Procrastination with flexible deadlines:

Can it wait?

Panagiotis Giannarakis, **Emanuela Lotti and Jana Sadeh**
(University of Southampton)

No. **2303**

Procrastination with flexible deadlines: Can it wait?

Panagiotis Giannarakis*   Emanuela Lotti   Jana Sadeh

May 26, 2023

Abstract

This work analyses the link between procrastination on long-duration assessment and academic performance in an environment with flexible deadlines. We show that there is a negative correlation between date of submission and assessment marks which, after controlling for various confounding factors, suggests that academic procrastination has a negative impact on academic performance. The results suggest also that further work is needed in identifying the most appropriate assessment structure of long-duration assessments and in introducing interventions aimed at reducing academic procrastination.

Deadline Extensions Higher Education Time Preference.

1   Introduction

Procrastination, or what economists term *present bias* is also, more generically known as *present-focused preferences*. It is the irrational delay of an intended course of action. This has been linked to poorer real-world outcomes, such as poorer job outcomes (DellaVigna & Paserman (2005)) and inadequate pension savings (Laibson, Repetto, Tobacman, Hall, Gale & Akerlof (1998)). It is also associated with sub-optimal outcomes in education environments (Han, Li & Parsons (2019), Steel (2007), Kim & Seo (2015),

---
*Mailing Address: Department of Economics, University of Southampton, Southampton, SO17 1BJ, United Kingdom. Email: P.Giannarakis@soton.ac.uk

Nicholls (2023)). In light of this, higher education providers have an interest in understanding the impact of student procrastination on academic performance in different assessment structures and in identifying ways to support students counter their procrastination tendencies. Module structure, information interventions and scaffolded assessment can encourage students to perform at the best of their abilities (Agnihotri, Baker & Stalzer (2020), Saplavska, Jerkunkova et al. (2018)). Understanding how the rigidity of assessment deadlines is impacting grades is an important input to this process. This paper focuses on the flexibility of deadlines and the impact this has on student procrastination. We use a relaxation in the extension and extenuating circumstances policy in a Russell Group University [1] on the ability to submit coursework late introduced during COVID as a response to student concerns on the impact of the pandemic on their academic performance to capture the impact in the deadline rigidity on procrastination.

Students are exposed to different kinds of assessment. Structured and independent learning are both parts of the learning journey for an undergraduate student, with some assessment requiring a higher degree of independence. Less structured assessment and long-duration coursework present a larger challenge for controlling procrastination. We use an undergraduate literature review project, a one-semester long piece of independent coursework undertaken by third year undergraduates, as a typical long-duration assessment.

Students who are able to follow through with their plans to complete their work (and not procrastinate) are often able to submit their coursework on time, even if personal circumstances might intervene to interrupt their schedule. We follow Cormack, Eagle & Davies (2020), Agnihotri, Baker & Stalzer (2020) and use the timing of submission of coursework as a proxy for procrastination. The group of students who submit their work late, can be thought of as individuals who were unable to deal with changes in their time availability (due to illness, or other personal circumstances) as a result of procrastination. In order to account for those students who submit late due to major unforeseen events in the weeks leading up to the deadline, rather than procrastination, we distinguish two subgroups of students who submit late. The first comprises of those who use the special COVID relaxation

---

[1]The University of Southampton, a founding member of the Russell Group, which includes 24 of top UK universities that are aiming to maintaining the highest research and teaching standards.

in University policy to excuse their late submission and those who report personal circumstances that are related to the more rigid (pre-COVID) policy referred to as "special considerations". By University of Southampton UoS (2021) policy these refer to "exceptional circumstances outside of the student's control, that may have a negative effect upon performance or ability to meet a deadline or to sit an examination". These typically include bereavement, serious short-term illness or significant adverse personal circumstances.

Evidence shows that requests for extensions have increased considerably over the last 2-3 years [2]. Figure 1 illustrates the increase in requests from 5-10% in 2019-20 to more than 20% in 2022 in the undergraduate literature review following the University policy relaxation. We use this change to analyse the impact of procrastination on academic performance. We show that submitting late the literature review has a negative impact on students' performance. This result is significant after controlling for topic, supervisor, 'ability' and programme of study. Our results further support the view that a more structured approach in setting deadlines for long-duration assessment can be an effective measure to improve academic performance of students who have the tendency, for various reasons, to postpone tasks associated with the completion of a long-duration piece of assessment.

2 Related work

Procrastination is something that many students will admit to doing (Solomon & Rothblum (1984), Steel (2007)) with estimates going as high as 90% of students self-identifying as procrastinators (Ellis & Knaus (1979)). In students, it manifests as poor time management leading to postponement of studying for exams and working on coursework, things that are generally considered to be poor study habits. Procrastination persists, despite the fact that there are numerous studies linking it to poor health outcomes such as stress, depression and anxiety (Tice & Baumeister (1997), Solomon & Rothblum (1984),

---

[2]Over the period in question, the undergraduate dissertation was subject to two changes. The weighting of the literature review increases by 10% and the deadline moved from before to after the Christmas break. While we can't provide a quantitative answer, we believe that the two changes offset each other with a negligible impact on extensions.

Figure 1: Approved Extension Requests by Academic Year
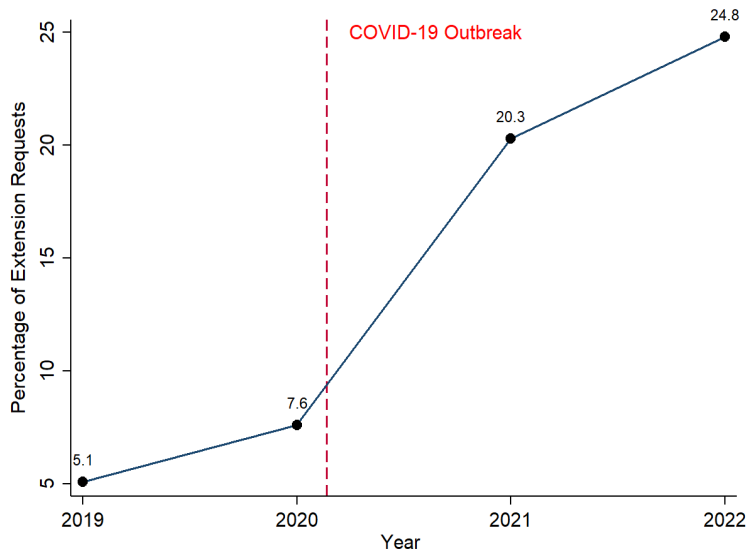
Rozental, Forsell, Svensson, Forsström, Andersson & Carlbring (2015), Lee (2005), Kader (2014), Saplavska, Jerkunkova et al. (2018)).

In addition, education literature supports the *a priori* expectations of educators, that such poor study habits are linked to poorer academic performance (Han, Li & Parsons (2019), Steel (2007), Kim & Seo (2015), Agnihotri, Baker & Stalzer (2020), Nicholls (2023), Cormack, Eagle & Davies (2020)), especially when the assessment format is of the coursework type (Kim & Seo (2015)). This is potentially linked to low self-confidence and evaluation anxiety (Solomon & Rothblum (1984)). Despite this clear evidence most students are unaware of the extent of the negative impact of procrastination on coursework (Shaked & Altarac (2022)).

Fedyk (2021) suggests that people are nuanced in their understanding of procrastination. When contrasting their own tendency to procrastinate with those of others people indicate high levels of sophistication in estimating others' tendency to procrastinate but are overconfident in their abilities to stay on track.

Measuring procrastination can present some challenges, While most of the studies rely on **self reported measures** (Solomon & Rothblum (1984), Saplavska, Jerkunkova et al. (2018), Ferrari & Scher (2000)), there is a growing body of work making use of **learning analytic measures** (Cormack, Eagle & Davies (2020), Agnihotri, Baker & Stalzer (2020)). This literature

4

is able to pinpoint, using electronic timestamps, the time and frequency of interaction with online content and ascertain the pace the students are taking on their studies. The wealth of online data created by the switch to online submissions and learning brought on by the COVID pandemic has provided much richer data sets in this area. The choice of measure in itself is important. Kim & Seo (2015) find that the relationship between procrastination and performance is dependent on the choice of measure of performance used, with self-report scales performing worse than observable measures.

This richer data allows researchers to not only ascertain the submission time of coursework but also the time when the students start interacting with it. This has generated interesting findings, such as the fact that a key driver of the link between procrastination and poorer academic performance could be the delay in actually starting the work (Franz (2020)). Agnihotri, Baker & Stalzer (2020) find that students starting work habitually late have a 21% higher probability of failing their course.

While lots of studies have looked into this relationship, a meta-analysis carried out by Kim & Seo (2015) finds large variation in correlations that emerge from the literature. In addition, being unable to meet deadlines is not universally considered to be a negative. Some authors posit that deadlines are merely social constructs that do not improve student outcomes (Thierauf (2021)) and allowing students to set their own deadlines can support improved learning. This suggests that there is still room for a stronger consensus on whether clear and rigid deadlines support student outcomes.

2.1   Why do we procrastinate?

Characteristics of students

Different behavioural traits exhibited by students may make them more prone to procrastination behaviour. Traits such as lack of self-control, being easily bored or distracted, poor organisational skill (Steel (2007)) and self-discipline (Van Eerde (2003)) have been linked to displays of procrastination and delays in submission of coursework. This itself is strongly linked with economic concepts of intertermporal preferences, discounting behaviour and present bias (Shamosh & Gray (2008)).

Individual preferences and characteristics are, by their nature, heterogeneously spread in the population. Han, Li & Parsons (2019) identify a subgroup of students they term "active procrastinators" who get higher than

average grades following an deadline extension. The distinction between active and inactive procrastinators is, *a priori*, hard to make prior to submission and grading, but it is clear that procrastinating may be a beneficial strategy to a subgroup of students for whom it is an intentional course of action.

There is some evidence of a gender effects in procrastination, with Han, Li & Parsons (2019) finding that females exhibit a higher propensity to do this. In contrast Whillans, Yoon, Turek & Donnelly (2021) find women are less likely to ask for extensions when facing deadlines that are potentially adjustable, and this leads to time stress and burnout. Solomon & Rothblum (1984) find that fear of failure is the main driver for procrastination for females.

The time students are in higher education seems to influence their procrastination habits, with those in their final year procrastinating the most according to Semb, Glick & Spencer (1979).

Task characteristics

The characteristics of the task itself are also a factor that influences the level of procrastination, Task aversion is the most cited causes for procrastination (Han, Li & Parsons (2019), Paden & Stell (1997)). Students may procrastinate if the task assigned is particularly unpleasant and conveys high levels of anxiety (Ferrari & Scher (2000)). The more familiar students are with a task and the less daunting it seems, the less procrastination seems to play a role. This is corroborated by Solomon & Rothblum (1984) who identify task aversion and fear of failure as the two main drivers for procrastination. The effect of task aversion is stronger the larger the distance between the present date and the deadline (Ferrari & Scher (2000)).

A third element, the perceived importance of the task is also identified by Paden & Stell (1997) as one of the principal elements that influence the degree of procrastination together with task appeal and difficulty.

2.2   Procrastination in Economics

There have been a limited number of papers in the economics education literature to focus on the relationship between procrastination and academic performance. Kader (2014) finds a significant negative impact of procrastination on student performance in two first year modules when coursework submission is used as a measure of procrastination. However, the negative

impact might be linked with their need to develop study skills as they transition into higher education. A second paper, by Nicholls (2023) also analyses the relationship between procrastination and academic performance in economics modules. This paper applies a learning analytic approach, using a large data-set which allows for the use of individual fixed effects. The author tests the impact of two different nudges on submission times but no effect was identified.

In this paper, we focus on a long duration assessment in a final year dissertation module where we expect that students on their third year should have 'mastered' the different level of independent studies required at University level. As in Kader (2014) and Nicholls (2023) we are also investigating the relationship between an objective measure of procrastination and academic performance in Economics. However, we focus on investigating the impact of procrastination specifically on long duration assessment in an environment where deadlines are malleable (where a no-questions asked 2 week extension is available to students). We do this by exploiting the change in policy on extensions and special considerations as a result of COVID.

This work contributes to the literature on procrastination and academic performance by testing the hypothesis that a more relaxed approach to deadlines leads to improved grades. Our results show that, in fact, grades for those granted extensions decrease, even when controlling for other potential confounds such as ability. We also discuss potential intervention strategies aimed at reducing such procrastination on long term assessment.

3 Methodology

3.1 Extension Request Policy

Shortly after the introduction of the first COVID lockdown in the UK (March 2020), it became apparent that Higher Education institutions had to reevaluate both the delivery of teaching and the assessment strategy. This put coursework deadlines in the spotlight. In the middle of the second semester of the 2019-20 academic year, students suddenly lost access to the resources available on campus and to the face-to-face support from academics. As a result, discussions started at local level in which academics shared concerns about the feasibility and practicality of asking students to submit evidence of medical conditions (doctor's letters etc.) to support requests for exten-

sions. This was formalised with the introduction of a policy that allowed the Student Office to automatically grant extensions up to two weeks to any students who requested it. This was in essence, a 'no questions asked' policy at the University of Southampton (UoS), a UK Russell Group University, which during the first wave of Covid cases in UK did not require students to submit evidence in order to be granted a two-week extension. At the UoS, the 'no question ask' policy was in place up to the end of July 2021. From 1 August 2021, the rules changed slightly and we entered a transitional phase. While students could continue asking for extensions but some evidence was preferred. The actual phrasing was "We will continue to considerately review requests for extensions that include a clear description of the issues you have faced, and where possible, supporting evidence". Therefore, for the 2021-22 academic year, students were required to provide evidence in order to be granted an extension but the interpretation of what was considered evidence was more 'relaxed'. Extensions are a particular case of special considerations in UoS. The University of Southampton Quality Handbook refers to extension requests as a way to receive an almost immediate response before the assessment deadline. If a student missed the deadline without applying for an extension, they are still in a position to apply for special considerations. If the latter is upheld at the relevant special considerations board, the penalty for late submission would then be removed ex-post. In practice, the extension guarantees some kind of certainty and immediate action. For this reason, students tend to prefer this tool for coursework assessment, when possible, as a mechanism to take into account poor performance following extenuating circumstances. One particular case includes extension requests which rely on self-certification. Without special considerations, a late submission is subject to severe penalties which decrease the maximum grade possible by 10% per day of delay. The late submission policy is transparent and applied at University level to provide a consistent and predictable way for students to infer the impact of an unjustified late submission on the assessment mark.

The number of extensions have increased considerably following the 'no-question' ask policy and the numbers have continued increasing even after we entered the transitional phase. In the next section, we look at the link between extension requests and academic performance. We use the presence of the 'no-questions asked' policy for 2 weeks-or-under extension requests as a way to analyse academic procrastination. Our implicit assumption is that for 'long-term' assessment, students should be able to plan their work around

unexpected events while two weeks or less extension requests should capture students who required extensions without explicit medical grounds.

3.2   Data Analysis

Data are taken from the Department of Economics at the University of Southampton using a third-year module Dissertation: Literature Review (ECON 3036) for the 2020-2021 and 2021-2022 academic years and a year long dissertation module Dissertation (ECON 3023) for the previous academic years. The semester long module Literature Review was introduced in 2020-21. Before 2020-21, students were expected to submit a piece of coursework as part of the dissertation project running in both semesters. The Literature Review takes place in semester 1 of each year and is the first part of the dissertation. Students need to pick a research topic and then write a review of academic papers that are relevant to that topic. The submission deadline of the ECON3036 literature review was in the first week of studies after the Christmas break for the 2020-21 and the 2021-22 academic years (week 15 in the University of Southampton academic calendar). In particular, the introduction of ECON3036 in 2020-21 is associated with the implementation of two changes which we argue are more or less neutralizing each other. We slightly increase the percentage weighting of the literature review by 10% (previously part of ECON3023 assessment) and we moved the submission deadline from before to after the Christmas break. On the one hand, the increase in the weighting should have made the task more relevant for students which could have potentially increased the extension requests. On the other hand, the postponement of the deadline should have given students more time and so less reasons to ask for an extension, unless the reason is in fact procrastination. More details regarding the change caused by the move from the year long dissertation (ECON3023) to a two-semester module where ECON3036 is in the first semester, will be provided below. Students who are not able to submit their report on time, will either request for an extension of the submission deadline or apply for special considerations if the Department is notified after the submission deadline. As discussed in the previous section, during the COVID pandemic there was a relaxation of the need to supply evidence for submitting a short extension request (up to 14 days). We believe that this relaxation was the main driver of the skyrocketing extension requests following the initial COVID-19 health shock.

In order to find the impact of extension requests on students' performance, we linked data on the marks of ECON3036 with the days of extension requested by students and approved by the Student Office. For the 2020-2021 academic year, there are also data on the reason for the extension request (we are able to distinguish COVID related reasons and non-COVID related reasons, but this information is not available in the 2021-2022 academic year). We also wanted to test whether students with approved extension requests are using all the days of extension and whether submitting the dissertation early has a positive impact on students' performance. For that reason, we obtained data of the actual submission date from the Web-based course-management system. We also included data on students' year 2 average grades (as proxy for ability), programme of study and the literature review topic and supervisor as controls. To test whether submitting late has an impact on the exams of other modules that are being assessed concurrently, we linked our data with the exam marks of four main economic modules: ECON3007 Applied Economics, ECON3010 Topics in Macroeconomics 3, ECON3015 Principles of Finance and ECON3027 Labour Economics. We also wanted to check the difference between the extension requests before and after the COVID era. As discussed above, before 2020-2021 there was one dissertation module, ECON3023 Dissertation/Project, that was running during the whole academic year. In the first report, which was counted 35% of the overall mark, students needed to write a literature review on a chosen topic. The task was similar to the one in ECON3036, but the submission deadline was before the Christmas break. For ECON3023 Part 1 (literature review) we analyse extension requests data for the 2018-2019 and 2019-2020 academic years. We linked them with the actual submission dates to get the number of submissions that were late with an approved extension (and exclude the students who may have requested an extension but have submitted on time or after the new deadline).

3.3 Descriptive Statistics

In our analysis we focus on longer duration of assessments with a malleable deadline that allows students greater control in deciding how and when to pace their workload. A good candidate for analysis is the third-year ECON3036 Dissertation: Literature Review, which includes the completion

of a one semester research project.

As mentioned in the previous section, data from ECON3036 show that extension requests have been skyrocketing during the pandemic. In Table 1 and Figure 1 we can observe that about 1 out of 5 students in the 2020-2021 academic year and 1 out of 4 students in the 2021-2022 academic year had an approved extension request of the submission deadline for the final report in ECON3036. Comparing these figures with the pre-COVID-19 estimates (even though it cannot be a one-to-one comparison), we can observe that extension requests have almost been tripled during the pandemic[3].

Table 1: Approved Extension Requests by Academic Year, in 2018-2019 and 2019-2020 academic years the submission deadline was before Christmas whereas afterwards after Christmas, ECON3023 Part 1 is equivalent to ECON3036 (Literature Review)

Module	Academic Year	Extensions	Total Submissions	%
ECON3023 Part 1	2018-2019	9	177	5.1
ECON3023 Part 1	2019-2020	13	172	7.6
ECON3036	2020-2021	45	222	20.3
ECON3036	2021-2022	50	202	24.8

Source: UOS Data

In Table 2 we can observe that in the 2020-2021 academic year almost 9 out of 10 students used all the days of extension that they have requested, whereas in 2021-2022 academic year less than 7 out of 10 students used all the days granted following the extension request. This result may suggest that the relaxation of providing sufficient evidence for requesting an extension of the ECON3036 deadline in 2020-2021 may have increased the requests also in 2021-2022 (due to a learning effect), even though some students did not need to use all the days of extension that they have requested (see also Table 6).

---

[3]A one-to-one comparison of the extension requests before and during the COVID-19 pandemic is not possible because in 2018-2019 and 2019-2020 academic years, the equivalent to ECON3036 module was the first report of ECON3023 (which was a literature review) where the submission deadline was before Christmas, whereas from 2020-2021 academic year the submission deadline in ECON3036 is after Christmas.

Table 2: Students who had an approved extension request in the ECON3036 Dissertation and used or not used all the days of extension that they have requested for the 2020-2021 and 2021-2022 Academic Year

Requested Extension	2020-2021 & 2021-2022		2020-2021		2021-2022	
Extension Days	Observations	%	Observations	%	Observations	%
Used all	74	77.89	40	88.89	34	68.00
Not used all	21	22.11	5	11.11	16	32.00
Total	95	100	45	100	50	100

Figure 2 shows a slightly negative correlation between submission days from the ECON3036 deadline and students' performance in that report. We also split the sample into four groups. The first group includes students who have submitted their report more than 1 day before the ECON3036 submission deadline, the second group includes students who have submitted either one day before the deadline or on the day of the deadline (we expect that submitting on the day of the deadline or one day earlier will not make a difference on students' performance), the third group includes students who have submitted from one to fourteen days after the submission deadline with an approved extension request (short extensions) and finally the last group includes students who have submitted over fourteen days after the submission deadline with an approved extension request (long extensions).

From Figure 3 and Table 3 we observe that submitting late the report is associated with a lower average grade. Students who submitted their ECON3036 report more than one day before the deadline, had on average almost 3.5 points out of 100 more than those who had short extensions (67.9 versus 64.5) and almost 4 points out of 100 more than those who had long extensions (67.9 versus 64.1). As expected, students who submitted their dissertation early, had a higher Year 2 average than those who submitted late with an approved extension (see Table 7). Therefore, in the estimations we control for Year 2 average to account for this fact. Finally, the results are mixed on whether submitting late has an impact on the exams of other modules (ECON3007, ECON3010, ECON3015 and ECON3027) that are being assessed concurrently (see Tables 8-11).

Figure 2: Scatter plot between ECON3036 final report mark and submission days from the deadline for the 2020-2021 & 2021-2022 academic years
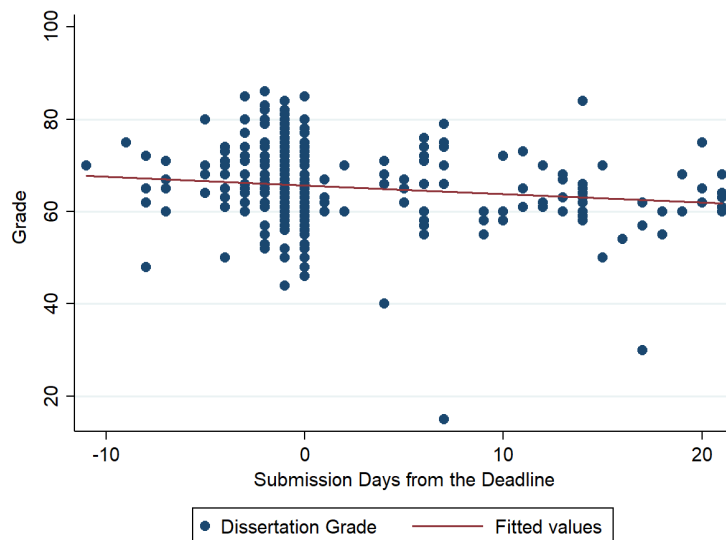

Table 3: Average ECON3036 Dissertation Grade and Standard Deviation by Submission Day for the 2020-2021 and 2021-2022 Academic Year

ECON3036	2020-2021 & 2021-2022			2020-2021			2021-2022		
Submission days	Obs.	Aver. Grade	St. Dev.	Obs.	Aver. Grade	St. Dev.	Obs.	Aver. Grade	St. Dev.
<-1 days	68	67.91	7.76	16	66.38	7.32	52	68.38	7.89
-1 to 0 days	261	65.44	6.80	161	65.82	6.89	100	64.82	6.67
1 to 14 days	55	64.49	8.84	30	63.60	11.24	25	65.56	5.72
over 14 days	40	64.13	7.61	15	64.73	4.70	25	63.76	9.34
Total	424	65.59	7.54	222	65.49	7.69	202	65.70	7.39

-1 day implies that student submitted 1 day before the deadline, Source: UOS Data

Figure 3: Dissertation marks by submission day for the 2020-2021 & 2021-2022 academic years
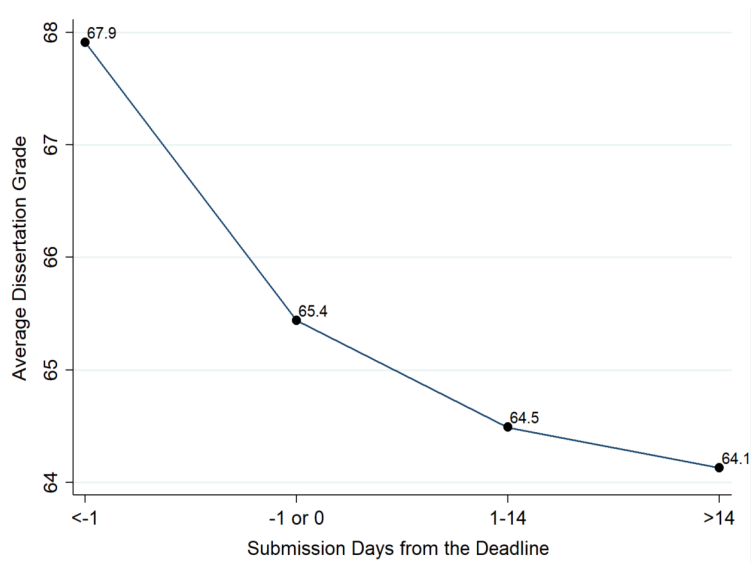
3.4 The Model

The purpose of this study is to estimate whether submitting a long duration assessment with an approved extension request has an impact on students' performance. We focus our analysis on ECON3036 Dissertation literature review module, where performance is the grade in the final report of ECON3036. To find the impact of submission days on ECON3036 grade, we estimate the following model:

$$Grade_{it} = \beta_0 + \beta_1 submissiondays_{it} + \gamma_{jit} X_{jit} + u_{it} \tag{1}$$

where $Grade$ is the grade in the final report of ECON3036 dissertation module at time t, t equals to either 2020-2021 or 2021-2022 academic year, $submissiondays$ is the number of days that a student i submitted their dissertation from the deadline. If a student submit their dissertation before the deadline, $submissiondays$ takes a negative value and if a student submit their dissertation after the deadline $submissiondays$ takes a positive value. For students who submit late, we include only those with an approved extension request. X_{jit} is a scalar of $j = 4$ control variables, which are the students' year 2 average (as proxy for ability), program of study and the ECON3036 research topic and supervisor.

To estimate the impact of late versus early submissions after the deadline with an approved extension request, we generate a categorical variable *groupsubmissiondays* with 4 categories. The reference category is the group of students who have submitted more that 1 day before the deadline, the second category includes students who have submitted either one day before the deadline or on the day of the deadline. We expect that submitting on the day of the submission deadline or one day earlier will not make a difference on students' performance. The third category includes students who have submitted from one to fourteen days after the submission deadline with an approved extension request and finally the last category includes students who have submitted over fourteen days after the submission deadline with an approved extension request. The categorical variable is defined as followed:

15

$$\text{groupsubmissiondays} = \begin{cases} 1, & \text{if submission days} < -1 \\ 2, & \text{if } -1 \leq \text{submission days} \leq 0 \\ 3, & \text{if } 1 \leq \text{submission days} \leq 14 \\ 4, & \text{if submission days} > 14 \end{cases} \tag{2}$$

Our focus on the impact of short approved extensions on students' performance is the third category and the impact of long approved extensions on students' performance is the fourth category. Given this categorical variable, we estimate the following model:

$$Grade_{it} = \beta_0 + \sum_{r=2}^{4} \beta_r D_{rit} + \gamma_{jit} X_{jit} + u_{it} \tag{3}$$

with:

$$D_r = \begin{cases} 1, & \text{if groupsubmissiondays} = r \\ 0, & \text{otherwise} \end{cases} \tag{4}$$

Where D_r is a dummy variable equal to one if $groupsubmissiondays = $ r and zero otherwise, with $r = 2, 3, 4$ and the reference category is the group of students who have submitted more than one day before the deadline.

4   Empirical Results

We estimate the impact of submission days on the final report of ECON3036 grade. Table 12 provides regression estimates of the impact of submission days on ECON3036 final report mark. In model 1 we do not control for ability (year 2 Average), program of study and dissertation topic and supervisor. Model 2 includes only a time dummy that represents the academic year ($Time$ is a dummy variable equal to one if the academic year is 2021-2022 and zero if the academic year is 2020-2021). In addition to the time dummy, in model 3 we also control for research supervisor and research topic. In model

4, in addition to the time dummy we also control for program of study, research supervisor and research topic. Finally, in addition to the time dummy, model 5 also controls for ability (using the year 2 average as approximation for ability), program of study, research supervisor and research topic. We base all our empirical results on model 5. In all models the empirical results suggest that submitting late the dissertation will have a negative impact on students' performance. This negative impact is statistically significant in all models. More specifically, according to model 5, a student who will submit 10 days before the deadline, is expected to have on average 2.4 higher mark out of 100 from a student who will submit 20 days after the deadline with an approved extension request.

Table 4: Empirical Results of the Impact of Submission Days on ECON3036 Dissertation Grades, Controlling for Ability (Year 2 Average), Dissertation Supervisor, Dissertation Topic and Program of Study

ECON3036 Mark	Model 1	Model 2	Model 3	Model 4	Model 5
Submission Days	-0.08*	-0.08*	-0.13**	-0.14***	-0.08*
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Time		0.20	0.73	0.72	0.02
		(0.73)	(0.88)	(0.89)	(0.85)
Year 2 Average					0.25***
					(0.04)
Supervisor			X	X	X
Topic			X	X	X
Program				X	X
Constant	65.79***	65.69***	64.28***	68.82***	47.75***
	(0.38)	(0.52)	(5.56)	(6.43)	(6.82)
N	424	424	421	421	421
r2	0.01	0.01	0.21	0.23	0.32
F	2.88	1.47	1.56	1.52	2.35
ll	-1456.30 -	-1456.27	-1399.17	-1393.40	-1367.83

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13 provides regression estimates of the impact of submission days if we split the students in 4 different categories as defined in Equation 2, on ECON3036 final report marks. In these estimates the reference category is the group of students who submitted more than one day before the ECON3036 deadline. We follow the same strategy as above and in model 1 we do not control for ability (year 2 Average), programme of study and dissertation topic and supervisor. Model 2 includes only a time dummy that represents the academic year ($Time$ is a dummy variable equal to one if the academic year is 2021-2022 and zero if the academic year is 2020-2021). In model 3 in addition to the time dummy we control for research supervisor and research topic. In model 4, in addition to the time dummy we control for program of study, research supervisor and research topic. Finally, in model 5, in addition to the time dummy we control for ability (using the year 2 average as approximation for ability), programme of study, research supervisor and research topic. We base all our empirical results in model 5.

In all models the empirical results suggest that the group of students who submitted more than one day before the ECON3036 deadline (reference category) is expected to get a higher mark from all the other groups of students. This result is statistically significant in all models. More specifically, according to model 5 students who submitted either one day before the deadline or on the day of the deadline are on average expected to get 1.8 points (out of a hundred) less than the students who submitted more than one day before the deadline. Students who have requested short extensions of the deadline (up to 14 days) are on average expected to get 2.4 points (out of a hundred) less than the students who submitted more than one day before the deadline. Finally, students who have requested long extensions of the deadline (more than 14 days) are on average expected to get 3.5 points (out of a hundred) less than the students who submitted more than one day before the deadline. The above results show that there is a positive relationship between early submission and students' performance or, in line with most papers estimating the impact of procrastination on academic performance, this study shows that late submission is associated with lower academic performance. Finally, students with long extensions, who are more likely to be affected by serious extenuating circumstances, tend to perform worse than students with short extensions.

We also tested whether submitting late has a negative impact on the exams of other modules that are being assessed concurrently. We focused on four main modules in economics, ECON3007 Applied Economics, ECON3010 Topics in Macroeconomics 3 and ECON3015 Principles of Finance and ECON3027 which have a main assessment component shortly after the submission deadline of the literature review. The results show that even though in most of the case there is a negative impact of late ECON3036 submissions on students' performance in the exams of these 4 modules, this impact is not significant.

5   Conclusion

This paper looks at the impact that the timing of submission of a long-term project has on academic student performance. We document a marked increase in reliance on extensions for a long-term assessment as a consequence of the relaxation of the extension policy and increased pressure due to COVID-19. We have shown that the students making use of extensions, on average, have lower grades than those who do not. This finding is not only statistically significant but persists when we control for students' ability using their second year average grades, ensuring this finding is not a result of some self-selection process where higher performing students submit their work on time. We can therefore conclude that for equally capable students, making use of an extension leads to a lower grade.

These findings support those of Agnihotri, Baker & Stalzer (2020), Saplavska, Jerkunkova et al. (2018) in suggesting that more structured deadlines and support for students aimed at improving their time management skills is a cost-effective way to improve their performance. This can be achieved by a three-pronged approach. Firstly, by training students to improve their ability to set and maintain goals and evaluate time constraints. This can be done through skills seminars or support sessions. Secondly, by creating more structured long-term assessments. The use of timely reminders and clear information on when tasks should be started and completed may reduce procrastination and improve their performance. Ariely & Wertenbroch (2002) note that people are aware of their tendency to procrastinate and are willing to set costly deadlines to help them overcome this tendency. However, they are unable to effectively do this themselves, which further motivates the need for an external framework to do this for them. In addition Ericson (2017) find

Table 5: Empirical Results of the Impact of Submission Days (splitting students in 4 different categories) on ECON3036 Dissertation Grades, Controlling for Ability (Year 2 Average), Dissertation Supervisor, Dissertation Topic and Program of Study

ECON3036 Mark	Model 1	Model 2	Model 3	Model 4	Model 5
-1 or 0 Submission Days	-2.47**	-2.55**	-1.89*	-2.33**	-1.80*
	(1.02)	(1.06)	(1.10)	(1.11)	(1.05)
1-14 Submission Days	-3.42**	-3.48**	-3.98***	-4.59***	-2.43*
	(1.36)	(1.38)	(1.44)	(1.46)	(1.42)
>14 Submission Days	-3.79**	-3.81**	-4.31***	-4.85***	-3.53**
	(1.49)	(1.50)	(1.60)	(1.61)	(1.53)
Time		-0.20	0.53	0.46	-0.20
		(0.76)	(0.91)	(0.92)	(0.76)
Year 2 Average					0.25***
					(0.04)
Supervisor			X	X	X
Topic			X	X	X
Program				X	X
Constant	67.91***	68.07***	65.59***	71.34***	49.79***
	(0.91)	(1.08)	(5.59)	(6.48)	(6.98)
N	424	424	421	421	421
r^2	0.02	0.02	0.22	0.24	0.32
F	3.12	2.36	1.59	1.58	2.33
ll	-1453.07	-1453.03	-1396.58	-1389.81	-1366.00

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

that memory, or rather forgetting, might be contributing to this inability to control their own procrastination. This further supports the use of reminders as a tool for reducing it. Finally, increasing the enjoyment of working on the assessment (Ferrari & Scher (2000)) and reducing the stress associated with the task (Saplavska, Jerkunkova et al. (2018)) will also support reductions in procrastination. We see deadlines, and the structure they impose, as a scaffold support to help students channel their energy effectively over time. Without deadlines most students would naturally tend to shift as much of

the workload to the future as possible resulting in compressed learning and a reduction in it's quality.

When looking at the impact on the performance of students on other modules that are being concurrently assessed, the 1-14 day extensions are more detrimental than longer extensions. This is unsurprising given that the deadline of the module is a week before the end of semester exams, and thus a 14 day deadline will clearly impact this period more than a longer extension. It is therefore suggested that any extension period is considered in context of overlap with other important timelines in the students' calendars. In addition, a mix of longer extensions and much shorter ones (5 days) would also be a way to diminish the impact on other subjects. This is supported by the fact that only 60% of students (in 2022) make use of the entire period of the extension. With longer extensions only being used for more serious cases with a deadline that clearly goes beyond the final exam period.

Further work on identifying the appropriate structure that best supports students on these long-term tasks is needed to understand what intervention, or combination of interventions, is best suited to achieve improved compliance with submission times and ultimately to support students to perform at the best of their abilities.

References

Agnihotri, L., Baker, R. & Stalzer, S. (2020), A procrastination index for online learning based on assignment start time., *in* 'EDM'.

Ariely, D. & Wertenbroch, K. (2002), 'Procrastination, deadlines, and performance: Self-control by precommitment', *Psychological science* **13**(3), 219–224.

Cormack, S. H., Eagle, L. A. & Davies, M. S. (2020), 'A large-scale test of the relationship between procrastination and performance using learning analytics', *Assessment & Evaluation in Higher Education* **45**(7), 1046–1059.

DellaVigna, S. & Paserman, M. D. (2005), 'Job search and impatience', *Journal of Labor Economics* **23**(3), 527–588.

Ellis, A. & Knaus, W. J. (1979), *Overcoming procrastination: or, how to think and act rationally in spite of life's inevitable hassles*, Signet Book.

Ericson, K. M. (2017), 'On the interaction of memory and procrastination: Implications for reminders, deadlines, and empirical estimation', *Journal of the European Economic Association* **15**(3), 692–719.

Fedyk, A. (2021), 'Asymmetric naivete: Beliefs about self-control', *Available at SSRN 2727499* .

Ferrari, J. R. & Scher, S. J. (2000), 'Toward an understanding of academic and nonacademic tasks procrastinated by students: The use of daily logs', *Psychology in the Schools* **37**(4), 359–366.

Franz, I. (2020), 'Unintentional procrastination, self control, and academic achievements', *Education Economics* **28**(5), 508–525.

Han, B., Li, F. & Parsons, D. (2019), 'Analysis of academic procrastination in professional students of a tertiary training programme'.

Kader, A. (2014), 'Academic procrastination and student achievement in an introductory economic course'.

Kim, K. R. & Seo, E. H. (2015), 'The relationship between procrastination and academic performance: A meta-analysis', *Personality and Individual Differences* **82**, 26–33.

Laibson, D. I., Repetto, A., Tobacman, J., Hall, R. E., Gale, W. G. & Akerlof, G. A. (1998), 'Self-control and saving for retirement', *Brookings papers on economic activity* **1998**(1), 91–196.

Lee, E. (2005), 'The relationship of motivation and flow experience to academic procrastination in university students', *Journal of Genetic Psychology* **166**, 5–14.

Nicholls, N. (2023), 'Procrastination and grades: Can students be nudged towards better outcomes?', *International Review of Economics Education* **42**, 100256.
URL: *https://www.sciencedirect.com/science/article/pii/S1477388022000238*

Paden, N. & Stell, R. (1997), 'Reducing procrastination through assignment and course design', *Marketing Education Review* **7**(2), 17–25.

Rozental, A., Forsell, E., Svensson, A., Forsström, D., Andersson, G. & Carlbring, P. (2015), 'Differentiating procrastinators from each other: A cluster analysis', *Cognitive behaviour therapy* **44**(6), 480–490.

Saplavska, J., Jerkunkova, A. et al. (2018), Academic procrastination and anxiety among students, *in* '19th scientific Conference. Latvia: Engineering for pural development', pp. 23–25.

Semb, G., Glick, D. M. & Spencer, R. E. (1979), 'Student withdrawals and delayed work patterns in self-paced psychology courses', *Teaching of psychology* **6**(1), 23–25.

Shaked, L. & Altarac, H. (2022), 'Exploring academic procrastination: Perceptions, self-regulation, and consequences', *Journal of University Teaching & Learning Practice* **19**(3), 15.

Shamosh, N. A. & Gray, J. R. (2008), 'Delay discounting and intelligence: A meta-analysis', *Intelligence* **36**(4), 289–305.

Solomon, L. J. & Rothblum, E. D. (1984), 'Academic procrastination: frequency and cognitive-behavioral correlates.', *Journal of counseling psychology* **31**(4), 503.

Steel, P. (2007), 'The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure.', *Psychological bulletin* **133**(1), 65.

Thierauf, D. (2021), 'Feeling better: A year without deadlines', *Nineteenth-Century Gender Studies* **17**(1).

Tice, D. M. & Baumeister, R. F. (1997), 'Longitudinal study of procrastination, performance, stress, and health: The costs and benefits of dawdling', *Psychological science* **8**(6), 454–458.

UoS (2021), Special considerations guidance, Technical report, University of Southampton.

Van Eerde, W. (2003), 'A meta-analytically derived nomological network of procrastination', *Personality and individual differences* **35**(6), 1401–1418.

Whillans, A. V., Yoon, J., Turek, A. & Donnelly, G. E. (2021), 'Extension request avoidance predicts greater time stress among women', *Proceedings of the National Academy of Sciences* **118**(45).

A   Appendix

Table 6: Average days of requested extension and submission after the official ECON3036 deadline for students who had an approved extension request in the ECON3036 Dissertation for 2020-2021 and 2021-2022 Academic Year

	2020-2021 & 2021-2022		2020-2021		2021-2022	
Req Extension	Ext Days	Sub Days	Ext Days	Sub Days	Ext Days	Sub Days
Mean	15.68	15.11	15.16	14.78	16.16	15.40
St. Dev	8.58	8.59	8.79	8.89	8.45	8.39
Observations	95	95	45	45	50	50

Table 7: Average of Year 2 Average Grade and Standard Deviation for students who did their ECON3036 dissertation, by Submission Day for the 2020-2021 and 2021-2022 Academic Year

Year 2 Av.	2020-2021 & 2021-2022			2020-2021			2021-2022		
Subm. days	Obs	Grade	SD	Obs	Grade	SD	Obs	Grade	SD
<-1 days	68	69.08	8.61	16	68.42	11.20	52	69.28	7.82
-1 to 0 days	261	66.48	10.40	161	65.39	10.53	100	68.23	10.18
1 to 14 days	55	60.03	8.64	30	59.17	8.46	25	61.07	8.86
over 14 days	40	64.09	8.91	15	61.18	8.39	25	65.84	9.23
Total	424	65.83	10.15	222	64.48	10.44	202	67.32	9.63

-1 day implies that student submitted 1 day before the deadline, Source: UOS Data

Table 8: Average ECON3007 Applied Economics Grade and Standard Deviation for students who did their ECON3036 dissertation, by Submission Day for the 2020-2021 and 2021-2022 Academic Year

ECON3007	2020-2021 & 2021-2022			2020-2021			2021-2022		
Subm. days	Obs	Grade	SD	Obs	Grade	SD	Obs	Grade	SD
<-1 days	15	60.00	11.15	6	65.50	12.29	9	56.33	10.38
-1 to 0 days	53	62.08	11.77	31	62.74	11.43	22	61.14	12.26
1 to 14 days	18	60.83	12.18	15	60.53	12.01	3	62.33	13.05
over 14 days	9	57.56	8.60	5	61.40	9.37	4	52.75	7.63
Total	95	61.08	11.42	57	62.33	11.31	38	59.21	11.49

-1 day implies that student submitted 1 day before the deadline, Source: UOS Data

Table 9: Average ECON3010 Topics in Macroeconomics 3 Grade and Standard Deviation for students who did their ECON3036 dissertation, by Submission Day for the 2020-2021 and 2021-2022 Academic Year

ECON3010	2020-2021 & 2021-2022			2020-2021			2021-2022		
Subm. days	Obs	Grade	SD	Obs	Grade	SD	Obs	Grade	SD
<-1 days	39	63.44	18.38	7	78.00	9.26	32	60.25	20.38
-1 to 0 days	154	69.81	15.82	94	77.20	12.75	60	58.23	20.62
1 to 14 days	25	55.52	26.53	12	68.67	25.14	13	43.38	27.82
over 14 days	21	56.86	24.46	6	66.67	8.87	15	52.93	30.70
Total	239	66.14	21.52	119	75.86	14.35	120	56.50	23.10

-1 day implies that student submitted 1 day before the deadline, Source: UOS Data

Table 10: Average ECON3015 Principles of Finance Grade and Standard Deviation for students who did their ECON3036 dissertation, by Submission Day for the 2020-2021 and 2021-2022 Academic Year

ECON3015	2020-2021 & 2021-2022			2020-2021			2021-2022		
Subm. days	Obs	Grade	SD	Obs	Grade	SD	Obs	Grade	SD
<-1 days	48	61.73	9.66	12	61.25	7.11	36	61.89	10.51
-1 to 0 days	193	60.56	7.61	121	59.42	8.37	72	62.47	6.33
1 to 14 days	33	61.45	6.55	15	60.00	5.00	18	62.67	7.84
over 14 days	30	60.50	7.93	11	58.18	9.02	19	61.84	7.30
Total	304	60.84	8.02	159	59.53	8.03	145	62.27	7.79

-1 day implies that student submitted 1 day before the deadline, Source: UOS Data

Table 11: Average ECON3027 Labour Economics Grade and Standard Deviation for students who did their ECON3036 dissertation, by Submission Day for the 2020-2021 and 2021-2022 Academic Year

ECON3027	2020-2021 & 2021-2022			2020-2021			2021-2022		
Subm. days	Obs	Grade	SD	Obs	Grade	SD	Obs	Grade	SD
<-1 days	26	63.54	7.93	4	58.25	10.14	22	64.50	7.53
-1 to 0 days	101	60.81	12.38	69	62.28	13.02	32	57.66	11.00
1 to 14 days	20	59.50	9.48	9	62.11	9.02	11	57.36	9.86
over 14 days	14	61.79	10.57	5	56.00	14.54	9	65.00	8.37
Total	161	61.17	11.46	87	61.71	12.56	74	60.54	10.05

-1 day implies that student submitted 1 day before the deadline, Source: UOS Data

B Appendix

Table 12: Empirical Results of the Impact of Submission Days on ECON3036 Dissertation Grades, Controlling for Ability (Year 2 Average), Dissertation Supervisor, Dissertation Topic and Program of Study

ECON3036 Mark	Model 1	Model 2	Model 3	Model 4	Model 5
Submission Days	-0.08*	-0.08*	-0.13**	-0.14***	-0.08*
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Time		0.20	0.73	0.72	0.02
		(0.73)	(0.88)	(0.89)	(0.85)
Year 2 Average					0.25***
					(0.04)
Supervisor			X	X	X
Topic			X	X	X
Program				X	X
Constant	65.79***	65.69***	64.28***	68.82***	47.75***
	(0.38)	(0.52)	(5.56)	(6.43)	(6.82)
N	424	424	421	421	421
r2	0.01	0.01	0.21	0.23	0.32
F	2.88	1.47	1.56	1.52	2.35
ll	-1456.30 -	-1456.27	-1399.17	-1393.40	-1367.83

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Empirical Results of the Impact of Submission Days (splitting students in 4 different categories) on ECON3036 Dissertation Grades, Controlling for Ability (Year 2 Average), Dissertation Supervisor, Dissertation Topic and Program of Study

ECON3036 Mark	Model 1	Model 2	Model 3	Model 4	Model 5
-1 or 0 Submission Days	-2.47**	-2.55**	-1.89*	-2.33**	-1.80*
	(1.02)	(1.06)	(1.10)	(1.11)	(1.05)
1-14 Submission Days	-3.42**	-3.48**	-3.98***	-4.59***	-2.43*
	(1.36)	(1.38)	(1.44)	(1.46)	(1.42)
>14 Submission Days	-3.79**	-3.81**	-4.31***	-4.85***	-3.53**
	(1.49)	(1.50)	(1.60)	(1.61)	(1.53)
Time		-0.20	0.53	0.46	-0.20
		(0.76)	(0.91)	(0.92)	(0.76)
Year 2 Average					0.25***
					(0.04)
Supervisor			X	X	X
Topic			X	X	X
Program				X	X
Constant	67.91***	68.07***	65.59***	71.34***	49.79***
	(0.91)	(1.08)	(5.59)	(6.48)	(6.98)
N	424	424	421	421	421
r^2	0.02	0.02	0.22	0.24	0.32
F	3.12	2.36	1.59	1.58	2.33
ll	-1453.07	-1453.03	-1396.58	-1389.81	-1366.00

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$