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# BUSINESS BACKGROUND AND COMPLIANCE BEHAVIOR: evidence from libraries

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## Evidence from libraries

## 1. INTRODUCTION

"Books are the best things, well used: abused, among the worst."
– Ralph Waldo Emerson, *American Scholar*, 1837

During the last decades, some authors emphasized the individualistic approach followed by economists and business students. In particular, there is the possibility that undergraduates who major in business would be more likely to free ride or defect from coalitions in collective action situations (Carter & Irons, 1991; Frank, Gilovich, & Regan, 1993; Marwell & Ames, 1981). One implication of this line of reasoning is that studying economics may affect cooperation, or ethical behavior, broadly defined (Ruske, 2015). On the other hand, contributions published since the mid-nineties have challenged that view, by presenting empirical evidence questioning the link between business education and opportunistic behaviors (Delis, Hasan, & Iosifidi, 2017; Frey & Meier, 2005; Godos-Díez, Fernández-Gago, & Cabeza-García, 2015; Yezer, Goldfarb, & Poppen, 1996).

The present paper revisits this debate, by studying the impact of a business education on compliance behavior in a specific type of common-pool resource, an information commons (Hess & Ostrom, 2007a, 2007b; Rosen & Carr, 1997). Employing a novel dataset related to more than 700,000 transactions in distinct libraries during a 10-year period (2006-2015), I estimate the effect of a business major on library performance measures. The data used in this paper presents two advantages for testing the effects of a business education on behavior, when compared to previous contributions. The first advantage relates to its longitudinal aspect: since I am able to follow individual users across time, I present econometric estimations in which I can control for their time-invariant characteristics (fixed effects), an important source of non-observable bias in some settings, as suggested by previous research (Delis et al., 2017). The second advantage refers to the possibility of tracking the behavior of distinct categories of library users (students, professors, and employees) over time, an advantage in terms of external validity, given the usual criticisms on laboratory experiments based exclusively on student subjects (Fréchette, 2015; Kagel, 2009).

Libraries arguably constitute an ideal setting for studying rule compliance, since they clearly establish specific return dates for items checked out by users, and send electronic reminders before (and after) they are due back (Apesteguia, Funk, & Iriberri, 2013). The existence of a number of variables related to library loans – such as dates of devolution, and number of books per user – allows me to build simple performance measures to evaluate compliance in this setting, such as frequency of delays, and the number of books borrowed by individual users, for example (more details below). Additionally, given the confidential nature of the data, I am able to track users according to their personal information, such as identification number, university category (high school, undergraduate, masters, MBA, former student, professor, and employee) and area of study (management, accounting, economics, international relations, advertising, and secretariat). These features of the data allow me to explore distinct combinations of background and user category, while not being limited to student behavior, only.

I anticipate the main result of the paper: when estimating the effects of business background on compliance behavior in libraries, I cannot find a significant effect of such a background on compliance in this specific setting. That is, library users with a business background – such as accounting, economics, or management – do not present statistically significant differences when compared to users with other university backgrounds. This result is in line with recent contributions in business ethics that question the influence of business education on individual orientations and political views (Delis et al., 2017; Godos-Díez et al., 2015). More than that, they have important implications for ethical theories of management (Arıkan, 2018; Melé, 2009; Surprenant, 2017). For example, several standard theories in management, accounting and economics rely on simplistic definitions of opportunistic behavior, such as principal-agent theory (Jensen & Meckling, 1976), transaction cost economics (Williamson, 1985, 2010), and teamwork theory (Alchian & Demsetz, 1972). The results reported in this paper suggest that opportunistic behavior is a hypothesis that is context-dependent, and may need to be reformulated in some occasions.

The remainder of the paper proceeds as follows. Section 2 contains a selective description of the related literature, as well as its relation to the contributions in this paper. Section 3 describes the data and research design employed in the empirical analysis below. Section 4 contains the main empirical results, as well as a related discussion. Finally, section 5 concludes.

## 2. RELATED LITERATURE

This paper brings three main contributions to distinct literatures. First, the results here reported relate to a sparse set of contributions focused on the behavior of economists in laboratory and field settings (Carter & Irons, 1991; Frank et al., 1993; Marwell & Ames, 1981; Yezer et al., 1996). While the latter contributions focus on the sole behavior of economists, this paper evaluates the interactions of library users from distinct areas of knowledge, such as management, accounting, and advertising, following recent contributions that relate the effects of a business education on observed behavior (Delis et al., 2017; Godos-Díez et al., 2015). These results contribute to the literature by contextualizing economists' behavior, when compared to other areas (Cadsby & Maynes, 1998; Fosgaard, Fosgaard, & Foss, 2017; Frey & Meier, 2005; Rubinstein, 2006). By emphasizing differences based on area of expertise, the results in this paper contribute to a better understanding of the effects of specific social factors – such as identity, culture, and social norms – on observed behavior (Acemoglu & Jackson, 2017; Akerlof & Kranton, 2000, 2005; Alesina & Giuliano, 2015; Bénabou & Tirole, 2011; Henrich et al., 2001)[i].

Second, when comparing the behavior of users subject to different kinds of sanctions (monetary and non-monetary), the present paper adds to a transdisciplinary literature on the importance of distinct types of incentives. In fact, there is not a clear consensus among social scientists in terms of the superiority of monetary sanctions over other forms of punishment (Gneezy, Meier, & Rey-Biel, 2011; Kamenica, 2012; Surprenant, 2017). Although there exists some evidence from laboratory experiments suggesting that different types of sanctions can affect behavior through distinct channels (Fehr & Gächter, 2000; Masclet, Noussair, Tucker, & Villeval, 2003), the available evidence presents mixed results, either in terms of natural or field experiments (Bar-Ilan & Sacerdote, 2004; Gneezy & Rustichini, 2000a; Haselhuhn et al., 2012). In this sense, the present paper brings new results to an open debate, by evaluating the behavior of users responding to distinct types of incentives in a field setting[ii].

Finally, the results here presented dialogue with an established literature in social dilemmas, with a special emphasis on common-pool resource management (Demsetz, 1967;

Hardin, 1968; Olson, 1965; Ostrom, 1990, 1999, 2010). Although there exists a large volume of evidence related to social dilemmas in artificial settings – such as laboratory experiments (Dawes & Thaler, 1988; Falk & Heckman, 2009; Kagel, 2009) – the present paper reports results in a field setting, along the lines of recent studies (Fehr & Leibbrandt, 2011; Gneezy, Leibbrandt, & List, 2016). Most previous contributions in the literature emphasized examples related to themes such as forests, fisheries, and wildlife in general (Cárdenas, 2003; Dietz et al., 2003; Fehr & Leibbrandt, 2011; Ostrom, 2007; Rustagi, Engel, & Kosfeld, 2010). Here, I present an example of application related to an information commons. On the other hand, it is worth noting that most contributions related to the inner workings of libraries have not explored collective action problems, such as those related to public goods provision and common-pool resource management (Getz, 1989; Koechlin, 2010; Paloheimo, Lettenmeier, & Waris, 2015). This paper differs from previous contributions by expanding the scope of analysis and focusing on the internal dynamics of an information commons (Bollier, 2007; Hess & Ostrom, 2007a, 2007b)[iii].

## 3. MATERIAL AND METHODS

*Data and Variables*

I study the behavior of library users covering more than 700,000 transactions during a 10-year period. I have access to confidential daily data related to library users of a private university in São Paulo, Brazil, for the 2006-2015 period. The data contain detailed information on 16,232 individual users, covering 723,798 daily transactions. This corresponds to an unbalanced panel, since each user may borrow different numbers of specific library items at distinct moments. For example, one user may borrow two books on March 1st, and then borrow one more book on March 3rd, before returning previous items. The data is available in electronic format through a system named *Pergamum* (https://www.pergamum.pucpr.br), which provides technology services for several libraries in Brazil.

The data contain information on users' socioeconomic characteristics – such as gender, date of birth, and address – as well as library's confidential information, with each user's identification number, university category (high school, undergraduate, master's, MBA, former student, professor, and employee) and area of study (management, accounting, economics, international relations, advertising, and secretariat). For each user in the data, I am able to identify her department and category. The data also contain the dates when each user borrowed specific items from the library, as well as each item's code, and title. Based on each title, I build a measure of area of expertise for each book in the sample, such as management, accounting, economics, and law.

One important information regarding the libraries studied in this paper relates to their location and size. These libraries belong to different *campi* of the same university, two located in central neighborhoods in São Paulo (Liberdade and Largo do São Francisco), and one located in an upper-class neighborhood (Pinheiros). The Liberdade unit is the oldest and largest library of the three: founded in 1902, it contained 31,193 books in the 2015 year. In the case of the Largo do São Francisco (San Fran) unit, it dates from 2006, containing 2,883 books, in 2015. Finally, the Pinheiros unit dates back to 2011, having 883 books.

I also have access to the library's official yearly reports. These reports contain rich institutional information related to the library's internal workings, for the 2005-2015 period. Based on this information, I am able to estimate the predicted devolution date for each user in the sample. Table 2 presents information related to the workings of the libraries studied in this paper. The table's first column contains information on the number of library items that each

user can borrow, based on the category that she belongs (named "Item Counts"). The table's second and third columns contain the number of loan days per user category ("Loan Days"), as well as the distinct types of sanctions they face in the case of delays ("Sanction Type"), respectively:

Table 2
Library rules by user category, 2006-2015

| USER CATEGORY | Item Counts | Loan Days | Sanction Type |
|---|---|---|---|
| High School Student | 5 | 7 | Fine |
| Undergraduate Student | 5 | 7 | Fine |
| Masters Student | 7 | 15 | Fine |
| MBA Student | 5 | 7 | Fine |
| Former Student | 2 | 7 | Fine |
| University Employee | 3 | 7 | Daily Suspension |
| Professor | 7 | 15 | Daily Suspension |

Source: authors' calculations, based on library data.
Notes: (a) Observations correspond to the 2006-2015 period, covering 723,798 transactions by 16,232 library users.

In this specific case, the library's electronic system (*Pergamum*) imposes a rule of 15 days for non-student and masters' students, and seven days, for all other users. Each user can renew books after the predicted devolution date expires, conditional on a waiting list managed by library staff. Although I do not have access to information on such lists' content, I can observe when users renew library items by comparing the dates of loans of the same item over time. There are also differences in terms of the number of items that each user can borrow from the library: while professors and masters' students can borrow a maximum limit of seven items, students can borrow a maximum of five, while university employees can borrow three items, only.

Table 3 presents descriptive statistics for the main variables used in the paper. The table's first and second columns display mean values for each variable, as well as standard deviation values, respectively. The third and fourth columns contain minimum and maximum values:

Table 3 - Main variables' descriptive statistics, 2006-2015

| VARIABLE | Mean | Std.Dev. | Minimum | Maximum |
|---|---|---|---|---|
| Age | 26.28 | 7.55 | 13 | 79 |
| Female | 0.53 | 0.50 | 0 | 1 |
| Business | 0.84 | 0.37 | 0 | 1 |
| Delays | 1.42 | 8.16 | 0 | 2,527 |
| Book Count | 2.65 | 1.42 | 1 | 7 |
| Early Return | 0.39 | 0.49 | 0 | 1 |
| First Year | 0.22 | 0.41 | 0 | 1 |
| Scholarship | 0.37 | 0.48 | 0 | 1 |
| 0 to 4 years in College | 0.89 | 0.31 | 0 | 1 |
| High School | 0.02 | 0.13 | 0 | 1 |
| Undergraduate | 0.66 | 0.48 | 0 | 1 |
| MBA | 0.21 | 0.41 | 0 | 1 |
| Graduate | 0.04 | 0.20 | 0 | 1 |
| Former Student | 0.04 | 0.20 | 0 | 1 |
| University Employee | 0.01 | 0.08 | 0 | 1 |
| Professor | 0.02 | 0.15 | 0 | 1 |
| Management | 0.33 | 0.47 | 0 | 1 |
| Accounting | 0.37 | 0.48 | 0 | 1 |
| Economics | 0.14 | 0.35 | 0 | 1 |
| International Relations | 0.05 | 0.21 | 0 | 1 |
| Advertising | 0.04 | 0.20 | 0 | 1 |
| Secretariat | 0.02 | 0.14 | 0 | 1 |
| Observations | | 723,798 | | |

Source: authors' calculations, based on library data.
Notes: (a) Observations correspond to the 2006-2015 period, covering 723,798 transactions by 16,232 library users.

For the main period of analysis in this paper (2006-2015), I observe 723,798 library transactions, made by more than 16,000 users. These users are, on average, 26 years old, with similar proportions in terms of gender. Among these users, 22% are in their first year in college, while 37% holds a scholarship. In terms of categories, most library users are either undergraduates (66%) or MBA students (21%). In terms of areas of study, the vast majority of users have a background in either accounting (36%), management (33%), or economics (14%), with a total proportion of 84% users with a business background. The other users have a background in international relations (5%), advertising (4%), and secretariat (2%), as well as other courses which do not have a precise business definition. This is an intuitive result, given the fact that the university in which the libraries are located corresponds to a business school. When looking at the library's books, a similar pattern reappears: one-third of these books correspond to business books, with accounting and economics books jointly responding for more than 30% of the total.

*Empirical Specification and Testable Hypotheses*

Here I describe the empirical strategy employed in the paper. Given the above mentioned references relating business background and compliance, I want to test the following hypothesis:

$H_1$: library users with a business background tend to present, on average, worst performance than users with a non-business background, in terms of rule compliance.

To assess the importance of a business background on compliance in this setting, I estimate (1) via Ordinary Least Squares (OLS):

$$(1) \quad Y_{ist} = \alpha + \beta(\text{Business}) + X_{ist}\gamma + Z_{st}\lambda + \delta_t + \theta_{st} + \varepsilon_{ist}$$

In the case of the above specification, $Y_{ist}$ represents the delay for an individual user *i*, in library *s*, at instant *t*. The term "*Business*" corresponds to an indicator variable, which assumes unity value for users with a business background, and 0, otherwise. We include user and book fixed-effects as controls in the regressions below (captured by the term $\alpha$), as well as time trends ($\delta_t$). We also consider alternative ways to control for the existence of distinct time trends in distinct libraries, by including monthly and yearly trends for each library in the sample (captured by the $\lambda$ and $\theta$ terms). In the case of the term $\varepsilon_{ist,}$ it has a conditional mean of zero ($E(\varepsilon_{ist} \mid s, t) = 0$). The parameter of interest in this context is $\beta$, which measures the effects of a business education on compliance. It is important to note that the estimates reported herein do not have a causal interpretation.

## 4. EMPIRICAL RESULTS

In this section, I present the main results of the empirical analysis performed in the paper. Table 5 contains the results of OLS estimations for the 2006-2015 period. In the table, the dependent variable corresponds to delays per user in the period, measured in days. The table's first column corresponds to an econometric specification for equation (1) with no controls. In the table's second column, I add a rich set of user-related covariates to capture their time-invariant characteristics (fixed effects): gender, age group, area of study, and time at school. In the third column, I also include library characteristics, such as their location, staff size, and book areas (accounting, management, economics, and law). In the fourth and fifth columns, I repeat the previous specification, but I include interactions between libraries and months, and libraries and years, respectively. I do this to control for distinct types of time trends that may affect the results, given the extended period covered in the sample (2006-2015). In the case of all estimations, I cluster standard errors by the number of courses offered at the university[iv].

Table 5
Effects of Business Background on Delays – OLS Estimates, 2006-2015

| VARIABLES | (1) Delays (OLS) | (2) Delays (OLS) | (3) Delays (OLS) | (4) Delays (OLS) | (5) Delays (OLS) |
|---|---|---|---|---|---|
| Business | -0.00 | -0.01 | -0.02 | -0.02 | -0.02 |
| | (0.037) | (0.020) | (0.020) | (0.021) | (0.021) |
| User Fixed Effects | No | Yes | Yes | Yes | Yes |
| Library Fixed Effects | No | No | Yes | Yes | Yes |
| Libraries x Months | No | No | No | Yes | Yes |
| Libraries x Years | No | No | No | No | Yes |
| Observations | 723,798 | 723,798 | 723,798 | 723,798 | 723,798 |
| Adj. R-squared | 0.000 | 0.191 | 0.192 | 0.219 | 0.229 |

Notes: (a) The dependent variable in the specifications corresponds to the average delays (in days) per user in each library studied in this paper. (b) Standard errors clustered by course (reported in parentheses). (c) "User Fixed Effects" correspond to a set of dummies for users' gender (female = 1), academic financial support (scholarship = 1), group ages (18-23, 24-30, 31-40, 41-50, 51-60, 60+), category (undergraduate, masters', graduate, and former student, employee, and professor), and time at school (0 to 4 years). (d) "Library Fixed Effects" correspond to a set of dummies for each library in the sample, as well as their books (management, accounting, economics, and law). (e) The terms "Libraries x Months" and "Libraries x Years" correspond to interactions between libraries and months and libraries and years, respectively. (f) Statistical

significance: * p < 0.10, ** p < 0.05, *** p < 0.01.

One main result emerges from the table: there is not a statistically significant effect of library users' business background on book delays. Although there are differences in terms of the adequacy of each specification (given by the values of the adjusted coefficient of determination, $R^2$), I find no effect of business background over delays. Although this is an interesting result, it could be biased because of the variable used to measure compliance in this setting. Given this possibility, I investigate the effects of business background on compliance using alternative measures of performance in the library.

In table 6, I present estimates in which I substitute the dependent variable with alternative measures of library users' compliance. These variables are the following: the effective duration of loans (in days), the proportion of early devolutions, the frequency of delays, the number of books borrowed by each user, and the number of fines imposed on them. Given the distinct nature of each one of these dependent variables, I employ different estimation methods in the case of each variable. In the first column of the table, I present the results of OLS estimations, correlating business background and loans' effective duration. In the second and third columns, I present results of Probit estimations, since the dependent variables in these columns correspond to a proportion between zero and one. In the fourth and fifth columns, I employ count-data models, based on the Negative Binomial distribution. I employ such models, since the dependent variables in these columns correspond to count data (non-negative integer numbers), with overdispersion patterns. In the case of each specification, I include a full set of covariates to capture distinct types of fixed effects, as well as interactions between libraries and months, and libraries and years:

Table 6
Effects of Business Background on Library Compliance Measures
OLS, Probit and Negative Binomial Estimates, 2006-2015

| VARIABLES | (1) Eff.Duration (OLS) | (2) Early Devolution (Probit) | (3) Freq.(Delays) (Probit) | (4) Number of Books (Neg.Binomial) | (5) Number of Fines (Neg.Binomial) |
|---|---|---|---|---|---|
| Business | -0.02 | 0.05 | -0.04 | -0.01 | 0.03 |
| | (0.032) | (0.074) | (0.047) | (0.038) | (0.070) |
| User Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Library Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Libraries x Months | Yes | Yes | Yes | Yes | Yes |
| Libraries x Years | Yes | Yes | Yes | Yes | Yes |
| Observations | 723,798 | 723,798 | 723,798 | 723,798 | 723,798 |
| Adj. R-squared | 0.144 | | | | |
| Pseudo R-squared | | 0.111 | 0.202 | | |
| Log-Likelihood | | | | -1236724.7 | -298551.98 |

Notes: (a) The dependent variable in the specifications corresponds to the effective duration of library loans (in days) per user (first column), the proportion of early devolutions (second column), the frequency of delays per user (third column), the number of books borrowed per user (fourth column), and the number of fines per user (fifth column). (b) Standard errors clustered by course (reported in parentheses). (c) "User Fixed Effects" correspond to a set of dummies for users' gender (female = 1), academic financial support (scholarship = 1), group ages (18-23, 24-30, 31-40, 41-50, 51-60, 60+), category (undergraduate, masters', graduate, and former student, employee, and professor), and time at school (0 to 4 years). (d) "Library Fixed Effects" correspond to a set of dummies for each library in the sample, as well as their books (management, accounting, economics, and law). (e) The terms "Libraries x Months" and "Libraries x Years" correspond to interactions between libraries and months and libraries and years, respectively. (f) Statistical significance: * p < 0.10, ** p < 0.05, *** p < 0.01.

In all cases depicted in the table, I cannot find a significant effect of business background over alternative compliance measures, regardless of measure or estimation method. I present, in table 7, distinct robustness tests to validate the main results reported before. Specifically, I present estimates of the effects of business background on compliance behavior, based on different samples. I do this to verify if the previous results are sensitive to

alternative sample definitions. Each column in the table considers a different sample. In the first two columns, I consider samples based on undergraduates, and students (undergraduates, masters, MBA, and graduate students), only. Since most contributions in the literature focus on the behavior of university students, I replicate the above analysis with these samples to see if the use of specific user categories could affect my results. Results remain the same in this case, indicating that the empirical patterns here reported do not depend on user categories.

In the third column, I present estimates in which I only keep exam weeks in the sample. I consider this specific sample as a test for opportunistic behavior in a library setting. Specifically, if users with a business background are more opportunist than similar users with different backgrounds, then one would expect a higher proportion of delays in times when competition for books is higher, such as exam weeks, for example. Even in the case of this reduced sample, I cannot find a significant effect of business education on compliance.

In the fourth and fifth columns of the table, I test the possibility that my results may be driven by psychological biases of users, such as inattention patterns. Given the increasing amount of information that most people face today, as well as their cognitive limitations, it is not feasible to simultaneously focus their attention on all events they face (Simon, 1955). As a result, inattention behavior may arise in different situations, even when people receive constant reminders to behave in a different manner. Although reminders can work in promoting rule compliance (Apesteguia, Funk, & Iriberri, 2013), there is evidence suggesting that individuals may not meet a deadline even when it is profitable to do so. If inattention affects delays in this setting, then one should expect a higher proportion of delays on dates in which procrastination play a predominant role, such as days before weekends or holydays, as suggested by previous contributions in finance (DellaVigna & Pollet, 2009), for example. This is the reason why I consider samples based on days before holydays (fourth column) and Fridays (fifth column).

Table 7
Robustness: Selected Samples
OLS Estimates, 2006-2015

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| VARIABLES | Undergraduates Only | Students Only | Exam Weeks | Holydays(t – 1) | Fridays |
| Business | -0.02 | -0.02 | -0.00 | -0.04 | -0.03 |
| | (0.027) | (0.021) | (0.032) | (0.025) | (0.018) |
| User Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Library Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Libraries x Months | Yes | Yes | Yes | Yes | Yes |
| Libraries x Years | Yes | Yes | Yes | Yes | Yes |
| Observations | 474,148 | 672,133 | 75,940 | 7,032 | 104,304 |
| Adj. R-squared | 0.206 | 0.228 | 0.250 | 0.240 | 0.248 |

Notes: see table 5 above.

A first inspection of the robustness checks presented in the table confirm that the previous results remain virtually the same, in the case of alternative samples. These results lend confidence to the claim that there is not a significant effect of business education on compliance behavior in the library setting studied in this paper.

## 5. CONCLUSIONS AND DISCUSSION

The present paper studied the impacts of business background on rule compliance in an information commons (libraries). Employing a novel dataset related to more than 700,000 transactions in distinct libraries during a 10-year period (2006-2015), I estimate the effects of a business major on library performance measures, by comparing the behavior of distinct categories of users (students, professors, and employees) over time, while controlling for their time-invariant characteristics. The results obtained suggest that there is no evidence of a

significant effect of business education on compliance behavior in this specific setting. These results are in line with recent contributions in business ethics that question the influence of business education on important behavioral traits, such as individual orientation, cooperation and political views (Delis et al., 2017; Frey & Meier, 2005; Godos-Díez et al., 2015).

In terms of strengths, this paper is probably one of the first attempts to evaluate individual behavior in an information commons. While most of the literature on the theme concentrated on determining precise definitions of related terms (Bollier, 2007; Hess & Ostrom, 2007a, 2007b; Rosen & Carr, 1997) – such as the new role of libraries in the digital age, or the diffusion of the Internet – there were few efforts aimed at empirically testing the predictions derived from the characteristics of an information commons. Additionally, it is worth noting that the repeated-measure nature of the phenomenon here studied constitutes a strength of this paper (since users borrow different library items over time), given that most collective-action situations reported in laboratory and field experiments involve repeated interaction (Andreoni & Croson, 2008; Cárdenas & Ostrom, 2004; Ostrom, 2000). In fact, contrarily to most research related to laboratory experiments, in which there is the possibility that part of the subject pool start gaming the experimenter – generating "experimenter demand effects" – the longitudinal data used in this paper allow me to observe individual behavior in a real-world setting during distinct moments of time, not being subject to such a bias.

In terms of limitations, the results here presented may lack external validity, since I study user behavior in different libraries of the same university. Although there seems to be considerable diversity among library units and their users, one may argue that these results could reflect a very specific institutional setting. Similarly, there is a well-known criticism related to laboratory experiments, stating that their exclusive reliance on student behavior may compromise external validity (Fréchette, 2015; Kagel, 2009; List, 2011). In this case, one advantage of the present findings is that they focus on the behavior of distinct users, such as professors, high school, undergraduate and graduate students, as well as university employees. This feature of the data lends confidence against such criticisms, at the same time that presents some of the advantages related to behavior observed in field settings (Apesteguia et al., 2013; Cárdenas & Ostrom, 2004; Fehr & Leibbrandt, 2011).

The results reported in this paper have direct implications for established explanations for organizational behavior, such as teamwork, transaction-cost, and principal-agent theories. In the case of teamwork, these results provide valuable insights for policies that take place inside organizations, given their increasing importance over the last decades (Hu & Liden, 2015; Jones, Wuchty, & Uzzi, 2008; Wuchty, Jones, & Uzzi, 2007). In particular, a traditional question in organization studies relates to the difficulty of measuring distinct members' contributions to teamwork, given the possibility of free-riding behavior (Alchian & Demsetz, 1972; Croson, 2008). Since some organizations have similar characteristics to common-pool resources – such as non-exclusion and rivalry – the results in the present paper may help distinguishing which incentives affect employee cooperation at different points in time, having important implications for organizational behavior and ethical theories (Melé, 2009; Mills & Rudnicki, 2015; Peredo & Chrisman, 2006). For example, a manager inspecting the performance of employees located at different plants could try to elicit differences in behavior during specific times of the day as a means to understand the determinants of cooperation in team arrangements.

In terms of transaction-cost theories, given their reliance on a specific type of opportunistic behavior (the "holdup problem") for contract design and vertical integration (Klein, 1990; Klein, Crawford, & Alchian, 1978; Williamson, 1985, 1996), one current challenge in organizations would be to understand which factors affect such behavior. A particular interesting line of inquiry would be to evaluate the antecedents of opportunistic behavior, as a means to provide more realistic definitions for theories that rely on such a

concept (Arıkan, 2018). In this regard, the analysis could extend to other real-world settings involving the possibility of holdup behavior. A particularly promising direction would be to run field experiments inside organizations, as originally suggested by Bandiera, Barankay, and Rasul (2011). In this case, managers could gather valuable insights from observing situations involving social dilemmas in a real-world setting.

In the case of agency theories (Jensen & Meckling, 1976), the results here reported suggest the occurrence of heterogeneous behavioral responses among library users in terms of the incentives they face. Given that distinct categories of users face different types of sanctions, these results call attention to the importance of incentives in organizations, by suggesting possible complementarities between sanctions in social dilemmas. For example, when dealing with situations similar to common-pool resource management, decision makers could think about employing gradual monetary sanctions as a means to induce behaviors that would improve efficiency in the organization as a whole (Bar-Ilan & Sacerdote, 2004; Haselhuhn et al., 2012; Surprenant, 2017).

Future research could benefit from an increasing focus on behavior in distinct settings. Although there were significant contributions in this direction coming from the work of Elinor Ostrom and coauthors (Dietz et al., 2003; Ostrom, 1990, 1999, 2005, 2010; Vollan & Ostrom, 2010), there is still room for improvement, either in terms of field or natural experiments. In this case, it is worth citing two novel contributions. Fehr and Leibbrandt (2011) present results of laboratory and field experiments focused on the behavior of Brazilian anglers in a lake, a typical example of a common-pool resource. In a similar spirit, Gneezy, Leibbrandt, and List (2013) study the evolution of social norms among anglers, conditional on their working routines. In both cases, the authors stress the importance of psychological traits predicting observed behavior in the field, as well as the importance of jointly considering the results of laboratory and field experiments, when evaluating social dilemmas. While there is a growing literature on experiments in several areas, such as economics and business (Falk & Heckman, 2009; Kagel, 2009; Smith, 1989), it seems clear that the current research on common-pool resource management could benefit from a tendency to blend the results of laboratory and field experiments.

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[i] Colander (2007), Colander and Klamer (1987), and Leijonhufvud (1973) correspond to examples of studies focused on the specific behavior of economists. See Cadsby and Maynes (1998), Delis et al. (2017), Fosgaard et al. (2017), and Godos-Díez et al. (2015) for studies related to broader contexts.

[ii] Additionally, and related to the latter point, it is worth noting that the paper contributes to a growing literature related to white-collar crime in distinct organizational settings (Fisman & Miguel, 2007; Levitt, 2006; Posner, 1980; Ruske, 2015).

[iii] See Andreoni and Croson (2008), Andreoni, Harbaugh, and Vesterlund (2008), Fehr and Gächter (2000), Gneezy, Leibbrandt, and List (2016), and Henrich et al. (2001) for examples of laboratory and field experiments related to public goods provision. Chaudhuri (2011), Ledyard (1995), and Zelmer (2003) correspond to surveys on the theme. In the case of studies related to common-pool resource management, see Bardhan (1993), Cárdenas (2003), Cárdenas and Ostrom (2004), Dietz, Ostrom, and Stern (2003), Fehr and Leibbrandt (2011), Ostrom (1990, 1999, 2000, 2005), Rustagi, Engel, and Kosfeld (2010), Vollan and Ostrom (2010), and Wilson, Ostrom, and Cox (2013).

[iv] There are 47 courses in the university during the 2011-2015 period. These courses differ from the areas of study (management, economics, accounting, international relations, advertising, and secretariat) that a student may choose when she enrolls in the university.