The More, the Merrier? The Bystander Effect on Crowdfunding Platforms

數大不一定美:旁觀者效應對群眾募資案表現之影響

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Abstract

From a network externalities perspective, prior studies suggest that social networks can improve fundraising performance on crowdfunding platforms. However, according to the bystander effect in the social psychological literature, the number of project supporters may be negatively associated with fundraising performance. By analyzing 5,773 daily observations from 191 crowdfunding projects on the flyingV platform, we show that the bystander effect harms the daily pledge amount. To mitigate such a negative impact, crowdfunding project creators may signal project legitimacy and use a longer project-funding period to escalate the conversion from bystanders to backers, which in turn enhances the fundraising performance.

[Keywords] bystander effect, social psychology, legitimacy, crowdfunding

摘要

在過去的群眾募資研究中,學者認為,社群網絡外部性愈強,愈可幫助專案募款表現。然而,從旁觀者效應觀點來看,旁觀的群眾人數愈多,反倒不一定會正面影響 群眾募資案之募資表現。本研究認為,當實際的出資贊助者 (Backers) 數量佔支持者 (Supporters) 比重低時(即旁觀者效應),反而可能減少專案的募資金額。藉由分析 台灣群眾募資平台 flyingV 上的 5,773 個觀察數據,本研究發現,旁觀者效應減低專 案的每日募資金額。然而,機構單位提出的群眾募資專案,因其正當性,可降低旁觀 者效應對每日募資金額的負面影響。另外,當專案設定的募款天數愈長時,也可以降 低旁觀者效應對每日募資金額的負面影響。

【關鍵字】旁觀者效應、社會心理學、正當性、群眾募資

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1. Introduction

Early-stage financing is important for new ventures to succeed (Gompers and Lerner, 2004). However, due to the high-risk nature (Hanley and Girma, 2006), lack of a track record (Scholtens, 1999), limited cash flow (Hanley and Girma, 2006), and absence of collateral, new ventures face more difficulties than established firms do to obtain financial resources (Cassar, 2004), thus making capital shortage a common concern for entrepreneurs. Conventionally, new ventures may access financial resources from different sources, such as entrepreneurs' families, friends, or angel inventors (Bruton, Khavul, Siegel, and Wright, 2015). Recently, crowdfunding has become a novel channel to obtain financial support for start-ups (Agrawal, Catalini, and Goldfarb, 2011).

Crowdfunding is "an open call, essentially through the Internet, for the provision of financial resources either in the form of donation or in exchange for some form of reward and/or voting rights to support initiatives for specific purposes" (Mollick, 2014). The growing popularity of crowdfunding has attracted scholarly attention, and researchers have sought to understand how this nascent fundraising platform differs from traditional financial intermediaries. Scholars have identified a number of factors associated with campaign fundraising performance, including the project's fundraising duration, campaign fundraising goal, project descriptions, and number of funders (Mollick, 2014).

Among these factors, the role of founders' social networks in social media has been examined by researchers increasingly (Bruton et al., 2015; Mollick, 2014). Specifically, social networks prompt people to visit the crowdfunding project initiator's webpage, thus increasing the project's publicity and the possibility of being funded (Hong, Hu, and Burtch, 2018; Kuppuswamy and Bayus, 2018; Mollick, 2014). However, the social psychological literature suggests that a growing size of social networks might not lead to positive outcomes. That is, more people may cause non-helping behaviors when people are aware of others being around; this is termed as the bystander effect (Darley and Latané, 1968; Fischer, Krueger, Greitemeyer, Vogrincic, Kastenmuller, Frey, Heene, Wicher, and Kainbacher, 2011; Hussain, Shu, Tangirala, and Ekkirala, 2019). This implies that, in the crowdfunding context, more supporters may negatively influence investors' propensity to fund a project.

While there are hints about the bystander effect on crowdfunding platforms,

there is no empirical analysis that directly examines their impacts primarily due to data unavailability (Kuppuswamy and Bayus, 2018). Fortunately, one reward-based crowdfunding platform in Taiwan, flyingV, records all related information by showing "Number of Supporters" for each project. Supporters refer to those who click "Like" on the project webpage. The supporters' list includes "backers" and "bystanders." "Backers" are defined as project funders who contribute funds to the projects (Kuppuswamy and Bayus, 2018). "Bystanders" are those who only psychologically support the project but have not contributed funds to the project (Chan, Parhankangas, Sahaym, and Oo, 2020; Kuppuswamy and Bayus, 2017). Despite growing scholarly attention to bystanders, the actual effect of those bystanders on project fundraising performance in crowdfunding remains unexplored and represents a crucial oversight in the crowdfunding literature.

To bridge this gap, our research draws on the bystander effect in the social psychological literature to examine their role in crowdfunding. First, we propose that a higher bystander ratio (i.e., more bystanders but with fewer backers) in a project is negatively associated with the project's daily pledge amount. This is probably because the presence of bystanders will discourage investors from investing and increase the risk of project failure. Furthermore, we identify project legitimacy and project duration as two important factors that mitigate the adverse bystander effect because these two factors provide campaign-related information.

We expect project legitimacy to lessen the adverse bystander effects (Belleflamme, Lambert, and Schwienbacher, 2013; Taeuscher, Bouncken, and Pesch, 2021). Project legitimacy in the form of firm incumbency provides project creators' past information and reduces information ambiguity, hence turning bystanders into actual funders. Moreover, the funding duration would mitigate the bystander effect. Specifically, as the project fundraising period goes by, the platform helps spread project information to more people (Pariser, 2012). Therefore, we expect an extended project funding period to convert "by-standers" into "backers," thus mitigating the negative bystander effect on project fund-raising. By examining 5,773 daily observations from 191 crowdfunding projects on the flyingV platform, we find support for our three proposed hypotheses.

This study complements recent works on the crowdfunding phenomenon and bridges several vital gaps in the literature. While prior studies have pointed out the importance to consider the network effect in crowdfunding (Hong et al., 2018; Kuppuswamy and Bayus, 2018; Mollick, 2014), we advance prior studies by looking at social networks at a more granular level on this nascent platform. We highlight that one type of supporters—bystanders—will undermine campaign fundraising performance based on the social psychological literature. Our findings thus contribute to an emerging research stream on more nuanced insight into the behavior of crowd investors (Chan et al., 2020). Moreover, we extend recent studies that examine bystander effects in the crowdfunding context by exploring the boundary conditions (Chan et al., 2020; Kuppuswamy and Bayus, 2017). We find that project legitimacy and project funding duration would mitigate the adverse bystander effect. Overall, we contribute to a better understanding of funding dynamics on crowdfunding platforms.

We discuss the research hypotheses in section 2. Section 3 describes the research methodology, and section 4 presents our empirical results. Section 5 discusses the findings, and the last section provides the conclusion for this study.

2. Theoretical Background and Hypothesis Development

2.1 Bystander Effects and Crowdfunding

The association between social ties and the success of start-up projects has been widely documented in the literature (Hsieh and Fang, 2020; Shane and Cable, 2002; Sullivan and Ford, 2014). Particularly, prior studies suggest that family and friends are important sources of seed capital for start-ups (Agrawal et al., 2011). According to Parker (2009), 31% of start-ups' capital comes from the founders' family and friends. This is primarily because relatives and friends have an information advantage over other potential investors, which allows them to overcome information asymmetry between project creators and potential investors (Agrawal et al., 2011). In addition to family and friends, social media platforms, such as Facebook and Twitter, represent an important source of social networks. Crowdfunding creators might benefit from sharing their projects on such platforms (Kuppuswamy and Bayus, 2018). Prior studies have demonstrated the significance of social media in shaping crowdfunding campaign performance. For instance, Mollick (2014) finds a positive association between the number of project initiators' Facebook friends and the success of crowdfunding fundraising. In a similar vein, Courtney, Dutta, and Li (2017) document that the use of media and backer sentiments are important predictors for funding

success. Kuppuswamy and Bayus (2017) also find that the contribution of other investors on the platform is crucial in shaping project funding success.

While prior studies have suggested that social networks play an important role in fundraising, whether the increasing social network size only benefits projects remains unexplored (Chiu and Chang, 2015). Indeed, within the project's social network, a few supporters only psychologically support the project by merely clicking the "Like" button but not contributing funds. The question of interest is whether these social ties also contribute to better fundraising performance. We draw on the bystander effect perspective from the social psychological literature to develop our arguments.

The bystander effect is defined as situations in which individuals are less likely to offer any means of help to those in need when others are present (Darley and Latané, 1968). This perspective suggests that the greater the number of bystanders, the less likely it is that any one of them will offer help. Scholars show that bystanders abstain from providing help for three reasons (Latané and Nida, 1981). First, bystanders do not offer any help because they fear that their helping behavior would be negatively construed by other bystanders, also known as audience inhibition. Second, in an ambiguous situation, bystanders are more likely to look for information cues from other bystanders. When bystanders notice that no one is providing help, they will restrain their helping behavior; this is called social influence. Third, bystanders might not take action in the presence of other people because they believe that someone else will take up this responsibility, also referred to as the diffusion of responsibility. Furthermore, Fischer et al. (2011) show that the bystander effect can be extended to non-emergency situations. In such cases, people will assume that someone else will eventually help, and therefore, there might be less need for them to provide any help. However, the bystander effect is less likely to occur in emergency situations (Fischer et al., 2011).

Recently management scholars have applied the notion of the bystander effect in the social media and crowdfunding contexts. Chiu and Chang (2015) find that the increasing size of social networks might not contribute to more social support on Facebook. Bystanders on the crowdfunding platform are defined as those who only psychologically support the project but have not contributed any funds (Chan et al., 2020; Kuppuswamy and Bayus, 2017). For example, people might psychologically support a project by clicking "Like" on the project's webpage. Along the campaign fundraising

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cycle, bystanders receive the notification letters from the platform after clicking the "Like" button. These letters provide updated project-related information, including the percentage of projects funded, number of supporters for the project, and funding requests. In this respect, these bystanders are still kept informed of the progress of the project. It remains interesting to explore how the presence of those bystanders on the crowdfunding platform impacts project fundraising performance.

We first describe the characteristics of investors on the reward-based crowdfunding platforms and examine how investors might respond to the presence of bystanders. Crowd investors are mostly small investors who lack investment expertise, skills, and experiences (Fisher, Kuratko, Bloodgood, and Hornsby, 2017; Steigenberger and Wilhelm, 2018). Prior crowdfunding studies thus find that crowd investors tend to base their investment decision on the investing behavior of their peers (Kuppuswamy and Bayus, 2017). Regarding the motivation for funding, researchers have established that some investors contribute their funding in exchange for tangible products, services, or rewards, often thought as a purchasing behavior (Mollick, 2014). Other investors are motivated to provide funding due to feelings of sympathy or empathy toward the funding objective (Agrawal, Catalini, and Goldfarb, 2014). For this reason, these investors tend to fund projects that support social initiatives consistent with their identity or beliefs. While investing behavior on crowdfunding platforms can be viewed as either purchasing or philanthropic behavior, investors derive their benefits only if the project they support reaches the funding target. Notably, the success of the crowdfunding project depends not only on the funding by the focal investor but also on contributions from other investors. In this regard, investors are aware of contributions by other investors and prefer to invest in campaigns with a higher probability of success (Mollick, 2014).

Considering these investor characteristics, we examine how the presence of bystanders will impact fundraising performance. We argue that the social influence mechanism in the bystander effect literature and the investors' risk aversion are crucial in our context. First, prior studies find that most investors on the crowdfunding platform do not possess investment-related expertise or skills (Fisher et al., 2017), so investors tend to base their investment decisions on others' investing behavior (Cecere, Le Guel, and Rochelandet, 2017; Chan et al., 2020; Kuppuswamy and Bayus, 2018). This tendency is particularly pronounced on the crowdfunding platform since this platform is a highly noisy and ambiguous environment (Kuppuswamy and Bayus, 2018). As such, the focal investor might look for cues from other bystanders about how to act in this ambiguous situation. When the focal investor notices that other bystanders still have a "wait-and-see" attitude, the focal investor is more inclined to mimic the non-helping behavior of others. In other words, the presence of bystanders will undermine investors' willingness to contribute to a crowdfunding project.

Second, investors might be less inclined to invest in a project with a higher bystander ratio since investors are risk-averse. Prior studies show that rewards play a significant role in explaining the funding decisions on crowdfunding platforms (Bruton et al., 2015; Mollick, 2014). A higher bystander ratio implies that fewer people are willing to provide funding, which leads to a higher risk of project failure. One of the main objectives of crowdfunding investors is seeking the first use of the novel product. If the project has a higher risk of failure, it will discourage investors from investing. As a result, investors tend to withhold their funding in the presence of bystanders. Based on the bystander effect and the risk aversion effect, in defining the bystander ratio as the number of bystanders divided by the number of supporters, we suggest a negative association between the bystander ratio and the daily aggregate amount of capital received.

Hypothesis 1: The bystander ratio of a project is negatively associated with the project pledge amount.

2.2 Interplay of Bystander Effect and Project Legitimacy

If the bystander effect prevents investors from investing in crowdfunding projects, the question of interest would be: How can project creators alleviate such effects? From the social psychological perspective, when the project creator provides more information to bystanders, they are more inclined to provide help (Darley and Latané, 1968). That is, bystanders are more likely to intervene in less ambiguous situations than in more ambiguous situations. Thus, how to reduce ambiguity with more information represents a potential mechanism to convert bystanders to backers.

The crowdfunding platform presents significant information asymmetries between project creators and crowd funders (Colombo, Franzoni, and Rossi-Lamastra, 2015; Mollick, 2014). For crowd funders, they face two main information challenges. First, these crowdfunding projects take place on the platform in a relatively short period, and it is dif-

ficult for the supporters to evaluate the quality of campaigns. For example, the project creators usually hold private and undisclosed information about the campaign's developmental stage, product quality, and prospectus. To improve the fundraising performance, project creators may have the incentive to overstate the quality of their projects (Usman, Bukhari, Usman, Badulescu, and Sial, 2019). Second, most of the projects are at the conceptual or developmental stages, and supporters have information disadvantage over whether the project creators will deliver the projects or services after the campaign ends (Mollick, 2014). To overcome these information disadvantages, prior studies suggest that crowd funders rely on various signals, such as founders' social and human capital, third-party endorsement, or project legitimacy (Colombo et al., 2015), to make their funding decision.

Considering the uncertainty of project quality, we expect that project legitimacy would reduce information ambiguity and mitigate the bystander effect. Prior studies suggest that legitimacy is one positive signal that indicates a firm's underlying quality and helps reduce investors' perception of project uncertainty (Certo, 2003; Meyer and Rowan, 1977). New ventures can build legitimacy through affiliation with reputable or high-status third-party organizations, such as venture capitalists and university or alliance partners (Rao, 1994; Sorescu, Shankar, and Kushwaha, 2007; Zimmerman and Zeitz, 2002).

On the crowdfunding platform, project legitimacy can be conferred by the background of the project initiator, such as whether these projects are initiated by incumbent organizations. Incumbent firms are considered legitimate for the following two reasons. First, incumbent firms have more information about their past business operations and financial performance (Stinchcombe, 1965). Second, incumbent firms have abundant resources, knowledge, and experiences necessary for completing the projects (Aldrich and Fiol, 1994). Given their resources and experiences, incumbent firms are less likely to encounter product delay issues caused by manufacturing, shipping, or technical problems. Consequently, incumbent firms have a higher probability of delivering their products or services on time.

Project legitimacy in the form of firm incumbency reveals the underlying quality of the project and helps reduce project ambiguity. Such a less ambiguous situation will turn those bystanders into backers. Thus, the negative relationship between the bystander effect and the daily pledge amount is weakened for projects initiated by incumbent firms. Our research proposes the following hypothesis: Hypothesis 2: Project legitimacy weakens the negative relationship between the bystander ratio of a project and the project pledge amount.

2.3 Interplay of Bystander Effects and Project Duration

The bystander effect literature suggests that if people know there are other bystanders in an emergent situation, the responsibility for helping would be diffused among them. Prior studies suggest that bystanders are more likely to take action in less ambiguous situations than in more ambiguous ones (Darley and Latané, 1968). Thus, providing those bystanders with more information is an important mechanism to convert bystanders to backers.

We expect that the funding project duration may influence the degree of ambiguity and thus reduce the bystander effect on crowdfunding platforms. On the flyingV platform, notification letters are sent to the supporters once they press the "Like" button on the project webpage. When project supporters receive notification letters from the flyingV platform, they are aware of the progress of the project, including such details as the number of remaining funding days and the accumulated number of pledges. At the same time, project creators will continue to post project updates and answer project-related questions to all supporters (Block, Hornuf, and Moritz, 2018), and this will significantly reduce information asymmetry between project creators and bystanders (Mollick, 2014). Therefore, the longer the project funding duration, the more likely that the bystanders have opportunities to gather and evaluate project-related information. The reduced project ambiguity is, therefore, more likely to convert bystanders to backers. We propose the following hypothesis:

Hypothesis 3: Project funding duration weakens the negative relationship between the bystander ratio of a project and the project pledge amount.

Thus far, we propose three hypotheses, and Figure 1 illustrates our research framework.



Figure 1 Research Framework

3. Data and Method

3.1 Sample Construction and Data Collection

As the goal of this paper is to test research hypotheses about crowdfunding, we extracted data from flyingV, one of the largest and dominant reward-based crowdfunding platforms in Taiwan. flyingV, established in 2012, operates under the All-or-Nothing model, which is a commonly used model for crowdfunding platforms. That is, founders can receive the funds raised if they meet or exceed their pre-set funding goal by the end of a campaign. For crowd funders, they receive tangible products or services in return for their financial contributions. Since its inception in 2012, flyingV had raised more than NT\$1.6 billion from backers by the end of 2019 (Backer-Funder, 2020).

We hand-collect 5,773 daily observations from the webpage of the 191 projects on the flyingV platform from December 2, 2014 to March 11, 2015 and extracted related information such as funding days, the amount of target pledges, the number of backers, and the number of supporters.



Figure 2 Project Schematic Page on flyingV

Figure 2 illustrates a project page on the flyingV website. We collect data in the following steps. First, we recorded the title of the project and project category ("Project Categories") from the upper left corner of the webpage. From the top right corner, we recorded the number of accumulated backers ("Number of Total Backers"), the number of accumulated supporters ("Number of Total Supporters"), and the number of accumulated pledges for each day. By doing so, we were able to record not only the number of daily backers, supporters, and pledges but also the increase in the number of backers, supporters, and pledge amount. We subtracted the daily number of backers from the daily number of supporters to ascertain the daily number of bystanders; to derive the daily bystander ratio, we divided the daily number of bystanders by the daily number of supporters.

Moreover, we also hand-coded the funding duration on the project page ("Funding Start Date – End Date"), the name of the project creator, and the target number of pledges from the project creator's original expectation ("Target Pledge Amount"). We calculated the days between the funding start date and end date to get the data of *project duration*. When we clicked the name of the project creator, the Internet browser directed us to the "About me" page of the project creator. This step enabled us to verify whether the project was initiated by a single person, an entrepreneurial team, or an existing organization.

To ensure the accuracy of daily observations hand-coded from the flyingV platform, we double-checked the sum of daily numbers against funding amounts and the total number of backers on the flyingV platform. We also interviewed flyingV staff to confirm our data collection process. Our final sample consisted of 5,773 funding efforts representing NT\$75.2 Million of pledges, of which 100 out of 191 projects (52.3%) succeeded in reaching their funding goals.

According to flyingV, in 2014, 78,688 funding efforts represented NT\$115 Million of pledges, of which 238 out of 523 projects (45.5%) succeeded in reaching their funding goals. No significant differences in success rates exist between our sample period and all of 2014, thus suggesting that our data should be representative of the funding efforts on the flyingV platform.

3.2 Variable Measurements

3.2.1 Dependent Variable

Our dependent variable *pledge amount* refers to the project pledge amount for each day, i.e., the total amount that a crowdfunding project received at the end of each day. To reduce the skewness of this value, we take the logarithm of the monetary value of the daily pledge amount.

3.2.2 Explanatory Variables

We use *bystander ratio* as our explanatory variable, which is computed as the number of bystanders divided by the number of supporters for each day. The flyingV platform provides information about the number of supporters and backers. The number of bystanders is given by the difference between the numbers of supporters and backers. A higher ratio indicates that fewer people have pledged, but there are more bystanders. To alleviate concerns about reverse causality, this variable is lagged by one day.

3.2.3 Moderator

Our study includes two moderating variables. The attributes of project creators may also affect the daily amount of fundraising. We coded *project legitimacy* as 1 if a project is initiated by an incumbent private or public organization and as 0 if it is initiated by a non-incumbent firm.

This second moderating variable is *project duration*. This variable represents the number of fundraising days for which a project is open to accept donations from backers on the platform. The flyingV platform allows projects to raise funds for as many as 90 days, but most projects set their duration from 30 to 60 days. We take the logarithm value of this variable to reduce its skewness (Courtney et al., 2017).

3.2.4 Control Variables

We control for the following factors that may affect the daily pledge amount. First, considering the impact of prior funding, we calculate the cumulative amount of money that has been pledged into this project from the beginning of the campaign to the previous day (Chan et al., 2020). *Cumulative pledge amount* is the ratio of cumulative pledge amount to the funding goal in our empirical analysis.

We also control for *perceived project quality*. We use the project creators' past campaign experiences on the flyingV platform as a proxy. Project creators with better past performance are expected to launch projects of better quality (Usman et al., 2019). Moreover, such experiences represent a certain guarantee for delivering the products or services after the campaign ends (Courtney et al., 2017). We manually gathered information from the project creators' profiles on the flyingV platform. Specifically, we exclude those projects whose starting date is before December 22, 2014, and the ending date is after March 11, 2015. We only include those projects that are completed before the start date of the focal project. *Perceived project quality* is computed as the ratio of the number of previous successful projects completed by the project creator to the total number of projects launched by this project creator on the flyingV platform. A project is considered successful if the project reaches its funding goal by the end of the crowdfunding campaign.

To control for unobservable category-specific heterogeneity, we also add category fixed effects in our empirical analysis. flyingV categorized projects into nine categories in our data collection period, including product design (C1), music and film (C2), art and

performance (C3), entertainment (C4), writing and publication (C5), society and culture (C6), technology application (C7), food and drink (C8), and travel (C9). Different types of projects may have different impacts on the daily amount of fundraising. While product design and technology application projects usually deliver tangible products, society and culture projects typically propose donations. For instance, a crowdfunding project creator, Milk House in the food and drink category, delivers milk to backers. Such a reward-based project not only attracts investors who have the same belief with the firm but also attracts investors who are interested in high-quality fresh milk. Another example is Ponzi Game in the product design category. Project creators plan to raise funds for developing board games; funders will receive a set of the board game in return. Campaigns in the society and culture category typically support different social causes. For example, one project seeks funds from individuals to support the Anti-nuclear Movement in Taiwan. Another crowdfunding campaign, a social movement called "Sunflower," also successfully raised funds to support their belief in reforming the government. Table 1 summarizes the key variables in our research.

3.3 Statistical Methods

We use regression models with robust standard errors to test our hypotheses. We use robust standard errors to consider the correlation among error terms over time within the same project. In the regression models, we also added year, month-of-year, and day-of-week fixed effects to control for unobservable time factors that may influence the pledge amount over time. Specifically, for the year fixed effect, our sample spans across 2014 and 2015, so we add one dummy variable *Year*₂₀₁₄, which equals one if an observation is 2014; observations in year 2015 are viewed as the benchmark group. For the month-of-year fixed effect, as our sample spans across December, January, February, and March, we include three dummy variables *Month*_{Dec}, *Month*_{Jan}, and *Month*_{Feb}, each of which equals one if an observation is in one of these months. For the day-of-week fixed effect, we follow a similar procedure. We include six dummy variables Day_{Mon} , Day_{Tue} , Day_{Wed} , Day_{Thu} , Day_{Fri} , Day_{Sar} , each of which equals one if an observation is in one of these months. For the day-of-week fixed effect, we follow a similar procedure. We include six dummy variables Day_{Mon} , Day_{Tue} , Day_{Wed} , Day_{Thu} , Day_{Fri} , Day_{Sar} , each of which equals one if an observation is in one of these days. Category fixed effects are added to control for unobservable category-level heterogeneity. In particular, as we have 9 project categories in our sample, we add 8 project category dummy variables (*C1* to *C8*) in our regression model, with observations in the travel category (*C9*) as our refer-

| Variables | Definitions | | | |
|---------------------------|--|--|--|--|
| Pledge Amount | The total amount of pledges that a crowdfunding project received at the end of each day. We take the logarithm value of this variable. | | | |
| Bystander Ratio | The ratio of the daily number of bystanders over the daily number of backers | | | |
| Project Legitimacy | Coded 1 if a project is initiated by an incumbent firm and 0 if initiated by non-incumbent firms | | | |
| Project Duration | The number of days for which a project creator chooses to accept pledges. We take the logarithm value of this variable. | | | |
| Cumulative Pledge Amount | The cumulative number of pledges until day <i>t</i> -1 divided by the funding goal | | | |
| Perceived Project Quality | The ratio of the number of previous successful projects to the total number of projects launched by the project creator | | | |
| | | | | |

Table 1 Variable Definition

ence group.

Model 1 examines the effects of the bystander ratio on the daily aggregate amount of capital received. Model 2 tests the moderating effects of project legitimacy on the daily amount of fundraising. Model 3 examines the moderating effects of project funding duration on the daily amount of fundraising. For the robustness tests, we also examine our three main hypotheses at the project level.

3.4 Results

Table 2 shows the descriptive statistics, Pearson, and Spearman rank correlations among variables. Since a moderate level of correlation among variables is observed, we further used Variance Inflation Factor (VIF) to examine the multicollinearity problem. Our results show that the VIF scores for all independent variables are less than 1.6, suggesting no severe concerns about multicollinearity (Bowerman and O'Connell, 1990).

Table 2 shows that the average bystander ratio is 0.45 in our sample, suggesting that approximately 45% of followers do not pledge funds to the campaign. Approximately 39.2% of campaigns are initiated by incumbent firms. Each campaign has 55.7 (= $e^{4.02}$) days of funding duration. The average cumulative pledge amount is 0.934. Moreover, we also find that some campaigns receive almost 100 times more than the amount required

in one day, and it seems that some campaigns perform much better than the rest of the campaigns.

Our unreported results further indicate that approximately 29.62% of our observations are in the society and culture (*C6*) category, and 21.38% of observations are in the product design (*C1*) category. Technology application (*C7*) and music and film (*C2*) account for 9.45% and 8.59% of our sample, respectively. These four categories account for approximately 70% of our sample.

We also examine whether there are differences in several key project characteristics among these project categories. With regard to the project success rate (i.e., whether the project reaches the funding goal at the end of the campaign), we find that projects in the music and film (*C2*) category and the society and culture (*C6*) category have the highest success rate (= 68.42%). By contrast, campaigns in the art and performance (*C3*) category and the food and drink (*C8*) category have 16.67% and 25% success rates, respectively.

Moreover, the average funding goal is the highest in the technology application (C7) category, with an average of NT\$519,888. A possible reason could be that most project creators seek a relatively large amount of funds to develop and manufacture specific products such as headphones and electric unicycles. Project creators in the travel (C9) and product design (C1) categories request a lower amount of capital, i.e., NT\$122,250 and NT\$153,196, respectively. Project creators in the product design (C1) category ask for funding to make leather bags or wallets.

As for the *bystander ratio* variable, we find that the average bystander ratio in the entertainment (C4) category and the technology application (C7) category are 0.6399 and 0.6363, respectively. Most investors seem to have a "wait-and-see" attitude in these campaigns. This is probably because while supporters in the technology application categories are interested in the project, they are still evaluating the rewards and considering whether products are worth the prices they pay. By contrast, projects in writing and publication (C5) and society and culture (C6) categories have relatively lower bystander ratios, i.e., 0.3104 and 0.3286, respectively. Given the relatively low bystander ratio in the writing and publication (C5) category, it seems to show that crowd investors are more generous in providing funding to cultural projects, which is consistent with findings in Mollick and Nanda (2016). Moreover, the lower bystander ratio in the society and culture category implies that once supporters pay attention to a project consistent with their own beliefs or ideologies, they

are more willing to support it.

Table 3 presents the regression results. Model 1 examines the effect of the bystander ratio. As shown in Model 1 of Table 3, the daily bystander ratio was negatively associated with the daily number of pledges (B = -4.311, p < 0.01). The results suggest that bystander effects do harm daily fundraising, thus supporting our Hypothesis 1.

Model 2 of Table 3 tests the moderating effect of project legitimacy on the daily amount of fundraising. The results suggest projects initiated by incumbent firms mitigate the negative impact of the bystander ratio on the daily amount of fundraising (B = 0.669, p < 0.05). We thus receive qualified support for Hypothesis 2.

Figure 3 visualizes the moderating effect of project legitimacy on the relationship between the bystander ratio and pledge amount based on Model 2 of Table 3. Specifically, we plot the effect of the bystander ratio when project legitimacy takes the value of one ("project legitimacy") and zero ("no project legitimacy"). The downward sloping line clearly shows that the negative effect of the bystander ratio is weakened when the project is of a higher level of project legitimacy, i.e., projects initiated by incumbent firms.

Model 3 of Table 3 tests Hypothesis 3, which predicts that the negative effect of the bystander ratio on daily fundraising will become weaker for projects with a longer funding duration. The results show that project duration weakens the negative relationship between the bystander ratio and the daily amount of fundraising (B = 0.972, p < 0.01), thus supporting Hypothesis 3.

Based on Model 3 of Table 3, Figure 4 plots the moderating effect of project duration when it takes the value of two standard deviations above (long project duration) and below (short project duration) the mean value of project duration. It shows an apparent positive moderating effect so that the negative impact of the bystander ratio becomes smaller as the project duration is extended. However, the negative impact of the bystander ratio is stronger for those projects with a shorter period. Therefore, we find support for Hypothesis 3.

Concerning the controls, we interpret our results based on Model 1 of Table 3. We found that the coefficient of *project legitimacy* is negative (B = -0.556, p < 0.01). While firm incumbency may provide crowd funders with information about the project creator, it may also indicate that these incumbent firms have financial resources to support their campaign projects; therefore, crowd funders might hold that there is less need for these

| | | , | | , | | | | | | |
|------------------------------|-------|-------|-------|---------|--------|--------|--------|--------|--------|--------|
| | Mean | S.D. | Min | Max | 1 | 2 | 3 | 4 | 5 | 6 |
| 1. Pledge Amount | 2.983 | 3.868 | 0 | 13.102 | 1.000 | -0.433 | -0.070 | -0.080 | 0.505 | 0.047 |
| 2. Bystander Ratio | 0.45 | 0.332 | 0 | 1 | -0.412 | 1.000 | 0.032 | 0.149 | -0.712 | -0.072 |
| 3. Project Legitimacy | 0.392 | 0.488 | 0 | 1 | -0.073 | 0.042 | 1.000 | -0.066 | -0.126 | 0.035 |
| 4. Project Duration | 4.021 | 0.36 | 0.693 | 5.587 | -0.066 | 0.027 | -0.061 | 1.000 | -0.110 | -0.148 |
| 5. Cumulative Pledge Amount | 0.934 | 8.653 | 0 | 193.726 | 0.160 | -0.084 | -0.063 | -0.027 | 1.000 | 0.025 |
| 6. Perceived Project Quality | 0.027 | 0.158 | 0 | 1 | 0.037 | -0.049 | 0.023 | -0.366 | -0.012 | 1.000 |

Table 2 Descriptive Statistics, Pearson, and Spearman Rank Correlations

Note: Number of observations = 5,773; All correlations above |.027| are significant at 0.05 level. The lower left denotes Pearson correlation; the upper right denotes Spearman rank correlation.

Table 3 Regression Results for the Effect of Bystander Ratio on Pledge Amount (Daily Level)

| | Model 1 | Model 2 | Model 3 |
|--------------------------------------|---------------|---------------|---------------|
| | Pledge Amount | Pledge Amount | Pledge Amount |
| Bystander Ratio | -4.311*** | -4.554*** | -8.214*** |
| | (0.161) | (0.211) | (1.279) |
| Bystander ratio * Project Legitimacy | | 0.669** | |
| | | (0.293) | |
| Bystander Ratio * Project Duration | | | 0.972*** |
| | | | (0.322) |
| Project Legitimacy | -0.556*** | -0.865*** | -0.572*** |
| | (0.098) | (0.190) | (0.099) |
| Project Duration | -0.624*** | -0.647*** | -1.087*** |
| | (0.140) | (0.141) | (0.213) |
| Cumulative Pledge Amount | 0.055*** | 0.054*** | 0.055*** |
| | (0.003) | (0.003) | (0.003) |
| Perceived Project Quality | 0.281 | 0.276 | 0.459 |
| | (0.351) | (0.351) | (0.363) |
| Constant | 7.057*** | 7.244*** | 8.923*** |
| | (0.604) | (0.616) | (0.871) |
| Ν | 5,773 | 5,773 | 5,773 |
| Adjusted R-squared | 0.224 | 0.224 | 0.224 |
| F-statistic | 114.01 | 109.05 | 111.77 |
| P-value | 0.001 | 0.001 | 0.001 |

Note: Robust standard errors are shown in parentheses. * significant at 0.1 level; ** significant at 0.05 level; *** significant at 0.01 level. Year, month-of-year, day-of-week, and category fixed effects included in the regression models but not shown in the table.



Figure 3 Moderating Effect: Project Legitimacy



Figure 4 Moderating Effect: Project Duration

projects to raise funds from the crowd. Given the possible conflicting interpretations, prior studies regarding the effect of project creators also provide mixed evidence (Bukhari, Usman, Usman, and Hussain, 2019; Josefy, Dean, Albert, and Fitza, 2017).

Consistent with prior studies (Chan et al., 2020), we found that the coefficient of *project duration* is negative (B = -0.624, p < 0.01). This finding seems to show that campaigns with longer project duration indicate the project creator's low self-confidence, thus influencing investors' confidence in the focal project. However, the coefficient of *cumulative pledge amount* is positive (B = 0.055, p < 0.01). Finally, we find that perceived project quality is not significantly related to the daily pledge amount (B = 0.281, p > 0.1).

3.4.1 Robustness Test

We also check the robustness of our findings at the project level. Table 4 shows the results of the robustness tests. We used a logistic regression since our dependent variable, *project success*, is a binary variable. *Project success* is equal to 1 if the project achieves the targeted funding goal at the end of the funding period, and 0 otherwise.

Model 1 examines the effect of the bystander ratio on project success. Model 1 of Table 4 shows that the coefficient of *bystander ratio* is negative (B = -2.773, p < 0.05). Models 2 and 3 show the moderating effect of project legitimacy and project duration, respectively (B = -4.119, p > 0.1; B = 1.131, p > 0.1). We do not find the moderating effects for our project-level analysis. Overall, these results suggest that our project-level results are partially consistent with our daily-level findings.

3.4.2 Controlling for Endogeneity Concerns

While we treat the *bystander ratio* variable as an exogenous variable in our main analysis, the negative relationship between the bystander ratio and the daily pledge amount may be driven by some omitted variables. For example, perceived project quality likely motivates investors to become passive (i.e., bystanders) and reduce their pledge amount concurrently. To address potential endogeneity, we use a two-stage regression model approach.¹ Specifically, in the first stage, we regress the *bystander ratio* variable on

¹ We are thankful to the anonymous reviewer for suggesting this additional analysis.

| | Model 1 | Model 2 | Model 3 |
|--------------------------------------|-----------------|-----------------|-----------------|
| | Project Success | Project Success | Project Success |
| Bystander Ratio | -2.773** | -2.028 | -7.281 |
| | (1.403) | (1.274) | (6.832) |
| Bystander Ratio * Project Legitimacy | | -4.119 | |
| | | (3.077) | |
| Bystander Ratio * Project Duration | | | 1.131 |
| | | | (1.859) |
| Project Legitimacy | -1.113** | 0.224 | -1.126** |
| | (0.494) | (1.117) | (0.493) |
| Project Duration | -1.021** | -0.995 | -1.473* |
| | (0.412) | (0.699) | (0.817) |
| Cumulative Pledge Amount | 3.987 | 4.075*** | 4.002 |
| | (2.928) | (0.875) | (2.986) |
| Perceived Project Quality | -4.512** | -4.718** | -4.545** |
| | (1.946) | (1.974) | (2.176) |
| Constant | 2.529 | 2.458 | 4.354 |
| | (3.465) | (3.502) | (3.491) |
| Ν | 191 | 191 | 191 |
| Pseudo R-squared | 0.561 | 0.570 | 0.562 |

| Table 4 | Regression Results for the Effect of Bystander Ratio on Project Success |
|---------|---|
| | (Project Level) |

Note: Robust standard errors are shown in parentheses. * significant at 0.1 level; ** significant at 0.05 level; *** significant at 0.01 level. Year, month-of-year, day-of-week and category fixed effects included in the regression models but not shown in the table.

the *perceived project quality* variable and other control variables, and calculate the firststage residual. We then re-estimate our regression model in Table 3 after replacing the independent variable with the first-stage residual.

Table 5 reports our empirical findings. In the first-stage regression model (Model 1 of Table 5), we find that the coefficient of *perceived project quality* is significantly negative (B = -0.092, p < 0.01), indicating that a higher level of perceived project quality leads to a lower level of bystander ratio. We calculate the first-stage residual, *bystander ratio (residual)*, and use this variable as an independent variable in the second-stage regression model.

| - | | | | - |
|--|-----------------|---------------|---------------|---------------|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| | Bystander ratio | Pledge amount | Pledge amount | Pledge amount |
| | 1st stage | 2nd stage | 2nd stage | 2nd stage |
| Perceived Project Quality | -0.092*** | 0.677* | 0.661* | 0.906** |
| | (0.031) | (0.351) | (0.352) | (0.365) |
| Bystander Ratio (Residual) | | -4.311*** | -4.569*** | -8.373*** |
| | | (0.161) | (0.212) | (1.131) |
| Bystander Ratio (Residual) * Project Legitimacy | | | 0.708** | |
| | | | (0.298) | |
| Bystander Ratio (Residual) * Project Duration | | | | 1.015*** |
| | | | | (0.287) |
| Project Legitimacy | 0.020** | -0.643*** | -0.644*** | -0.662*** |
| | (0.009) | (0.098) | (0.098) | (0.098) |
| Project Duration | 0.006 | -0.648*** | -0.675*** | -0.725*** |
| | (0.015) | (0.140) | (0.141) | (0.139) |
| Cumulative Pledge Amount | -0.003*** | 0.069*** | 0.069*** | 0.069*** |
| | (0.001) | (0.003) | (0.003) | (0.003) |
| Constant | 0.391*** | 5.371*** | 5.465*** | 5.679*** |
| | (0.065) | (0.601) | (0.604) | (0.597) |
| Ν | 5,773 | 5,773 | 5,773 | 5,773 |
| Adjusted R-squared | 0.017 | 0.224 | 0.224 | 0.225 |
| F-statistic | 27.71 | 114.01 | 109.19 | 112.25 |
| <i>P</i> -value | 0.001 | 0.001 | 0.001 | 0.001 |

Table 5 Regression Results for the Effect of Bystander Ratio on Pledge Amount

Note: Robust standard errors are shown in parentheses. * significant at 0.1 level; ** significant at 0.05 level; *** significant at 0.01 level. Year, month-of-year, day-of-week and category fixed effects included in the regression models but not shown in the table.

Model 2 to 4 of Table 5 report our second-stage results. As shown in Model 2 of Table 5, we find that the coefficient of *bystander ratio (residual)* is significantly negative (B = -4.311, p < 0.01), indicating that the bystander ratio is negatively associated with daily pledge amount. Our findings continue to hold when we add our interaction terms. Specifically, project legitimacy and project duration weaken the negative relationship between the bystander ratio and daily pledge amount, respectively (B = 0.708, p < 0.05;

B = 1.015, p < 0.01). In sum, our empirical results remain robust to this alternative model specification.

4. Discussion

In this study, we examine funding dynamics on the crowdfunding platform by pinpointing the role of the bystander effect. While previous studies have provided some evidence on this relationship (Chan et al., 2020; Mollick, 2014), our study contributes to this research stream by explicitly examining the notion of the "bystander effect" on the crowdfunding platform. By using granular day-by-day campaign data from flyingV, we investigate whether the bystanders would influence the daily campaign fundraising performance. Drawing on insights from social psychological research, we find that a higher bystander ratio discourages these supporters from funding the project. Consequently, a higher bystander ratio may lead to a lower level of daily pledge amount. Our study suggests that investors' funding decisions are influenced not only by the project rewards themselves but also by the presence of bystanders.

Furthermore, we examine the boundary conditions of the bystander effect in the crowdfunding context (Fischer et al., 2011; Hussain et al., 2019). First, we find that project legitimacy, derived from firm incumbency, is an important signal to bystanders; our results reveal that project legitimacy mitigates the negative bystander effect. Moreover, the longer the duration of the fundraising period, the weaker the negative bystander effect. Specifically, when the project duration is extended, crowd funders have more opportunities to collect campaign-related information, thus reducing the information asymmetries and in turn converting bystanders into funders.

One unique feature of the flyingV platform is that it records the number of supporters and backers. Based on this information, we derive the number of bystanders by subtracting the number of backers from the number of supporters. Such information is important since most crowdfunding platforms such as Kickstarter only record the number of backers who have contributed funds to the project (Kuppuswamy and Bayus, 2018). Using data from the flyingV platform, we can capture information about the number of bystanders who are attentive to the project but have not contributed funds yet. Therefore, data from flyingV provides a unique opportunity to capture the bystander effect in the crowdfunding context directly.

Another unique feature of the flyingV platform is that it allows project creators to reach the actual crowd. In particular, when someone hits the Facebook "share" button on the project page, his/her Facebook friends will also receive information about the current project. After his/her Facebook friends share this crowdfunding project information on his/ her Facebook message wall, based on the algorithm of the Facebook platform (Pariser, 2012), more people will receive information about the focal crowdfunding project. Other crowdfunding platforms, such as Kickstarter, primarily rely on the social network of the project creator alone. In this regard, flyingV helps project creators reach a broader audience. Thus, using data from the flyingV platform allows us to examine the social network and the associated bystander effect in a more nuanced manner.

5. Theoretical Contribution

Our research contributes to the existing crowdfunding research by providing new insights into the funding dynamics on a crowdfunding platform (Kim, Kannan, Trusov, and Ordanini, 2020). While prior studies have examined how the founders' social networks influence funding success (e.g., Kuppuswamy and Bayus, 2018), our study cautions that some types of social networks may cause the potential adverse bystander effect. Specifically, when the bystander notices that other bystanders also receive the funding request in the notification letter, this will negatively influence a person's likelihood of providing funding. This is primarily because the bystander might believe that someone else will provide help. Moreover, the presence of bystanders also indicates a higher risk of project failure, which discourages investors from investing. Based on the above two arguments, we expect that the bystander ratio leads to a reduced pledge amount. Our findings provide direct empirical evidence about the bystander effect on the crowdfunding platform.

Our research is related to an emerging literature that investigates the bystander effect in the crowdfunding context (Kim et al., 2020). Borrowing insights from the social psychological literature (Darley and Latané, 1968; Fischer et al., 2011), recent scholars have examined the bystander effect in the crowdfunding setting (Chan et al., 2020; Kuppuswamy and Bayus, 2017). We add to this line of literature by providing empirical

evidence that the bystander effect reduces the daily pledge amount on crowdfunding platforms. Furthermore, in line with information asymmetries arguments, we find that project legitimacy and funding durations convert more bystanders into backers. Our results thus provide more nuanced insights into how the bystander effect, project legitimacy, and funding duration all together shape project fundraising performance.

6. Managerial Implications and Limitations

Our research has several policy implications. First, entrepreneurs can gain further insights from our research, especially that not all supporters contribute funds to campaigns. Notably, some of those supporters are only bystanders who do not pledge and may cause the bystander effect, which negatively influences fundraising performance. In this respect, project creators may consider more effective communication strategies that would help convert bystanders into backers. Our findings suggest that project legitimacy in the form of firm incumbency and funding duration mitigate the negative bystander effect.

Second, our research also highlights the importance of setting funding durations, as this will affect the projects' amount of capital received. Specifically, a long funding period will weaken the bystander effect, primarily because these supporters have more time to evaluate and gather information about campaigns. By setting an appropriate period of funding duration, creators have a higher likelihood of converting bystanders into real backers.

Third, our findings also provide some implications for crowdfunding platform managers. While making the crowdfunding platform more transparent to users is of primary importance (Cumming, Vanacker, and Zahra, 2021; Donovan, 2021), our findings suggest that how investors interpret such information influences investors' decisions to fund. Specifically, additional details about the bystander ratio provided by the flyingV platform lead to a reduced daily pledge amount,² which was counterintuitive. Thus, platform managers should caution that some project-related information they display on the webpage might lead to unintended consequences.

² flyingV now no longer provides information about the number of supporters (and bystanders) on the project webpage.

Several limitations may constrain the generalizability of our findings. First, we used a Taiwan-based crowdfunding platform, flyingV, as our sample of analysis. Compared to Kickstarter in the U.S., the biggest crowdfunding platform globally, the scale of flyingV is relatively small, leading to the concern about the generalization of our case. However, from the social psychological perspective, the behaviors of investors should be similar all around the world regardless of the size of the platform (Fischer et al., 2011). Thus, our research provides an initial attempt that allows future researchers to explore related research questions on other crowdfunding platforms.

Second, in line with the definitions in Darley and Latané (1968), we define bystanders as those who pay attention to the project but who do not pledge (i.e., do not offer help). On the crowdfunding platform, those supporters might become bystanders for different reasons; for example, they might forget to "unclick" the "Like" button on the project webpage after their initial project evaluation. Indeed, due to data limitations, we do not know why those bystanders do not pledge. However, the bystander literature primarily focuses on how the presence of bystanders influences non-helping behavior (Darley and Latané, 1968; Fischer et al., 2011), without explicitly considering the motivation for being bystanders. While examining the motivations for being bystanders and its implications for fundraising performance is an interesting research question, it is beyond the scope of our study. We encourage future researchers to investigate how various reasons for being bystanders would influence subsequent non-helping behavior.

Third, we used incumbent-firm projects as a proxy for project legitimacy. Future studies are encouraged to explore other forms of legitimacy on crowdfunding platforms, such as affiliation with reputable organizations (Rao, 1994; Sorescu et al., 2007), entrepreneurs' narratives (Frydrych, Bock, Kinder, and Koeck, 2014; Lin and Siao, 2012), and founders' social networks (Hsieh and Fang, 2020). We hope that our study will stimulate more researchers to delve more deeply into the role of legitimacy on crowdfunding plat-forms.

Lastly, similar to prior studies (Chan et al., 2020; Kuppuswamy and Bayus, 2017), we examine the daily funding dynamics based on a sample of crowdfunding projects. However, it may be of value to gather more information about the decision-making process of individual investors through survey questions or face-to-face interviews. Despite these limitations, our findings provide robust evidence on the existence of the bystander effect

based on a representative sample of crowdfunding projects in Taiwan.

7. Conclusion

While a majority of empirical crowdfunding research mainly focuses on how campaign-related attributes affect the success of crowdfunding projects, our research provides novel insights into the determinants of campaign fundraising performance. In particular, our research finds that an increase in bystanders of a project will undermine project fundraising performance. Further investigation reveals that project legitimacy and project duration can mitigate the negative bystander effect on the amount of fundraising. Overall, our study advances scholarly and practitioner knowledge about the role of bystanders on the crowdfunding platform.

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