Monetary Incentives for Journal Publications: Evidence from a Natural Experiment at Three Indian Business Schools *

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Abstract

In a bid to improve research output, educational institutions across the world have tried incentivising faculty with financial rewards for journal publications. However, empirical evidence on the effectiveness of monetary incentives, for tasks that require cognitive and creative abilities, is either absent or scarce at best. Using a unique natural experiment setting, across several schools of management education in India, we investigate whether and the extent to which monetary incentives for research influence research output. While some institutions implemented very specific monetary reward programs around 2012, others did not. Our strategy exploits the idea that while all institutions experienced a long-term increasing trend in research publications, only those with an incentive policy in place would have experienced a jump, if any, in publications around 2012. Specifically, we investigate whether publications increased in those journals which were covered by the incentive scheme. Most importantly, we explore the quality-quantity trade-off. If one higher quality publication fetches as much monetary reward as several lower-quality publications, do researchers choose the latter or the former? Our preliminary results indicate that the total number of publications in journals, rewarded by the incentive scheme, increased significantly. Moreover, the increase is driven primarily by relatively lower ranked publications across all institutions. At the same time, we also document an increase in the proportion of high ranked to low ranked publications due to the incentive policy.

Keywords: Monetary Incentive, DID, Research Productivity, Quality-Quantity Trade-off

JELcodes: E24, J33, M52

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1 Introduction

It is now well known that monetary incentives, or pay-for-performance contracts, can and do increase ones effort function thereby increasing productivity for jobs that essentially entail largely physical effort and/or repetitive tasks (Lazear, 2000). This is what Gneezy et al. (2011) call the *direct price effect* triggered by one's *extrinsic* motivation. In these situations, the performance metric used to set these contingent contracts are easily monitored, cheaply measurable, and mostly non-controversial. However, for jobs and tasks that are complex and require cognitive and creative abilities, and where performance metrics are controversial and involve both quantity and quality, financial incentives can be detrimental, that is, *good intentions can go wrong* (Holmström, 2017). In these situations, Ariely et al. (2009) have shown that beyond a certain threshold level of incentives, output declines through the *crowding out* of *intrinsic* by *extrinsic* motivation; or what Gneezy et al. (2011) call the *choke under pressure* phenomenon. As Holmström (2017) sums up in his review paper: "Within firms, high-powered financial incentives can be very dysfunctional and attempts to bring the market inside the firm are generally misguided. Typically, it is best to avoid high-powered incentives and sometimes not use pay for performance at all."

Given these now well-accepted findings on the effects of high-powered incentives on creative output in the literature, it is somewhat surprising then that over the last few decades several universities and educational institutions across the world have put in place generous financial rewards for faculty research publications.[1] While reward policies have been in place in the US in various forms many emerging market countries adopted direct cash-for-publication policies, perhaps with the expectation to increase publications in reputed journals over a short period of time. This could work either through attracting new talent or increasing the effort function of existing faculty. For example, many Chinese Universities instituted reward policies since the early nineties where an article in Nature or Science is equivalent to twenty times a university professors average annual salary (Quan et al., 2017). In South African universities too similar cash-for-publications policies since 2003 were implemented under the *New Funding Framework* (Muller, 2017). Casual empirical evidence suggests that these policies led to an increase in international scientific output. However, concerns have also been raised about the perverse effects of monetary incentives on the quality, vis-a-vis quantity, of academic research in addition to questioning accepted ideas of quantitative performance metrics (Edwards and Roy, 2017; Vaughan, 2008).[2]

In this paper, we investigate whether, and the extent to which, monetary incentives for research influenced both the quantity and quality of journal publications, using a unique natural experiment setting across eight management schools in India for the period January 2001 to December 2017. In line with the previous literature, we first examine whether introduction of prize money for journal publications leads to more journal publications. In addition, we also ask if faculty concentrate their effort in producing fewer high quality journal

[1] On the substantial differences between awards and monetary compensation for research output , see Frey and Neckermann (2008).

[2] For an extensive discussion of incentives and ethics in educational institutions, see (Grant, 2011).

publications or do they instead steer their effort functions toward increasing the number of lower quality publications, when the amount of prize money increases with the quality of the journal.

We exploit variations in the implementation of the incentive schemes across institutions and over time to estimate the effects of monetary incentives on journal output employing a difference-in-differences framework. Specifically, three of the schools in our study sample, the Indian Institute of Managements (IIM), implemented their incentive schemes during 2011-2012 and form our *treatment* group. Schools of Management at five Indian Institutes of Technology (IIT) did not have any such incentive scheme and form our *control* group. Both IITs and IIMs are institutions of higher education under the Central Government of India and they follow a system of uniform rules for faculty appointment, tenure, pay and promotion, as mandated by the government.[3][4] While evaluation of faculty for promotion depends on peers' subjective judgment of a candidate's quality, these rules minimize the room for discretion. Pay at these institutions is fully determined by rank and seniority, and promotions provide only a small non-negotiable pay rise. In addition, horizontal moves across these institutions also cannot raise pay and dismissals for low productivity are non-existent, in practice. The details of these mandates and uniform application of these rules, particularly with respect to faculty pay and promotion, across the institutions ensure that academic conditions across these institutions are comparable.

We construct a faculty level (pseudo) panel data on journal publications across these 8 institutions over 2001-2017 by extracting, and cross-verifying, information on journal publications from a combination of online platforms - Google Scholar, faculty webpages and LinkedIn profiles. We estimate how the number of articles published by a faculty at one of the three IIMs changed after the introduction of the reward policy, compared to before. We then compare these over-time differences at each IIM with similar differences at all IITs combined to arrive at the difference-in-differences(DID) estimate of the effect of the reward policy on the quantity of research output. In practice, we implement the DID strategy by introducing publication-year specific and faculty specific fixed effects. In addition, we also include institute specific linear time trends. The year fixed effects account for India wide changes in academic conditions from one year to another - for instance the importance of publications would have increased over time across all institutions. In addition, research infrastructure - like access to journals, availability of funding for research - while increasing over time with higher economic growth rates of India, might have evolved differently for each institution. The institute specific time trends allow us to account for the linear growth in these institute specific research environments. Finally, the faculty fixed effects eliminate ability and other unobserved individual characteristics that determine effort, in addition to subsuming institution specific idiosyncrasies that are time invariant and might enable research.

Using this DID framework, we next turn to the question of quality. At the time of the

[3]These institutions, along with a few others, are tagged as Institutions of National Importance under an Act of the Parliament of India.

[4]See Sahoo et al. (2017) for a detailed comparison of research productivity of faculty at various Management Schools in India, inclduing the IITs and IIMs.

policy implementation, each IIM introduced its own unique list of journal quality ranking in approximately three broad categories - A, B, and C (see Section 2 for details). We compare each IIM to all the IITs, using the journal ranking list of the respective IIM to categorize publications at IITs. This baseline DID framework provides the average effect of the policy on journal publications over the 5-6 year post policy period. To the extent that publications take time to materialize we expect the effect to vary over time. Hence, we also estimate the effect of each additional year of exposure to the policy on journal publications.

Finally, using a *journal-article level* (pseudo) panel data, we examine a faculty's decision to allocate effort-hours across publications of different quality. Since total hours are fixed, a faculty must not only decide how much total time to devote on research, but also whether to allocate more hours publishing several relatively low quality articles, or whether to allocate more hours in publishing a few high quality articles. Since the uncertainty and waiting time of publishing a paper in high ranking journal is likely to be higher, a reward policy might hurt risk-taking due to the *certainty effect*. Faculty are likely to overweight the prospect of publishing in low quality journals that are considered more certain, relative to publishing in high quality journals that are merely probable under a reward system in which monetary incentives from publishing one paper in a high ranked journal is equivalent to the incentive from several low ranking journals (Kahneman and Tversky, 1979).[5] To capture this effect, we estimate the probability of publishing in A vis-is B or C category journals.

We find that the reward policy led to a significant increase in the average number of publications per faculty. However, across all three institutions the improvement is driven largely by an increase in publications in C-ranking journals. We find some increase in A-category publications only at IIMA. As we discuss in Section 5.2, part of this increase at IIMA might be explained by a much broader list of A-category journals at IIMA compared to IIMB and IIMC. While the policy led to an increase in the number of C-category publications as opposed to A-category publications, we do find a shift in effort when we consider the distribution of journal publications. The probability of publishing in an A-category journal goes up compared to publishing in a B or C-category journal, in response to the policy. However, there is no change in the probability of publishing in an A-category journal compared to not publishing at all or publishing in non-journals. Finally, we find that it takes time for the effect of the reward policy on publications to materialize. The size of the effect on the total number of publications increases over time from the commencement of the policy, for all IIMs.

Our results are robust to a series of sensitivity tests - (a)falsification tests using publication data from the pre-policy data, (b)dropping institutions from the control group one-by-one so that our findings do not hinge on any one control institution, and (c) restricting the sample to faculty who started their careers before the policy was implemented so as to eliminate the possibility that the results are driven by hiring, or self-selection, of more productive faculty.

Overall, our results suggest that journal reward policies are effective in increasing publica-

[5]While it is possible that the certainty effect might be offset by very high rewards for high quality journals, we do not have detailed reward data to estimate the trade-off.

tions. One way to reconcile our findings with the theoretical prediction of Holmström (2017) is that financial incentives can improve effort when the task, and the associated reward, is well defined and the performance metric is not controversial. The reward policies that are in place in the three IIMs have well defined journal lists and corresponding pay-offs, reducing the effective uncertainty of how a publication would be treated in terms of quality, ex-post.

Our paper contributes to the literature that studies behavioral responses, specifically research output, to monetary incentives in academic settings. Given the difficulties involved in assembling the required data on research output, there is expectedly a paucity of research that estimates the effects of performance incentives on research output. Of the empirical studies that do exist, most study changes in promotion policies on research output (Backes-Gellner and Schlinghoff, 2008; Checchi et al., 2021; De Philippis, 2021). While Backes-Gellner and Schlinghoff (2008) and Checchi et al. (2021) estimate the effect of a change in research related promotion policies on research output, De Philippis (2021) evaluates the simultaneous effect of changes in promotion policies on research and teaching performance. However, while promotion is associated with monetary benefits, a higher designation is also likely to be associated with greater prestige. Hence, it becomes difficult to infer the stand-alone effects of monetary incentives. Further, promotion policies by design cannot answer whether monetary rewards can incentivize full-professors into publishing more. To our knowledge, the only paper that directly tests the effect of a monetary reward policy on academic research is Andersen and Pallesen (2008). They examined journal output data across 162 research institutions in Denmark at two points in time, 2000 and 2005. Their study establishes a positive correlation between financial incentives and the quantity of research output, conditional on faculty perception about the nature of their contingent contracts. As discussed earlier, we investigate changes in both quantity and quality in response to the reward policy. The unique nature of the policy allows us to also study the quantity-quality trade-off.

The structure of the paper is as follows. In section 2 we discuss the institutional details of the IIMs, their respective monetary reward schemes for journal publications, and their respective journals ranking lists. In section 3 we discuss our process of assembling the publication datasets and provide a characterization of our data. In section 4, we explain our identification strategies. In section 5 we present and discuss our main findings and report the results from the sensitivity tests. Finally, section 6 concludes and points out some caveats.

2 Policy Background

At IIMA and IIMB, the first incentive plans took effect in 2012-13, whereas at IIMC it took effect from 2011-12. All three incentive structures took the usual form: broadly, monetary incentives for research output kicked in, explicitly or implicitly, only after a well-defined institution-specific minimum annual teaching and research output threshold was reached. However, the three schemes differed considerably in their internal structure. At IIMC, faculty members became eligible for incentive payments for additional teaching and/or publications provided minimum teaching and research publications norms, based on the option exercised by him/her at the beginning of a three-year block, were met over this period. Incentive payments for both teaching and research were paid after the three-year block ended. Monetary returns accrued only to two forms of research output: journal articles and books (by well reputed national and international publishers). Other forms of research output (e.g., edited books and chapters in edited books) are counted in calculating the minimum threshold. Administrative roles, typically a two-year term, attracted course waivers. The first three-year block commenced in April 2011 and ended in March 2014. The second three-year block was from April 2014 to March 2017 that continued with the same policy.

At IIMB, teaching, administrative service and research output of all kinds (except journal articles) attract different levels of units. Thus, research output of all kinds other than journal articles attract units that go to meet the research plus service threshold level. Compensation for teaching kicks in only for the part that exceeds the minimum teaching threshold, provided that the research plus service threshold is met. A part of research can be substituted by administrative duties in attaining the minimum threshold. Incentive payments are only for journal articles provided that the minimum teaching units are met. Although incentive payments for both extra teaching and journal articles are paid every year, the minimum threshold is calculated based on a facultys output during the past three years, and payments are withheld if this threshold is not met. At this institute, the first incentive year was 2012-13 and goes on till 2016-17 as one-year blocks.

At IIMA, teaching, administrative and research output of all kinds, including journal articles, attract different levels of performance credits under the 2012 incentive-policy. Credits are monetized if and only if a minimum threshold level of both teaching and overall credits are attained and the payments are for the extra teaching. Monetary rewards for journal articles are also linked to meeting the 'overall' and 'teaching' credit thresholds, at least implicitly, since all those who receive incentive payments for journal articles would have to meet the the minimum 'overall' thresholds.

Further, journal articles fetched both direct monetary prizes as well as research credits, and these credits if beyond the research threshold, of 80 credits per year, are monetizable as well. At IIMA, the first three-year block commenced in 2012-13 and ended in 2014-15. Two one-year blocks followed from 2015-16 to 2016-17. In this latter period, changes were made to how performance credits were allocated to journal publications of different categories and the threshold used for monetizing these credits. Specifically, the number of credits in each of the three categories, A, B and C, were revised downwards even though the minimum credit threshold required to monetize remained the same. Appendix Table A1 provides the details of the credit requirements. At IIMA, incentive payments for extra teaching are usually paid annually, and incentive payments for journal articles are usually made as soon as they are published.

Each of the three IIMs generated their individual journal category lists consisting of what they defined as A, B and C journals. These journal ranking lists were constructed using information from a combination of publicly available sources: the ABDC journal quality list (Australian Business Deans Council), Thomson Reuters, Schimago, and the Scopus Databases/Journal Categorization Lists. Appendix Table A1 provides an outline of the policy. At IIMC, category A and B journal lists are well-defined, and category C journals consists of all articles in other peer-reviewed journals that are not in A and B. Thus, all journal articles fall into one of these three categories. In IIMB, there are three well-defined journal categories, A, B and C1 (journals that have an impact factor greater than 1) and the residual category is C2 (all other peer-reviewed journals). Here too, all journal articles fall into one of the four categories. In IIMA, since 2012 there are three well-defined lists: A, B and C. In addition, there is residual category called Other referring to all other peerreviewed journal articles outside these three lists.

Prior to 2012, from 2007 to 2012, IIMA had an incentive policy in place for a much smaller list of journals. Majority of these journals are Acategory, and the rest primarily Bcategory, as per the 2012-2013 policy.[6] Publications in these journals received only monetary incentives but no credits were attached to these. A pre-existing policy, even if for a very small subset of journals, might affect our estimates of the effect of the policy commencing in 2012 for IIMA. Hence, we provide a robustness analysis excluding the years 2007-2011 from the IIMA estimation in Section 5.6. Our main results remain unchanged. [7]

Since 2012, monetary returns accrued to journal publications at IIMA, IIMB and IIMC either through direct payments or through monetizable creditsunits. The structure of monetary payoffs attached to journal articles by category as incentives for research after thresholds are reached are outlined in Appendix Table A1. In all cases, the prize money is adjusted by the number of authors (X/n, where X is the prize and n are the number of authors). At IIMB, a Category A paper received Rs.12 lakh as direct payment and Rs.3 lakh as research support, a Category B paper received Rs.5 lakh as direct payment and Rs.3 lakh as research support, a Category C1 and Category C2 paper received Rs.2 lakh and Rs.1 lakh as direct payment respectively. At IIMA, since 2012, Category A and B received Rs 2.5 lakh and Rs 1.5 lakh respectively. In addition, these publications fetched credits that were monetizable if a threshold values was crossed. Since 2012, Category C journals and Other peer-reviewed journal articles do not get monetary rewards directly although they do attract some performance credits, and if threshold limits are passed, these too are indirectly monetizable. At IIMC, Category A, B and C journals fetched Rs.5 lakh, Rs.2 lakh, and Rs.50,000 respectively.

Although credits/units were assigned to all forms of published research, monetary returns accrued to only journal publications at IIMA and IIMB, at IIMC books too attracted incentives. However, the ranking of books was not well defined and the amount of reward was decided ex-post by a committee appointed by the institute, depending on their evaluation of the ranking of a book. At IIMC, books received Rs.5 lakh, or Rs.2 lakh, or Rs.50,000, the

[6] In all there were 218 journals earmarked for monetary incentives. Out of these, 41 journals were listed as A-category, and 177 journals were listed as B category, according to their 2007-11 policy. As per the 2012 policy categorization, approximately 62% of these were either A* or Acategory journals, 35% were Bcategory journals and only 3% were Ccategory journals.

[7] However, as we note in Section 5.6, we cannot rule out the possibility that the effect of the 2007-2011 policy, even if the rewards were much lower, is observed in later years.

actual amount being determined by a committee set up by the institutes Director. For the sake of uniformity in our paper, we consider only journal publications as research output. Note also that ex-post determination of the quality of a publication and the effective reward makes it quite uncertain to the faculty about the expected benefits of the publication. Hence, it is not clear how faculty would respond to such uncertain incentives. On the other hand, publication in journals is associated with benefits that accrues with certainty.

At all three IIMs a second incentive plan commenced soon after the first one ended in 2017 and these new plans were implemented by the middle of 2017. All three institutions altered the structure of their incentive schemes in their second plan, specifically, by increasing the prize money and altering the Journal Category Lists. In this paper, we consider only the production of journal articles at the three IIMs during their first incentive plans (2012-2017). We restrict to the initial policy date for two reasons. First, there remains a possibility that different institutes might learn from its own experience and from each other during the first phase and modify the journal categorization which would then make the categorization endogenous to publications. Second, at the time of collecting the data, very few months had elapsed since the second policy change.

3 Data

We observe the data in 2018 when all the information was scraped and verified from all the relevant websites. In our first approach, we aggregate the data to faculty-year cells where each cell reports the number of total publications by a faculty in a specific year, as well as their break-up into their institution-specific journal category (the A, B or C lists; applicable only to the IIMs not the IITs). We call this our faculty-level data. In our second approach, we use the data, as collected, disaggregated at the publication level. We call this our article-level data.

3.1 Assembling the faculty-level Dataset

We constructed our faculty-level data in two parts. First, we gathered information on research publications of all full-time faculty employed in each of the 8 institutions included in our study. Second, we combined that with information on publication-award policies from the 3 IIMs. For the first part, we started by scraping information from faculty webpages and, where available, LinkedIn profiles. The websites varied, across institutes and individuals, in form and the extent of information provided. The information collected from these sources included personal characteristics and academic information on several human capital variables. Specifically, these variables were: gender, academic rank, department/group affiliation, and date of Ph.D. and graduating institution. We collected all journal publication data that were listed on their institutional websites and on their vitas if attached. However, an overwhelming number of faculty pages and resumes hosted on these pages were dated or with incomplete information. For instance, names of co-authors were missing in some, peer reviewed and other publications were listed together etc. For each case we verified the names of the journals and co-authors for the published articles using Google, Scimago and Researchgate. In addition, we followed an alternate approach to verify and complement the information on faculty publications. For each of the 373 faculty members across the 8 institutions in our database we collected publication records from google scholar.

We have included all journal publications that can be verified online on Google. Since eligibility for awards require a publication to be peer reviewed and all peer reviewed publications are part of google scholars database, this approach gives us confidence that the final information set on publications is complete. As discussed before, we analyze only the first incentive policy that came in to effect between 2011-2012 and not the change in policy that was implemented later around 2017. Hence, the publication data was collected only till December 31, 2017 and no publication after this date was included in our dataset. In addition, faculties who joined their institutes after December, 2017 were also not included in our dataset. The database included only the core or permanent faculties belonging to the eight respective business schools. As shown in Table 3, we finally collected information on 373 faculty members, 274 from the three IIMs and 99 from the five IITs. At the end of these search and verification iterations, as of December 2017 we collected information on a total of 5892 journal articles, 3571 from IIMs and 2321 from IITs, published between 1975-2017. This was spread across 373 faculty members, 274 from the three IIMs and 99 from the five IITs.

For the second part, we matched each of the 3571 IIM publications with their institution specific journal category lists comprising of broad 3 brackets of A, B and C-category [See Section 2 for details].[8] As indicated in Section 3, at IIMC and IIMB all journal articles fit into one of their respective well-defined journal categories, whereas IIMA does not have a well defined C category. Instead, there is another category Other which we treat as category C for symmetry in nomenclature. For the 2321 publications at the IITs we coded them using the journal category list of the respective IIM to which they are compared. For example, the publications at IITs are matched with the journal categorization of IIMA when IITs are compared to IIMA, the journal categorization of IIMB is used when IITs are compared to IIMB and so on.

3.2 Assembling the article-level Dataset

The article level data is used in an alternate estimation approach where we compare the relative probability of publications in A vis-is B or C category journals. To do this, we organize the data at the disaggregated level of articles published. In other words, the data records whether a particular faculty published a journal article, or not, in a specific year. In addition to this binary information, it simultaneously records the details of the publication

[8] IIMB has two categories C1 and C2 unlike at IIMA and IIMC. We combine these two and report as C

in terms of journal category. We call this our article-level data.

3.3 Data Characteristics and Some Trends

Our data starts from 1975 as the senior-most faculty member in our entire sample joined in 1975. The publication information in our dataset thus runs from 1975 to December 2017. For each faculty in our dataset across all the institutes, we observe the publication history from the date of first publication or from the date of receiving the Ph.D. degree, whichever occurs first. Unfortunately, we could not find the information on the date when a faculty member joined his/her institute for a majority of faculty in our entire sample. Hence, we estimate whether the rate at which a faculty member publishes changes before and after the incentive policy was implemented, irrespective of the year in which the faculty joined the institute. Specifically, we choose the 2000 as a cut-off year and consider 2001-2012 (2001-2011 for IIMC) to be the pre-policy years and 2012-2017 (2011-2012 for IIMC) to be the post policy years. The choice of 2000 is driven by two observations. First, as can be seen in Figure 1, there were less than 100 publications per year, all institutions combined, in majority of the years before 2001. Consequently, and more importantly, there are very few faculty members who have publications in years before 2001 in our data. Close to 90% of the 373 faculty have less than 5 publications in the span of 25 years between 1975-2000 and almost 70% of them do not have any publications over the same period (See Table 1).

Table 2 shows the total number of journals included in the journal category listing of the three IIMs. We see that across all IIMs, category A includes fewest journals, followed by category B and then by category C. While IIMA has a well-defined list of C-category journals, IIMB and IIMC have an open-ended list for Category C. As discussed in Section **??**, at IIMA, apart from categories A and B, there is a category C and a category 'Other'. For both 'C' and 'Other' the monetary rewards that accrue are indirect, through encashing of acquired points, unlike in the case of A and B where the monetary rewards are direct. Moreover, 'C' journals reward much lower amounts than 'B' and 'Other' journals reward even lower amounts. For our analysis we club 'C' and 'Other' in to a single category 'C' for IIMA. Similary, for IIMB, we combine 'C1' and 'C2' in to a single category 'C'. Another important point to note is the difference across institutions in the number of journals listed in each of the categories. IIMB has the lowest number of journals in category A and IIMA has the highest number across all three. In category B, once again IIMB has the lowest number of journals while IIMA and IIMC are comparable. Finally, all three IIMs have an open ended C-category list which includes all peer-reviewed journals.

Table 3 summarizes the characteristics of faculty in our data. First, it presents the distribution of faculty across institutions. We observe the following. First, in terms of faculty, the business schools at the IITs are much smaller than each of the three IIMs. Second, the percentage of women faculty members is generally higher at the five IITs combined compared to the IIMs. Third, the percentage of faculty members with foreign PhDs is significantly higher at the three IIMs compared to IITs. Fourth, the average faculty is relatively senior at IIMs compared to IITs. 51% of the faculty at IIMs are full professors compared to only 37% at IITs. Finally, the policy-year refers to the year in which the incentive scheme gets activated at the three IIMs.

Tables 4 and 5 summarize the journal publications in our estimation sample. Table 4 reports the total number of journal publications, as of 2017, at each of the 3 treatment institutions and all five control institutions combined. Table 5 is comparable to Table 4 except that it reports the average publications per faculty per year instead of the totals. In these tables, and in subsequent analysis based on the faculty-level data, we consider all peer-reviewed journal publications at each of the IIMs. For IITs we report the number of publications in each category for each of the three definitions used to categorize these publications. In terms of total journal output, the IIMs have more publications than the IITs and this is to be expected given the faculty size differential (274 versus 99). Second, IIMB has the lowest number of A-category publications compared to IIMA and IIMC. However, all IITs combined also have only 5 A-category journals between 2000-2017 when they are categorized according to the IIMB list. This underscores the importance of comparing IIMs and IITs using the same metric when analysing category wise publications.

Table 5 shows that publication per faculty per year, at 1.74, is higher at IITs than the per faculty per year average of 0.83 at IIMs. However, the distribution across various journal categories varies significantly both across IIMs as well between IITs and each of the IIMs. For instance, a faculty at IIMB writes about half of a C-category journal article per year on average, while at IIT the average faculty writes about 1.7 C-category articles per year, when measured according to IIMB journal categories. Note, however, that these numbers cannot be directly compared to the C-category publications of IIMA or IIMC since they have a different list. Instead, we see that IIMA and IITs on average produce about 0.8 and 1.6 C-category journals per year per faculty, respectively, when IIMA journal categories are used to recalibrate IITs C-category journal output.

While the above tables shows variations across institutions, Figure 2 plots the trends in publications. Panel-I plots the average total publications for every year between 2000-2017 across the three IIMs in our sample vis-a-vis the average over all 5 IITs over the same period. The vertical line at 2011 indicates the policy year in which the incentives amongst the IIMs first kicked in. We see that total journal publications have been going up at both set of institutions over time. However, most importantly for us, the trends are roughly similar across IITs and IIMs up to about 2011 after which they tend to diverge. Moreover, this divergence seems to arise from a jump in the rate of publications per year among the IIMs. In panels II, III and IV we plot the trends in total number of journal publications separately for IIMA, IIMB and IIMC vis-is the average for IIT. The vertical line indicates IIMAs (IIMB, IIMC) policy year, 2012 (2012, 2011). This lends support to the assumption of common trends driving the causal interpretation of our estimates.

4 Empirical Model

We exploit variations in the implementation of the publication-incentive scheme across institutions and over time to estimate the effect of monetary incentives on publication output. We employ a difference-in-differences framework to estimate this effect in two different approaches.

4.1 Baseline Approach

In our first approach, we compare how total number of journal publications per faculty changed at each of the three IIMs, and all of the eight IITs combined, before and after the relevant policy year. We then compare these over-time differences at each IIM with similar differences at all IITs combined to arrive at the difference-in-differences estimate. We conduct this using the following specification.

$$y_{fit} = \beta_0 + \beta_1 IIM * Post + \beta_2 E_{fit} + \beta_3 E_{fit}^2 + D_f + D_t + \epsilon_{fit} \tag{1}$$

Where, y_{fit} is the # of journal publications by faculty f, in institution i, and year t. E are the years of work experience in year t for faculty f. Ideally, years of work experience should be calculated from the year of joining work. However, in the absence of precise information on the year of joining work, we use the year of PhD as a proxy. In those few cases where year of PhD is not available, we calculate years of experience from the year of first publication, roughly reflecting the years of research experience.

As earlier stated, the policy year is 2011 for IIMC, becoming active in 2012, whereas, for both IIMA and IIMB the policy year is 2012, becoming active in 2013. In Eq 1, *Post* is a dummy indicating whether a particular year, in which we are measuring publications, is post-policy. We define the years (January) 2001 to (December) 2012 as the pre-policy period, and the years (January) 2013 to (December) 2017 as the post-policy period (*Post*), since 2012 was still not post-policy for IIMA and IIMB.[9]

Since our observations are at the level of faculty-year, there is a possibility that the publications would be correlated across faculty of an institute in a specific year. For example, institutes might get a one-time funding in a specific year, or several faculty members might work together on the same project. In other words, there could be institute-year shocks that invalidate the assumption of independent and identically distributed regression error. Hence, across all specifications we cluster the standard errors at the institute-year level.

[9]Note that this specification should give us more conservative estimates since we assign one year of post-policy for IIMC as pre-policy.

4.2 Quality versus Quantity

The specification in Eq 1 estimates how the total number of publications changed in response to the research-incentive policy. Next we ask whether the quality of publications also responded to the incentives. We do not explicitly use the degree of difference in incentives across the publications-quality spectrum. Instead, we study the extent to which publications in various categories responded to the incentive policy which rewards higher quality publication more than lower quality publications. Moreover, since each IIM has a distinct list of journal-categorization, our specifications are both institution specific and journal-category specific. We compare each IIM separately with all the IITs. Hence, in contrast to Eq 1, where we assign the same policy year to all treatment institutions, here we use the policy year that is specific to IIM-i. Further, for every treatment institution, we estimate Eq 2 for each journal category (A, B or C). Finally, when we compare IIM^i with all the IITs, the IIT publications are categories as per the ranking of IIM^i. The specification is explained in Eq 2.

$$y_{ft}^{ij} = \beta_0 + \beta_1^i IIM^i * Post + \beta_2 E_{ft} + \beta_3 E_{ft}^2 + D_f + D_t + \epsilon_{ft} \tag{2}$$

Where, y_{ft}^{ij} measures the number of total publications by faculty f, in institution i, journal category j and year t.

D_f denotes faculty fixed effects, which also account for time-invariant unobserved heterogeneity specific to each institution in our study. D_t are year fixed effects that reflect changes in rates of journal publications over time that are common across all institutions. For instance, a general push for more research orientation across all IITs and IIMs during this time period is captured by D_t.

4.3 Years of Exposure

While the disaggregated analysis in Eq 2 allows us to capture the variation in policy-implementation-year across the three IIMs accurately, it does not give us an average estimate of the effect of the incentive policy across all institutions. Hence, we turn to our second approach which corrects for this loss of information. We define a measure of exposure to the policy as the number of years that have elapsed since the implementation of the incentive policy. We estimate the following regression specification, where years of exposure (YOE) varies by publication-year, across all IIMs and for every faculty member.

$$y_{fit} = \beta_0 + \beta_1^e \sum_{e=1}^{6} YOE_{fit} + \beta_2 E_{fit} + \beta_3 E_{fit}^2 + D_f + D_t + \epsilon_{ft} \tag{3}$$

Where, $\sum_{e=1}^{6} YOE_{fit}$ is an indicator for e years of exposure to the incentive program for faculty f, in institution i and year t. The earliest year when one could be exposed to the incentive policy is 2012 (at IIMC) and the latest year for which we observe publications is 2017 in our data. Hence $e \in [1, 6]$. The omitted category includes pre-policy years when program exposure is zero. Each coefficient β_1^e can be interpreted as the estimate of the impact of the incentive program for e years of exposure. As in Eq 2, we also estimate Eq 3 separately for each IIM where total publications in each journal rank-category is IIM specific. Further, we also provide estimate of the average effect of an additional year of exposure using a more restricted version of Eq 3.

4.4 Relative probability of publishing in high rank journal

The models so far estimate the extent to which the incentive program changes total publications in a journal, or in a journal of a specific category. However, it is does not capture if there is substitution away from low-reward journal categories to the high-reward ones. Like publishing more, publishing in higher ranked journals also involves effort. However, while the quantity of publications might go up linearly with the amount of effort, the link from effort to quality of publications is unlikely to be linear. Hence, the effect of incentives on effort to publish quantity vis-a-vis quality is unclear. In order to understand the changes in the latter we explore the article-level-data and estimate the following specification.

$$Pr(P_{fit} = 1) = \beta_0 + \beta_1^i IIM_i * Post + \beta_2 E_{fit} + \beta_3 E_{fit}^2 + D_f + D_t + \epsilon_{fit} \tag{4}$$

Equation 4 is identical to Equation 2 except that the dependent variable is now an indicator for whether the publication P, by faculty f, at IIM i and year t is category A vis-a-vis category B or C. β_1^i then shows the change in probability of publishing in a category-A journal relative to publishing in journal categories B or C. In other words, we ask if the higher monetary incentives for category A journal compared to category B or C nudges faculty to switch publishing from C or B to A category journals.

5 Results

Differences-in-differences estimates rely on both differences across treatment and control as well as on changes over time in the dependent variable. Hence, it is important to understand, and eliminate, pre-existing differences across space and time. Tables 4 and 5 provide an idea about the differences between IIMs (treatment institutions) and IITs (control institutions) in the number of publications. The inherent differences between these institutions are embedded in the time-invariant faculty-fixed effects introduced in all specifications discussed in Section 4. Here, we investigate over time changes in publications across the institutions, using the faculty-level data.

Table 6 presents estimates of the change in total journal publications before and after the implementation of the incentive policy. We account for faculty fixed effects across all specifications in Table 6. The estimates indicate the change between pre and post policy years for the average faculty. Columns 1 to 5, respectively, report the trends in total journal publications across all five IITs together, three IIMs together, and then the three IIMs individually. We observe that the total number of journal publications increased post 2013 in each of these cases with all three IIMs roughly experiencing similar increases in publications per faculty in the post-policy period compared to the pre-policy period. Column 5 shows that the total number of journal publications increased much more for the average IIT faculty compared to the average IIM faculty over this period. Column 6 additionally includes the linear time trend in total journal publications for each institute. The estimates in Column 6 shows that the pre-post differences are driven by long term trends in publications. Although the time trend in publications is positive for all institutes, they are dissimilar in magnitude. The IITs by and large have higher coefficients than the IIMs implying that IITs have experienced a stronger positive trend in total number of publications over time compared to the IIMs. Once again, the three IIMs experience similar time trends. These results underscore the importance of controlling for underlying trends in our estimations.

5.1 Baseline

Table 7 presents the results from estimation of Eq 1. While faculty and year fixed effects account for time invariant factors that vary across institutes and common effects that vary year to year in the same way for all institutions, respectively, there is still the possibility that each institute might follow its own time trend, as observed in column 6 of Table 6. We cannot account for non-linear time trends since our variable of interest varies at the institute-time level. Hence, we include linear trends specific to each of the 8 institutes in our sample.

Column 1 reports the results from the DID model with faculty fixed effects and with a Post-2013 indicator, assuming 2013-2017 to be the post-policy period, across all IIMs, and 2001-2012 as the pre-policy period. Specifically, we compare total number of journal publications (in any of the categories: A, B or C) by each faculty member in any year after the policy-year of 2013 across all IIMs to the total number of journal publications by each faculty member in any year before the policy-year of 2013. We also compare similar estimates for all faculty members across all IITs. The DID estimates that we report are a difference of the latter from the former. The positive DID estimate implies that total number of journal publications increased much more for the average faculty at the IIMs compared to the average faculty at the IITs after 2013, compared to the pre-policy period once differences in long term publication trends across institutions have been eliminated.

Column 2 additionally includes experience and experience squared for each faculty, corresponding to the publication year. In tandem with the extant human capital literature, we find that total number of publications per faculty increases with years of experience but at a decreasing rate. Importantly, the DID estimate remains unchanged. In column 3, we estimate the full specification as in column 2, but now allow the policy effects to vary by each IIM. The institution specific DID coefficients are all positive and significant, and are not statistically different from each other Overall, the findings from Table 7 suggests that the incentive policies at the three IIMs have had a positive impact on total journal publications. Column 3 in Table 7 form our baseline full specification.

5.2 Quality of publications

We next explore how the incentive policies at the IIMs affected quality of publications where quality is defined by the institute specific journal ranking lists. While each institution has its own list, the overall list of journals are roughly comparable to the extent that they are derived from a combination of well-established journal ranking systems like the Australian Business Deans Council, Scimago Journal Ranking etc. As discussed before, we use the ranking list of a specific IIM to categorize the publications of all IITs for estimating the effect of the incentive program on the quality of publications for that specific IIM.

Tables 8 – 10 present the results from estimating Eq 2, using as dependent variable the number of journal publications in category A, B and C journals, by a faculty in a specific year, respectively. Since journal categories are IIM-specific, we can only estimate the specification in Eq 2 separately for each IIM. Thus, in column 1(2 and 3), where we compare IIMA (IIMB and IIMC) with IITs, journal publications at IITs are categorized following the journal ranking list of IIMA (IIMB and IIMC), in each of the three tables.

In Table 8 we investigate the effect of the policy on publishing in A-category journals. While the coefficients are all positive, only in case of IIMA are the coefficients significant. This means that the average number of A-category publications increased at IIMA compared to IITs, while using IIMAs ranking list to define A category publications at each IIT. IIMB and IIMC do not experience a similar increase in A-category publications, as per their definition, compared to the IITs. There are two possible explanations for this result. First, it is possible that IIMA experiences an increase in A-publications in response to the incentive policy but it doesn't happen at the other two institutions. The second possibility is that there is a difference in the list of journals included in the A-category list. Appendix Table A2 shows a comparison of the journal ranking lists across IIMA, IIMB and IIMC. It shows that IIMA has 136 publications in journals categorized as A, according to IIMA's ranking list. Of these only 5 qualify as A-category according to IIMB's ranking list and only 84 qualify as A-category according to IIMC's ranking list. This means that at IIMA there are many more journals to choose from that qualify as A. Even if faculty at IIMB and IIMC publish in these journals, they are not categorized as A-publications. Finally, we see that unlike in the case of total number of publications across all journal types, publication in A-category journals do not seem to depend on the years of experience of a faculty in any of the institutions. The estimates on experience are close to zero.

Table 9 and 10 replicate the same formulation and format as in Table 8 now for category B and C journals, respectively. The results indicate that IIMA and IIMB experienced increases in B journal publication post-policy compared to the IITs. While the coefficient for IIMC is positive, it is insignificantly different from zero. Like in the case of A-category journals, number of publications in B-category journals do not seem to depend on the years of experience of a faculty.

The results in Table 10 indicate that all three IIMs experienced large increases in C publications after the implementation of the incentive-policy, compared to the IITs. The extent of increase is higher at IIMB and IIMC relative to IIMA. This could be explained by the fact that all three institutions experienced similar increases in the total number of publications. For IIMA this increase is distributed across A-category and C-category publications. While for IIMB and IIMC the increase is mainly driven by the C-category publications. Interestingly, unlike in the case of A and B category publications, C-publications go up, non-linearly, with experience. This finding possibly suggests that while C-publications can be achieved through increase in effort and experience, A and B publications possibly require additional complementary resources and effort alone is not sufficient to publish in A and B journals.

5.3 Placebo Checks

The DID estimates in Tables 7 through 10 account for institution specific linear time trends. While we cannot completely rule out the possibility that treatment and control institutions might have different non-linear time trends, having common underlying linear-trends reduces the possibility of the former. Hence, in this section, we further explore the possibility of pre-existing differences in trends across the treatment and control institutions.

Figures 2 shows that the rate of increase in publications over time was similar across IIMs and IITs before the 2012 incentive policy came into being. In Table 11, we provide more formal evidence on common trends. We present results from a placebo exercise, that we perform with our faculty-level data, for years ranging from 1985 to 2000, using 1994 as the pseudo-policy year. Column 1, PanelI shows the overall effect on total number of publications; we do not find any evidence of pre-existing trends. Columns 2-4 report the results for IIMA, IIMB and IIMC respectively and Panels I-III present comparable results for each journal category. The coefficients are all insignificant and mostly close to zero indicating absence of any effect on publication prior to the incentive policy.

5.4 Years of Exposure

So far, we have used an indicator for policy-year to define pre and post policy periods. A problem with this approach is that policy years are different for the three IIMs. To recall, 2012 is the first post-policy year for IIMC, whereas for both IIMA and IIMB it is 2013. Thus, our measure of the policy indicator had an assignment problem. More importantly, response to a research-incentive policy is unlikely to take full effect immediately after the policy implementation since the process of conducting research and publishing is time-intensive. Hence, in what follows, we allow the effect of the incentive policy to vary by the number of years elapsed since policy implementation. Specifically, for every publication-year for each faculty, we construct a measure of years of exposure (YOE) to policy. Thus, for a publication by a faculty member at IIMC in 2012, YOE=1; whereas, for the same publication from IIMA and IIMB, YOE=0. For a publication in 2013, YOE=2 for IIMC faculty and YOE=1 for IIMA and IIMB faculty. For all IIT faculty, YOE is always equal to zero.

Table 12 reports results from estimation of Equation 3 for total number of journal publications. Column 1 reports the average effects on total number of journal publications for all IIMs taken together. Columns 2-4 report results for the three IIMs separately. What is clear from this table is that the overall effects are muted in the first year of exposure and then increases over time. While the higher increase from the second year of exposure, compared to the first year, is stronger for IIMA and IIMC, even at IIMB we see an increase in the effect of the incentive policy from year 2 onwards. As before, experience and experience squared have the expected signs for total journal publications.

It is clear from Table 12 that more years of exposure to the policy has a larger impact on total number of publications across all three IIMs. Next we investigate how quality of publications are affected by years of program exposure. However, to maintain brevity in the results and easier comparison across institutions, we estimate the journal-quality wise specifications, separately for each IIM, using linear years of program exposure. Tables 13 presents these results for total publications in category A, B and C journals. For comparison, we also report the estimate of the linear effect of an additional year of exposure on total number of publications for each IIM. As before, IIMA journal categories are used to define the journal publications of IITs for IIMA-estimates and similarly for IIMB and IIMC.

The results, in column 1 of Panel-I, suggest that for each additional year of exposure to the reward policy, a faculty at IIMA is likely to publish 0.2 more journal articles. One way to understand the result is that 5 years of exposure to the policy leads to one additional publication by a faculty at IIMA. Another interpretation is that the reward policy would result in 20 more publications from IIMA per year, if IIMA had 100 faculty members. Similarly, considering that each IIM had 100 faculty members, while an additional year of exposure led to 4 additional A-category publications, it led to 17 additional C-category publications at IIMA (Refer to Column 4, Panel-I and Panel-II respectively).

5.5 Probability of publishing in 'A'-Journals

The estimates we presented so far looks at the change in total number of journal publication, or totals in each quality-category for each faculty. While increases in total number of high-ranking publications is the ultimate goal of all business schools in order to improve their own rankings, what this does not capture is the substitution between low and high ranking publications. Since total number of hours are fixed, faculty must decide how to distribute effort- whether to spend more time in writing many papers that can be published in relatively low ranking journals or to spend more time in writing a few papers that can be published in high ranking journals. If, for instance, the reward policy pushes faculty to make more money by devoting all time in publishing low quality publications, then we should see a switch from A publications to B or C publications for the average faculty post policy. The trade-off between high and low quality papers would then depend on the reward gap between low- and high-quality journals. If the gap is too large, for example, then it might be worthwhile to spend the effort in publishing a few high quality papers. Of course, it would also depend on private information about ability. On the other hand, if the reward policy pushes faculty to make more money by devoting all time in publishing high quality papers, then we should see a switch from C publications to A and B publications post policy. While we cannot estimate the intensive margin of the effect of reward policy on a faculty's decision making, due to data limitations, we provide reduced form estimates of the effect of the reward policy on the probability of publishing in relatively high ranking journals as opposed to relatively low ranking journals.

As discussed in Section 4.4, we use the specification in Eq 4 to answer this question. Panel-I of Table 14 shows the effect of the reward policy on the probability of publishing in A-category journals compared to B- or C- category journals. Panel-II shows the effect of the reward policy on the probability of publishing in A-category journals compared to no journal publication. In contrast to our baseline results in Table 8 where total number of A-category publications increased only for IIMA, we find that there is a switch from publishing in B or C category journals to A category journals in both IIMB and IIMC but not at IIMA. However, as before, the switch to publishing in relatively high ranking journals does not depend on the years of experience. On the other hand, the results in Panel-II suggests that the probability of publishing in A category journals did not go up compared to no-journal publications in either IIMB or IIMC. This means that those who were not publishing before do not start publishing in A journals due to the incentive policy. Only at IIMA, there is an increase in the probability of publishing in A journals compared to no journal publication. This is in line with our baseline findings that only IIMA experiences an overall increase in the total number of A publications. On the other hand, at IIMB and IIMC, while the total number of A publications has not gone up, those who were publishing in relatively low ranking journals before, now switch to publishing in relatively high ranking journals.

5.6 Robustness

In Tables 15 through 17 we provide a series of sensitivity checks for further assurance that the results in the previous sections are not driven by idiosyncrasies of the control group, sample period or sample selection. All estimations are based on the the specification described in Eq 3 for continuous years of exposure to the program.

Table 15 provides estimates by removing one IIT at a time from the control group, lest our results are driven by specific trends in any of the institutions in the control group. Each cell reports the estimate of average β_1 in Eq 3 across all years of exposure. For example, the coefficient in column 1, row 1, of Panel-I, shows the effect of an additional year of exposure to the reward program on the number of A-category publications, when IITB is removed from the control group. We see that all the coefficients, across journal categories and across the three treatment institutions, are robust to the modifications in the control group. This indicates that our findings do not hinge on any one control institution.

Table 16 provides estimates by restricting the sample of faculty to only those who joined the institutions in our study before 2012. A concern with our estimation strategy is that we might be picking up publications of faculty at other institutions who joined the IIMs post the reward policy. This could either be because the performance-pay regime attracts the more motivated faculty or the implementation of the reward policy means that IIMs are more actively hiring faculty with good publication record. We need to observe the precise year of joining to be able to conduct this analysis. In the absence of that information, we use the year of PhD as a proxy. The results in 16 indicate that the effect is similar to our baseline findings in Table 13.

Finally, as discussed in Section 2, IIMA had an incentive policy in place between 2007-2011, before the 2012 policy came in. Under this older policy scheme, IIMA paid monetary incentive for a small list of journals, primarily from their A and B Category list of the 2012 policy. To purge our estimates of the pre-existing incentive scheme, in Table 17 we report estimates for IIMA for excluding the sample period of 2007-2011. We see that while the coefficients on total number publications and total number of C-category publications are little lower than in the full sample, reported in Table 13, none of the coefficients are significantly different from those for the full sample. Note, however, that we cannot rule out that part of the effect on publications in the post 2012 policy period at IIMA, is a long term impact of the 2007-2011 policy.

6 Conclusion

This paper examines whether explicit monetary rewards for journal publications affects both the quantity and quality of research output. If substantially more prize money is given to higher quality journal publications compared to lower quality publications, where quality is defined by clearly-communicated journal rankings, we examine the resulting quantity-quality trade-off. Specifically, we investigate whether faculty steer their effort functions toward increasing the number of lower quality publications, or do they instead, concentrate their effort in producing fewer high quality journal publications. Our motivation in asking these questions comes from the economics of incentives literature, where it is now but a truism to suggest that monetary incentives work well for largely physical and repetitive tasks but could be detrimental to complex tasks that require creative and cognitive abilities, like publishing in peer-reviewed academic journals. Given the latter, it is surprising then that several educational institutions across the world during the last few decades have implemented these monetary incentives schemes for journal publications.

Using a unique natural experiment setting across eight management schools in India for the period January 2001 to December 2017, we investigate whether, and the extent to which, monetary incentives influenced both the quantity and quality of journal publications. Three of these schools, the IIMs, implemented their incentive schemes during 2011-2012 (our treatment group), whereas, the five IITs did not have any such incentive scheme (our control group). Although the structure of these incentive schemes at the three IIMs were similar, they each had their own unique sets of journal category lists (A, B, and C). This sets the policy aside from those used in the previous literature. The clear communication about the journal title and the corresponding reward provides more outcome certainty to faculty choosing the effort for research output. In contrast, the previous literature is restricted by policies that determine the reward amount (either direct or through promotions) ex-post, i.e. after the publication.

Our estimation data consists of journal output over 17 years between 2000-2017 for 373 faculty members, across the 8 institutions. We exploit variations in the implementation of these incentive schemes across institutions and over time to estimate the effects of monetary incentives on journal output employing a difference-in-differences framework. Our baseline approach compares how total publications per faculty changed at each of the three IIMs before and after the relevant policy year. We then compare these over-time differences at each IIM with similar differences at all IITs combined to arrive at the difference-in-differences estimate. We find that the incentive policies at the three IIMs have had a positive impact on total journal publications and the estimates are indistinguishable across the three IIMs. Using a similar identification strategy, separately for each IIM and each journal-category, we find a significant increase in A-category publications only at IIMA. IIMB and IIMC did not experience a similar increase in A-category journals as per their own journal lists. Likewise, while B-category publications increase in both IIMA and IIMB, there is no significant change at IIMC. However, all three IIMS experienced a significant increase in C-category publications. Importantly, the size of the effect on C-category publications is several times higher compared to the effect on A or B category publications across all three institutions. An interesting additional finding is that the effect of experience on total research output is in line with the human capital literature - productivity goes up with experience but at a decreasing rate. However, we find that experience matters only for C-category publications, it does not affect A-category research output.

Since publication is a time consuming process, we next estimate the dynamic effect of the policy. We estimate how the number of publication, in total and in each category, changes with the years of exposure to the policy. We find that number of publications, per faculty per year, went up with, almost, every passing year. Our estimates suggest one additional publication, in A B or C journal, for roughly 5 years of policy exposure at IIMA and 6 years of exposure at IIMB and C.

We next explore the decision to allocate effort across various journal categories: does a faculty allocate more hours publishing several articles in lower ranked journals, or does she instead choose to publish a few in higher ranked journals. We estimate two probabilities: the probability of publishing in A vis-is B or C category journals, and the probability of publishing in category A journals vis-is not publishing any journal article. In contrast to our baseline results, where A-publications increased only for IIMA, we find here that there has been a significant switch from publishing in B and C-category journals to A-category journals at both IIMB and IIMC but not at IIMA. As before, this switch does not depend on years of experience. In terms of the probability of publishing in A, B or C category journals versus no journal publication, only at IIMA did these probabilities increase to some extent. IIMB and IIMC did not experience any increase. This, coupled with our earlier findings suggest the following. First, faculty who were not publishing before continue to not publish at both IIMB and IIMC. Second, the increase in publications then driven by those who were already publishing some articles in journals before the policy. Third, those who were publishing before, allocate, at least a part of, their efforts to publish in better quality journals after the policy.

Our results are robust to a series of sensitivity tests - control group modifications, old hires, . In addition, we the results go through a placebo exercise using publication data from much before the policy implementation, between 1985 and 2000. All our results, taken together, clearly indicate that the incentive policies at the three IIMs did increase total journal publications as well as steer faculty towards producing articles in relatively higher quality journals.

Two important caveats need to be noted. First, due to data limitations, we cannot say anything about the intensive margin, i.e., how much monetary incentives are needed to increase publications and by how much. Second, as there are teaching incentives working simultaneously at the three treatment organizations, faculty could be teaching more as well. Although we have found faculty responding to research incentives, we cannot say how much more research would increase in the absence of teaching incentives.

How do our results in this paper relate to the wider pay-for-performance literature? Our findings confirm the two main propositions of this literature that monetary incentives significantly increase productivity when the tasks are relatively simple and when output is easily measurable (Lazear, 2000); however, these incentive policies when implemented beyond certain threshold levels could have adverse output effects when the tasks are relatively difficult, time intensive, and most importantly, involve considerable intellectual effort due to the creative abilities involved in generating quality (Ariely et al., 2009; Holmstrom, 2017). Monetary incentives significantly increased the total number of journal publications at those institutions that implemented these policies with this increase driven primarily by relatively lower ranked journals. That is a significant quantity effect, or what Gneezy et al. (2011) call the direct price effect set off by ones extrinsic motivation, resulted. However, the same outcome did not occur for the high-quality A journals, that is, incentives did not lead to an increase in quality journal publications at two of the three IIMs. Although it did increase at IIMA, the list journals included in A-category is large for IIMA and there are many journals in the A-category list of IIMA which are not included in the respectve lists of IIMB and

IIMC.

Given the high uncertainty associated with publishing in high-quality journals (very low acceptance rates and high waiting time) faculty at the IIMs largely took the low-risk option of focusing their effort in publishing several low-quality journal publications per year, as opposed to steering their effort functions towards the high-risk option of attempting to publish a few high-quality publications. Nevertheless, the incentive policies did to some extent shift the effort function of the average IIM faculty towards high-quality journals when one views the proportion of publications in these journals over time. We feel our results are reconciled with the theoretical concerns regarding the downside of contingent contracts, such as quality issues and performance metrics, as expressed by Holmstrom (2017) and others in the literature, since in our example, tasks, rewards, and performance metrics are a priori well defined and largely noncontroversial. In addition, there are no uncertainties regarding how quality will be treated ex post.

The reasons why monetary incentives failed to have any significant effect on high-quality journal publications in our example could be many. Besides considerable ability and expert domain knowledge requirements, one may also need sufficient research infrastructure to publish at these journals. Secondly, as pointed out in the theoretical and experimental literature, it could be the case that to publish in high-quality journals it is intrinsic (prestige, peer recognition) rather than extrinsic motivation that works and monetary incentives simply crowds out the latter with the former. This crowding out adds pressure on faculty to produce and thus several low quality publications emerge. Specific to our example of course, journal quality is well defined by the individual IIMs category list, and thus output of high quality publications depends on the size of this list. It is thus no coincidence that category A publications increased as a result of incentives only at IIMA where the list of these journals were the largest.

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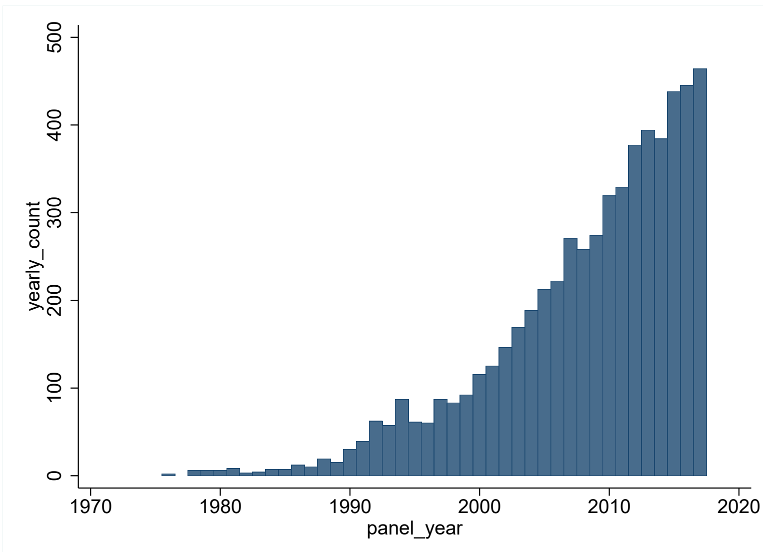
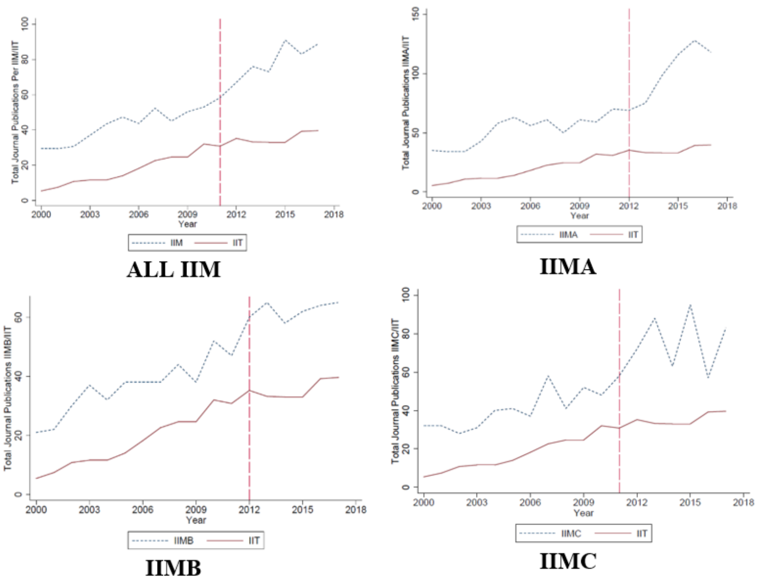
7 Tables

Figure 1: Yearly Publications: 1975-2017



Notes: The figure shows the frequency distribution of the number of yearly publications, in A, B and C category journals combined, between 1975 and 2017, across all IIMs and IITs.

Figure 2: Trends in Publications: IIMs vis-a-vis IITs



Notes: The figure shows the trends in annual journal publications, in A, B and C category journals combined, over the study period, 2000-2017. The vertical line denotes the policy-year at each institute. For Panel(a) the vertical line is drawn at the earlist policy-year, 2011, across all three IIMs.

Table 1: Journal Publications: 1975-2000

Faculty-Publication Data	Totals	Percent
# total faculty	373	
# with no publication 1975-2000	256	0.69
# with <= 2 publications 1975-2000	300	0.80
# with <= 5 publications 1975-2000	329	0.88
# with <= 10 publications 1975-2000	347	0.93

Notes: This table shows the total number of faculty, across IIMs IITs, with none, 2, 5 or 10 publications over the entire period between 1975-2000.

Table 2: Summary of Journals

	IIMA	IIMB	IIMC
A-cat*	597	36	285
B-cat	770	106	866
C-cat	1418+PR	PR	PR

In the event of two separate lists for A and A journal categories, we combine them under A. Similarly for journal category, C.

Notes: Journal Category Lists of the 3 IIMs. PR implies any peer-reviewed journal.

Table 3: Faculty Characteristics

	IIM	IIT	IIMA	IIMB	IIMC
# Faculty	274	99	96	89	89
% Female	0.20	0.32	0.18	0.19	0.22
Foreign PhD	0.44	0.15	0.41	0.65	0.25
Experience	10.56	8.67	10.60	10.76	10.31
Assistant	0.24	0.27	0.25	0.22	0.24
Associate	0.25	0.35	0.27	0.24	0.24
Professor	0.51	0.37	0.48	0.54	0.53
Experience	11	9	11	11	10
Policy Year			2012	2012	2011

Notes: Table reports faculty composition at all IITs combined and faculty composition and policy year for each IIM.

Table 4: Total Faculty Publications

	IIM	IIMA	IIMB	IIMC	IIT		
	Respective Categories				IIMA Cat	IIMB Cat	IIMC Cat
All Journals	2907	1193	790	924	2107	2107	2107
A-cat	311	118	35	158	105	5	181
B-cat	413	90	100	223	88	65	344
C-cat	2183	985	655	543	1914	2037	1582

Notes: Columns 1-4 use IIMA categories to define IIMA's publications, IIMB categories to define IIMB's publications, IIMC categories to define IIMC's publications. In columns 5-7 IITs' publications are categorised using IIMA, IIMB and IIMC categories, respectively.

Table 5: Publications per Faculty

	IIM	IIMA	IIMB	IIMC	IIT		
	Respective Categories				IIMA-cat	IIMB-cat	IIMC-cat
All Journals	0.83	1.01	0.66	0.82	1.74	1.74	1.74
A-cat	0.09	0.10	0.03	0.14	0.09	0.00	0.15
B-cat	0.12	0.08	0.08	0.20	0.07	0.05	0.28
C-cat	0.62	0.83	0.54	0.48	1.58	1.68	1.31

Notes: Table reports average publications per faculty per year. In columns 5-7 IITs publications are categorised using IIMA, IIMB and IIMC journal categories, respectively.

Table 6: Linear Trends in Publications

Dependent Variable: Total Publications						
	(1)	(2)	(3)	(4)	(5)	(6)
	All IIM	IIMA	IIMB	IIMC	All IIT	All
Post 2013	0.15***	0.15**	0.13**	0.15**	0.50***	-0.06
	(0.039)	(0.075)	(0.060)	(0.066)	(0.111)	(0.064)
Linear trend IIMA						0.02**
						(0.010)
Linear trend IIMB						0.02*
						(0.009)
Linear trend IIMC						0.02
						(0.010)
Linear trend IITB						0.06***
						(0.017)
Linear trend IITK						0.14***
						(0.025)
Linear trend IITD						0.24***
						(0.022)
Linear trend IITM						0.05***
						(0.017)
Linear trend IITKGP						0.11***
						(0.022)
Constant	0.77***	0.95***	0.61***	0.76***	1.54***	-0.43*
	(0.023)	(0.045)	(0.035)	(0.039)	(0.067)	(0.227)
Faculty FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,513	1,181	1,203	1,129	1,211	4,724
Adjusted R-squared	0.297	0.283	0.252	0.323	0.513	0.473

Notes: Post 2013 is a dummy variable =1 for years between 2013–2017 and =0 for years between 2000–2012. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7: Total Publications - DID

Dependent Variable: Total Publications			
	All-IIM	All-IIM	IIM_i
	(1)	(2)	(3)
IIM*Post2013	0.65***	0.67***	
	(0.155)	(0.156)	
IIMA*Post2013			0.63***
			(0.201)
IIMB*Post2013			0.66***
			(0.151)
IIMC*Post2013			0.72***
			(0.186)
exper		0.25***	0.25***
		(0.085)	(0.085)
$exper^2$		-0.00***	-0.00***
		(0.000)	(0.000)
Faculty FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes
Constant	3.71***	2.43***	2.44***
	(0.778)	(0.817)	(0.817)
Observations	4,724	4,724	4,724
Adjusted R-squared	0.474	0.480	0.480

Notes: Dependent variable is the total number of peer reviewed journal publications by a faculty member in a specific year between 2000-2017. Across all columns the omitted category is all 5 IITs combined. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8: A Category Publications - DID

Dependent Variable: Total Publications in A-category Journals			
	IIMA	IIMB	IIMC
	(1)	(2)	(3)
IIM_i*$Post2013$	0.13***	0.01	0.07
	(0.041)	(0.015)	(0.047)
exper	-0.01	0.02	0.00
	(0.022)	(0.017)	(0.036)
exper_sq	-0.00***	-0.00	-0.00***
	(0.000)	(0.000)	(0.000)
Faculty FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes
Constant	-0.06	-0.09*	-0.21*
	(0.104)	(0.048)	(0.123)
Observations	2,392	2,414	2,340
Adjusted R-squared	0.254	0.138	0.348

Notes: Dependent variable is the total number of publications in A-category journal by a faculty member in a specific year between 2000-2017. Across all columns the omitted category is all 5 IITs combined. Column 1 uses IIMA journal ranking list to categorize publications at IIMA and at all IITs. Column 2 uses IIMB journal ranking list to categorize publications at IIMB and at all IITs. Column 3 uses journal ranking list to categorize publications at IIMC and at all IITs. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 9: B Category Publications - DID

Dependent Variable: Total Publications in B-category Journals			
	IIMA	IIMB	IIMC
	(1)	(2)	(3)
IIM_i*$Post2013$	0.06**	0.06**	0.03
	(0.025)	(0.026)	(0.059)
exper	0.02	-0.01	0.03
	(0.036)	(0.015)	(0.041)
exper_sq	-0.00**	-0.00***	-0.00**
	(0.000)	(0.000)	(0.000)
Faculty FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes
Constant	-0.02	-0.03	0.25
	(0.115)	(0.079)	(0.279)
Observations	2,392	2,414	2,340
Adjusted R-squared	0.137	0.173	0.252

Notes: Dependent variable is the total number of publications in B-category journal by a faculty member in a specific year between 2000-2017. Across all columns the omitted category is all 5 IITs combined. Column 1 uses IIMA journal ranking list to categorize publications at IIMA and at all IITs. Column 2 uses IIMB journal ranking list to categorize publications at IIMB and at all IITs. Column 3 uses journal ranking list to categorize publications at IIMC and at all IITs. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 10: C Category Publications - DID

Dependent Variable: Total Publications in C-category Journals			
	IIMA	IIMB	IIMC
	(1)	(2)	(3)
$IIM_i * Post2013$	0.45**	0.60***	0.63***
	(0.178)	(0.153)	(0.135)
exper	0.23**	0.34***	0.27***
	(0.108)	(0.128)	(0.101)
exper_sq	-0.00***	-0.00***	-0.00**
	(0.001)	(0.001)	(0.001)
Faculty FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes
Constant	1.62**	1.24	1.67***
	(0.759)	(0.814)	(0.599)
Observations	2,392	2,414	2,340
Adjusted R-squared	0.481	0.549	0.476

Notes: Dependent variable is the total number of publications in C-category journal by a faculty member in a specific year between 2000-2017. Across all columns the omitted category is all 5 IITs combined. Column 1 uses IIMA's journal ranking list to categorize publications at IIMA and at all IITs. Column 2 uses IIMB's journal ranking list to categorize publications at IIMB and at all IITs. Column 3 uses journal ranking list to categorize publications at IIMC's and at all IITs. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11: Placebo: 1985-2000

Panel-I, Dependent Variable:	Total Publications	A Category		
	All IIM	IIMA	IIMB	IIMC
IIM*Post-Placebo	-0.04			
	(0.281)			
IIM'i'*Post-Placebo		-0.13	0.01	-0.21
		(0.109)	(0.017)	(0.130)
exper	0.37***	-0.05	-0.02	-0.09
	(0.140)	(0.053)	(0.023)	(0.107)
$exper^2$	-0.00**	-0.00	-0.00*	0.00
	(0.001)	(0.001)	(0.000)	(0.001)
Constant	-0.45	0.75	-0.16	0.03
	(0.930)	(0.494)	(0.195)	(0.495)
Adjusted R-squared	0.404	0.081	-0.013	0.400
Panel-II, Dependent Variable:		B Category		
IIM'i'*Post-Placebo		0.01	-0.04	0.17
		(0.120)	(0.126)	(0.149)
exper		0.03	0.06	0.07
		(0.068)	(0.094)	(0.078)
$exper^2$		-0.00	-0.00	-0.00**
		(0.000)	(0.000)	(0.001)
Constant		0.01	0.36	-1.94***
		(0.500)	(0.512)	(0.479)
Adjusted R-squared		0.267	0.198	0.267
Panel-III, Dependent Variable:		C Category		
IIM'i'*Post-Placebo		0.16	-0.08	0.29
		(0.108)	(0.276)	(0.250)
exper		0.04	0.05	0.51***
		(0.091)	(0.228)	(0.143)
$exper^2$		-0.00	-0.00*	-0.00
		(0.001)	(0.001)	(0.001)
Constant		-0.51	-0.32	0.62
		(0.427)	(1.512)	(1.051)
Adjusted R-squared		0.262	0.431	0.327
Observations	1330	588	625	565
Faculty FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes	Yes

Notes: Dependent variable is number of publications (in total or in each journal category, as indicated) by a faculty member in a specific year between 1985-2000. 1994 has been coded as the placebo post-policy year. Across all columns the omitted category is all 5 IITs combined. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 12: Years of Exposure: Total Publications

Dependent Variable: Total Publications				
	(1)	(2)	(3)	(4)
	ALL-IIM	IIMA	IIMB	IIMC
$YOE = 1$	0.31***	0.26	0.55***	0.34
	(0.105)	(0.188)	(0.185)	(0.238)
$YOE = 2$	0.72***	0.67***	0.66***	0.85***
	(0.120)	(0.199)	(0.196)	(0.197)
$YOE = 3$	0.79***	0.99***	0.85***	0.74***
	(0.136)	(0.185)	(0.181)	(0.207)
$YOE = 4$	0.99***	0.96***	0.71***	1.21***
	(0.166)	(0.226)	(0.225)	(0.195)
$YOE = 5$	0.80***	0.99***	0.87***	0.64***
	(0.188)	(0.230)	(0.227)	(0.238)
$YOE = 6$	0.99***			1.10***
	(0.234)			(0.241)
exper	0.25***	0.25**	0.35***	0.30**
	(0.085)	(0.120)	(0.129)	(0.115)
exper_sq	-0.00***	-0.00***	-0.00***	-0.00***
	(0.000)	(0.001)	(0.001)	(0.001)
Constant	2.69***	1.79**	1.21	1.97**
	(0.835)	(0.821)	(0.819)	(0.782)
Faculty FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes	Yes
Observations	4,724	2,392	2,414	2,340
Adjusted R-squared	0.481	0.507	0.541	0.536

Notes: Dependent variable is the total number of peer reviewed publications by a faculty member in a specific year between 2000-2017. Across all columns the omitted category is all 5 IITs combined. For IIMA and IIMB, $YOE \in [1, 5]$ for each $year \in [2013, 2017]$, respectively. For IIMC, $YOE \in [1, 6]$ for each $year \in [2012, 2017]$, respectively. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 13: Years of Exposure: Publications in Each Category

	(1)	(2)	(3)	(4)	(5)	(6)
Panel I: Dependent Variable	Total Publications			Total A-category Publications		
	IIMA	IIMB	IIMC	IIMA	IIMB	IIMC
Years_exposed	0.22***	0.16***	0.15***	0.04***	0.01*	0.02
	(0.045)	(0.043)	(0.042)	(0.011)	(0.003)	(0.012)
exper	0.25**	0.34***	0.30***	-0.01	0.02	0.00
	(0.120)	(0.128)	(0.114)	(0.022)	(0.017)	(0.036)
exper_sq	-0.00***	-0.00***	-0.00***	-0.00***	-0.00	-0.00***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	1.68*	0.98	1.68*	-0.06	-0.08	-0.20
	(0.855)	(0.860)	(0.851)	(0.110)	(0.050)	(0.134)
Adjusted R-squared	0.507	0.541	0.535	0.254	0.138	0.348

Panel II: Dependent Variable	Total B-category Publications			Total C-category Publications		
	IIMA	IIMB	IIMC	IIMA	IIMB	IIMC
Years_exposed	0.01*	0.02***	-0.00	0.17***	0.13***	0.14***
	(0.007)	(0.007)	(0.014)	(0.045)	(0.043)	(0.033)
exper	0.02	-0.01	0.03	0.23**	0.33***	0.27***
	(0.036)	(0.015)	(0.041)	(0.108)	(0.127)	(0.101)
exper_sq	-0.00**	-0.00***	-0.00**	-0.00***	-0.00***	-0.00**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Constant	-0.03	-0.03	0.21	1.76**	1.09	1.67**
	(0.111)	(0.075)	(0.271)	(0.814)	(0.853)	(0.641)
Adjusted R-squared	0.136	0.173	0.252	0.482	0.548	0.476
Faculty FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Institute Linear Trend	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,392	2,414	2,340	2,392	2,414	2,340

Notes: Dependent variable is number of publications (in total or in each journal category, as indicated) by a faculty member in a specific year between 2000-2017. For IIMA and IIMB, $years\_exposed \in [1,5]$ for $year \in [2013,2017]$. For IIMC, $years\_exposed \in [1,6]$ for $year \in [2012,2017]$. Across all columns the omitted category is all 5 IITs combined. Columns 4 of Panel I and 1 and 4 of Panel II use IIMA's journal ranking list to categorize publications at IIMA and at all IITs. Columns 5 of Panel I and 2 and 5 of Panel II use IIMB's journal ranking list to categorize publications at IIMB and at all IITs. Columns 6 of Panel I and 3 and 6 of Panel II use IIMC's journal ranking list to categorize publications at IIMC and at all IITs. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 14: Probability of Publishing in A-Category Journal

	(1)	(2)	(3)
Panel-I, Dependent Variable		**A vs BC**	
	IIMA	IIMB	IIMC
Years_exposed	0.01	0.01**	0.02**
	(0.008)	(0.003)	(0.010)
exper	-0.04*	0.01	-0.03
	(0.023)	(0.017)	(0.024)
exper_sq	-0.00	0.00	-0.00
	(0.000)	(0.000)	(0.000)
Constant	0.10	-0.02	0.18
	(0.092)	(0.052)	(0.108)
Observations	3,300	2,897	3,031
Adjusted R-squared	0.169	0.263	0.175
Panel-II, Dependent Variable		**A vs No Journal Publication**	
Years_exposed	0.03***	-0.00	0.01
	(0.008)	(0.002)	(0.009)
exper	0.00	0.00	0.00
	(0.004)	(0.002)	(0.003)
exper_sq	-0.00***	-0.00**	-0.00***
	(0.000)	(0.000)	(0.000)
Constant	-0.14*	-0.06**	0.03
	(0.074)	(0.030)	(0.107)
Observations	3,162	3,051	3,464
Adjusted R-squared	0.217	0.125	0.295
Faculty FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Institute Linear Trend	Yes	Yes	Yes

Notes: This table uses publication level data for years between 2000-2017. In Panel-I, the dependent variable is a dummy = 1 if there is at least 1 A-category publication and = 0 if there is at least one publication in B or C category. In Panel-II, the dependent variable is a dummy = 1 there is at least 1 A-category publication, and = 0 if there is no journal publication. For IIMA and IIMB, $years\_exposed \in [1,5]$ for $year \in [2013, 2017]$. For IIMC, $years\_exposed \in [1,6]$ for $year \in [2012, 2017]$. Columns 1 uses IIMA's journal ranking list to categorize publications at IIMA and at all IITs. Column 2 uses IIMB's journal ranking list to categorize publications at IIMB and at all IITs. Column 3 uses IIMC's journal ranking list to categorize publications at IIMC and at all IITs. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 15: Robustness - Modifying the control group

	(1)	(2)	(3)	(4)	(5)
	-IITB	-IITK	-IITD	-IITM	-IITKh
	Panel-I: IIMA				
A Category	0.03**	0.04***	0.02**	0.06***	0.04***
	(0.012)	(0.012)	(0.010)	(0.011)	(0.012)
B Category	0.01*	0.01	0.02***	0.01	0.01*
	(0.008)	(0.007)	(0.007)	(0.008)	(0.008)
C Category	0.16***	0.17***	0.15***	0.13**	0.21***
	(0.053)	(0.049)	(0.046)	(0.051)	(0.040)
Observations	2,086	2,235	2,177	2,062	2,189
	Panel-II: IIMB				
A Category	0.01*	0.01*	0.01**	0.01**	0.01*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
B Category	0.01*	0.02**	0.02**	0.03***	0.02**
	(0.008)	(0.007)	(0.007)	(0.006)	(0.008)
C Category	0.13**	0.14***	0.10**	0.10**	0.18***
	(0.053)	(0.048)	(0.044)	(0.050)	(0.037)
Observations	2,108	2,257	2,199	2,084	2,211
	Panel-III: IIMC				
A Category	0.00	0.02	0.02*	0.03**	0.02
	(0.012)	(0.013)	(0.012)	(0.013)	(0.014)
B Category	0.01	-0.00	-0.02	-0.01	0.01
	(0.016)	(0.015)	(0.014)	(0.016)	(0.013)
C Category	0.14***	0.14***	0.13***	0.11***	0.16***
	(0.039)	(0.034)	(0.035)	(0.037)	(0.031)
Observations	2,034	2,183	2,125	2,010	2,137
Faculty FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES
Institute Linear Trend	YES	YES	YES	YES	YES

Notes: Each cell in this table reports β_1^i from Equation 2 where the dependent variable is total number of publications in the journal category specified in each row. Across all columns IITs form the omitted category and each column drops one IIT from the control group, as specified in the respective columns. Panels I, II and III estimates Equation 2 for IIMA, IIMB and IIMC, respectively. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 16: Robustness - PhD Before 2012

Dependent Variable: Total Publications			
	A-Category		
	IIMA	IIMB	IIMC
Year_exposed	0.03***	0.00	0.02
	(0.011)	(0.003)	(0.012)
exper	-0.00	0.01	-0.02
	(0.024)	(0.006)	(0.041)
$exper^2$	-0.00***	-0.00	-0.00***
	(0.000)	(0.000)	(0.000)
Constant	-0.07	-0.08*	-0.15
	(0.117)	(0.046)	(0.158)
Adjusted R-squared	0.259	0.151	0.355
	B-Category		
	IIMA	IIMB	IIMC
Year_exposed	0.01	0.02**	-0.01
	(0.008)	(0.008)	(0.015)
exper	0.06	0.01	0.05
	(0.040)	(0.016)	(0.051)
$exper^2$	-0.00**	-0.00***	-0.00**
	(0.000)	(0.000)	(0.000)
Constant	-0.16	-0.07	0.13
	(0.136)	(0.079)	(0.283)
Adjusted R-squared	0.120	0.170	0.262
	C-Category		
	IIMA	IIMB	IIMC
Year_exposed	0.16***	0.14***	0.15***
	(0.046)	(0.046)	(0.034)
exper	0.35***	0.50***	0.35***
	(0.124)	(0.158)	(0.115)
$exper^2$	-0.00***	-0.00***	-0.00**
	(0.001)	(0.001)	(0.001)
Constant	1.37	0.46	1.52**
	(0.852)	(0.909)	(0.673)
Observations	2,217	2,240	2,225
Adjusted R-squared	0.494	0.557	0.486
Faculty FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes

Notes: This table is similar to Table 13 except that it restricts the sample to only those faculty members who completed their PhD before 2012, the earliest post-policy year between IIMA IIMB and IIMC. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 17: Robustness - IIMA without 2007-2011

Dependent Variable: Total Publications				
	(1)	(2)	(3)	(4)
	Total	A-category	B-Category	C-Category
Years_exposed	0.18***	0.04***	0.01	0.12**
	(0.061)	(0.013)	(0.008)	(0.061)
exper	0.22	-0.02	0.04	0.21
	(0.182)	(0.031)	(0.054)	(0.153)
exper_sq	-0.00***	-0.00**	-0.00**	-0.00**
	(0.001)	(0.000)	(0.000)	(0.001)
Constant	1.96**	0.10	-0.08	1.94**
	(0.963)	(0.120)	(0.129)	(0.924)
Faculty FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Inst Linear Trend	Yes	Yes	Yes	Yes
Observations	1,674	1,674	1,674	1,674
Adjusted R-squared	0.459	0.250	0.116	0.441

Notes: This table is similar to the IIMA-specifications in Table 13 except that it drops all years between 2007-2011 from the estimation sample. Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

8 Appendix

Table A1: Journal Reward Policy

	IIMA			
Journal Categories	A	B	C	Other
Direct Payment	2.5 lakh	1.5 lakh		
Research Support				
Credits (monetizable)			credits	credits
Policy Year	2012	2012	2012	2012

	IIMB			
Journal Categories	A	B	C1	C2
Direct Payment	12 lakh	5 lakh	2 lakh	1 lakh
Research Support	3 lakh	3 lakh		
Credits (monetizable)				
Policy Year	2012	2012	2012	2012

	IIMC		
Journal Categories	A	B	C
Direct Payment	5 lakh	2 lakh	0.5 lakh
Research Support			
Credits (monetizable)			
Policy Year	2011	2011	2011

Notes: Table shows details of the journal reward policy that was in place between 2011-2017 at the three IIMs.

Table A2: Overlap in Journal Categories

	IIMA A-category		
	IIMA	**IIMB**	**IIMC**
A-category	136	5	84
B-category		49	12
C-category		82	40
	IIMB A-category		
A-category	5	6	6
B-category	0		0
C-category	1		0
	IIMC A-category		
A-category	84	6	243
B-category	22	87	
C-category	137	150	

Notes: Table shows overlaps in Journals-ranking across IIMA, IIMB and IIMC.

Table A3: Probability of publishing in a journal vs not publishing

	IIMA	IIMB	IIMC
	A Category		
exposure	0.03***	-0.00	0.01
	(0.008)	(0.002)	(0.009)
exper	0.00	0.00	0.00
	(0.004)	(0.002)	(0.003)
exper_sq	-0.00***	-0.00**	-0.00***
	(0.000)	(0.000)	(0.000)
Constant	-0.14*	-0.06**	0.03
	(0.074)	(0.030)	(0.107)
Observations	3,162	3,051	3,464
Adjusted R-squared	0.217	0.125	0.295 [b]
	B Category		
exposure	0.01	0.00	0.01 [t]
	(0.007)	(0.009)	(0.010)
exper	-0.00	-0.01**	-0.02***
	(0.004)	(0.005)	(0.005)
exper_sq	-0.00***	-0.00***	-0.00***
	(0.000)	(0.000)	(0.000)
Constant	-0.09	0.67***	0.80***
	(0.069)	(0.091)	(0.113)
Observations	3,117	5,703	5,250
Adjusted R-squared	0.164	0.363	0.366 [b]
	C Category		
exposure	0.03***	0.00	0.01 [t]
	(0.010)	(0.009)	(0.010)
exper	-0.02***	-0.01**	-0.02***
	(0.005)	(0.005)	(0.005)
exper_sq	-0.00***	-0.00***	-0.00***
	(0.000)	(0.000)	(0.000)
Constant	0.72***	0.67***	0.80***
	(0.097)	(0.091)	(0.113)
Observations	5,838	5,703	5,250
Adjusted R-squared	0.359	0.363	0.366 [b]

Notes: Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A4: Robustness - Modifying the control group

Dependent Variable: Total Publications															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	-IITB	-IITK	-IITD	-IITM	-IITKh	-IITB	-IITK	-IITD	-IITM	-IITKh	-IITB	-IITK	-IITD	-IITM	-IITKh
	IIMA-A Category					IIMA-B Category					IIMA-C Category				
exposure	0.03**	0.04***	0.02**	0.06***	0.04***	0.01*	0.01	0.02***	0.01	0.01*	0.16***	0.17***	0.15***	0.13**	0.21***
	(0.012)	(0.012)	(0.010)	(0.011)	(0.012)	(0.008)	(0.007)	(0.007)	(0.008)	(0.008)	(0.053)	(0.049)	(0.046)	(0.051)	(0.040)
exper	-0.01	-0.01	-0.00	-0.00	-0.00	0.02	0.03	0.02	0.00	0.01	0.28**	0.27**	0.25**	0.15	0.16
	(0.023)	(0.022)	(0.023)	(0.026)	(0.025)	(0.041)	(0.037)	(0.040)	(0.041)	(0.038)	(0.119)	(0.111)	(0.103)	(0.120)	(0.115)
exper_sq	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00**	-0.00***	-0.00**	-0.00**	-0.00**	-0.00***	-0.00***	-0.00*	-0.00**	-0.00***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Constant	-0.05	-0.06	-0.09	0.02	-0.03	-0.04	-0.05	0.05	-0.02	-0.01	1.77**	1.69**	2.35***	1.93**	0.88**
	(0.122)	(0.115)	(0.104)	(0.114)	(0.118)	(0.116)	(0.119)	(0.120)	(0.120)	(0.111)	(0.801)	(0.816)	(0.779)	(0.798)	(0.415)
Obs	2,086	2,235	2,177	2,062	2,189	2,086	2,235	2,177	2,062	2,189	2,086	2,235	2,177	2,062	2,189
Adj R-sq	0.268	0.259	0.222	0.257	0.256	0.124	0.145	0.126	0.150	0.134	0.499	0.481	0.340	0.504	0.496
	IIMB-A Category					IIMB-B Category					IIMB-C Category				
exposure	0.01*	0.01*	0.01**	0.01**	0.01*	0.01*	0.02**	0.02**	0.03***	0.02**	0.13**	0.14***	0.10**	0.10**	0.18***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.008)	(0.007)	(0.007)	(0.006)	(0.008)	(0.053)	(0.048)	(0.044)	(0.050)	(0.037)
exper	0.00	0.02	0.02	0.02	0.02	-0.00	-0.01	-0.01	-0.02	-0.01	0.40***	0.38***	0.40***	0.23	0.24*
	(0.009)	(0.017)	(0.019)	(0.021)	(0.019)	(0.017)	(0.015)	(0.017)	(0.017)	(0.018)	(0.145)	(0.129)	(0.118)	(0.143)	(0.135)
exper_sq	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00**	-0.00**	-0.00***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-0.06	-0.09*	-0.09	-0.09	-0.05	-0.07	-0.03	-0.04	-0.05	-0.30***	0.97	0.88	1.61**	1.36	0.57
	(0.049)	(0.054)	(0.056)	(0.058)	(0.046)	(0.078)	(0.081)	(0.082)	(0.082)	(0.101)	(0.845)	(0.855)	(0.804)	(0.838)	(0.420)
Obs	2,108	2,257	2,199	2,084	2,211	2,108	2,257	2,199	2,084	2,211	2,108	2,257	2,199	2,084	2,211
Adj R-sq	0.138	0.140	0.141	0.136	0.142	0.182	0.173	0.174	0.167	0.171	0.568	0.556	0.387	0.573	0.567
	IIMC-A Category					IIMC-B Category					IIMC-C Category				
exposure	0.00	0.02	0.02*	0.03**	0.02	0.01	-0.00	-0.02	-0.01	0.01	0.14***	0.14***	0.13***	0.11***	0.16***
	(0.012)	(0.013)	(0.012)	(0.013)	(0.014)	(0.016)	(0.015)	(0.014)	(0.016)	(0.013)	(0.039)	(0.034)	(0.035)	(0.037)	(0.031)
exper	0.01	0.01	0.01	0.00	-0.03	0.03	0.02	0.01	0.01	0.02	0.30***	0.31***	0.32***	0.19*	0.23**
	(0.040)	(0.036)	(0.038)	(0.045)	(0.035)	(0.045)	(0.041)	(0.044)	(0.048)	(0.044)	(0.112)	(0.102)	(0.092)	(0.106)	(0.109)
exper_sq	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00**	-0.00***	-0.00**	-0.00	-0.00**	-0.00**	-0.00***	-0.00	-0.00*	-0.00**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Constant	-0.29**	-0.22	-0.13	-0.16	-0.34**	0.23	0.18	0.25	0.24	0.12	1.78***	1.62**	2.19***	1.87***	1.01***
	(0.138)	(0.142)	(0.133)	(0.143)	(0.169)	(0.275)	(0.276)	(0.253)	(0.276)	(0.152)	(0.630)	(0.646)	(0.607)	(0.629)	(0.350)
Obs	2,034	2,183	2,125	2,010	2,137	2,034	2,183	2,125	2,010	2,137	2,034	2,183	2,125	2,010	2,137
Adj R-sq	0.368	0.356	0.302	0.343	0.349	0.247	0.263	0.212	0.275	0.259	0.499	0.472	0.352	0.497	0.496
Faculty FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Inst Trend	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors presented in parentheses are clustered by institute and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$