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SLACK TIME AND INNOVATION

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ABSTRACT

The extant literature linking slack time to innovation focuses on how slack time facilitates creative activities such as ideation, experimentation, and prototype development. We turn attention to how slack time may enable activities that are less creative but still important for innovation, namely mundane, execution-oriented tasks. First, we document the main effect: a sharp rise in innovative projects posted on a major crowdfunding platform when colleges are on break. Next, we report timing and project type evidence consistent with the causal interpretation that slack time drives innovation. Finally, we present a series of results consistent with the mundane task mechanism but not with the traditional creativity-related explanations. We do not rule out the possibility that creativity benefits from slack time. Instead, we introduce the idea that mundane, execution-oriented tasks, such as those associated with launching a crowdfunding campaign (e.g., administration, planning, promotion), are an important input to innovation that may benefit significantly from slack time.

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"It's no coincidence that Microsoft and Facebook both got started in January. At Harvard that is (or was) Reading Period, when students have no classes to attend because they're supposed to be studying for finals." - Paul Graham, Y-Combinator founder, quoted in "How to Get Startup Ideas"

1 Introduction

Innovation, the engine of economic growth, is usually associated with creativity and clever insight. We shine a light on another important input to innovation: mundane, execution-oriented tasks. In particular, we report evidence consistent with the view that, at the margin, mundane tasks may pose a non-trivial friction with respect to bringing creative solutions to market. Furthermore, slack time may effectively address this friction.

Slack time has previously been linked to innovation through the role it plays in facilitating creative activities, such as ideation, experimentation, and prototype development (Richtner, Ahlstrom, and Goffin 2014, Menzel, Aaltio, and Ulijn 2007, Shah and Tripsas 2007, Greve 2007). For example, Google's slack time policy famously allows employees to devote 20% of their time to projects of personal interest. "The 20 percent rule was a way of encouraging innovation" (Vise 2008) (p. 131). As Google engineer Joe Beda describes, "This isn't a matter of doing something in your spare time, but more actively making time for it" (Vise 2008) (p. 139).[1] 3M and Wella are other well-known innovative companies with similar slack time policies (Menzel, Aaltio, and Ulijn 2007). Nohria and Gulati (1996) provide a review of the evidence on slack time and other slack resources and conclude that there is an "inverse-U" relationship with performance and hypothesize that this results from a trade-off between the benefits of experimentation and the costs of complacency. This ambiguity about the returns to slack time may be one reason why many companies do not adopt a formal slack time policy. Richtner, Ahlstrom, and Goffin (2014) provide a more recent review.

We shift attention to the role slack time may play in enabling creators to perform tasks that

[1] In his book on creativity (Lehrer, 2012), Jonah Lehrer notes: "The Google program is officially known as Innovation Time Off. That program has led directly to the development of Gmail, Google's successful email program, and AdSense, a nine-billion-dollar-a-year platform that allows Internet publishers to run Google ads on their sites. Marisa Mayer, Google's [former] VP of search products and user experience, estimates that at least 50 percent of new Google products begin as Innovation Time Off speculations."

are likely viewed as mundane but are necessary for transforming an idea or invention into an innovation that can be enjoyed by others. We report evidence indicating that a relatively short amount of slack time can have a significant effect on the amount of innovation that is brought to market. Furthermore, we present evidence that is consistent with the mundane task explanation but not with other creativity-related explanations. We do not rule out the role that slack time likely plays in facilitating creativity. Rather, we design our empirical work to identify the relationship between slack time and execution-oriented tasks in the context of innovation in order to highlight the importance of mundane tasks in innovation, the friction associated with mundane tasks in bringing creative projects to market, and the role slack time may play in reducing that friction.

We use as our empirical setting the creative projects posted on a crowdfunding website. Specifically, we examine the location and timing (city-week) of all new projects posted during a five-year period on Kickstarter, the leading rewards-based crowdfunding platform. Crowdfunding is the practice of funding a project by raising small amounts of money from a large number of people using an online digital platform. Pre-selling new products on a crowdfunding platform has become an oft-used method for acquiring early-stage capital by technology startups and has also become an important source of funding for projects in the arts (Agrawal, Catalini, and Goldfarb 2013).

Our empirical work focuses on examining how slack, or low-opportunity cost, time (Catalini 2013) influences innovative activity on a crowdfunding platform using college breaks as a measure of slack time. We document a sharp rise in crowdfunding activity in the local region when colleges are on break and control for differences across time using week fixed effects and differences across locations using city fixed effects. Furthermore, we observe no pre-trend, either positive or negative, in projects posted to the platform before students are on vacation. The lack of a positive pre-trend suggests that the result is not driven by an omitted variable that is coincident with the timing of school breaks in college towns. The lack of a negative pre-trend suggests that the projects posted during the break are not simply shifted in time from the weeks leading up to the break but rather represent innovations that otherwise would not have been posted.

Providing additional support for the causal interpretation that slack time drives innovation, we report evidence showing that the increase in projects posted is consistent with the expertise of the students affected: when top engineering schools are on break, we see a positive effect on technology projects but not art projects and vice versa when art and design schools are on break. Furthermore, we report results suggesting that the increase in posting projects is driven by the supply side (projects by creators) rather than by increased capital availability due to students allocating funds while they are on break. We do this by documenting that the result does not hold for projects started just before a break whose fundraising continues during the break and also by showing that the result is not stronger in categories that are likely of particular interest to students (e.g., video games).

Next, we report three results that are consistent with the mundane task explanation but not with the traditional creativity explanation. First, we examine a change in the policy for posting projects in two out of the thirteen categories: Design and Technology. The policy change was implemented by Kickstarter in response to a series of inexperienced creators who attracted significant capital for their creations and then failed to deliver as a result of manufacturing and distribution problems due to planning inadequacies that were often foreseeable to those with consumer product manufacturing experience. Thus, the site increased the planning documentation required to post a project but only in these two categories. We examine the effect of breaks before and after this change in policy. We find that, after the policy change, which increased the effort required on mundane tasks in Design and Technology, slack time has a disproportionate effect on the number of projects posted in these two categories relative to the others.

Second, we examine timing: when during breaks do we observe the largest increase in the number of projects posted? If creators require slack time to perform creative tasks, such as ideation, experimentation, or prototype development, then we expect to see a spike in the number of projects posted in the later part of breaks or perhaps even after breaks are over. However, if creators already have performed many of the creative tasks and the friction preventing them from posting their creations is the mundane task of filling out the project registration form and other similar tasks associated with launching a crowdfunding campaign, then the spike is likely to occur early in the break. Indeed, we observe the greatest increase in the number of projects posted during the early part of the breaks.

Third, we examine variation in the length of time projects have been in development prior to launching on the crowdfunding platform. If creators are using the slack time to experiment and develop their projects, then they may have shorter development times than those who spread out their development during evenings and weekends without the benefit of a solid block of time during a holiday break. However, we find no evidence of the breaks disproportionally affecting projects with shorter development times.

The empirical research on innovation that employs data from crowdfunding is nascent but growing. Most papers focus on issues related to asymmetric information between creators and funders. In a prior essay, we review much of the literature and discuss the incentives and disincentives of crowdfunding from the points of view of entrepreneurs and investors (Agrawal, Catalini, and Goldfarb 2013). In short, entrepreneurs gain quick access to non-dilutive capital and feedback from potential customers. In exchange, they must disclose their ideas and manage the crowd. Financial backers receive early access to products and a formalization of contracts for projects they might otherwise have supported by donation. Similarly Belleflamme, Lambert, and Schwienbacher (2014) emphasize asymmetric information in their review. Broadly, funders and creators are initially overoptimistic about outcomes (Mollick 2014), though overall the crowd appears to select similar projects to experts, at least in theater (Mollick and Nanda 2014). Perhaps the dominant finding from this setting concerns the role of signaling: the propensity to fund increases with accumulated capital. The crowd views accumulated capital as a signal, which may lead to herding (Agrawal, Catalini, and Goldfarb 2015, Zhang and Liu 2012, Kuppuswamy and Bayus 2013). One key exception to this finding is Burtch, Ghose, and Wattal (2013), who show that public goods concerns may counteract herding effects. Also related to information, Burtch, Ghose, and Wattal (2015) show that privacy concerns play a role in funder decisions to contribute.

We build on this extant empirical work, utilizing specific features of the empirical setting. First, we exploit the fact that crowdfunding is a broad phenomenon that includes innovative activity across a wide range of fields, including but not limited to technology. Second, we take advantage of the rapid and frequent nature of posting projects that enables us to exploit variation across city-weeks in order to explore the relationship between slack time, measured in days or weeks, and innovation-related activities. Third, we exploit a policy change that only affects two out of thirteen categories. Thus, crowdfunding affords us a vantage point to conduct research that would not be possible using data traditionally employed for studying innovation, such as patents or copyrights.

Ultimately, our contribution is to highlight the role that mundane, execution-oriented tasks play in the creative endeavor of innovation. Our findings demonstrate that although creativity may be a necessary input for innovation, it is not sufficient. Transforming creative ideas into useful products requires many steps, such as marketing and finance, that themselves necessitate a series of mundane tasks. We focus on a particular mundane task concerning the administrative activity associated with registering a project on a crowdfunding platform and creating a complete project page (this usually includes different rewards, pictures, a summary video, and additional information on the project and creators). Our evidence suggests that although creators may be able to perform their most important creative work during their "spare time" while they are at school or work, they are more likely to overcome the friction presented by mundane tasks when they have a solid block of slack time. In our case, holiday breaks from school provide this slack. This contribution links research on creativity and innovation, the costs and benefits of entrepreneurship (Koellinger and Thurik 2012, Hartog, Van Praag, and Van Der Sluis 2010, Åstebro, Chen, and Thompson 2011, Åstebro and Thompson 2011), and organization design (Bourgeois 1981, Galbraith 1974).

We proceed in Section 2 by describing our empirical setting and features of the dataset, which we construct at the city-week level. Then, in Section 3, we describe our empirical strategy, which is based on a simple linear model with fixed effects. Next, in Section 4, we present our results. We begin with the main result that slack time is correlated with an increase in the number of projects posted. Then, we present evidence consistent with the causal interpretation that slack time drives an increase in posted projects. Finally, we present results that are consistent with the mundane task explanation but less so with traditional creativity explanations. In Section 5, we discuss the implications of our findings, describe the limitations of this study, and offer directions for future research.

2 Data and Empirical Setting

Our empirical setting is Kickstarter, the world-leading reward-based crowdfunding platform. We collect data for the 97,423 US-based projects that attempted to raise money on the platform between April 2009 and July 2014. We have information on approximately $985M raised both by successful (59.7% of the projects, 94% of the capital) and failed projects (40.3% of the projects, 6% of the capital). The distribution of capital is highly skewed: the top 1% (10%) of projects accounts for $378M ($695M), or 38% (70%), of the capital (Agrawal, Catalini, and Goldfarb 2013).

Our data contain project-level information that is publicly available on Kickstarter. This includes information on the time each project was posted, total funds raised, and descriptive information about each project. We do not have comprehensive data on the timing of funding within projects nor the location of the funders.

We define success and failure relative to the funding goals of the campaign. Specifically, Kickstarter requires projects to state a funding goal in advance. Creators that start projects that fail to achieve their funding goal do not receive any money. Instead, the capital is returned to funders. We label projects that achieve their funding goal as "successful" and ones that do not (and therefore do not receive any funds) as "failed." The overall success of projects, once funded, is not our focus here and has been studied elsewhere (Mollick and Nanda 2014).

The projects span 13 categories defined by Kickstarter (Art, Comics, Dance, Design, Fashion, Film & Video, Food, Games, Music, Photography, Publishing, Technology, Theater), and 5,919 US cities.

We manually collect data on holiday breaks between 2009 and 2014 (summer break, spring break, winter break, Thanksgiving, reading week) for the top 200 US colleges as defined by US News & World Report.[2] This information is publicly available through posted academic calendars. We consider a city to have a school break in a given week if a top 200 college with a break is present within five miles of the city center.

We present descriptive statistics at the city-week level for our main sample in Table 1. During

[2]Source: http://colleges.usnews.rankingsandreviews.com/best-colleges/rankings/national-universities/data (accessed September 2013).

our study period, the average city-week had 0.060 projects launched, with slightly more than half (0.036) successfully reaching their funding goal and the remainder (0.024) failing to reach their goal. In other words, in most city-weeks, no projects are launched. However, the distribution is right-skewed with many zeros, such that some cities have projects posted in many weeks.

In addition, the descriptive statistics show that the maximum number of successful projects for any US city in a single week is 49 (Los Angeles, CA), whereas the maximum number of failed projects is 40 (also Los Angeles). In a single week, cities are able to attract as much as $10.3M in successful funds, with an average per city-week of $552 and a standard deviation of $21,990. Approximately 4% of our observations are city-weeks where at least one of the top 200 colleges is on holiday break, the majority of it being summer break weeks (2.2% of the sample), followed by winter breaks (0.7% of the sample) and reading weeks (0.4% of the sample).

In Table 2 (parts a and c), we present the Top 10 Core-Based Statistical Areas (CBSAs) by total funding raised: results are generally unsurprising, with Boston and San Francisco leading in technology and Los Angeles and New York leading in Film & Video.[3] Not surprisingly, in all cases, the top 10 regions are large metropolitan areas. However, once we turn to the funding per capita results in Table 2 (parts b and d), the results are more revealing and suggest that colleges and universities may disproportionately use crowdfunding platforms: Boulder (CO) appears both on the Technology and the Film & Video top list, Provo, home of Brigham Young University, is first in Technology, and several other college towns appear prominently in both lists.[4]

In light of the prominence of college towns on Kickstarter, our empirical analysis exploits the week-by-week variation in slack time in these towns. Next, we examine correlations between school

[3] "CBSA is a collective term for both metro and micro areas. A metro area contains a core urban area population of 50,000 or more and a micro area contains an urban core population of at least 10,000 (but less than 50,000). Each metro or micro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core." Source: http://www.census.gov/population/metro/. The full list of CBSAs is available at: http://www.census.gov/population/metro/files/lists/2009/List1.txt. For most of the analysis that follows, we use Kickstarter's definition of cities rather the CBSA.

[4] For example, in Technology: UC Santa Cruz, UCSF, UC Berkeley, Stanford University, Boston College, Boston University, Brandeis University, Harvard University, MIT, Northeastern University, University of Massachusetts, University of New Hampshire, East Carolina University, University of Vermont, University of Utah. In Film & Video: University of Montana, Azusa Pacific University, Biola University, California Institute of Technology, Pepperdine University, UC Irvine, UCLA, University of La Verne, University of Southern California, Cornell University, Montana State University; San Diego State University, University of San Diego, UC San Diego, University of Colorado Boulder.

breaks and new projects on Kickstarter.

3 Empirical Strategy

Our econometric analysis is a straightforward framework at the city-week level. We focus on a simple linear model with fixed effects to document the underlying correlations in a direct and easily interpretable manner. We exploit variation across cities in the timing of holiday breaks at local colleges and universities to estimate how the availability of free time for college students influences the number of projects posted as well as the amount of funding they attract:

$$Y_{ct} = \beta HolidayBreak_{ct} + \mu_c + \psi_t + \epsilon_{ct}$$

where Y_{ct} is either the number of projects posted on the platform in city c during week t or the total amount raised by the projects posted in city c during week t. Kickstarter identifies a city for each project, based on the location of the project creators. We use these as a measure of location. It provides a smaller geographic measure than a CBSA and a larger one than a Census Place. The key advantage is that it does not involve location aggregation or disaggregation of the core dependent variable. $HolidayBreak_{ct}$ is a dummy equal to one if any of the colleges in the focal city is on holiday in the focal week and zero otherwise. μ_c is a city fixed effect to control for underlying differences across US cities that are consistent over time. ψ_t is a week fixed effect to control for changes in the Kickstarter environment over time, and ϵ_{ct} is an idiosyncratic error term. The fixed effects mean that our analysis examines the change in the propensity to post projects and attract funding (both successful and failed) over time for cities where we observe at least one project. Because there are few city-level measures that change at the week level, we do not include additional covariates in the regressions beyond city and week fixed effects. Unsurprisingly given city and week fixed effects, results do not change when including controls such as weekly temperature and annual CBSA-level demographics. Since nothing changes, we focus on the more parsimonious specification. The fixed effects completely capture cities in which we never see activity, and thus we remove these pairs from the analysis without any empirical consequences. In some specifications, we interact the $HolidayBreak_{ct}$ variable with time and market characteristics. Robust standard errors are clustered at the city level. We measure projects posted and amount raised at the city-week level.

In some specifications, we decompose the effect of breaks by holiday type:

$$Y_{ct} = \beta_1 ReadingWeek_{ct} + \beta_2 Summer_{ct} + \beta_3 Spring_{ct} + \beta_4 Thanksgiving_{ct} + \beta_5 Winter_{ct} + \mu_c + \psi_t + \epsilon_{ct}$$

where β_1 to β_5 are coefficients on indicator variables equal to one if any of the colleges in the focal city is on holiday because of reading week, summer break, spring break, Thanksgiving, or winter break, respectively. We have also performed the same set of analyses at the CBSA-week level and obtain the same qualitative results.

4 Results

We build our main result in three steps. First, we document that crowdfunding activity increases during holiday breaks, both in terms of the number of projects posted and also the amount of funding raised (Section 4.1).

Second, in Section 4.2, we provide evidence of a causal relationship from college breaks to new crowdfunding projects by showing that the correlation between crowdfunding and college breaks is sharply confined to the timing of breaks without positive or negative pre-trends and also that technology projects increase in locations with technology schools and art projects increase in locations with arts schools.

Third, in Section 4.3, we provide evidence that is consistent with the mundane tasks explanation. We first demonstrate that the result likely is not driven by a change in the supply of capital available from students who might spend more on crowdfunding during breaks. We show this in two ways: 1) projects posted just before a break do not attract disproportionate funding during break weeks, and 2) projects in the video game category, plausibly of particular interest to college students on break, do not experience a disproportionate increase in funding during a break week. Next, we exploit a change in the market design of the platform that increases the effort associated with mundane tasks required to post a project in Technology and Design (but not in other categories) to further support our interpretation. Then, we show that the increase in crowdfunding during breaks is driven by projects launched early in the breaks, consistent with the explanation that entrepreneurs use this time to focus on mundane, execution-oriented tasks associated with posting projects on the platform rather than on ideation and product development. Finally, we show that projects posted during break weeks have as long a lead time in development as projects posted during non-break weeks, consistent with the interpretation that ideation and other creative tasks likely are not driving the estimated slack time effect.

4.1 Crowdfunding and college holiday breaks

In Table 3, we present the main result of the paper: when college students are on holiday in a city, more projects (Column 1) from that city are posted on Kickstarter and more funding (Columns 2 and 3) flows to that city, controlling for week fixed effects and city fixed effects.

In Column 1, we show with 95% confidence that the number of crowdfunding campaigns launched increases during holiday breaks. The estimated coefficient, 0.0294, is large relative to the average number of campaigns per city-week, 0.0603 (Table 1, first row).

In Column 3, where we use $log(funding + 1)$ as the dependent variable, we report a positive and significant correlation between funding and holiday breaks. In Column 2, where we use funding (not logged) as the dependent variable, the estimated coefficient on holiday breaks is also positive and large relative to average values but is not significantly different from zero with 90% confidence. This is a result of the highly skewed distribution of funding since the amount raised in most city-weeks is zero or a nominal amount (mean value is \$610) but is occasionally very high (up to \$10 million).[5]

[5] As with many other quasi-experimental regression papers (e.g., Athey and Stern (2002) and Simcoe and Waguespack (2011)), the R-squared in the analysis in this table is low. This is not surprising given that city fixed effects are differenced out rather than estimated and that there are many reasons why people post projects on Kickstarter besides having time during college breaks. Key for our conclusions is that our coefficient estimates have statistical power and magnitudes of economic importance.

4.2 Evidence for a causal interpretation of holiday breaks on Kickstarter projects

We provide two different pieces of evidence to support a causal interpretation of the results we present in the previous section. First, we show that the *timing* of the increase in projects relative to the timing of holiday breaks is consistent with a causal interpretation. Second, we show that technology projects increase in places with strong engineering and science programs and that art projects increase in places with strong arts schools, consistent with a causal interpretation.

In terms of the timing, we explore the presence of a pre-trend in the data by introducing dummies for the weeks before and after a holiday period in our main specification. As we illustrate in Figure 1, holiday breaks are correlated with a substantial spike in crowdfunding activity. However, there is no *increase* in projects immediately before or after, ruling out a spurious correlation related to seasonality.

Furthermore, there is no *decrease* in activity immediately before or after the break, suggesting that the observed increase in activity is not caused by shifting from immediately adjacent periods. If slack time merely leads creators to shift *when* they post their project, then in the absence of holiday weeks there would still be the same number of projects but project postings would occur more evenly across all weeks, rather than disproportionately during breaks. Stated another way, if slack time merely shifts projects in time, then an increase in projects posted during holiday weeks would be coupled with a decrease in projects posted during non-holiday weeks. Furthermore, if creators face a discount rate (they prefer receiving funding sooner rather than later), then weeks that are adjacent to the breaks would have a sharper drop in postings than weeks that are farther away. Thus, under the assumption of time discounting, if slack time shifts projects that would have been posted anyway, then we would expect a particularly sharp decline in the weeks immediately preceding and following the slack period. However, we do not see such a decline in Figure 1. Thus, we interpret these data as implying that slack time generates new project postings.

In Table 4, we exploit variation across types of universities and Kickstarter categories to examine whether the spike in activity is consistent with the type of human capital involved. We do this because although we exploit variation in slack time using university-level data, we measure activity at the city level. Thus, demonstrating that the city level effect (e.g., more technical projects posted on Kickstarter) is consistent with local university-level activity (e.g., holiday week for an engineering school as opposed to an arts school) provides further evidence that is consistent with our interpretation. In Columns 1 to 3, we only use projects in the arts and in Columns 4 to 6 we focus on projects in technology. Holiday breaks at top art, design, film, and theater schools are positively correlated with art projects, but not technology projects. Conversely, holiday breaks at top engineering schools are positively correlated with technology but not art projects, consistent with our expectation that technical orientation plays a key role in these types of projects.

Combined, we interpret this evidence to suggest that slack time causes more projects to be posted on Kickstarter.

4.3 The Mechanism: Mundane, Execution-Oriented Tasks

Next, we explore *why* slack time yields an increase in innovative projects. First, we present evidence that is not consistent with the explanation that students spend more money supporting crowdfunding projects when they are on break. Then, we present evidence that is consistent with the mundane tasks explanation rather than the traditional creativity-related activities explanations. We do not reject the thesis that slack time may also enhance creativity-related activities that drive innovation, but rather we present evidence that suggests slack time also reduces the friction created by mundane tasks that may otherwise hinder the development of some innovations.

4.3.1 Supply of capital from college students?

If holiday breaks provide college students with more time to browse through Kickstarter and fund projects they are interested in, including those by local creators, then this will increase the supply of capital available to Kickstarter projects in college towns. We have data on the location of posted projects but not on the location of funders, so it is difficult to test this directly.

Instead, we conduct two alternative tests. First, we examine the timing of funding associated with projects posted in the week preceding a college break. We examine whether funding for those projects increases during the break. For consistency, we specifically look at 8-14 days after posting. If the slack time effect is due to increased funding by students on a break, perhaps because they have more time to browse projects, then we expect to observe an increase in funding during break weeks for projects posted just prior to the break. However, in Table 5, we report results indicating that funding associated with projects started during a non-break week does not rise during break weeks even though fundraising efforts continue during those weeks.

Second, we examine funding in a category that is particularly likely to be affected by increased student funding, especially in locations with strong engineering programs: video games. In Table 6, we report results indicating that funding for video games is not particularly affected by breaks, even in places with top engineering schools. We also examine the games category and find that there is no significant difference between engineering schools and other schools, and the overall magnitude of the effect is not substantially different from the other categories.

4.3.2 Mundane, Execution-Oriented Tasks

Next, we present evidence that is consistent with the mundane task explanation for the slack time effect on innovation. We focus on tasks associated with posting a project on Kickstarter. Posting a project involves a variety of mundane tasks, even if the creator has fully developed their idea and has a working prototype. Creators must prepare a detailed description of their idea and many also illustrate their idea through a short video (2-3 minutes). This involves describing how the creation works, the progress to date, and a project timeline. In addition, creators must estimate a budget for completing their project and describe line items in the budget. Also, on reward-based crowdfunding platforms such as Kickstarter, the creators must design a schedule of rewards that are a function of the amount of money provided by the backer. The creators must also determine a financial goal (how much they aim to raise), which is not an arbitrary number because if they fail to raise that amount then they receive none of the money that they raised. However, they are able to raise more than the amount specified. Creators must select the length of their fundraising campaign (60 days maximum) and must develop a plan for promoting their project to backers, which may include an email campaign to the network, individual follow-up emails, pitching to the press, social media activity, and possibly hosting an offline event.

We examine the role of mundane tasks by exploiting a change in the design of the platform rules that increases the intensity of mundane tasks required for posting a project in two categories but not the others. In response to a series of high-profile Design and Technology projects that raised a significant amount of capital and then failed to deliver the promised products in the anticipated amount of time (some delivered very late and others failed to deliver at all), Kickstarter changed the requirements for posting projects in those two categories. One of the primary criticisms was that in most of these cases the creators raised capital and promised backers a product without any experience or preparation for production or distribution. Therefore, in May 2012 Kickstarter added additional guidelines and requirements for Design and Technology projects. In a note on how they revised their rules to address accountability concerns, they explain that they now require "creators to provide information about their background and experience, a manufacturing plan (for hardware projects), and a functional prototype. We made this change to ensure that creators have done their research before launching and backers have sufficient information when deciding whether to back these projects."[6] This policy change disproportionately increases the effort associated with mundane tasks, such as describing the creator's background and experience and preparing a manufacturing plan, for projects in Design and Technology. In Table 7, we report results indicating that after the policy change, holiday breaks are associated with a disproportional increase in the number of projects posted in Design and Technology relative to all other categories.

Next, we provide evidence that the increase we observe during breaks is not primarily driven by time for ideation. Specifically, we examine whether the increase in projects posted occurs early or late during breaks. If projects posted during breaks are at the ideation stage or not yet conceived when the break starts, then we expect activity to peak later in the break, when projects are more developed. In contrast, if projects are already well-developed before the break starts and instead students use the time to perform the mundane tasks associated with executing their crowdfunding campaign, then they are more likely to post them early during the break. In Table 8 (Columns 1 and 2), we report results that are more consistent with the idea that most of the increase in activity takes place early in the break (we define early as the first 33% of a break): project postings on Kickstarter are significantly more likely in the first days of a break.

[6] https://www.kickstarter.com/blog/accountability-on-kickstarter (Accessed on March 12, 2015)

Finally, we examine variation in the length of project development time. In Table 8 (Columns 3 and 4), we examine the share of projects with long development time (greater than 60 days) relative to the total number of projects for which we could find development information. We manually code development time by reading the project pages and identifying when the project creator started working on a specific idea. The positive coefficient suggests that the increase in launching new crowdfunding campaigns during school breaks is driven by relatively polished projects that start before the break as opposed to newly born projects developed during the break. It is therefore unlikely that creators increase their launching activity during the break due to more time for ideation and product development.

5 Conclusion

We explore if and how the availability of slack time influences the level of innovation output on a leading crowdfunding platform: when students are on break in a specific region, more projects are posted (and funded) in the same geographic area. The spike in activity is strongly coincident with breaks and follows the type of talent that is affected: when arts schools are on break, artistic projects increase; when top engineering schools are on break, technology projects increase.

Our results suggest that slack time may facilitate performing mundane, execution-oriented tasks that otherwise inhibit innovations from advancing from prototypes to products. Perhaps this is because creators are able to develop their creative ideas during short bursts of spare time, such as during weekends and evenings, while they are at school or work. However, it is plausible that mundane tasks require longer blocks of slack time because, unlike the creative tasks (e.g., creating art for an artist or designing an invention for an engineer), they are unfamiliar or not as fun, inspiring, or energizing as creative tasks. While we can only speculate on why slack time might facilitate mundane tasks, we are on more solid ground when we advance the thesis that slack time drives innovation, and one of the mechanisms through which this occurs is the facilitation of mundane tasks. Indeed, to our knowledge, this is the first study to report empirical evidence suggesting that slack time may play such an important role in innovation due to reducing frictions associated with mundane, execution-oriented tasks as opposed to by facilitating creative activities.

Although our results are consistent with the mundane tasks explanations, they do not rule out other explanations. For example, one plausible alternative explanation is that breaks might create a perception of a "fresh start." Building on ideas related to mental accounting of notional boundaries in time (Soman 2001, Thaler 1999), Dai, Milkman, and Riis (2014) show that temporal landmarks such as the beginning of the year, birthdays, and holidays motivate people to pursue their aspirations. While school breaks do represent temporal landmarks, a fresh start effect should also be present at the beginning of terms. We see no increase in projects posted in the week following a break (see Figure 1), and therefore we suspect that mundane tasks is a more likely explanation, though the reasons are not mutually exclusive and could operate at the same time. Of course, there might be other possible explanations, perhaps rooted in the psychology of procrastination. Nevertheless, we emphasize the mundane tasks explanation because it seems most consistent with our results.

As with any project, our analysis has a number of limitations. First, with respect to the generalizability of our findings, we document that slack time appears to facilitate mundane tasks. This does not rule out the possibility that slack time also supports ideation and product development that increases innovation outputs overall (in addition to the effect we measure where the output occurs specifically during the break). Second, we cannot identify whether particular projects are started by students, professors, or other members of the local community because such information is usually not provided. Thus, our results are strongly suggestive of slack time, but we cannot identify projects as having been posted because specific individuals (students) are on break. In other words, our data do not afford a smoking gun. Third, we cannot pin down the exact reason why school breaks facilitate mundane tasks. We believe it is likely due to lower opportunity cost of time (Catalini 2013) and its effect on entrepreneurial experimentation (Kerr, Nanda, and Rhodes-Kropf 2014), but other explanations cannot be ruled out.

Notwithstanding these limitations, our results inform our understanding of how slack time enhances innovation above and beyond the widely recognized creativity benefits. At the same time, our results raise the question of *why* mundane, execution-oriented tasks create such a friction in the innovation process and, furthermore, why slack time provides at least a partial antidote. We speculate above that this may be due to rational behavior driven by differences in the opportunity cost of time (lower cost during slack time) and the benefits and costs associated with different tasks that provide varying levels of consumption value based on their familiarity and the pleasure creators derive from performing them. Alternatively, this may be due to less rational behavioral biases such as those motivated by perceptions of a "fresh start." Given the importance of innovation to economic growth and competition and the evidence we report in this research linking slack time to innovation, exploring the reason why slack time facilitates the performance of mundane tasks associated with innovation has the potential to be a fruitful topic for future research.

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Table 1: Descriptives for the Main Sample

	Obs.	Mean	Std. Dev.	Min	Max	Total
City-Week level						
Total Projects	1,615,887	0.0603	0.8159	0	75	97,423
-*Total Successful Projects*	1,615,887	0.0360	0.5409	0	49	58,172
-*Total Failed Projects*	1,615,887	0.0243	0.3260	0	40	39,251
Total Funding	1,615,887	609.67	22,583.94	0	10,266,800	985,164,831
-*Total Successful Funding*	1,615,887	552.36	21,990.09	0	10,266,800	892,546,742
-*Total Failed Funding*	1,615,887	57.32	1,699.67	0	617,100	92,618,089
All Holiday Breaks	1,615,887	0.0362	0.1869	0	1	
-*Reading Week*	1,615,887	0.0038	0.0615	0	1	
-*Summer Break*	1,615,887	0.0224	0.1479	0	1	
-*Spring Break*	1,615,887	0.0035	0.0593	0	1	
-*Thanksgiving Break*	1,615,887	0.0001	0.0086	0	1	
-*Winter Break*	1,615,887	0.0073	0.0850	0	1	

The sample includes 5,919 cities and 273 weeks. 496 cities have one of the top 200 colleges nearby. The average length of a reading week break is 2.6 days, of summer break is 107.2 days, of spring is 8.4 days, of Thanksgiving is 6.3 days, of winter break is 28 days.

Table 2: Top 10 CBSAs by Total Funding Raised

(a) Technology Overall

1	Boston-Cambridge-Newton, MA-NH
2	San Francisco-Oakland-Hayward, CA
3	Los Angeles-Long Beach-Anaheim, CA
4	San Jose-Sunnyvale-Santa Clara, CA
5	New York-Newark-Jersey City, NY-NJ-PA
6	Minneapolis-St. Paul-Bloomington, MN-WI
7	San Diego-Carlsbad, CA
8	Austin-Round Rock, TX
9	Seattle-Tacoma-Bellevue, WA
10	Provo-Orem, UT

(b) Technology Per Capita

1	Provo-Orem, UT
2	Boulder, CO
3	San Jose-Sunnyvale-Santa Clara, CA
4	Santa Cruz-Watsonville, CA
5	San Francisco-Oakland-Hayward, CA
6	Boston-Cambridge-Newton, MA-NH
7	Greenville, NC
8	Burlington-South Burlington, VT
9	Salt Lake City, UT
10	Kalispell, MT

(c) Film & Video Overall

1	Los Angeles-Long Beach-Anaheim, CA
2	New York-Newark-Jersey City, NY-NJ-PA
3	San Diego-Carlsbad, CA
4	San Francisco-Oakland-Hayward, CA
5	Chicago-Naperville-Elgin, IL-IN-WI
6	Seattle-Tacoma-Bellevue, WA
7	Boston-Cambridge-Newton, MA-NH
8	Austin-Round Rock, TX
9	Washington-Arlington-Alexandria, DC-VA-MD-WV
10	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD

(d) Film & Video Per Capita

1	Missoula, MT
2	Bennington, VT
3	Los Angeles-Long Beach-Anaheim, CA
4	Ithaca, NY
5	Taos, NM
6	Bozeman, MT
7	San Diego-Carlsbad, CA
8	Jackson, WY-ID
9	Clarksdale, MS
10	Boulder, CO

Table 3: All Holiday Breaks

VARIABLES	(1) Projects	(2) Funding	(3) Log Funding
All Holiday Breaks	0.0294**	515.6985	0.0728***
	(0.0133)	(359.3996)	(0.0171)
City Fixed Effects	YES	YES	YES
Week Fixed Effects	YES	YES	YES
Observations	1,615,887	1,615,887	1,615,887
R-squared	0.008	0.001	0.017
Number of Cities	5,919	5,919	5,919

Robust standard errors clustered at the city level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

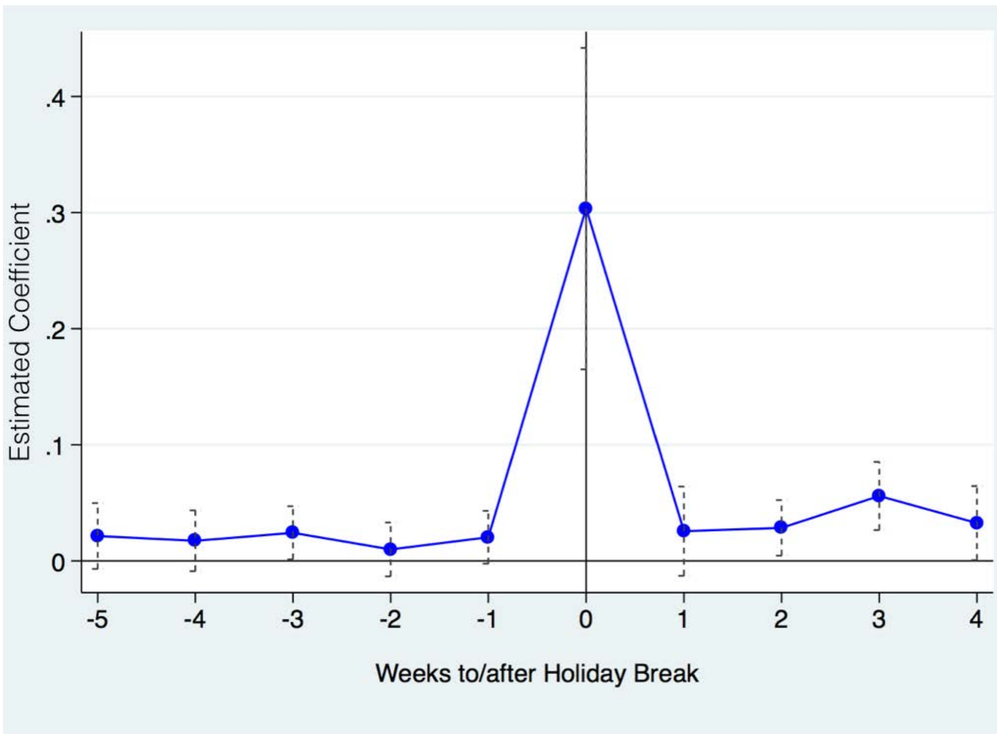

Figure 1: Estimated Coefficient for Weeks Before and After the Holiday Breaks. Dependent Variable is the Number of Projects Created in the Focal City-Week. Regression Includes Week Fixed Effects and City Fixed Effects. Error Bars Represent 95% Confidence Intervals Based on Robust Standard Errors Clustered at the City-Week Level.

Table 4: Projects by University Types

VARIABLES	(1) Art	(2) Art	(3) Art	(4) Tech	(5) Tech	(6) Tech
All Holiday Breaks	0.0016	0.0010	0.0005	0.0001	0.0011*	0.0004
	(0.0012)	(0.0011)	(0.0012)	(0.0007)	(0.0006)	(0.0007)
Holiday at Top Engineering School	0.0096		0.0044	0.0052*		0.0065**
	(0.0071)		(0.0061)	(0.0029)		(0.0032)
Holiday at Top Art, Design,		0.0130**	0.0108**		0.0005	-0.0027
Film, Theatre School		(0.0062)	(0.0045)		(0.0022)	(0.0025)
City Fixed Effects	YES	YES	YES	YES	YES	YES
Week Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	1,615,887	1,615,887	1,615,887	1,615,887	1,615,887	1,615,887
R-squared	0.002	0.002	0.002	0.002	0.002	0.002
Number of Cities	5,919	5,919	5,919	5,919	5,919	5,919

Robust standard errors clustered at the city level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Funding Between Day 8 and Day 14 of a Campaign

VARIABLES	(1) Funding Days 8-14	(2) Log Funding Days 8-14
One Week Before the Break	-126.7508	-0.0101
	(525.5428)	(0.0549)
City Fixed Effects	YES	YES
Week Fixed Effects	YES	YES
Observations	21,587	43,102
R-squared	0.013	0.067
Number of Cities	4,441	5,808

Robust standard errors clustered at the city level in parentheses.
Covariate measured date the campaign launched.
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Projects in Video Games

VARIABLES	(1) Projects	(2) Projects	(3) Projects
All Holiday Breaks	0.0015	0.0014	0.0012
	(0.0012)	(0.0011)	(0.0011)
Holiday at Top Engineering School	0.0023		0.0010
	(0.0037)		(0.0047)
Holiday at Top Art, Design,		0.0032	0.0027
Film, Theatre School		(0.0034)	(0.0044)
City Fixed Effects	YES	YES	YES
Week Fixed Effects	YES	YES	YES
Observations	1,615,887	1,615,887	1,615,887
R-squared	0.003	0.003	0.003
Number of Cities	5,919	5,919	5,919

Robust standard errors clustered at the city level in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7: Share of Projects and Funding in Design and Technology Before and After the Change

VARIABLES	(1) Share of Projects	(2) Share of Projects	(3) Share of Funding	(4) Share of Funding
All Holiday Breaks	0.0012**	-0.0022***	0.0015**	-0.0028***
	(0.0006)	(0.0006)	(0.0006)	(0.0007)
All Holiday Breaks * After the Change		0.0087***		0.0113***
		(0.0012)		(0.0017)
City Fixed Effects	YES	YES	YES	YES
Week Fixed	YES	YES	YES	YES
Observations	1,615,887	1,615,887	1,615,887	1,615,887
R-squared	0.003	0.003	0.003	0.004
Number of Cities	5,919	5,919	5,919	5,919

Robust standard errors clustered at the city level in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8: Projects and Funding Early in the Break, and with Long Development Time

VARIABLES	(1) Projects	(2) Log Funding	(3) Projects with Long Dev. Time	(4) Funding with Long Dev. Time
All Holiday Breaks	0.0173	0.0599***	0.0011**	2.7457
	(0.0112)	(0.0166)	(0.0005)	(5.3684)
All Holiday Breaks * Early	0.0488***	0.0519***		
	(0.0131)	(0.0178)		
Observations	1,615,887	1,615,887	1,615,887	1,615,887
R-squared	0.008	0.017	0.001	0.000
Number of city_code	5,919	5,919	5,919	5,919

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1