreneurs.

- We retest our hypotheses by adopting a gender-based matching approach (139 VS 139):
  - From the same country.
  - Crowdfunding campaign goal has the closest dollar amount.

Panel B: Facial trustworthiness, gender, and project-application outcome, using the gender-matched sample based on campaign goal in the same country

| Variable[a,b] | Sign | Kickstarter project-application outcome [c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 0.709*** | 1.149*** | 1.148*** | 0.560*** |
| | | (0.28) | (0.13) | (0.13) | (0.07) |
| TRUST*GENDER | − | −0.683* | −0.925** | −0.922** | −0.514*** |
| | | (0.37) | (0.33) | (0.33) | (0.12) |
| GENDER | − | −0.977*** | −0.703** | −0.698** | −0.293* |
| | | (0.16) | (0.23) | (0.22) | (0.13) |
| *N* | | 278 | 278 | 278 | 278 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.289 | 0.428 | 0.500 | 0.437 |

# Robust Test: Initial project applications

- We conjecture that the effect of entrepreneur's facial trustworthiness perceptions on the performance of their crowdfunding campaigns be more pronounced when funders are initially exposed to the entrepreneur's picture.

Panel A: Facial trustworthiness and project-application outcome in initial application

| Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 0.099* | 0.146*** | 0.152*** | 0.048* |
| | | (0.06) | (0.04) | (0.04) | (0.03) |
| *N* | | 1687 | 1687 | 1687 | 1687 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.270 | 0.374 | 0.484 | 0.378 |
| TRUST | + | 0.139** | 0.152*** | 0.157*** | 0.058** |
| | | (0.06) | (0.04) | (0.04) | (0.02) |

# Robust Test: U.S. sample only

- To address potential concerns that the observed effects of facial trustworthiness might be driven by unobservable country-level factors that affect both backers' perceptions and the likelihood of success.

- We isolate a sample of U.S.-based projects (67.2%) to further explore the effects of facial trustworthiness on crowdfunding success.

| Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 0.809*** | 1.229*** | 1.229*** | 0.557** |
| | | (0.31) | (0.31) | (0.31) | (0.22) |
| TRUST*GENDER | − | −0.667* | −1.089** | −1.089** | −0.498* |
| | | (0.37) | (0.34) | (0.34) | (0.23) |
| GENDER | − | −0.642*** | −0.558** | −0.558** | −0.230* |
| | | (0.22) | (0.17) | (0.17) | (0.11) |
| *N* | | 1190 | 1190 | 1190 | 1190 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.244 | 0.352 | 0.462 | 0.343 |

# Robust Test: Controlling for facial attractiveness

- We calculate a facial symmetry index (ATTRACTIVENESS) for entrepreneurs in our sample and include it in our regression models as a control variable to further test our hypothesis.

Panel A: Facial trustworthiness and project-application outcome, controlling for facial attractiveness

| Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| TRUST | + | 0.141** | 0.127*** | 0.133*** | 0.041* |
| | | (0.06) | (0.04) | (0.04) | (0.02) |
| ATTRACTIVENESS | ? | 0.042 | 0.134* | 0.126 | 0.087 |
| | | (0.05) | (0.07) | (0.07) | (0.05) |
| *N* | | 1770 | 1770 | 1770 | 1770 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.289 | 0.373 | 0.491 | 0.373 |
| TRUST | + | 0.579*** | 0.800*** | 0.798** | 0.313* |
| | | (0.13) | (0.28) | (0.28) | (0.15) |
| TRUST*GENDER | − | −0.480*** | −0.727** | −0.717** | −0.294* |
| | | (0.16) | (0.28) | (0.29) | (0.16) |
| GENDER | − | −0.534*** | −0.590*** | −0.595*** | −0.208*** |
| | | (0.15) | (0.08) | (0.08) | (0.05) |
| ATTRACTIVENESS | ? | 0.042 | 0.118 | 0.110 | 0.080 |
| | | (0.04) | (0.08) | (0.08) | (0.05) |
| *N* | | 1770 | 1770 | 1770 | 1770 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.290 | 0.374 | 0.492 | 0.374 |

# Robust Test: Other determinants of trustworthiness

- Funders' perceptions of entrepreneurs' trustworthiness might still be affected by other observable factors.
- The residuals from the regression capture trustworthiness perceptions based on entrepreneurs' static facial features but cannot be explained by an entrepreneur's other observable characteristics.

Panel A: Determinants of potential backers' trustworthiness perceptions

| Variable[a,b] | Sign | *TRUST* | |
|---|---|---|---|
| | | Estimate | *t*-statistic |
| ATTRACTIVENESS | ? | 0.271*** | 9.87 |
| GENDER | ? | 0.191*** | 4.14 |
| Intercept | | Yes | |
| Race/ethnicity fixed effects | | Yes | |
| Country fixed effects | | Yes | |
| *N* | | 1770 | |
| Adj. $R^2$ | | 0.078 | |

Panel B: Trustworthiness perception residuals and project-application outcome

| 5Variable[a,b] | Sign | Kickstarter project-application outcome[c] | | | |
|---|---|---|---|---|---|
| | | *SUCCESS* | *PLEDGED* | *PLEDGED_GOAL* | *BACKER* |
| | | (1) | (2) | (3) | (4) |
| RESID_TRUST | + | 0.148*** | 0.228*** | 0.235*** | 0.101*** |
| | | (0.03) | (0.04) | (0.04) | (0.02) |
| *N* | | 1770 | 1770 | 1770 | 1770 |
| Pseudo $R^2$/Adj. $R^2$ | | 0.260 | 0.334 | 0.460 | 0.338 |

# Research Conclusion

- We find that entrepreneurs who look more trustworthy are more likely to succeed in the crowdfunding market.

- Specifically, trustworthy-looking entrepreneurs receive a 13.1% greater pledge amount and attract 4.8% more backers in their crowdfunding campaign as compared to those who are untrustworthy-looking.

- We also find that the facial trustworthiness of female entrepreneurs plays a more prominent role in determining project success than that of male entrepreneurs. Our results are robust to a series of additional analyses and sensitivity checks.

- Overall, the results of our study suggest that entrepreneurs' facial trustworthiness is an important factor that affects funders' decision-making process in reward-based crowdfunding