

CROWDFUNDING: GEOGRAPHY, SOCIAL NETWORKS, AND THE TIMING OF INVESTMENT DECISIONS

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We examine a crowdfunding platform that connects artists with funders. Although the Internet reduces many distance-related frictions, local and distant funders exhibit different funding patterns. Local funders appear less responsive to information about the cumulative funds raised by an artist. However, this distance effect appears to proxy for a social effect: it is largely explained by funders who likely have an offline social relationship with the artist (“friends and family”). Yet, this social effect does not persist past the first investment, suggesting that it may be driven by an activity like search but not monitoring. Thus, although the platform seems to diminish many distance-sensitive costs, it does not eliminate all of them. These findings provide a deeper understanding of the abilities and limitations of online markets to facilitate transactions and convey information between buyers and sellers with varying degrees of social connectedness.

1. INTRODUCTION

Crowdfunding provides a method for artists and entrepreneurs to finance their projects, potentially facilitating gains from trade that would not otherwise occur. It works by enabling small funding increments (often as low as \$5 in nonequity settings) through social networking platforms that allow funders to communicate with each other as well as with funding recipients. Although small in terms of overall economic activity,

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crowdfunding is expanding in the variety of sectors to which it is applied as well as in the value of overall transactions (Lawton and Marom, 2010). Furthermore, there is increasing interest in the potential role it could play in early-stage finance. For example, in April 2012, President Obama signed into law the Jumpstart Our Business Startups (JOBS) Act with the goal of reducing regulatory restrictions on raising capital for young and small businesses. While at the time of this writing the implementation of key elements of the Act, such as legalizing equity investments by nonaccredited investors, still await the required rules to be set by the Securities and Exchange Commission, many platforms are already growing exponentially, such as AngelList (which currently only allows for equity investments by accredited investors) and Kickstarter (which focuses on rewards for funders and does not allow equity investments).

We examine data from the first significant crowdfunding platform, Sellaband. The platform was dedicated to new musical artists not yet signed to a record label, and enabled artists to raise capital to finance the recording and production of an album. The company, headquartered in the Netherlands at the time of our study, allowed for equity-like crowdfunding (through revenue sharing) for approximately 3 years before being acquired by a German firm, at which time it was subjected to stricter securities rules. We examine data on every investment transaction on that platform during its first 3 years of operations.¹

This new and rapidly evolving form of financing offers insight into a range of interesting questions regarding the early-stage finance of projects and ventures. In Agrawal et al. (2014), we lay out the key economic features of these platforms, including the actors (entrepreneurs, funders, platforms) and the incentives and disincentives facing each in terms of the attractiveness of raising capital through crowdfunding relative to traditional sources of funding. In this paper, we focus on two specific questions relating to information and reputation: How do local and distant investment patterns differ? What might explain those differences?

A long literature suggests that (offline) investments in early-stage ventures tend to be local due to the importance of reputation and trust, which are especially important in the absence of regulatory disclosures and oversight, and also because of distance-sensitive costs associated with early-stage investments, such as identifying opportunities, conducting due diligence, and monitoring progress (Tribus, 1970; Florida and Kenney, 1988; Lerner, 1995; Sohl, 1999; Sorenson and Stuart, 2001; Seasholes and Zhu, 2005; Nieuwerburgh and Veldkamp, 2009). In the case of offline funding, reputation and trust are often built through interpersonal interactions which most commonly occur between colocated individuals.

However, a striking feature of crowdfunding is the great distance between artists (and other types of entrepreneurs) and many of the people who fund them. In this paper, we document some of the key challenges of distant investments and explore the mechanisms through which they have been overcome in the context of crowdfunding. We also speculate on the consequences of these mechanisms for market outcomes. Thus, one of our objectives is to better understand how crowdfunding platforms might generate challenges and opportunities for geographically isolated funders and artists or other entrepreneurs.

1. Although this platform was based on revenue sharing with funders, individuals may have invested for philanthropic or other reasons besides pecuniary returns. This need not affect the interpretation of our main results. We address this point in Section 2.1.

On the Sellaband platform at the time of our study, artists needed to raise \$50,000 before they were able to access the capital. Individuals were funded in \$10 increments and could purchase as many “shares” as they choose during a single round of financing. In these data, the average successful artist raises \$50,000 from approximately 609 individuals over a 1-year period. The average distance between an artist and a funder is approximately 5000 km. Thus, distance does not seem to be an important barrier to raising funds.

At some level, this is unsurprising because crowdfunding platforms have three common properties that are purposefully designed to overcome distance-related frictions: (1) easier search—they provide a format for potential recipients of funds to present their projects online in a standardized and comprehensive manner that makes search relatively easy, (2) less need for monitoring—they allow for small financial transactions (e.g., \$10) to enable broad participation with limited downside risk and thus lessen the need to monitor day-to-day activities compared to traditional funders of early-stage projects and ventures (e.g., Gompers, 1995; Lerner, 1995), and (3) information on what others have done—they provide investment information (e.g., cumulative amount raised to date and the online identity of current funders) and tools for funders to communicate with each other. By enabling such activities and consistent with prior research in retail and advertising that examines how the online setting allows people to overcome offline barriers to market transactions (Brynjolfsson et al., 2009), crowdfunding platforms reduce market frictions associated with geographic distance. Therefore, the importance of distance-related frictions in crowdfunding depends on the tension between these distance “flattening” properties and the traditional needs of early-stage funders.

To explore this further, we begin by focusing on the role of information about online investments as conveyed by the amount of capital raised to date. This amount conveys information, such as what other funders believe about the quality and potential of the project. The amount raised may also convey other information that is distinct from the expected payoff, such as the extent of the artist’s social ties. We discuss this alternative in the conclusions. Our primary focus on the amount raised to date and our assumptions about the information conveyed is consistent with prior literature that documents “herding behavior” in crowdfunding on Prosper.com and elsewhere (Burtch et al., 2013; Freedman and Jin, 2011; Zhang and Liu, 2012). Our results are consistent with this prior literature and show that investment propensity rises as an artist’s cumulative capital raised increases.

To the extent that local funders have information advantages over distant funders due to offline access to the artist, they may derive less new information from knowing the amount of capital raised to date. If so, then this would imply that local advantages related to search and monitoring may still be salient in the early stages of a crowdfunding campaign.

We exploit this potential wedge in the value of posted information and compare how the timing of local versus distant investments differs with the publicly visible amount raised to date. Specifically, we estimate the propensity of a funder to fund an artist in a given week, conditional on the amount raised, and compare propensities for local versus distant funders. We find that the timing of distant, but not local, investments is very responsive to the cumulative level of funding already raised. Thus, while many investments are distant, there is a qualitative difference between the types of investments made locally versus those made over distance, and this difference seems to be related to information.

After establishing a difference between local and distant investments, the remainder of the paper explores the reasons behind this difference. We emphasize a social explanation for this finding. Our results suggest that local funders differ from distant funders in their responsiveness to the investment decisions of others because proximity enables social ties. The entrepreneurial finance literature makes frequent reference to the role of friends and family (F&F) as an important source of capital for early-stage ventures.² Parker (2009) reports that 31% of start-ups' funds come from F&F. Researchers have emphasized F&F's informational advantages concerning the quality of the entrepreneur (Cumming and Johan, 2009). Given the local nature of social networks (Hampton and Wellman, 2002), F&F tend to be disproportionately local.

We code each funder-artist pair with an indicator variable for F&F based on two measures: (1) behavioral traits they exhibit on the web site and (2) survey information from a subset of artists who specifically identify their F&F among their funders. We find that F&F are disproportionately colocated with the artists they fund, although there are many local funders who are not F&F and many F&F funders who are distant. We then compare how the relationship between cumulative funding and the propensity to fund in a given period varies with distance after controlling for F&F. The distance effect largely disappears. In other words, although local and distant funders do display different investment patterns, this difference is mostly explained by the disproportionately local nature of social relationships. Controlling for preexisting offline social networks, we see little difference between local and distant investment patterns.

We next examine the role social networks play in facilitating investments. The early-stage finance literature emphasizes search and monitoring as two key information advantages of collocation between funders and the people they fund. Social networks could substitute for the information provided by prior funders for either search or monitoring. It could be that prior funders help prospective funders identify artists worth investing in and that social networks enable the same phenomenon. It also could be that prior funders serve as monitors and that prospective funders trust that those monitors will provide oversight to artists in the same way that social networks do.

We present evidence that monitoring is unlikely to explain the difference between investments made by those inside and outside the artist's social network. Specifically, exploiting the observation that many funders invest more than once in a single artist over the duration of the fundraising (i.e., before they reach \$50,000), we examine the difference between F&F versus non-F&F funder behavior for first versus subsequent investments. We find the difference is primarily driven by the first investment a funder makes in a particular artist. Furthermore, artist activity on the platform (such as posting videos and songs) does not seem to substantially alter behavior after the first investment. If the difference is specific to the first investment, then it is likely related to the information F&F funders have before investing in the artist on the platform. Thus, this information appears to influence search rather than monitoring. The search information may be a simple heuristic that involves an invest/not invest binary decision based on a consideration set and the information facilitated by social ties may influence which artists are in the consideration set.

We explore the possibility that non-F&F erroneously interpret F&F investment decisions as signalling quality when in fact they may simply be the result of social obligation. Surely social obligation plays some role in the investment decisions of F&F.

2. Despite the acknowledged importance of F&F, few empirical studies focus on this form of investment, likely owing to a paucity of data.

However, given the significant variation in artists' ability to raise funds (thousands of artists raise almost nothing from anyone, including F&F), it seems unlikely that there is no information in the investment decisions of F&F. To examine this possibility, we show some suggestive (though inconclusive) evidence that funders may partially discount the information in prior funding by F&F.

More broadly, we interpret our results to suggest that the crowdfunding platform eliminates many distance-related costs normally associated with financing early-stage projects such as monitoring progress. However, it does not eliminate certain frictions that are associated with information more likely to be held by socially connected individuals. This interpretation, which emphasizes the importance of interpersonal relations in early-stage finance, is consistent with the findings of Nanda and Khanna (2010), who report that cross-border social networks play a key role when access to capital is especially difficult. It is also consistent with models that emphasize the role of information in explaining home bias in investments (e.g., French and Poterba, 1991; Nieuwerburgh and Veldkamp, 2009). As long as the information flowing through social networks cannot be easily communicated online, distance will continue to play a role.

These results lead us to speculate that there may be path dependency in the process of accessing distant funders online. To the extent that distant funders disproportionately rely on information revealed in the investment decisions of others, F&F might play an important role in making early investments that generate that information. Conti et al. (2011) argue that investments by F&F can signal the entrepreneur's commitment to the venture. To the extent that any discounting of the information in prior funding by F&F is not complete, then this would imply a limitation to the "equal access for all" potential of the Internet. Communications technologies enable artists and other entrepreneurs from anywhere to access capital globally, but in reality only those with a sufficient base of offline support may be able to do so.³ Focusing on the role of distance, the results suggest that crowdfunding may indeed reduce distance-related barriers to investment with at least one important caveat: market efficiency depends on whether there is efficient information transfer from preexisting (offline) social networks to the online global crowd.

2. EMPIRICAL SETTING

2.1 SELLABAND

Sellaband was an early and prominent crowdfunding platform. Launched on August 15, 2006, it has been referred to as the "granddaddy of crowdfunding" (Kappel, 2009). The company was founded in Amsterdam with a mission to enable unsigned musicians to raise financing through crowdfunding to record and produce an album.

At the time of our data, the Sellaband web site worked as follows.⁴ Artists set up a profile page on Sellaband, at no charge, where they include a photo, bio, links, blog

3. Although such a pattern suggests potential returns to gaming the system, where artists (perhaps under a pseudonym) fund large sums of money in themselves early and then pull that money out as other funders pile in, we find no evidence of such behavior in our data. In particular, we see few withdrawn investments. The largest disinvestment in our data is \$450, and overall disinvestments of more than \$100 are quite rare. Furthermore, disinvestment rates are lower for F&F than non-F&F regardless of whether we define F&F by the survey or algorithmically.

4. The web site has changed substantially since September 2009, reducing the focus on early-stage artists, eliminating direct revenue sharing, and allowing flexibility in the amount artists can raise and how they can use funds.

postings, and up to three demo songs. Funders search the web site, learn about these musicians, listen to their demos and, if they choose, buy one or more shares in an artist's future album at \$10 per share. Funders see information posted by the artist as well as how much financing the artists has raised to date. Funds raised are held in escrow and may not be accessed by the artist until they have sold 5,000 shares (raised \$50,000). Upon raising \$50,000, artists spend the funds according to a plan they develop for recording and marketing their album, which must be approved by Sellaband. They send vendor invoices to Sellaband for payment. After the album is completed, the revenues from album sales are split equally three ways between the artist, funders, and Sellaband. In this way, the investment resembles a security. Funders also receive a compact disc (CD).

Artists on Sellaband face many of the same financing challenges and constraints as first-time entrepreneurs in other settings. Thus, the platform is designed with features and protocols that enable artists to conduct a range of activities that will support their fundraising efforts, such as marketing their venture, presenting their budget, sharing their plan for promoting their future album, and communicating directly with current and potential funders.

Because the individuals who fund Sellaband artists do so for many reasons, some pecuniary and others not, we refer to them collectively as "funders" (as opposed to investors or philanthropists). At the time of our data, Sellaband facilitates revenue sharing and thus funders can earn profits if albums sell well.⁵ Of course, many funders may also have philanthropic or other utility-seeking motivations. In fact, Sellaband refers to them as "believers."⁶ However, even philanthropically motivated individuals must allocate scarce resources. Although they may not be focused on a pecuniary return on investment, they are focused on some type of return on their investment and therefore must select among many projects competing for their donations. Thus, Sellaband artists compete for funding. They pitch their projects and enter into contracts that commit them to sharing their revenue with funders. This is true even for F&F: one benefit of crowdfunding in terms of raising funds from F&F might be that the structure of the platform makes it easier to ask for money from F&F and commit to using it for a particular purpose. Even individuals who commit funds to projects for nonpecuniary reasons are likely to be sensitive to the types of costs, such as those associated with monitoring, that often favor financial transactions between colocated individuals. Furthermore, early-stage, not-for-profit ventures seeking donors often face similar criteria as for-profit ventures when seeking funding (Katz, 2006).⁷ Importantly, our interpretation of the results does not rely on our decision to label them as funders. Whether they are funders, believers, investors, or donors, the relationship between distance, social networks, and information remains.

5. Unfortunately, since the company's change in ownership, we have not been able to obtain information on the actual returns to investments in Sellaband.

6. Some crowdfunding platforms are explicitly designed with philanthropic intentions. For example, Kiva, a platform that focuses on lending to entrepreneurs in developing countries, does not allow lenders to charge interest and thus provides no mechanism for earning a return on their capital. Galak et al. (2011) document that crowdfunding on Kiva is a hybrid decision, with both reimbursement likelihood and charity as considerations.

7. "At the 'venture' end of the new philanthropy, the entrepreneurial techniques of venture capital are being applied (Letts et al. 1997). Donees are analogized to start-up firms, donors partner with them, establishing specific and measurable benchmarks, and continuing their investments only if periodic goals are met" (p. 1311).

2.2 DATA

Our data set is provided by the company and drawn from their internal database. The data set contains every investment made on Sellaband from its launch in August 2006 until September 2009.

We combine this with geographic information disclosed by artists and funders on Sellaband.⁸ In our focal sample, we have distance measures for 90% of the artist–funder pairs. We also use data on the cumulative investment raised by the artist from all funders as of the previous week, song and video uploads that artists post on the platform, and funder proximity to concert locations (and the dates of those concerts). Concert location data are found on the artist’s web sites.

Over this period, there are 4,712 artists on Sellaband who receive at least one \$10 investment. Of these, 34 raise the \$50,000 required to access their capital to finance the making of their album. The distribution of investments is highly skewed: these 34 raise 73% of the total \$2,322,750 invested on the platform. We focus our analysis on investments in the 34 artists who raise \$50,000, examining the timing of investment and types of funders. We focus on these 34 for several reasons. First, they are more comparable with each other in terms of their performance because they have each successfully gone through the full funding cycle. Second, we eliminate concerns about right truncation of the data by focusing on artists who complete the funding cycle (Van den Bulte and Iyengar, 2011). Third, we have geographic location information for the vast majority of the funders in these 34 artists because funders must give their location in order to receive their CD. Fourth, focusing on these 34 eliminates artists who use Sellaband sporadically. Finally, because these 34 artists account for nearly three-quarters of all funds raised on Sellaband, little funding information is lost by focusing on them (and robustness checks to other samples confirm this).

Artists enter the sample when they receive their first investment and exit when they reach the target. The resulting panel is unbalanced. We identify every funder who invests at least once in one of these 34 artists. Funders enter the sample when they make their first investment on Sellaband (in any artist, including those that are not one of the 34) because their profile becomes visible to artists and other funders at that time. Funders never exit the sample.

Our main sample of artist–funder pairs is the Cartesian product of the 34 successful artists and all funders who invest at least once in one of them. Each pair appears during each week in which both the artist and the funder are in the sample.⁹ Because we use artist–funder pair fixed effects in our regression analysis, we drop pairs with no investments. There are 18,827 artist–funder pairs with at least one investment from the funder in the artist and 709,471 artist–funder-week observations.

We present descriptive statistics for the \$50,000 sample in Table I. Of these successful artists, the average takes approximately 1 year (53 weeks) to reach \$50,000, although there is considerable variation around the mean from just under 2 months to more than 2 years. The source of financing is widely distributed; on average, artists raise their

8. For artists, we crosscheck the locations they report on Sellaband with their official web site, MySpace, and Facebook profiles. We use Google Maps’ APIs to retrieve latitude and longitude for each location and to standardize city names. Finally, we calculate geodesic distances between artists and funders using a method developed by Thaddeus Vincenty and implemented by Austin Nichols (Nichols, 2003).

9. For example, if Artist 1 receives her first investment in Week 10 and reaches \$50,000 in Week 20, then she will appear in the sample from Weeks 10 through 20. If Funder 2 makes his first investment in Week 5, then he is paired with Artist 1 for Weeks 10 through 20. If Funder 3 makes his first investment in Week 18, then he is paired with Artist 1 for Weeks 18 through 20.

TABLE I.
DESCRIPTIVE STATS: \$50K (MAIN) SAMPLE

	Obs.	Mean	Std. Dev.	Min	Max
Artist Level					
Funders at \$50K	34	608.8	220.9	316	1,338
Weeks to \$50K	34	53.1	34.6	8	124
Songs uploaded†	34	4.29	8.02	0	32
Videos uploaded	34	0.68	0.47	0	1
Funder Level					
Number of 50K artists invested in	8,149	2.54	4.23	1	34
Number of distinct investments	8,149	4.33	12.78	1	330
Total amount invested across 50K artists (\$)	8,149	227	1,147.6	10	33,430
Artist-Funder Level					
Investment amount (\$)	18,827	89	393.9	10	23,500
Geographic distance (km)	18,827	5,118	5,658	0.003	19,827
Number of investments in same artists	18,827	1.7	2.3	1	72
Position in funding cycle at first investment (\$)	18,827	12,099	13,361	0	49,990
Artist-Funder-Week Level					
Investment amount (\$)	709,471	2.378	40.82	0	15,000
Live show proximate to funder	709,471	0.002	0.046	0	1

Notes: † Artists may upload one to three songs when registering on the web site. Because we do not have access to these data, we do not include initial songs in this count.

financing from 609 different funders. On average, funders fund 2.5 \$50,000 artists, making 4.3 distinct investments (i.e., they often provide funding on more than one occasion to a single artist).

Participants on the Sellaband platform are distributed over five continents in 80 countries, with some concentration in western Europe and the eastern United States. Despite the wide geographic variation, funders disproportionately fund local artists. Conditional on making at least one investment in any artist on Sellaband, 3% of funders who are local invest.¹⁰ In contrast, only 0.9% of funders who are distant from an artist invest. Thus, funders are disproportionately local. At the same time, there are many more distant funders, and therefore in aggregate they account for the vast majority of total investments.

3. EMPIRICAL STRATEGY

Our econometric analysis is a straightforward framework at the artist-funder-week level. Funder i will invest in artist a in week t if the expected value from investment is positive:

$$v_{ait} = \beta \text{CumulativeInv}_{at-1} + \gamma X_{ait} + \mu_{ai} + \psi_t + \epsilon_{ait},$$

where v_{ait} is the value of funding artist a at time t by funder i . The value from investment includes both the monetary expected return of investment as well as the consumption utility derived from funding that artist. β is the perceived marginal value of cumulative investment as of the previous week. For example, a higher cumulative investment

10. In order to simplify the analysis, we group all artist-funder pairs within 100 km as “local” and all others as “distant.” Our results are robust to other thresholds of “local.”

may indicate that more funders perceive the artist to be of high quality and therefore a better investment. Alternatively, funders may derive more consumption utility from funding artists who are closer to the \$50,000 threshold. In our main specification, *CumulativeInv*_{at-1} is included as a vector of dummy variables defined by the \$10,000 cumulative investment thresholds. In addition, γ is the perceived marginal value of the controls (X_{ait}) including a control for time since the artist began on Sellaband, μ_{ai} is an artist–funder fixed effect to control for overall tastes of the funder, ψ_t is a week fixed effect to control for changes in the Sellaband environment over time, and ϵ_{ait} is an idiosyncratic error term.

Because v_{ait} is a latent variable, we instead examine the decision to fund. Therefore, to understand the value to the funder in funding an artist a at time t , we use the following discrete choice specification:

$$\mathbf{1}(Invest_{ait}) = \beta CumulativeInv_{at-1} + \gamma X_{ait} + \mu_{ai} + \psi_t + \epsilon_{ait}.$$

Consistent with the suggestions of Angrist and Pischke (2009), we estimate this using a linear probability model. We show in the Appendix S1 (Supporting Information) that results are robust to a number of alternative specifications. Likely because our covariates are binary, the vast majority of the predicted probabilities of our estimates lie between zero and one. Therefore, the potential bias of the linear probability model is reduced in our estimation (Horrace and Oaxaca, 2006). The fixed effects mean that our analysis examines the timing of investment for artist–funder pairs where we observe at least one investment. The fixed effects completely capture the artist–funder pairs in which we never see investment, and thus we remove these pairs from the analysis without any empirical consequences. Standard errors are clustered at the artist level. We measure cumulative investment at the artist-week level. Because the average artist in our main sample has more than 600 funders, no single funder drives the cumulative investment number.¹¹

In order to understand the role of distance, we separately estimate local and distant artist–funder pairs.¹²

$$\mathbf{1}(Invest_{ait}) = \beta^l CumulativeInv_{at-1} + \gamma X_{ait}^l + \mu_{ai}^l + \psi_t^l + \epsilon_{ait}^l \quad \text{if local,}$$

$$\mathbf{1}(Invest_{ait}) = \beta^d CumulativeInv_{at-1} + \gamma X_{ait}^d + \mu_{ai}^d + \psi_t^d + \epsilon_{ait}^d \quad \text{if distant.}$$

Furthermore, in order to understand the role of F&F, we interact F&F with cumulative investment in each of these separately estimated local and distant equations.

$$\begin{aligned} \mathbf{1}(Invest_{ait}) = & \beta^l CumulativeInv_{at-1} + \theta^l F \& F_{ai} \times CumulativeInv_{at-1} \\ & + \gamma X_{ait}^l + \mu_{ai}^l + \psi_t^l + \epsilon_{ait}^l \quad \text{if local,} \end{aligned}$$

$$\begin{aligned} \mathbf{1}(Invest_{ait}) = & \beta^d CumulativeInv_{at-1} + \theta^d F \& F_{ai} \times CumulativeInv_{at-1} \\ & + \gamma X_{ait}^d + \mu_{ai}^d + \psi_t^d + \epsilon_{ait}^d \quad \text{if distant.} \end{aligned}$$

11. We address the potential bias from the use of fixed effects when several funders make only one investment by showing robustness to random effects and to limiting the sample to funders who invest in the artist at least twice.

12. We estimate these separately for clarity of presentation. All results are robust to using interaction terms in a simultaneous estimation of local and distant.

TABLE II.
FRIENDS AND FAMILY: \$50K (MAIN) SAMPLE

	F&F	Not F&F
F&F Use the Web Site Differently		
Average # of e-mails sent to artists	0.22	1.74
Average # of comments sent to artists	0.41	2.69
Average # of e-mails received from artists	12.39	14.40
Average # of comments received from artists	1.02	3.95
Average amount invested	\$20.65	\$6.38
F&F are Disproportionately Active at the Beginning		
First 4 weeks	33%	67%
First \$500	21%	79%
Full \$50K	19%	81%
F&F are Disproportionately Local		
Local (0–100 km) artist–funder pairs	63%	37%
Distant (> 100 km) artist–funder pairs	16%	84%
Number of artist–funder pairs	6%	94%
	(586)	(9,214)

The main effect of F&F drops out due to collinearity with the artist–funder fixed effects. With this empirical approach, we examine *when* a funder chooses to fund a particular artist, conditional on at least one investment by that funder in that artist. Funders often invest more than once in the same artist during a single \$50,000 round of fundraising. We assume that the timing of investment is driven by the change in cumulative investment rather than by another change that is specific to the artist–funder pair. We also assume that the covariates, as well as the artist–funder and week fixed effects, control for omitted variables. Our causal interpretation of the main results hold as long as there is not an omitted variable that drives lagged cumulative investment, an increase in the value of distant funding, and a simultaneous decrease in the value of local funding. One plausible variable that might fit such a description is concert touring. As an artist gains visibility, they may be more able to travel to distant locations. We therefore control for funder proximity to live performances by the artist. The funder proximity to concert location variable is equal to one if the artist played a concert within 100 km of the funder’s location during the week of the observation or the week prior to the observation.

4. RESULTS

We build our main result in steps. First, we document that funders’ propensity to invest in a given artist increases as that artist visibly accumulates capital on the platform. Second, we show that local funders deviate from this pattern; they are more likely to fund earlier in the fundraising cycle. Third, we show that the difference between local and distant funders is largely explained by the group of funders we label as F&F. Although we focus on a single specification in the paper, we document in the accompanying Appendix S1 robustness of the results in each step to numerous alternative specifications.¹³ In addition, to address the concern that our linear control for the age of an artist’s Sellaband

13. In the Appendix S1, we show that our results are robust to alternative samples, covariates, and functional forms. Specifically, in terms of the sample, we show robustness to the full sample (Table A-2), the sample of artists who reach \$5,000 in investments (Table A-3), the sample constructed by dropping artists from the music hubs of New York City, Los Angeles, Nashville, London, and Paris (Table A-4), including

listing may not sufficiently capture overall time effects that may be correlated with the profile of accumulated funds, we provide additional evidence that our estimated effects reflect the information in accumulated funds by more flexibly controlling for a listing's age, which we do by employing a 6^o polynomial in age (Tables A-21 and A-22) and month-age fixed effects (Tables A-23 and A-24). To shed light on the underlying mechanism, we present suggestive evidence that it is unlikely that monitoring drives the difference in the pattern of F&F investments. Finally, we provide suggestive evidence that later funders may discount the information provided by prior F&F funding.

4.1 INVESTMENT PROPENSITY INCREASES WITH FUNDS RAISED

In Table III, column (1), we show that investment propensity increases as an artist accumulates investment. As discussed earlier, the use of the \$50,000 sample ensures this is not a simple selection story where only the better artists appear in the sample with higher cumulative investment. Relative to an artist with less than \$10,000 in investment, a given funder is 2.1 percentage points more likely to fund in a given week if the artist has \$10,000–\$20,000 and 8.4 percentage points more likely to fund if they have more than \$40,000. These increases are large relative to a weekly base rate of 4.1% during the first \$10,000.

The observed acceleration of investment as an artist gets closer to \$50,000 is consistent with Zhang and Liu (2012), who document a similar pattern in the context of lending on Prosper.com. This is suggestive evidence of path dependency: past investment by others may increase the propensity to fund. Although only suggestive in the absence of a truly exogenous shock to investment, the underlying pattern in the data suggests that high levels of cumulative investment may cause an increase in the rate at which new investment arrives.¹⁴

4.2 LOCAL AND DISTANT FUNDERS ARE DIFFERENT

In columns (2) and (3) of Table III, we stratify the data between local and distant funders. Local funders are more likely to invest during the first \$20,000 than later. In contrast, the results for distant funders resemble the results shown in column (1). In Figure 1 a, we provide a graphical representation of this. Because we use a linear probability model, we can simply plot the estimated coefficient values. Local and distant funders

only funders who fund two or more times (Table A-5), and using artist–funder–month as the unit of analysis (Table A-6). In terms of covariates, we show robustness to including video uploads (Table A-7), song uploads (Table A-8), both videos and songs (Table A-9), removing the focal funder's past investment from the artist's accumulated capital (Table A-10), and including whether the artist appeared in the Sellaband newsletter (Table A-11). In terms of the functional form, we show robustness to fixed-effects logit (Table A-12), fixed-effects poisson regression on the total parts invested (Table A-13), linear regression on the total parts invested and (when applicable) disinvested (Table A-14), and random effects (Table A-15). The Appendix S1 also shows robustness of Tables III and IV to alternative measures of "local" (Tables A-16 and A-17), treating missing geographic information as distant (Table A-18), combining distant and local in the same regression and using interactions (Table A-19), and alternative definitions of F&F (Table A-20). In addition, to address the concern that our linear control for the age of an artist's Sellaband listing may not sufficiently capture overall time effects that may be correlated with the profile of accumulated funds, we provide additional evidence that our estimated effects reflect the information in accumulated funds by more flexibly controlling for a listing's age, which we do by employing a 6^o polynomial in age (Tables A-21 and A-22) and month-age fixed effects (Tables A-23 and A-24).

14. Consistent with this interpretation, in Appendix Tables A-25 and A-26, we find that investment rates are higher in the periods immediately following a large investment.

TABLE III.
LOCAL, DISTANT, AND FRIENDS & FAMILY

Variables	(1) All	(2) Local	(3) Distant	(4) Local	(5) Distant
\$10–20K accum. capital	0.0213*** (0.0045)	0.0083 (0.0133)	0.0216*** (0.0048)	0.0340** (0.0158)	0.0236*** (0.0049)
\$20–30K accum. capital	0.0261*** (0.0072)	–0.0225 (0.0171)	0.0290*** (0.0076)	0.0307 (0.0212)	0.0336*** (0.0074)
\$30–40K accum. capital	0.0420*** (0.0099)	–0.0255 (0.0209)	0.0458*** (0.0107)	0.0377 (0.0225)	0.0527*** (0.0103)
\$40–50K accum. capital	0.0840*** (0.0198)	–0.0137 (0.0267)	0.0902*** (0.0210)	0.0639** (0.0254)	0.1099*** (0.0213)
\$10–20K accum. capital * F&F				–0.0898*** (0.0315)	–0.0876*** (0.0311)
\$20–30K accum. capital * F&F				–0.1301*** (0.0339)	–0.1346*** (0.0359)
\$30–40K accum. capital * F&F				–0.1507*** (0.0320)	–0.1657*** (0.0357)
\$40–50K accum. capital * F&F				–0.1812*** (0.0312)	–0.2533*** (0.0389)
Funder proximate to Live Show	0.0079 (0.0061)	0.0105 (0.0103)	–0.0072 (0.0096)	0.0098 (0.0110)	–0.0062 (0.0099)
Weeks on Sellaband	–0.0033*** (0.0010)	–0.0041*** (0.0004)	–0.0031*** (0.0011)	–0.0035*** (0.0003)	–0.0030*** (0.0010)
Observations	709,471	78,897	630,574	78,897	630,574
R ²	0.012	0.039	0.012	0.049	0.018
Number of groups	18,827	1,572	17,255	1,572	17,255

Notes: Dependent variable is any investment and the unit of observation is the \$50K artist–funder–week. Local is defined as within 100 km from the artist. All regressions include a full set of fixed effects for each artist–funder pair (differenced out) and each week. Robust standard errors clustered at the artist level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

clearly display distinct patterns; distant funders' propensity to fund rises as the artist accumulates capital, whereas local funders' propensity does not.

This general pattern holds across specifications except that, in several of the robustness checks, there is a flatter relationship between investment propensity and cumulative investment for local funders. Still, the key distinction for our purposes is that distant funders significantly increase their propensity to fund as the artist accumulates capital, whereas local funders do not.

4.3 FRIENDS AND FAMILY

Next, we show that a particular type of funder, whom we label as F&F of a particular artist, explains the observed difference between local and distant funders. Importantly, many F&F are distant from their focal artist. Furthermore, many local funders are not F&F. However, F&F are disproportionately local.

We report results using two different measures for F&F. First, we employ a proxy based on funder behavior. Second, we use a survey-based indicator where artists code each of their funders based on their social relationship prior to joining Sellaband. For the proxy measure, we define F&F as funders who have the following characteristics: (1) they invest in the focal artist before investing in any other (i.e., the funder likely joined the system for the focal artist), (2) their investment in the focal artist is their largest

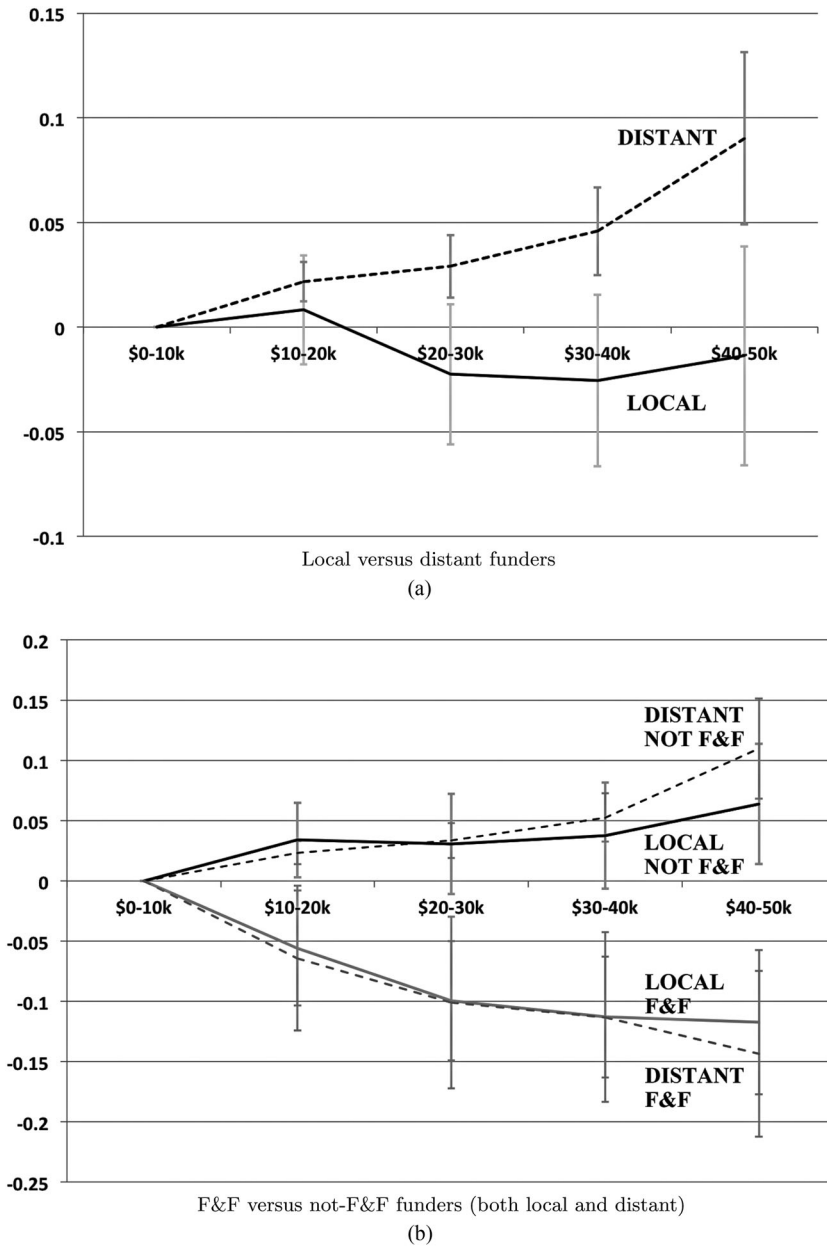


FIGURE 1. RELATIVE PROPENSITY TO FUND OVER CAPITAL LEVELS

Note: Baseline is propensity to fund between \$0K and 10K within focal group. Error bars represent 95% confidence intervals based on robust standard errors clustered at the artist level.

investment, and (3) they invest in no more than three other artists (i.e., the focal artist remains a key reason for being on the site).

As a check on the validity of this measure, in Table II we examine whether F&F exhibit behavior on the site that suggests they are a distinct group. Using our proxy measure of F&F, we find they use the platform much less intensively than other funders

TABLE IV.
LOCAL, DISTANT, AND FRIENDS & FAMILY (SURVEY SAMPLE)

Variables	(1) All	(2) Local	(3) Distant	(4) Local	(5) Distant
\$10–20K accum. capital	0.0203** (0.0073)	0.0145 (0.0196)	0.0201** (0.0076)	0.0370* (0.0199)	0.0213** (0.0078)
\$20–30K accum. capital	0.0263** (0.0098)	−0.0122 (0.0244)	0.0283** (0.0104)	0.0155 (0.0245)	0.0296** (0.0106)
\$30–40K accum. capital	0.0441*** (0.0137)	−0.0152 (0.0289)	0.0482*** (0.0148)	0.0188 (0.0308)	0.0496*** (0.0151)
\$40–50K accum. capital	0.0964*** (0.0215)	−0.0005 (0.0379)	0.1042*** (0.0232)	0.0319 (0.0372)	0.1069*** (0.0238)
\$10–20K accum. capital * F&F				−0.0604* (0.0337)	−0.1204*** (0.0317)
\$20–30K accum. capital * F&F				−0.0669* (0.0342)	−0.1300*** (0.0346)
\$30–40K accum. capital * F&F				−0.0780** (0.0303)	−0.1412*** (0.0304)
\$40–50K accum. capital * F&F				−0.0826*** (0.0285)	−0.1977*** (0.0436)
Funder proximate to Live Show	0.0128* (0.0065)	0.0165 (0.0122)	−0.0068 (0.0161)	0.0164 (0.0130)	−0.0064 (0.0159)
Weeks on Sellaband	−0.0003 (0.0002)	−0.0001 (0.0004)	−0.0003 (0.0003)	0.0001 (0.0004)	−0.0003 (0.0003)
Observations	414,835	64,403	350,432	64,403	350,432
R ²	0.014	0.047	0.015	0.050	0.016
Number of groups	9,800	1,096	8,704	1,096	8,704

Notes: Dependent variable is any investment and sample is the survey sample (i.e., includes all investments in the artists who identified their Friends and Family). The unit of observation is the survey artist–funder–week. Local is defined as within 100 km from the artist. All regressions include a full set of fixed effects for each artist–funder pair (differenced out) and each week. Robust standard errors clustered at the artist level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

for communication with the artists to whom we assume they are connected, suggesting they have other channels of communication. In addition, they fund disproportionately early in the funding cycle. Finally, they are disproportionately local.

Regarding the survey-based measure, 18 of the 34 successful artists provide us with information on the funders they know independently of Sellaband. Specifically, we sent each their list of funders and asked them to identify everyone they knew prior to joining Sellaband. Our proxy measure captures 84.1% of the funders identified by these 18 artists. A total of 16.1% of those classified by the algorithm are not identified by the 18 artists. Thus, by a surprising coincidence, the rates for false negatives and positives are almost identical.

In columns (4) and (5) of Table III, we run our main specification on local and distant funders but include an interaction of cumulative investment levels with an indicator for F&F. The results show that local and distant funders are qualitatively similar in terms of the coefficient sign and in terms of the relative magnitude of the main effect and the interaction with F&F. For both local and distant funders, F&F tend to fund early in the funding cycle and non-F&F tend to fund later. We illustrate this result in Figure 1b, which shows that non-F&F funders, both local and distant, increase their propensity to fund as the artist accumulates capital, whereas F&F funders do not. In Table IV, we show that the qualitative results are robust to the subsample of 18 artists who identify their

preexisting social relationships. Whenever we focus on this subsample in the tables, we use the label “survey subsample.”

In summary, our results suggest little systematic difference in the timing of investments between local and distant funders, except to the extent that social networks (as measured by F&F) are disproportionately local.

4.4 WHAT DO F&F KNOW? IDENTIFYING OR MONITORING WORTHWHILE INVESTMENTS

Why do F&F exhibit distinct investment patterns? Perhaps they have certain information about the artist that others do not. Consider two activities common among early-stage funders: identifying worthwhile investments and monitoring the progress of those investments. Identifying worthwhile investments is a search process that involves sifting through a wide variety of information to come up with a smaller consideration set before making a decision. Monitoring involves continued interaction with the recipient of funds and an investment response to the behavior of the recipient.

In this subsection, we show that it is unlikely that the difference between F&F and other funders is driven by monitoring. Instead, our results are more suggestive of F&F being different because of information asymmetry related to the process of identifying worthwhile investments.

Specifically, we examine investments that occur after the first investment. The first investment reveals when the funder identifies a project as worthwhile. Subsequent investments reveal how additional information affects funder decisions. Therefore, we interpret the results on subsequent investments as providing information on monitoring the behavior of the artists. Thus, if the difference between F&F and non-F&F funding persists after the first investment, then the results suggest a role for offline social networks related to monitoring and interpreting artist behavior rather than a role related to identifying investments.

To further explore this, in Tables V and VI we drop all first investments (and consequently all funders who invest on only one occasion). With this subsample, we find that local and distant funders follow a similar qualitative pattern: investments rise as the amount funded approaches \$50,000. Although the coefficient on F&F investments remains negative for high values of cumulative funding, the main effect of the pattern has changed substantially. Specifically, adding the F&F coefficients to the main effects demonstrates that after the first investment, all funders increase their probability of investing in a given week as the accumulated capital raised to date increases. This implies that, conditional on identifying an artist and deciding to invest in them, the online tools for monitoring progress through the funding cycle (e.g., tools for posting progress updates on new compositions, album artwork, media attention) seem to diminish the asymmetry between F&F and non-F&F funders.

We interpret this to suggest that the results are unlikely to be driven by monitoring. If the difference between F&F and non-F&F was due to monitoring, then we would expect subsequent investments to exhibit similar patterns to the first investment. Tables V and VI suggest otherwise.

In the Appendix S1, we provide further evidence that suggests no difference in the role of online monitoring between local and distant funders or between F&F and non-F&F funders. In particular, Appendix Tables A-27 and A-28 show that subsequent investments (whether local or distant) are not sensitive to artist postings of songs and

TABLE V.
REPEATED INVESTMENT

Variables	(1) All	(2) Local	(3) Distant	(4) Local	(5) Distant
\$10–20K accum. capital	0.0393*** (0.0067)	0.0326** (0.0135)	0.0400*** (0.0068)	0.0411*** (0.0149)	0.0407*** (0.0068)
\$20–30K accum. capital	0.0613*** (0.0098)	0.0300 (0.0187)	0.0632*** (0.0100)	0.0483** (0.0217)	0.0648*** (0.0102)
\$30–40K accum. capital	0.0967*** (0.0126)	0.0361 (0.0214)	0.1012*** (0.0136)	0.0727*** (0.0241)	0.1039*** (0.0137)
\$40–50K accum. capital	0.1969*** (0.0287)	0.1024*** (0.0332)	0.2036*** (0.0302)	0.1291*** (0.0335)	0.2094*** (0.0304)
\$10–20K accum. capital * F&F				–0.0242 (0.0155)	–0.0265* (0.0149)
\$20–30K accum. capital * F&F				–0.0433** (0.0175)	–0.0462* (0.0236)
\$30–40K accum. capital * F&F				–0.0805*** (0.0227)	–0.0744*** (0.0236)
\$40–50K accum. capital * F&F				–0.0665** (0.0297)	–0.1160*** (0.0229)
Funder proximate to Live Show	0.0105 (0.0128)	0.0129 (0.0169)	–0.0122 (0.0262)	0.0130 (0.0169)	–0.0121 (0.0262)
Weeks on Sellaband	–0.0008* (0.0004)	0.0012*** (0.0004)	–0.0008* (0.0005)	0.0014*** (0.0004)	–0.0008* (0.0005)
Observations	213,133	20,127	193,006	20,127	193,006
R ²	0.028	0.027	0.030	0.029	0.031
Number of groups	5,213	449	4,764	449	4,764

Notes: Dependent variable is any investment and sample and the unit of observation is the \$50K artist–funder–week. Only funders who invest at least twice in the focal artist are included. Local is defined as within 100 km from the artist. All regressions include a full set of fixed effects for each artist–funder pair (differenced out) and each week. Robust standard errors clustered at the artist level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

videos.¹⁵ In this way, subsequent investments do not seem to react to a straightforward form of monitoring.

Next, we look at differences between F&F and others for the first investment to look for suggestive evidence that F&F do not search much on the platform before making investments. We find that F&F first investments happen just 1.6 weeks after they join the platform. In contrast, non-F&F first investments happen 6.7 weeks after they join.¹⁶ We also have aggregate data on the engagement of funders on the platform as a whole. F&F interact less with artists online and they spend less time on the platform overall.

Overall, we interpret the difference between first and subsequent investments to suggest that monitoring is unlikely to explain differences between F&F and other funders. Instead, F&F funders likely have additional information relative to non-F&F funders for identifying whom to fund. Simply, social ties yield awareness of the opportunity to invest (and perhaps exert some social pressure to do so).

15. Appendix Table A-7 shows that overall investments are sensitive to video posts, especially local investments. Appendix Table A-6 shows that investments do not seem to be sensitive to song posts.

16. This is based on the survey sample data. The full sample yields a narrower but still substantive difference.

TABLE VI.
REPEATED INVESTMENT (SURVEY SAMPLE)

Variable	(1) All	(2) Local	(3) Distant	(4) Local	(5) Distant
\$10–20K accum. capital	0.0339*** (0.0105)	0.0439** (0.0170)	0.0327*** (0.0107)	0.0387** (0.0167)	0.0328*** (0.0107)
\$20–30K accum. capital	0.0607*** (0.0152)	0.0410 (0.0251)	0.0613*** (0.0158)	0.0385 (0.0225)	0.0617*** (0.0162)
\$30–40K accum. capital	0.0950*** (0.0186)	0.0428 (0.0282)	0.0991*** (0.0199)	0.0492* (0.0269)	0.0999*** (0.0203)
\$40–50K accum. capital	0.2092*** (0.0332)	0.1140** (0.0425)	0.2165*** (0.0344)	0.1432*** (0.0448)	0.2181*** (0.0348)
\$10–20K accum. capital * F&F				0.0132 (0.0148)	–0.0125 (0.0271)
\$20–30K accum. capital * F&F				0.0064 (0.0201)	–0.0228 (0.0349)
\$30–40K accum. capital * F&F				–0.0125 (0.0242)	–0.0407 (0.0377)
\$40–50K accum. capital * F&F				–0.0618 (0.0370)	–0.0778 (0.0586)
Funder proximate to Live Show	0.0233* (0.0133)	0.0301 (0.0179)	–0.0139 (0.0326)	0.0289 (0.0179)	–0.0135 (0.0323)
Weeks on Sellaband	–0.0013*** (0.0003)	0.0012** (0.0005)	–0.0013*** (0.0003)	0.0014** (0.0005)	–0.0013*** (0.0003)
Observations	119,630	14,798	104,832	14,798	104,832
R ²	0.028	0.029	0.032	0.030	0.032
Number of groups	2,690	283	2,407	283	2,407

Notes: Dependent variable is any investment and sample is the survey sample. The unit of observation is the survey artist–funder–week. Only funders who invest at least twice in the focal artist are included. Local is defined as within 100 km from the artist. All regressions include a full set of fixed effects for each artist–funder pair (differenced out) and each week. Robust standard errors clustered at the artist level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.5 DO FUNDERS TREAT INVESTMENTS BY F&F OR LARGE INVESTORS DIFFERENTLY?

Given that F&F funders invest early because social ties yield awareness of the opportunity to invest (and perhaps social pressure too), later funders should discount investments by F&F as less informative about quality than other investments. Although such investments are not easy to identify on the Sellaband web site, the identity of the most recent funders is prominent. If the most recent funders have a clear connection to the artist (such as a shared last name that they choose to disclose on their Sellaband username), then it is possible for a later funder to see that the artist’s recent funds came from a social tie.

Columns (1) and (2) of Table VII explore this by looking at situations when the previous investment was an F&F investment. We identify whether the most recent week of investments in the artist involved only F&F funders, both F&F and non-F&F funders, or only non-F&F funders, leaving the dummy for non-F&F funders as the omitted group.¹⁷

Column (1) contains the main sample and column (2) contains the survey sample. Artists with both types of funders (in the previous week with investments) are more likely to receive further funds. This is consistent with these artists having momentum

17. Our data make it difficult to identify, within a given week, which investments occurred first and so we aggregate to the week level.

TABLE VII.
LAST INVESTMENT BY F&F OR LARGE INVESTOR

	(1) Main Sample	(2) Survey Sample	(3) Main Sample	(4) Survey Sample
\$10–20K accum. capital	0.0182*** (0.0039)	0.0148** (0.0057)	0.0182*** (0.0041)	0.0173** (0.0062)
\$20–30K accum. capital	0.0245*** (0.0063)	0.0218** (0.0078)	0.0218*** (0.0068)	0.0222** (0.0087)
\$30–40K accum. capital	0.0387*** (0.0087)	0.0390*** (0.0116)	0.0369*** (0.0095)	0.0391*** (0.0128)
\$40–50K accum. capital	0.0805*** (0.0186)	0.0890*** (0.0193)	0.0784*** (0.0196)	0.0902*** (0.0207)
Last Investment by F&F	0.0024 (0.0052)	–0.0339* (0.0172)		
Last investment by F&F and Not-F&F	0.0091** (0.0044)	0.0454** (0.0174)		
Large Investor (Lagged)			0.0205** (0.0095)	0.0203** (0.0090)
Both Large and Small Investor (Lagged)			0.0085*** (0.0015)	0.0066*** (0.0017)
Funder proximate to Live Show	0.0091 (0.0058)	0.0097 (0.0064)	0.0061 (0.0061)	0.0112 (0.0066)
Weeks on Sellaband	–0.0019*** (0.0002)	–0.0008*** (0.0002)	–0.0035*** (0.0010)	–0.0005* (0.0003)
Observations	703,417	411,454	709,471	414,835
R ²	0.012	0.015	0.012	0.015
Number of groups	18,827	9,800	18,827	9,800

Notes: Dependent variable is any investment. Sample is the \$50K sample in columns (1) and (3) and the survey sample in columns (2) and (4). “Last investment by F&F” is equal to one if the last week with investment only had investment by F&F. “Last investment by F&F and Not-F&F” is equal to one if the last week with investment had investment by F&F and Not-F&F. Large investor is defined as an investor in the top 25% of the investment distribution. The unit of observation is the artist–funder–week. All regressions include a full set of fixed effects for each artist–funder pair (differenced out) and each week. Robust standard errors clustered at the artist level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

in the funding process. In contrast, artists with only F&F funders (in the previous week with investments) are no more likely to receive funds. In the survey sample, where close F&F are particularly likely to be identified, the coefficient is negative and significant with 90% confidence. With different signs and significance across specifications, the results cannot be seen as definitive. Still, this suggests that, if anything, other funders use the information in the identity of prior funders and potentially discount previous investments by F&F.

Unfortunately, there is insufficient power in the data to split this analysis by overall amount of funds raised to date. Therefore, the marginal effects are hard to assess. In other words, we are comfortable saying that column (2) suggests some discounting, but the data do not allow us to assess the degree to which this discounting reduces the main effect of funding following prior funding.

Columns (3) and (4) of Table VII look at whether the identity of the investor can provide other information leading to more follow-on investments. In particular, these columns explore whether the previous investment was by an investor in the top 25% of the overall investment distribution on Sellaband in terms of dollars spent. The positive coefficient suggests that the choices of the largest funders are amplified in terms of their correlation with later funding. Again, while not definitive, this suggests that other funders use the information in the identity of prior funders and follow the leading participants on the platform.

5. CONCLUSION

Motivated by the recent rise in crowdfunding and the wide geographic dispersion of crowdfunding investments, we examine the role of distance in an online platform for financing new artists. A key challenge to crowdfunding markets, like many other online marketplaces, is the information asymmetry between funders and the recipients of the funds. For other early-stage investments, these asymmetries are partly overcome through information most easily gleaned via colocation. Crowdfunding, however, often happens at a distance.

We explore whether and how distant and local funders differ. We show that they respond differently to information about prior investment decisions. Our results suggest that the different responses relate to the likelihood that F&F (who are disproportionately local) identify a given artist as a worthy recipient of funds.

Specifically, we find that investment patterns over time are not strongly related to the geographic distance between artist and funder after controlling for the artist's offline social network. This result contrasts with the existing literature that emphasizes the importance of spatial proximity in early-stage financing. Instead, our result suggests that online mechanisms can reduce economic frictions associated with such investments over long distances. Only the spatial correlation of preexisting social networks is not resolved; the online mechanisms do not (yet) eliminate frictions related to preexisting social networks. The persistence of such "social frictions" but not other distance-related frictions is consistent with prior research on online activity that shows many but not all distance-related frictions are reduced in the online setting (Blum and Goldfarb, 2006; Hortacsu et al., 2009).

Broadly, this paper is a theory-driven study of crowdfunding. To clarify its scope, our results are not meant to test general theories of capital markets, entrepreneurial finance, or social networks. At the same time, our results are more than an exploratory description of the data.

Basic theory helps us identify and understand that asymmetric information, in terms of identifying worthwhile investments and monitoring the recipients of funds, may be a key challenge for crowdfunding. Because this challenge is likely to be larger for distant funders, we focus on differences between local and distant investment patterns to explore these differences. We test theory concerning geographic distance, social relationships, and information. We recognize that there are several reasons that the geographic distance between artists and potential funders might matter, such as spatially correlated tastes, monitoring progress, search frictions, and reputation effects related to trust and the risks associated with fraud or managerial incompetence. We demonstrate that what appears to be a geographic distance effect is mostly a social effect. Although it is likely that colocation influences the likelihood of establishing social connections, it is preexisting social relationships that serve as the mechanism through which geographic distance matters. We then show that it is unlikely that monitoring is the reason that social relationships matter. Instead, the difference between socially connected funders and others seems to be driven by differences in information used to identify the investment consideration set. We also present some suggestive (though inconclusive) evidence that later funders may recognize and discount the information in funds from F&F.

Our paper has several limitations that affect the scope of the interpretation. Two central ones concern generalizability and the motivations of F&F. First, the sample is from a single crowdfunding platform and thus the results may not generalize to other platforms with different market design features.

Second, although Sellaband provides revenue-sharing opportunities for funders, it is plausible that funders view their funding decisions more like philanthropic donations than investments seeking to maximize the risk-adjusted rate of return. In that case, F&F may invest earlier than non-F&F due to their social ties (e.g., social obligation, reciprocal F&F arrangements, utility from helping a friend) rather than due to different information as we have assumed. If so, then perhaps non-F&F erroneously interpret this investment as a signal of value, mistakenly assuming that prior investments were motivated by expected payoff rather than by social ties. In other words, F&F investment decisions may be biased and therefore the information in their signal may be misleading. Our suggestive evidence of discounting of F&F funding and amplification of large investor funding suggests that some participants on the platform may be aware of the information in the identity of prior funders.

To the extent the evidence does not suggest complete discounting of prior F&F funding, it is important to recall that there is significant variation in the level to which artists receive funding from F&F. In fact, thousands of artists on the platform receive very little funding support from anyone, including F&F. That is at least partly due to differences in the wealth endowment of F&F associated with different artists. However, the variation in F&F investment across artists is also likely to be partly due to variation in artists' ability to garner confidence from their F&F networks. It seems unlikely that there is no information contained in the variation in the ability of artists to attract financial support from F&F. If an artist is not able to convince even their F&F to invest in their project, then that conveys useful information to potential investors that are non-F&F. Even a little information in this signal may systematically influence non-F&F behavior. In other words, if non-F&F respond to this information, whether erroneously or not, then this behavior is consistent with our interpretation that non-F&F invest later because they are in part reacting to information from prior investors embedded in the total capital raised to date. This is an interesting area for future research as the industry matures.

One may also worry that perhaps non-F&F invest later than F&F because the artist becomes "more visible" as the artist is pushed up the rankings, which is more relevant for non-F&F than F&F. This is consistent with our interpretation that the difference in timing of investment is likely due to information that influences heuristics associated with forming a consideration set. Alternatively, one may be concerned that non-F&F invest later because they derive more utility from making investments in projects that are actually close to reaching the target because they feel they can have more of an impact. This is plausible and one of the reasons that we carefully examine funder behavior on subsequent funding rounds. Our result that the difference between F&F and non-F&F propensity to invest at different cumulative funding levels disappears after the first investment suggests that, conditional on making more than one investment in the same artist, F&F and non-F&F do not seem to be different in terms of the utility they derive from helping artists who have already raised some funding to cross the finish line. Furthermore, to the extent that investors who have made an initial investment then use information from monitoring the artist's subsequent activities to influence their decision to make subsequent investments in the same artist, we are able to rule out differences in information related to monitoring between F&F and non-F&F (due to offline relationships, for example) as an explanation for differences in funding behavior. The difference between F&F and non-F&F propensity to invest in a given week at different cumulative funding levels disappears after the first investment.

These limitations, combined with our results on distance and social networks, suggest an additional potential interpretation of our results. Social information is unlikely

to be perfectly codified on a platform, suggesting that the role of geographic proximity may be relatively large when the financial returns are small relative to the social nature of crowdfunding investments. Given that funders appear to rely on information revealed by the funding decisions of others, F&F might play an important role in generating that information and signaling value (Conti et al., 2011). However, if subsequent funders erroneously interpret F&F funding as a signal of quality, then the crowdfunding platform may inefficiently allocate funds to lower quality projects by socially connected artists. Our evidence suggests something in the middle: there is likely some, but not complete, discounting by platform participants.

Our results also inform and link the literatures on home bias and networks in investment decisions. Consistent with the social networks results in Hochberg et al. (2007), Hsu (2007), and elsewhere, we find that networks affect investment patterns and that their relationship can help explain patterns in home bias (Seasholes and Zhu, 2005). Speculatively, this may help pin down the type of information discussed in Nieuwerburgh and Veldkamp (2009) that allows home bias to persist when information flows are global.

Finally, we comment on the implications of crowdfunding for our particular industry setting, recorded music. This industry has experienced a significant decline in revenues, approximately 50% over 10 years, which many experts attribute to piracy through online file sharing (Rob and Waldfogel, 2006; Passman, 2009). At the same time, costs associated with the production and distribution of music have also dropped substantially due to the development of inexpensive production software and the digital distribution of music over the Internet. However, production costs are not zero, and recording artists are commonly cash constrained. In the traditional vertically integrated industry setup, large record companies provide both financing and a full suite of services (e.g., producer, studio, cover design, distribution, auxiliary musicians) in exchange for ownership of or equity in the artist's intellectual property. As the major labels decline in importance, artists have fewer options to relieve cash constraints by borrowing against or selling equity in their current and future intellectual property. Crowdfunding may help overcome that constraint by creating a market for investing in the most salient assets available to aspiring new artists—their ideas, vision, and future intellectual property—who can leverage their (local) social networks to access a much larger pool of capital from (distant) strangers.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Appendix S1.

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