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COVID-19 and entrepreneurial processes in U.S. equity crowdfunding

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No. 665

Douglas Cumming and Robert S. Reardon

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COVID-19 and Entrepreneurial Processes in U.S. Equity Crowdfunding

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Abstract

COVID-19 brought about a shift in entrepreneurial opportunities and in the United States. In this paper, we proxy entrepreneurial processes by examining housing prices in different regions of the United States. Housing prices capture the movement in people, tax dynamics, and behavioral preferences for equity ownership in different regions and over time, all of which were drastically impacted by COVID-19. We examine all U.S. equity crowdfunding offerings starting with the very first offerings in 2016 Q2 until 2021 Q1 based on data from the Securities and Exchange Commission. The data indicate that regional housing prices post-COVID-19 are a strong predictor of the number of equity crowdfunding campaigns and the amount of capital raised. The impact of housing price changes on crowdfunding is more pronounced among more prosperous regions. The housing price effect is robust to numerous controls and consideration of outliers.

Keywords: Equity Crowdfunding, COVID-19, Regional Entrepreneurship

JEL Codes: G21, G28, G51

1. Introduction

The literature on entrepreneurial processes is vast, as the nature of what goes into entrepreneurship is multifaceted (Steyaert, 2007; Bygrave, 2009; Johannisson, 2011; Leyden & Link, 2015; Brixy, Sternberg & Stüber, 2012; McMullen & Dimov, 2013; Dimov, 2020). Entrepreneurship is in part planned, but it also intersects with opportunities that may unexpectedly appear. Further, entrepreneurship is also affected by differing social norms and preferences, which vary over time and across regions. Over time, and almost by definition, the literature on entrepreneurial processes will become more diverse as we learn more about entrepreneurial behaviors and how they intersect with irrational and rational decision-making, culture, market conditions, and opportunities.

This paper examines the impact of the COVID-19 event on entrepreneurial processes through the unique context of equity crowdfunding. The first equity crowdfunding campaigns appeared in the United States in May 2016 after the introduction of the JOBS Act (Rossi & Vanacker, 2021). Equity crowdfunding involves entrepreneurs selling equity in their start-ups through an internet portal with minimal disclosure, and certainly not with the level of disclosure required in initial public offerings as required by the Securities and Exchange Act of 1933 (Horvathova, 2019; Allem Gu, & Jagtiani, 2021; Coakley, 2021). The equity crowdfunding context allows a range of entrepreneurial processes to be assessed all at once, including entrepreneurs discovering a new opportunity to seek funding, risk-taking by individuals, and changing external environments (Pryor, Webb, Ireland & Ketchen 2016; Dimov, 2020).

This paper introduces a unique look at the regional and time series dynamics of equity crowdfunding that evolved with the start of the COVID-19 crisis in the United States. Further, we

examine housing prices across different regions and over time prior to and after the declaration of COVID-19 as a national emergency. COVID-19 brought about several shocks to U.S. markets. Some urban centers were particularly hard-hit due to social distance requirements. Depending on where people lived, COVID-19 affected individuals' risk-taking, interest in owning equity, time to and interest in starting a new business, the likelihood of migration to a different region and related tax planning strategies, short- versus long-termism behavior. We argue that, while most of these factors are not directly measurable, housing prices capture a significant element of each of these factors that enable a measurable real-time predictive assessment of entrepreneurial processes in crowdfunding markets.

We examine all of the data on equity crowdfunding available from the Securities and Exchange Commission (SEC) in the United States from 2016 Q2 to 2021 Q1 (see also Cumming, Johan, & Reardon, 2021; Cumming, Martinez-Salgueiro, Reardon, & Sewaid, 2021). The data examined indicate strong support for the role of housing prices in explaining processes in equity crowdfunding. For example, housing prices are a strong predictor of regional and time series differences in the number of crowdfunded opportunities and success with crowdfunding in terms of the amount of capital raised. These effects are robust to the consideration of control variables and econometric methods. These effects are more pronounced in regions of the United States that have higher housing prices, but outliers do not drive them. Also, it is noteworthy that housing prices explain several unusual dynamics in the market, including but not limited to falls in crowdfunding in New York and massive rises in Florida post-COVID-19.

Our paper contributes to a small but growing literature on equity crowdfunding. Equity crowdfunding is often viewed as a very risky strategy for entrepreneurs that have trouble obtaining other forms of capital (Walthoff-Borm, Schwienbacher, & Vanacker, 2018; Blaseg, Cumming, &

Koetter, 2020). Entrepreneurs have to effectively signal their ability and the business opportunity or risk raising no funding at all (Ahlers, Cumming, Guenther, & Schwienbacher, 2015; Philippi, Schuhmacher, Bastian, 2021; Cerpentier, Vanacker, Paeleman, & Bringman, 2021; Johan & Zhang, 2021), and the effectiveness of these signals depends on investor characteristics (Kleinert & Mochkabadi, 2021). Entrepreneurs can make use of social media to influence success (Datta, Sahaym, & Brooks, 2019). Successful crowdfunding can lead to other opportunities, such as venture capital finance (Thies, Huber, Bock, Cenlian, & Kraus, 2019; Buttice, Di Pietro, & Tenca, 2021). To the best of our knowledge, prior work has not considered the processes that lead to entrepreneurial efforts and success with equity crowdfunding in different regions of the United States, and particularly not in the pre- versus post-COVID-19 eras and/or in relation to housing price dynamics.

This paper is organized as follows. Prior literature is reviewed in section 2 alongside the development of new hypotheses. Section 3 presents the data and sample construction. Summary statistics, empirical tests, and robustness checks are provided in section 4. This section also examines the dynamics of our main findings, including a New York and Florida comparison. Finally, concluding remarks, policy implications, and future research are discussed in section 5.

2. Theory

2.1. Prior Literature and Hypotheses

Entrepreneurial processes necessarily involve culture and socially shaped achievements (Steyaert, 2007; Zapkau, Schwens, & Kabst, 2017). Equity crowdfunding embodies both social shaping and culture in the entrepreneurial process as it involves many individuals in the ‘crowd’

that give small amounts (relative to other forms of entrepreneurial finance, such as venture capital and private equity deals) to entrepreneurs.

Successful equity crowdfunding is the intersection of a risk-taking entrepreneur seeking capital and the willingness of the crowd to fund the opportunity. Equity crowdfunding is particularly risky, as prior research shows that, on average, there are more pronounced adverse selection problems associated with equity crowdfunders than other forms of entrepreneurial finance (Walthoff-Borm et al., 2018; Blaseg et al., 2020).

Investors in equity crowdfunding campaigns receive illiquid equity that they are unlikely to be able to sell for many years in the future. Equity crowdfunding investors have to be very long-term oriented in their decision making and investment strategies due to the extreme illiquidity and high risk. Exit opportunities for investors may come at the time of subsequent investment from an angel investor, venture capital deal, or an initial public offering. Nevertheless, the timing of those exits may be many years after crowdfunding, and these opportunities are often rarely available.

Given this context of high risk, illiquidity, and orientation towards equity investment, what are the processes that drive entrepreneurs and their investors to engage in equity crowdfunding? We propose four factors that are significant drivers for the demand side to engage in fundraising through crowdfunding and for the supply side to invest in crowdfunding.

First, investors need to be willing to undertake illiquid investments that are not readily convertible into cash. Shares in start-ups are not easily resold, as there needs to be an exit venture such as through an initial public offering, an acquisition, or a follow-on fundraising event from an investor such as a venture capitalist (Signori & Vismara, 2018). More recently, several equity crowdfunding platforms outside the U.S. have started developing secondary markets where

investors can buy and sell investments in start-ups that have already raised money, but trading is so thin that the impact of these markets is minimal (Lukkarinen & Schwienbacher 2020). And these markets are not developed yet in the U.S. This underdeveloped secondary market bears its own unique risks. Investor willingness to undertake illiquidity is higher among more strategic and wealthier investors (Lerner & Schoar, 2004). Active investors are also typically more willing to undertake stock illiquidity (Bhide, 1994).

Second, investors need to be very long term since crowdfunding is a very long term from the first investment to exit. Venture capital investments are generally at least 3-5 years from first investment to exit (Cumming & Johan, 2010), and it is even longer in crowdfunding because it is at an earlier stage (Signori & Vismara, 2018; Cumming & Johan, 2019). Therefore, the incentive to engage in long-term investments in a region should reflect cultural attitudes towards long-term equity crowdfunded deals.

Third, regional population changes and migration should influence the demand for and the supply of venture capital. Distance in equity crowdfunding matters a great deal due to pronounced information asymmetries and the role of local knowledge in mitigating those asymmetries (Guenther, Johan, & Schweizer, 2015). Furthermore, movement in people affects both the demand for and supply of equity crowdfunding capital.

Fourth, equity crowdfunding is highly risky. Many campaigns raise no money. There is also a risk of complete fraud (Cumming & Johan, 2019). Last, equity crowdfunding is a new market without many home-run investments to celebrate (Schwienbacher, 2019).

For these reasons, we conjecture that many key processes give rise to the entrepreneurial initiative to engage in equity crowdfunding and affect the success of the equity crowdfunding venture.

Hypothesis 1: *Tolerance for illiquidity, long-termism, and risk, alongside large and growing populations, are critical inputs into the entrepreneurial process to engage in equity crowdfunding.*

Hypothesis 2: *Tolerance for illiquidity, long-termism, and risk, alongside large and growing populations, are critical inputs into the entrepreneurial process that gives rise to success with equity crowdfunding.*

2.2. Theoretical Rationales for Empirical Proxy

It is difficult, if not impossible, to accurately measure within-country regional differences in the tolerance for illiquidity, long-termism, and risk. And even for population and migration patterns, recent data are not available (typically the U.S. census population statistics are 2-3 years behind the current year). As such, before examining the data, it is worth explaining our empirical proxy and the theoretical rationales for its use.

We propose that housing markets are a significant driver for the demand side to engage in fundraising through crowdfunding and for the supply side to invest in crowdfunding for at least five reasons. First, housing markets involve illiquid equity investments in one's home (Capozza, Hendershott, & Mack, 2004), so it is culturally and opportunistically the same type of market as illiquid investments in equity crowdfunding.

Second, housing investments are incredibly long-term. A mortgage is typically 15-30 years in duration (Jordan & Sanchez, 2019). Therefore, the incentive to engage in long-term investments in a region should reflect cultural attitudes towards long-term equity crowdfunded deals.

Third, housing markets show large booms and busts that track migration patterns (Francke & Korevaar, 2021). House prices collapse when people move out of a region and boom when people move into a region. Similarly, movement in people affects both the demand for and supply of equity crowdfunding capital.

Fourth, and related to the third factor, housing prices reflect regional differences in tax planning opportunities over time and across regions (Fortune & Moohan, 2008). These strategies include opportunities for tax savings through children's education funds, investment trusts, real estate, and other opportunities that differ across states leading people to migrate from one state to another.

Fifth, the housing market in the United States is risky with boom-and-bust cycles, as classically illustrated by the global financial crisis that began in the United States in the first week of August 2007 and continued through 2009 (Diamond & Rajan, 2009). Local investors that engage in risks with housing investments will have a correlated appetite for risks with equity crowdfunding.

For these reasons, we conjecture that regional and time series differences in housing prices are a primary factor in the entrepreneurial processes - tolerance for illiquidity, long-termism, and risk, alongside large and growing populations - that give rise to an entrepreneurial initiative to engage in equity crowdfunding, and to achieve success in the equity crowdfunding venture.

3. Data and Sample Construction

3.1. Description of the Data

In this paper, we study a balanced panel dataset that contains aggregate totals of state equity crowdfunding activity at a frequency of each quarter. Our data set includes 51 regions (50 states and the District of Columbia) and 20 quarters per region, making the total number of observations 1,020. Our dataset begins in the second quarter of 2016, with the first campaigns beginning on May 16th, 2016. Equity crowdfunding as an alternative financing process for entrepreneurs, start-ups, and small-business began proliferating in Europe and Australia around 2012-2017 (Ralcheva and Roosenboom 2019). Equity crowdfunding in the United States, however, did not begin until the approval of the Jumpstart Our Businesses (JOBS) Act, signed into law by former U.S. President Barack Obama on April 5th, 2012 (Horváthová, 2019). The JOBS Act contained several provisions implemented in a staged fashion to ease the existing regulatory restrictions. Title III, which took effect in September 2015, expanded equity crowdfunding in the United States beyond just accredited investors to all investors and allowed companies to start raising regulated equity crowdfunding as of May 16th, 2016 (Mamonov & Malaga, 2020).

As part of the equity crowdfunding market regulation, the SEC collects and reports on all U.S. regulation crowdfunding offerings. When a company plans to launch a campaign on a U.S.-based intermediary crowdfunding platform, that company must file a set of documents to the SEC via the Electronic Data Gathering Analysis and Retrieval System (EDGAR). Each quarter, the SEC releases the collection of new offerings on its website. The primary form filed is the offering statement, or Form C, which provides information about the company's characteristics, offering features such as the offering amount, disclosure requirements, and the intermediary crowdfunding platform. Following the data collection processes of Rossi, Vanacker, and Vismara (2021);

Cumming, Johan, and Reardon (2021); and Cumming, Martinez-Salgueiro, Reardon, and Sewaid (2021), we use Form C filings to build our cross-sectional population of U.S. regulated equity crowdfunding campaigns. In addition to Form-C filings, the SEC also releases Form C-W (withdrawal-type), C/A (amendment-type), and C-U (update-type) filings. We make use of these forms by matching their data to a corresponding Form-C based on the unique campaign identifier 'FILE_NUMBER.' With this information, we exclude withdrawn campaigns, make updates to campaigns with an amendment, and extract campaign fundraising amounts from the Form C-U filings. Occasionally a firm will submit a duplicate Form-C rather than submit a Form C/A. We have identified those cases and consolidated them within our dataset to count as a single campaign using the most recent submission as truth. Per SEC regulations, an issuer must provide an update on the progress of a campaign within 5-days of the campaign, reaching 50% and 100% of its target amount offered. These updates are reported via a Form C-U. The issuer must also report an update a final time when the campaign is closed. To compensate for the ambiguous funding amounts of campaigns still open for investment or any campaigns that failed to report (a combined 63%), we validate the accuracy of the data by manually cross-examining each campaign with the crowdfunding tracking website KingsCrowd and the individual platform websites. In doing so, our dataset is up-to-date as of September 27th, 2021; however, it should be noted that some campaigns in our dataset are still open to funding; thus, the total amount raised may exceed that which we report within this paper. Our final cross-sectional population contains 3,664 campaigns launched from April 2016 to April 2021. Subsequently, our panel dataset is formed by aggregating these campaigns at the state level with a quarterly frequency to obtain a panel dataset of 1,020 observations.

3.2. Variables

In Table 1, we provide a brief description of each variable and the data source used to obtain each variable. Our two main variables of interest are the *Number of Campaigns* and the total dollar *Amount Raised* by each state in each quarter. These dependent variables measure the U.S. equity crowdfunding activity population and provide great insight into how the market has grown when measured over time. Both variables are first measured at the campaign level for the quarter in which the company filed the originating Form C opening for public investment. While most campaigns raise the majority of their funds in that same quarter, campaigns can and often do remain open for several quarters, sometimes even years. We control economic activity expansion across regions by using real gross domestic product (*GDP*). Real *GDP* is an inflation-adjusted measure that reflects the quantity of goods and services produced by an economy. In this case, we can obtain state-level *GDP* at a quarterly frequency to match our equity crowdfunding panel dataset. Our primary explanatory variable is the Federal Housing Finance Agency's House Price Index (*HPI*), a freely available measure of the movement of single-family house prices. The index incorporates tens of millions of home sales and provides insights about house price fluctuations across different regional levels. As discussed in subsection 2.2 above, *HPI* is a proxy for entrepreneurial processes in equity crowdfunding. Finally, we measure the effect of COVID-19 using a *COVID-19* dummy variable and further interact the dummy variable with our *HPI* measure. We use the interaction term to test the relationship between housing prices on equity crowdfunding activity in the pre-COVID-19 and post-COVID-19 periods. The World Health Organization first declared COVID-19 a Pandemic on March 11th, 2020. Two days later, former U.S. President, Donald Trump, declared COVID-19 a national emergency. We use 2020 Q2 as the start of our COVID-19 dummy period to ensure that every associated campaign started fundraising after the

emergency declaration. Therefore, our pre-COVID-19 period extends from 2016 Q2 to 2020 Q1, and our post-COVID-19 period extends from 2020 Q2 to 2021 Q1, the most recent quarter in our dataset.

[Table 1 near here]

4. Analysis and Results

4.1. Summary Statistics & Graphs

Under Title III of the JOBS Act, entrepreneurs can raise up to \$1.07 million, and anyone can invest up to \$10,000 or 10% of annual income without complex regulatory filings. On March 26th, 2021, the SEC increased the maximum amount that can be raised to \$5 million, effective immediately. Our dataset includes some of the first campaigns that exceed the traditional \$1.07 million maximum. Tables 2 and 3 present summary statistics of our variables and their correlations. We also report variance inflation factors (VIFs) for the independent variables. Because our regressions use an interaction term, we standardize the *GDP* and *HPI* variables to reduce multicollinearity and allow for statements of economic significance. Five individual campaigns in our dataset raised the maximum of \$5 million. The largest *Amount Raised* in one quarter by a particular state is \$49.8 million (California, 2021 Q1). The mean and median *Amounts Raised* in one quarter by a particular state are \$651,161 and \$17,708, respectively. The mean and median *Number of Campaigns* are 3.58 and 1.0, respectively. The larger means suggest that our dependent variables follow a skewed right distribution.

In figure 1, we display the aggregate fundraising totals over time. The *Amounts Raised* in each quarter follow a positive linear relationship that accelerates during the COVID-19 period.

Based on data as of September 27th, 2021, the total amount raised in the four quarters post-COVID-19 is \$316 million, which nearly matches the total raised in the previous 16 quarters (pre-COVID) combined (\$347 million). In Figure 2, we similarly display the aggregate *Number of Campaigns* each quarter which follows the same positive linear pattern.

In Figure 3, we display a heat map of the density of all equity crowdfunding activity amongst the U.S. states. 55% of the total amount raised from 2016 Q2 to 2021 Q1 was raised in California, New York, and Texas. 35% was raised in just California alone. Other top fundraising states, in order of amount raised, include Florida (5.2%), Massachusetts (3.8%), Colorado (3.0%), Utah (2.0%), Pennsylvania (2.0%), New Jersey (1.8%), Washington (1.8%), Delaware (1.7%), and Ohio (1.7%). For more information about equity crowdfunding activity in the emerging United States market, the Equity Crowdfunding Tracker at Florida Atlantic University can be accessed at the following address: <https://business.fau.edu/equity-crowdfunding-tracker/>. The tracker provides up-to-date interactive graphs for the number of campaigns, amount raised, success rate, security type, firm, and platform characteristics.

[Tables 2-3 near here]

[Figures 1-3 near here]

In our first analysis, we focus on a univariate setting. To gauge the general effect of COVID-19 on the variables of interest, we conduct a two-tailed t-test means comparison test to see if there are significant differences pre- and post-COVID-19 (see Table 4). The data indicate that relative to their pre-COVID-19 values: equity crowdfunding *Amounts Raised* in a particular quarter and state increased by 265% (from \$425,000 to \$1.55 million), The number of ECF campaigns increased by 134% (from 2.92 campaigns to 6.85 campaigns), and *HPI* increased by 13%. While equity crowdfunding activity and *HPI* increased significantly during COVID-19,

average state *GDP* slightly declined (from \$362 billion to \$361 billion). This relationship is illustrated further in Figure 4. Average state *GDP* per quarter peaks at 380 billion in 2019 Q4, falls by 11.8% to 340 billion in 2020 Q2, and then surges back to near-peak levels by 2021 Q1, forming a V-shaped recovery similar to that of the U.S. stock market. On the other hand, the average *HPI* maintained and slightly improved on its pre-COVID-19 trend.

[Table 4 near here]

[Figure 4 near here]

4.2 Multivariate Analysis

We now turn to multivariate analysis to evaluate the effect of housing prices on equity crowdfunding *Amounts Raised* and the *Number of Campaigns*. We run two independent and robust ordinary least squares (OLS) regression models with time fixed effects. In the first OLS regression model, *HPI* is regressed on *Amounts Raised*. To capture the effect of COVID-19, a *COVID-19* dummy variable and a *COVID-19 x HPI* interaction term are added to the model. The interaction term is necessary to measure the unique effect of *HPI* during the COVID-19 period. Further, we control for real *GDP* as a measure of economic growth within each state (observation). Table 5 reports results for our first OLS regression on the dependent variable equity crowdfunding *Amounts Raised*.

In Model 1, each of our independent variables is statistically significant at either the 5% or the 1% level. More precisely, when the housing price index increases by 1-standard deviation, comparing before and after COVID-19, the *Amounts Raised* in a particular state and quarter combination is \$928,565 higher, holding all other variables constant. This evidence is consistent

with our second hypothesis that tolerance for illiquidity, long-termism, and risk, alongside large and growing populations as proxied by housing prices increases, are critical inputs into the entrepreneurial process that gives rise to success with equity crowdfunding. The R-squared of our model is 41.89%.

In Models 2-3, we present two additional tests that aimed to check the robustness of our result in Model 1. In particular, we address the concern that 35% of the aggregate amount raised in the United States is raised in California alone. We address this concern by first excluding California observations from our sample in Model 2. Moreover, 55% of the aggregate total is raised in California, New York, and Texas; hence, we exclude these 60 observations from our sample in Model 3 as another check. These robustness checks are essentially equal to controlling for outliers within the data, given the right skew of our dependent variable. Our main regression results hold against both robustness checks, and the interaction of *COVID-19* and *HPI* remains significant at the 1% level.

In Models 4-7, we examine if the impact of housing price changes on crowdfunding is more pronounced among regions with differing housing prices by separating our observations into quartiles based on HPI. While quartiles 1-3 are not statistically significant, quartile 4 (the highest HPI observations) is positive and significant. In fact, when looking at this highest HPI quartile, not only do our main findings hold, but also the coefficient of the interaction term increases by one-third or \$338,626. This result leads to our second main conclusion that the effect of the interaction between *HPI* and *COVID-19* is stronger in states characterized by higher housing prices. Wealthier regions are more likely to have residents that are financially able to invest in equity crowd-funded ventures.

In Table 6, we perform the same seven regressions for the alternative dependent variable of the *Number of Campaigns*. Similar to our results from Table 5, the interaction of *COVID-19* and *HPI* is significant at the 1% level in the base model and holds up well to the exclusion of California observations as a robustness check. For example, when the housing price index increases by 1-standard deviation, comparing before and after *COVID-19*, the *Number of Campaigns* in a particular state and quarter combination is higher by 1.62 campaigns, holding all other variables constant.

In Figure 5, we graphically showcase our main finding from Table 6. While *COVID-19* had an overall positive impact on equity crowdfunding activity within the United States, states in which *HPI* increased the most (Top 10) during the period experienced a more significant increase in equity crowdfunding activity. From the pre-*COVID-19* to post-*COVID-19* period, the number of campaigns in the Top 10 *HPI* % gainers increased by 116%, whereas the Bottom 10 *HPI* % gainers saw a comparatively smaller, but still large, 100% increase in the number of campaigns.

[Tables 5-6 near here]

[Figure 5 near here]

4.3 Shifting Entrepreneurial Activity from New York to Florida

There are several examples that we can use to provide context and exemplify the findings of this paper; none, however, is perhaps more appropriate than a comparison of the New York and Florida entrepreneurial markets.

It is often repeated in practice that wealthy individuals move to Florida for tax purposes. But it is not just individuals who are moving, its corporations, and often start-ups who are moving too. According to the Tax Foundation's 2021 State Business Tax Climate Index, Florida ranks 4th after Wyoming, South Dakota, and Alaska as the friendliest business state in the country (Cammenga, & Walczak 2020). Additionally, a 2021 report from CNBC on America's Top States for Business ranks Florida in the top 5 states for access to capital (Cohn, 2021). In point of fact, venture capital market inflows have grown from \$2.5 billion in 2019 to \$3.1 billion in 2020 (eMerge Insights 2021). The influence of the wealthy has affected real estate sales too. The average home price in Florida increased from \$254,000 in March 2020 to \$313,000 in August 2021, according to Zillow's Home Price Value Index (Zillow, n.d.). Conversely, people have been exiting New York in the years leading up to and especially during the COVID-19 pandemic. According to new data from the Florida Department of Highway Safety and Motor Vehicles, the number of New Yorkers exchanging their drivers' licenses for Florida ones is up 32% from September 2020 and March 2021 versus the same period in the prior year (Skelding, 2021). While we await official census statistics on net migration patterns within the United States, we use changes in housing prices to proxy the movement of individuals and other entrepreneurial processes.

Figures 6-7 display a comparison of equity crowdfunding activity in New York and Florida. We find that the existing trend of an increasing the number of campaigns in Florida accelerates during the COVID-19 period and is met with a decrease in the number of campaigns in New York (see Figure 6). When comparing crowdfunding demand between the two states using the amount raised as a percentage of GDP, the acceleration of activity in Florida during COVID-19 appears even stronger (see Figure 7). In Florida, the housing price index increased by 1.7%

more than in New York for the pre- to post-COVID-19 period of 2020 Q1 to 2021 Q1. This fact combined with the trends we see in equity crowdfunding activity serves as an example to our conclusion that housing price increases, which serve as a proxy for tolerance for illiquidity, long-term investments, and risk, alongside high and growing population levels, cause a significant increase in equity crowdfunding activity, especially during the COVID-19 period.

The dynamic presented between New York and Florida can be applied across other states as well. The Equity Crowdfunding Tracker at Florida Atlantic University provides the public an interactive way to compare city and state fundraising activities over time.

[Figures 6-7 near here]

5. Conclusions

This paper presented theory and evidence on entrepreneurial processes that drive the levels of, and success with, equity crowdfunding. We conjectured tolerance for illiquidity, long-term investments, and risk, alongside high and growing population levels, would explain the number of equity crowdfunding campaigns and the success of these campaigns. We further conjectured that housing prices are a solid proxy for long-termism, illiquidity, risk, and population levels and patterns.

The U.S. regulated equity crowdfunding data examined here provided very strong support for the theory. Using a panel dataset containing a population of 3,664 SEC reported campaigns from 2016 Q2 to 2021 Q1, we find that real gross domestic product, housing prices, COVID-19, and the interaction of housing prices and COVID-19 all significantly affect equity crowdfunding success as defined by *Amounts Raised* and *Number of Campaigns*. More precisely, when the

housing price index increases by 1-standard deviation, comparing before and after COVID-19, the *Amounts Raised* in a particular state and quarter combination is \$928,565 higher, holding all other variables constant. We also find that impact of housing price changes on crowdfunding is more pronounced among regions with higher housing prices. The housing price effect is robust to numerous controls and the consideration of outliers.

The theory and evidence presented here on entrepreneurial processes and equity crowdfunding have important implications for policymakers. The SEC crowdfunding exemptions are designed in ways to mitigate extreme movements in crowdfunding, and to avoid fraud and market collapses. Knowing that crowdfunding levels in a region are highly tied to the success of housing markets shows that there are spillovers from the housing market to the equity crowdfunding market. Further research that enables a better understanding of the dynamics of the U.S. crowdfunding market would be warranted so that SEC may better regulate the market and keep it from collapsing or having a crisis.

Future research could likewise examine international markets, and the entrepreneurial processes that lead to levels of and success with equity crowdfunding in different countries around the world. The crowdfunding market is still very young, with most markets having started in the late 2000s or early 2010s. As more data become available, our knowledge base will continue to grow as future research explores these markets and the rich and varied ways in which they are connected to entrepreneurial processes.

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Table 1. Variable Definitions

Variable	Description	Source
Amounts Raised	The total dollar amount raised on equity crowdfunding platforms by each state in a particular quarter	SEC.gov
Number of Campaigns	The total number of campaigns on equity crowdfunding platforms by each state in a particular quarter	SEC.gov
GDP	Real gross domestic product (GDP) is a measure of the total monetary value of all finished goods and services produced at the state level in a particular quarter	BEA.gov
HPI	The Federal Housing Finance Agency (FHFA) Housing Price Index (HPI) is a weighted, repeat-sales index which measures housing price fluctuations at the state level in a particular quarter	FHFA.gov
COVID-19	A dummy variable = 1 for observations during the period Q2, 2020 through Q1, 2021 (most recent quarter in sample)	
COVID-19 x HPI	Interaction variable between the COVID-19 dummy and the Housing Price Index (HPI)	

Table 2. Descriptive Statistics

Variable	Obs	Mean	Median	SD	Min	Max	Lower Quartile	Upper Quartile
Amounts Raised (in \$)	1020	651,161	17,708	2,410,990	0	49,798,041	0	419,659
Number of Campaigns	1020	3.58	1	8.27	0	91	0	3
GDP (in millions of chained 2012 \$)	1020	362,173	204,118	464,597	26,079	2,848,267	96,749	468,586
HPI	1020	423.44	387.67	138.51	219.23	954.97	322.24	492.71

Table 2 reports the descriptive statistics of our dependent and independent variables.

Table 3. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	VIF
(1) Amounts Raised	1						
(2) Number of Campaigns	0.861 ***	1					
(3) GDP	0.645 ***	0.827 ***	1				1.06
(4) HPI	0.280 ***	0.373 ***	0.239 ***	1			1.46
(5) COVID-19	0.187 ***	0.160 ***	-0.001	0.160 ***	1		6.56
(6) COVID-19 x HPI	0.280 ***	0.265 ***	0.104 ***	0.508 ***	0.256 ***	1	1.42

Table 3 reports a correlation matrix with the dependent variables, Amount Raised and Number of Campaigns, and the standardized independent variables used in our regressions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Variance inflation factors (VIFs) are obtained after estimating an OLS regression of the number of campaigns against all explanatory variables.

Table 4. Difference in Means (Pre- COVID-19 & Post- COVID-19)

Variable	Pre- COVID-19	Post- COVID-19	Two tailed t-test
Amounts Raised	\$ 425,559	\$ 1,553,569	***
Number of Campaigns	2.92	6.85	***
GDP (in millions of chained 2012 \$) (State Level)	\$ 362,355	\$ 361,445	
Housing Price Index (State Level)	412.4	467.7	***

Table 4 reports the two-tailed t-test, which is applied to compare means between the pre-COVID-19 (04/01/2016-03/31/2020) and post-COVID-19 (04/01/2020 to 03/31/2021) periods. The difference in means was calculated using quarterly data for Amounts Raised (state level), Number of Campaigns (state level), Real Gross Domestic Product (state level), and Housing Price Index (state level). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Robust Ordinary Least Squares (OLS) Regression Model (Amounts Raised)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$
GDP	17,500,000*** (1,302,455)	6,610,951*** (890,447)	5,035,874*** (1,068,268)	2,701,852** (1,233,490)	3,546,489 (2,501,875)	6,203,978*** (2,084,638)	21,500,000*** (3,120,990)
HPI	-1,138,939** (553,964)	404,141 (258,030)	308,933 (204,562)	920,713 (606,630)	1,106,842 (1,233,960)	-86,346 (601,381)	-6,786,732** (267,186)
COVID-19	1,151,575** (487,050)	108,099 (224,177)	106,257 (170,153)	-173,826 (422,377)	71,438 (1,038,638)	652,430 (456,460)	7,499,021** (3,437,988)
COVID-19 x HPI	928,565*** (130,985)	188,862*** (61,781)	140,868*** (47,730)	228,153 (300,698)	-240,985 (1,756,453)	161,324 (594,796)	1,267,191** (573,772)
Constant	364,910 (279,489)	1,096,799 (157,602)	1,373,275 (240,843)	1,829,970 (637,139)	1,126,421 (1,003,928)	998,884 (331,244)	-1,555,417 (2,295,312)
Time Fixed Effects	X	X	X	X	X	X	X
Excluding California		X	X				
Excluding New York + Texas			X				
Quartile 1 of HPI				X			
Quartile 2 of HPI					X		
Quartile 3 of HPI						X	
Quartile 4 of HPI							X
Observations	1,020	1,000	960	255	255	255	255
R-Squared	.4189	.3948	.1971	.5631	.4644	.1647	.4672

Table 5 reports the results of the robust ordinary least squares time fixed effects regression with Amount Raised as the dependent variable regressed on the standardized independent variables. Regression (1) is a full sample base model. Regression (2) excludes California observations. Regression (3) excludes California, New York, and Texas observations. Regressions (4-7) are performed on a reduced sample of observations from each housing price index quartile. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6. Robust Ordinary Least Squares (OLS) Regression Model (Number of Campaigns)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$	$\beta/s.e.$
GDP	42.74*** (2.72)	26.32*** (3.25)	21.91*** (4.11)	4.82 (5.47)	15.86*** (5.68)	17.01** (8.16)	44.25*** (5.89)
HPI	0.18 (1.16)	2.24** (0.92)	1.96** (0.79)	11.44*** (2.69)	2.80* (2.80)	-2.78 (2.35)	-7.72 (5.04)
COVID-19	2.41** (1.02)	1.21 (0.80)	1.29** (0.66)	-2.55 (1.87)	2.06 (2.36)	6.65*** (1.79)	12.80** (6.49)
COVID-19 x HPI	1.62*** (0.27)	0.57*** (0.22)	0.23 (0.18)	1.31 (1.33)	4.80 (3.99)	5.82** (2.32)	2.38** (1.08)
Constant	2.48 (0.58)	4.85 (0.56)	6.43 (0.93)	14.47 (2.83)	5.47 (2.28)	2.38 (1.30)	-8.24 (4.33)
Time Fixed Effects	X	X	X	X	X	X	X
Excluding California		X	X				
Excluding New York + Texas			X				
Quartile 1 of HPI				X			
Quartile 2 of HPI					X		
Quartile 3 of HPI						X	
Quartile 4 of HPI							X
Observations	1,020	1,000	960	255	255	255	255
R-Squared	.6976	.5633	.4224	.4149	.7221	.5077	.7790

Table 6 reports the results of the robust ordinary least squares time fixed effects regression with Number of Campaigns as the dependent variable regressed on the standardized independent variables. Regression (1) is a full sample base model. Regression (2) excludes California observations. Regression (3) excludes California, New York, and Texas observations. Regressions (4-7) are performed on a reduced sample of observations from each housing price index quartile. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Figure 1. Total Amount of Equity Crowdfunding \$ Raised in United States

Figure 1 shows the evolution of the U.S. equity crowdfunding market from the second quarter of 2016 to the first quarter of 2021. We report the national quarterly fundraising totals. We provide a four-period moving average to smooth the trend of fundraising activity. Additionally, we highlight the COVID-19 period for direct observation. *note the fundraising totals reported are as of September 27th, 2021; some campaigns (mainly from the first quarter of 2021) remain open for fundraising at the time of data collection.

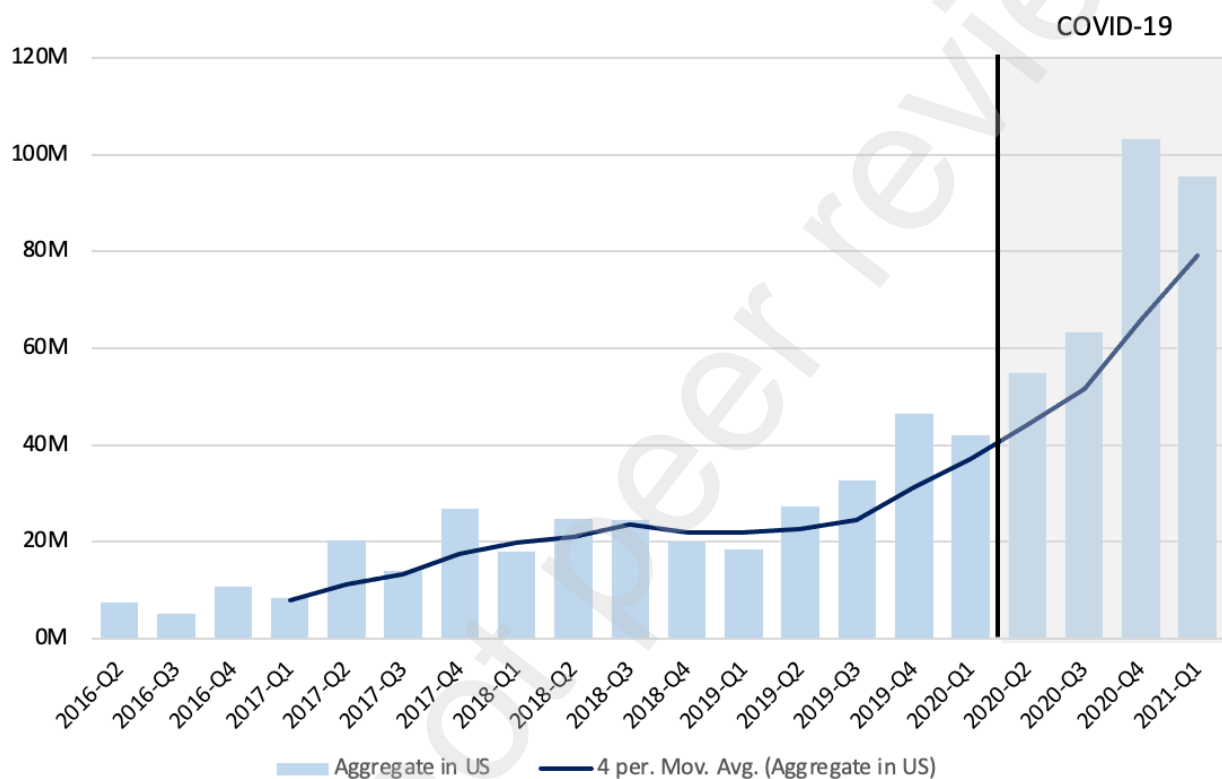


Figure 2. Total Amount of Equity Crowdfunding Campaigns in United States

Figure 2 shows the evolution of the U.S. equity crowdfunding market from the second quarter of 2016 to the first quarter of 2021. We report the national quarterly campaign totals. We provide a four-period moving average to smooth the trend of fundraising activity. Additionally, we highlight the COVID-19 period for direct observation. *the fundraising totals reported are as of September 27th, 2021, some campaigns (mainly from the first quarter of 2021) remain open for fundraising at the time of data collection.

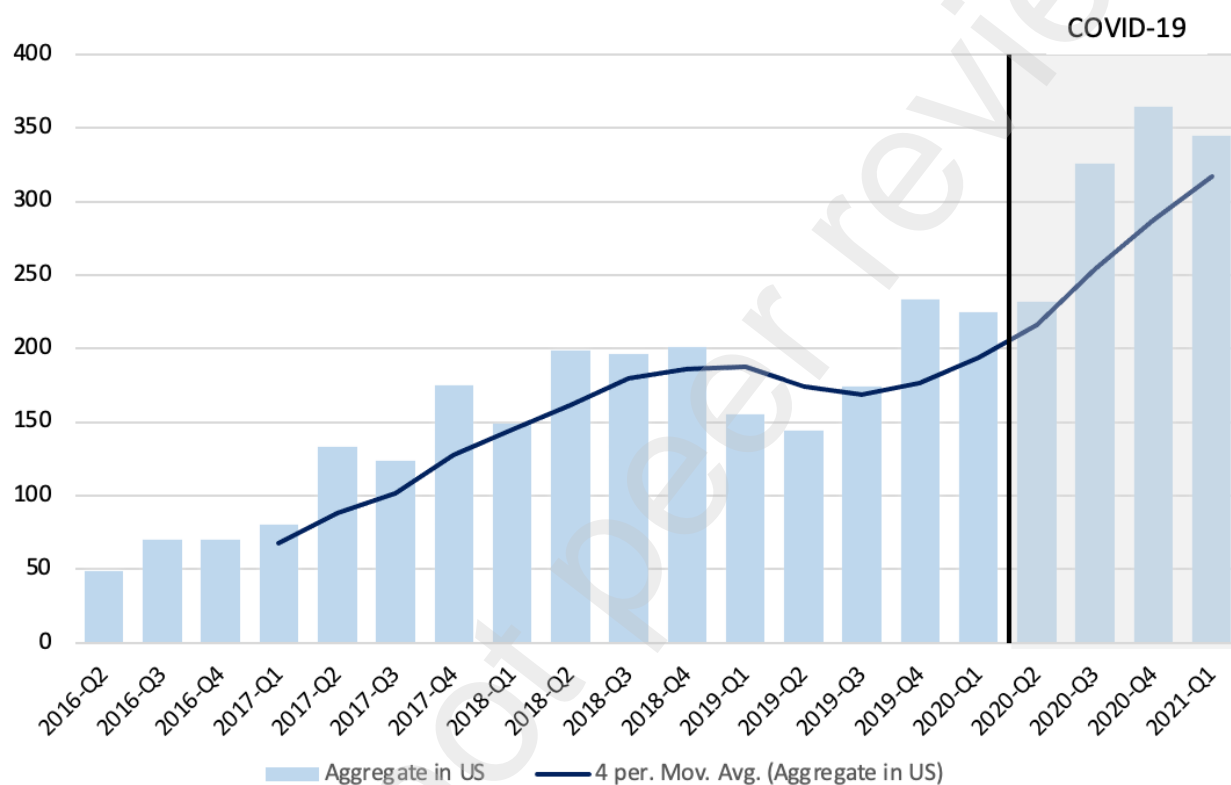


Figure 3. Heat Map of U.S. State Equity Crowdfunding Activity

Figure 3 shows a heat map of the density of all equity crowdfunding activity amongst U.S. states. The darker the shade of blue, the greater the amount raised by campaigns in that particular state. For example, the campaigns of all collective firms headquartered in California have raised the largest amount of money of any state from 2016 Q2 to 2021 Q2.

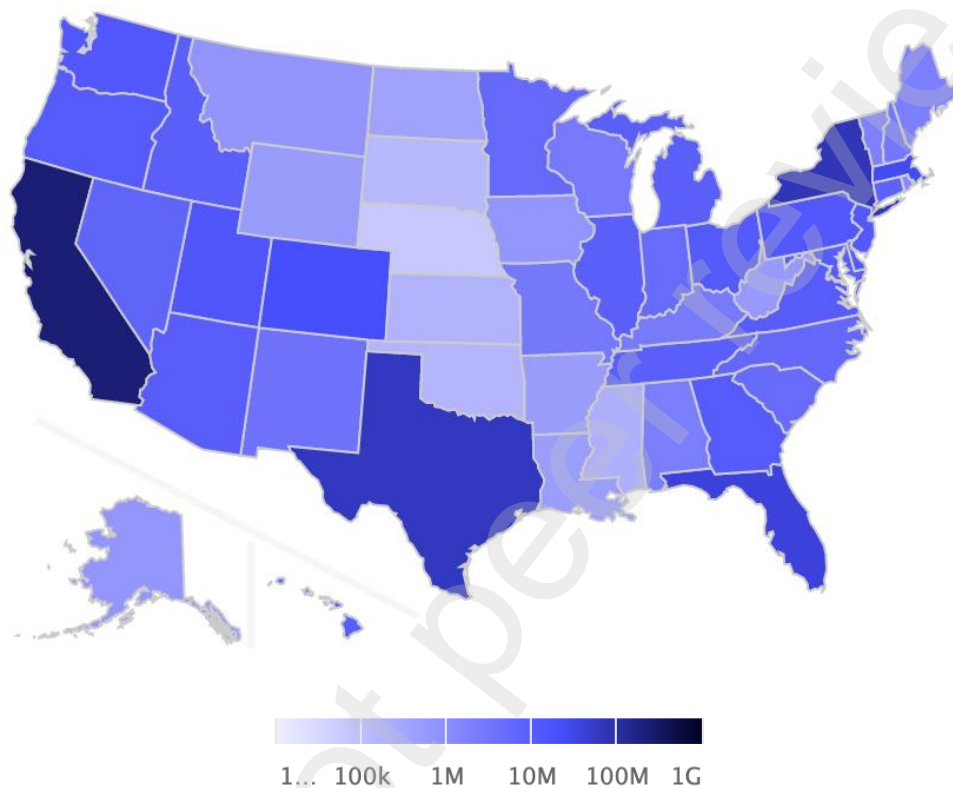


Figure 4. Average HPI & GDP

Figure 4 shows the average housing price index (HPI) as well as the average gross domestic product (GDP) for all 50 states and the District of Columbia in each quarter over the time period of our equity crowdfunding dataset (2016 Q2 through 2021 Q1). We highlight the COVID-19 period for direct observation and particularly note the drop in GDP followed by a V-shaped recovery compared to a continuation of the existing trend in HPI.

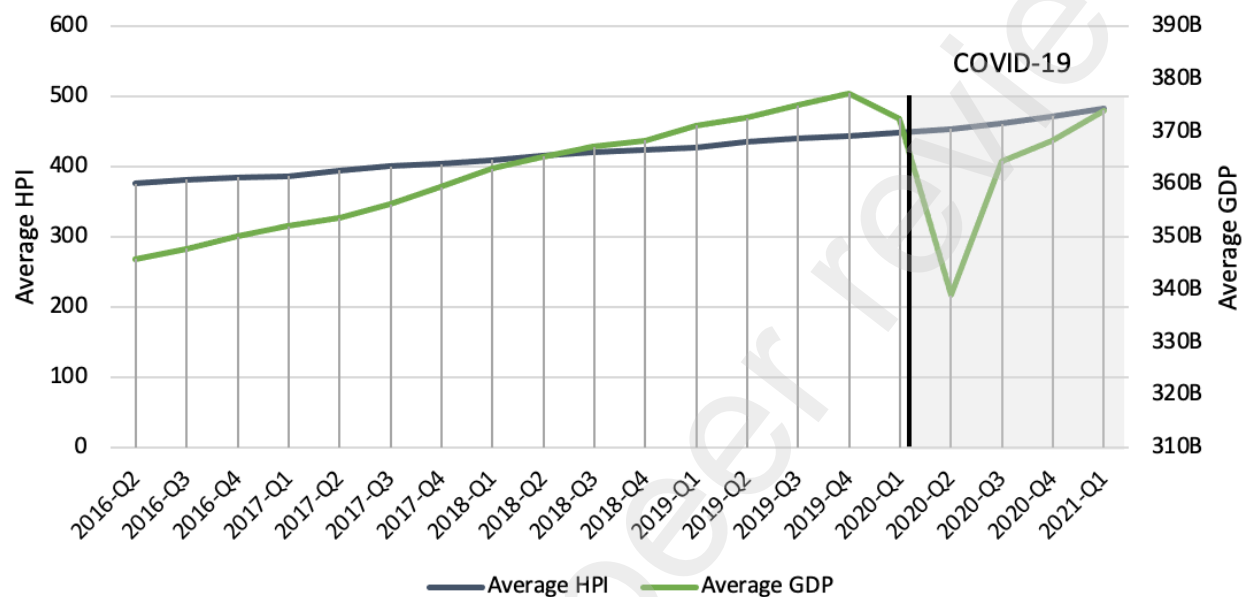


Figure 5. Comparison for Top 10 and Bottom 10 HPI % Change

Figure 5 compares the aggregate equity crowdfunding Number of Campaigns between the Top 10 and Bottom 10 Housing Price Index (HPI) percentage gainers during the COVID-19 period. We calculate the HPI percentage increase during the COVID-19 period as $\{(HPI \text{ in } 2021 \text{ Q1} - HPI \text{ in } 2020 \text{ Q1}) / HPI \text{ in } 2020 \text{ Q1}\}$. Next, all states were sorted based on their percentage gain, and two groups were formed (Top 10 and Bottom 10). For each state, we calculate the mean number of campaigns for the pre-COVID-19 previous four quarters (2019 Q2 through 2020 Q1) and the post-COVID-19 four quarters (2020 Q2 through 2021 Q1). Then, for each grouping, we aggregate the pre-COVID-19 and post-COVID-19 state means. Last, we report the aggregated totals below to highlight the interaction between house prices and equity crowdfunding during COVID-19 at the state level.

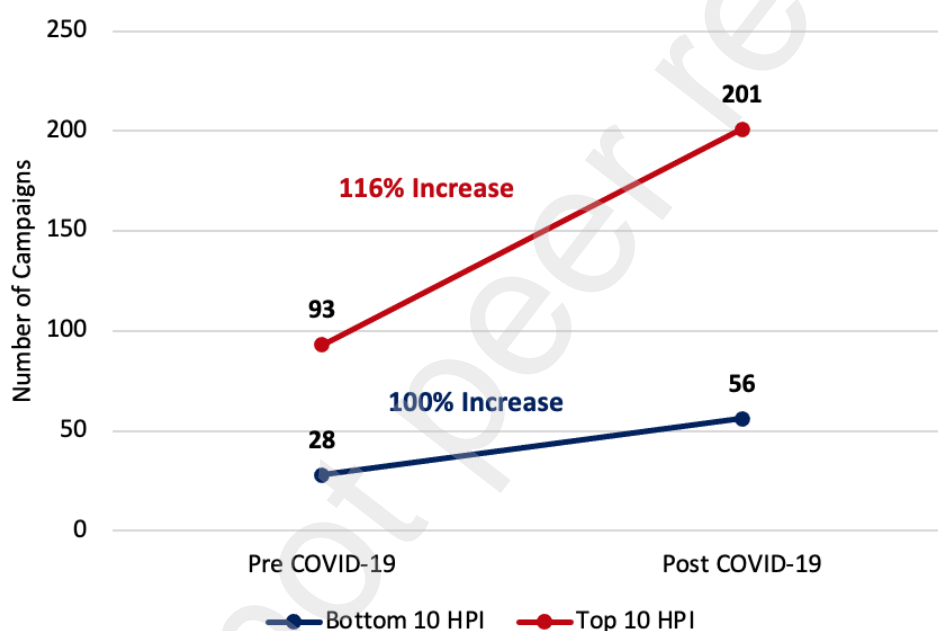


Figure 6: New York vs. Florida (Number of Campaigns)

Figures 6-7 compare equity crowdfunding activity in two leading entrepreneurial states, New York (blue graphs) and Florida (red graphs). The bar charts illustrate how equity crowdfunding activity in these two states has changed over time. While New York campaign totals far exceed that of Florida in the pre-Covid-19 period, crowdfunding activity in Florida accelerates in the post-COVID-19 period intersecting with a slight decline of activity in New York. In Figure 6, we report quarterly number of campaigns in each state. We provide a two-period moving average to smooth the trend of fundraising activity. *note the fundraising totals reported are as of September 27th, 2021; some campaigns (mainly from the first quarter of 2021) remain open for fundraising at the time of data collection.

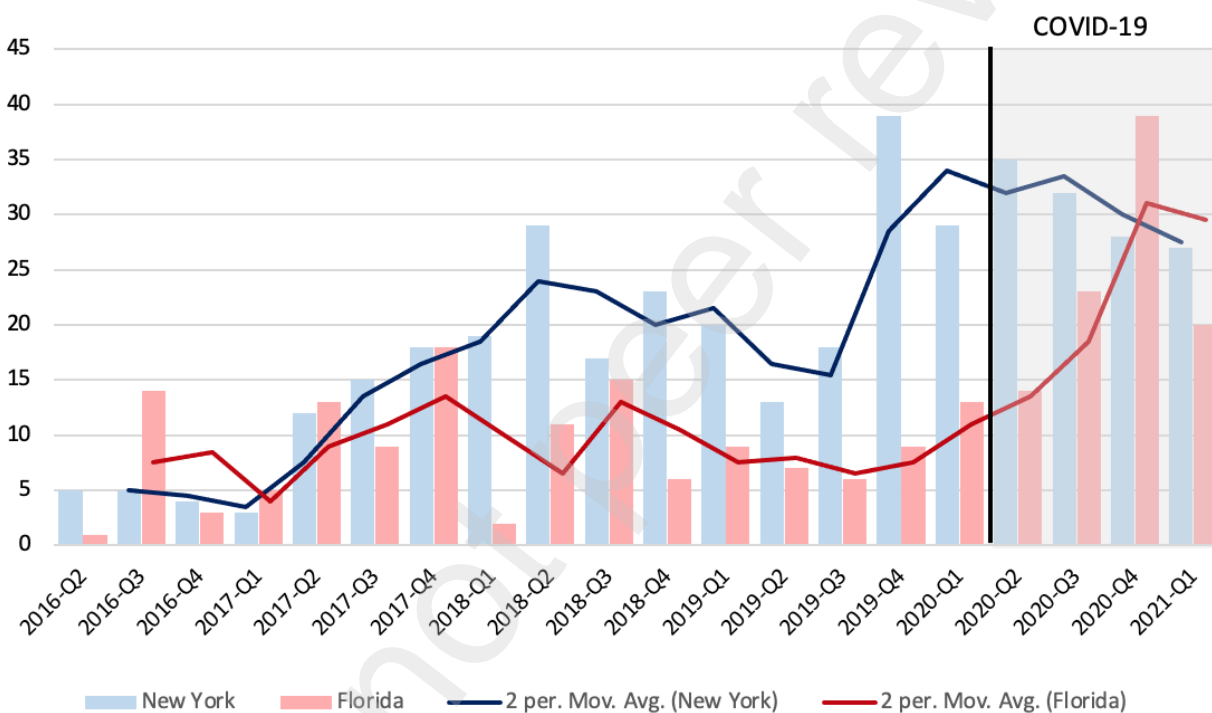
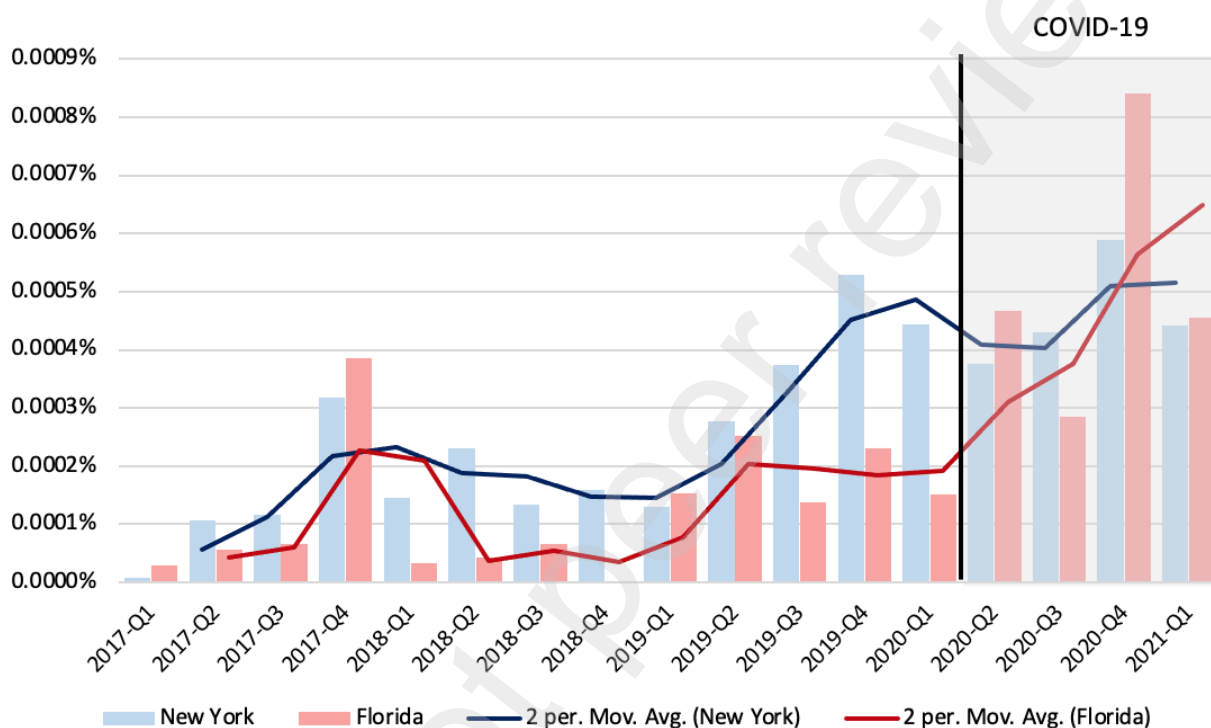


Figure 7: New York vs. Florida (Amount Raised as a % of GDP)

In Figure 7, we report quarterly fundraising totals as a percentage of GDP in New York (blue graphs) and Florida (red graphs). We provide a two-period moving average to smooth the trend of fundraising activity. *note the fundraising totals reported are as of September 27th, 2021; some campaigns (mainly from the first quarter of 2021) remain open for fundraising at the time of data collection.



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