

The Glittering Prizes: Career Incentives and Bureaucrat Performance*

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Abstract

Bureaucracies are configured differently to private sector and political organizations. Entry is competitive, promotion is based on seniority, jobs are often for life and retirement occurs at a fixed age. This implies that older entering officers, who are less likely to attain the glittering prize of reaching the top of the bureaucracy before they retire, may be less motivated and exert less effort. Using a nationwide stakeholder survey and rich administrative data on elite civil servants in India we provide evidence that: (i) officers who cannot reach the senior-most positions before they retire are perceived to be less effective and are more likely to be suspended, (ii) this effect is weakened by a reform that extends the retirement age and (iii) states that contain a higher proportion of career capped officers perform less well but this effect is weakened by the pension reform. Together these results suggest that the career incentive of reaching the top of a public organization is a powerful determinant of bureaucrat performance.

JEL classification: D73, H11, O10

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1 Introduction

Bureaucrats are a core element of state capacity. They are responsible for implementing policy and may therefore have a critical bearing on societal outcomes. Bureaucrat effectiveness is particularly important in developing economies. Many have recently adopted economic and social reform programs that are aimed at promoting structural change and have the potential to substantially raise living standards. The eventual success or failure of these programs depends centrally on how they are implemented in the field.

Yet, despite their centrality to development and poverty reduction, the incentives civil servants face within bureaucracies are seldom studied. It is striking, for example, how the study of bureaucrats, and professional bureaucracies in general, has lagged well behind that of politicians or private sector managers. While the influence of political leaders on economic growth (Jones and Olken 2005, Besley et al. 2011) and the impact of CEOs on firm performance (Bertrand and Schoar 2003, Bertrand 2009, Kaplan et al. 2012) have been extensively studied, we know very little about what motivates bureaucrats and how this affects development and growth. Political, private sector and civil service leaders all run large organizations and so the career incentives they face may impact organizational performance and a wider set of economic outcomes.

This paper addresses this gap in the literature by studying the elite cadre of civil servants in India - the Indian Administrative Service (IAS). The IAS, often called the “steel frame” of India, is responsible for running all key government departments at the state and federal levels as well as a range of public sector enterprises and corporations.¹ This makes them a particularly interesting set of bureaucrats to study as they oversee the implementation of a range of policies that have the potential to affect aggregate economic outcomes.

A few key features distinguish professional bureaucratic organizations from other organizations: selection through competitive examinations, a virtual absence of discretionary firing (and hence limited exit), seniority-based progression rules and a fixed retirement age. These rules are a direct response to earlier patronage systems, where appointments, promotions and dismissals were decided based on personal or political favors.² The reliance on objective selection criteria is meant to ensure that the most talented, as opposed to the best connected, are recruited. Once recruited, clear progression rules and limits on discre-

¹For much of its post-Independence history India has been a centrally planned economy with IAS officers being responsible for implementing successive five year plans. Post-1990 they were responsible for liberalising the economy and dismantling the planning architecture that had built up since the 1950s (Aghion et al 2008).

²The earliest modern bureaucracies go back to the British Northcote-Trevelyan (1854) report which recommended that recruitment into the civil service be by open examination, that the entry age window be between 19 to 25 years, that entrants should be recruited into a unified, permanent civil service and that promotion should be based on merit, not preferment, patronage, purchase or length of service. Many of the recommendations in the report were influenced by the earlier Macaulay reforms in the Indian Civil Service, the predecessor of the modern IAS which was the first of the British civil services to abolish patronage. The Macaulay Report recommended the replacement of the patronage-based system of appointment in the Indian Civil Service by open and competitive examinations (which were made open to Indians), the establishment of a permanent civil service, and an age window for new entrants of 18-25 years. After recruitment, candidates underwent two years of training - one year of formal training in the UK and one year of district training in India - similar to the training structure of the modern IAS (Fulton 1968; Kirk-Greene, 2000). See also Bai and Jia (2016) for a discussion of the Chinese recruitment system for elite civil servants and its impact on political outcomes.

tionary firing are meant to restrict wasteful lobbying or influence activities by agents who seek to affect the principal’s decisions (Milgrom 1988, Prendergast 1999). Seniority-based promotion rules also reduce principals’ and politicians’ ability to engage in favoritism, patronage and corruption by providing objective, impartial criteria for career progression in settings where performance is difficult to measure (Iyer and Mani 2012, Xu 2017).³ As Weber (1922) notes, “bureaucracy develops more perfectly, the more it is dehumanized, the more completely it succeeds in eliminating from official business love, hatred, and all purely personal, irrational, and emotional elements which escape calculation.” (p. 975)

The IAS shares these classic characteristics of modern professional bureaucracies. Selection into the IAS, as for many other civil services around the world, is based on a competitive entry examination, with the top 100-150 scorers on the exam being admitted each year (out of about 450,000 exam takers). Once selected, IAS officers are allocated to a state, also known as a “cadre”, through a rule-based allocation process and officers stay part of the same cadre throughout their career. Promotions within the IAS, as shown in Figure 1, are subject to tenure-based rules, with promotion waves occurring at 4, 9, 13, 16, 25 and 30 years of service. Officers do not move to a higher payscale until the required number of years of experience have been achieved. While the timing of actual promotions closely tracks the promotion grid for junior officers, senior officers have to wait beyond the minimum tenure levels to access the top ranks of the bureaucracy.

In the absence of firing and performance pay, career concerns are one of the few ways to incentivize bureaucrats. Promoting bureaucrats predominantly based on seniority can therefore affect career incentives as a wide entry age window,⁴ combined with seniority-based progression and a fixed retirement age of 60 (58 before 1998), implies that those who enter older will face barriers to reaching senior payscales (Figure 2). Older entering officers, who are less likely to attain the glittering prize of reaching the top of the bureaucracy (which is associated with a significantly higher pay and pension benefits) before they retire, may therefore be less motivated and exert less effort.

This is the core issue we take up in this paper. We make three contributions. First, we empirically assess whether entering the service older and hence being less likely to attain the glittering prize of reaching the uppermost echelon of the bureaucracy affects IAS officers’ on-the-job performance. Second, we exploit a pension reform that extended the pension age by two years to see whether this helped to motivate officers and improve their performance. Third, we examine whether Indian states that contain a higher proportion of career capped officers that are less likely to reach the uppermost echelon of the bureaucracy perform less well and whether the pension reform relaxes this constraint.

To make progress we must confront the key difficulty associated with studying civil servants – the lack of reliable individual performance measures (Oyer and Schaefer 2010).

³Objective performance measures are also confronted with the multi-tasking problem where bureaucrats exert effort only on measurable dimensions (Holmstrom and Milgrom 1991; Baker et al. 1994). Rasul and Rogger (2017), for example, show that the introduction of monitoring can result in excessive “box ticking” activities that are detrimental to project completion rates.

⁴The entry window in our study period is 21 to 30 for general candidates, extended to 35 for reserved caste candidates.

Politicians need to win elections and the performance of CEOs may be reflected in sales or stock prices. What the “output” of civil servants is, is much less clear particularly for generalists like IAS officers who work in a variety of departments across their career.⁵ We get around this difficulty by polling a group of stakeholders who operate in the same state as an IAS officer and elicit their perception of the effectiveness of that named civil servant. The key stakeholders we survey include IAS officers, state civil servants, elected politicians, representatives of business associations, local TV and print media, and civil society organisations. For each IAS officer they know, we ask stakeholders to grade them on a 1 (low) to 5 (high) scale for: effectiveness, probity, the ability to withstand illegitimate political pressures, pro-poor orientation and overall rating. We gather this information in the 14 main states of India and cover the majority of centrally recruited IAS officers.

Figure 3, which is based on these surveys, motivates much of our subsequent analysis. The figure shows the raw relationship between an IAS officer’s perceived effectiveness in the stakeholder survey and the officer’s age at the time of entry into the IAS.⁶ As expected if a lack of promotion prospects is particularly demotivating for officers that enter the service older, we find a negative relationship between officers’ perceived effectiveness and their age at entry into the IAS. This decline coincides with the discontinuous decline in the probability of reaching the top payscale, as shown in Figure 2.

Exploiting the non-linear variation in the probability of reaching the top payscale, we find that officers who are constrained from reaching the senior-most positions perform worse. Compared to unconstrained officers, career capped officers are perceived to be less effective, less likely to withstand illegitimate political pressure, less likely to be pro-poor and are deemed to perform worse overall.

We provide additional evidence that this association is indeed driven by the bureaucratic rigidity by making use of a natural experiment. The 1998 pension reform increased the retirement age for IAS officers by two years from 58 to 60. From a career perspective, the reform disproportionately benefited career capped entrants as these officers became more likely to qualify for senior positions. While career capped officers who entered prior to the reform performed worse, the relaxation of the rigidity coincides with the disappearance of the negative performance gap for cohorts entering after the reform.

We then extend the results from the 360 cross-section to a panel setting, making use of suspensions as a direct measure of performance. We validate our subjective performance measures by showing that career capped officers are more likely to be suspended. Mirroring previous result, we also find that this differential suspension probability only appears in the pre-reform period and vanishes after the progression constraint is relaxed.

Our next step is to exploit the quasi-random allocation of officers to states which implies that, holding an officer’s age at entry and the size of his or her cohort constant, there will be as good as random variation in the share of officers in the batch that are younger or older than the given officer. We find that officers that enter the state cadre with more younger

⁵In our data the average posting length of an IAS officer is 16 months and officers careers typically involve postings in a large variety of departments.

⁶Appendix Figure B3 reproduces the same figures for the remaining 360 performance measures.

officers are deemed to be less effective and less able to withstand illegitimate political pressure but that these effects are mitigated by the 1998 pension reform. This lines up with our previous results and has the advantage that we can hold age at entry constant and just rely on the comparison of relative age among officers in the same cohort to identify the impact of career incentives on bureaucrat performance.

We then leverage this core finding that career capped officers perform worse to check whether having a greater share of older entering (and hence demotivated) officers in a state cadre negatively affects state-level economic performance and whether this effect is mitigated by extending the retirement age of all officers by two years in 1998. We focus on the 1980-2011 liberalization period when extensive reforms were being implemented and aggregate the probability of being capped to the state-year level. We argue that, due to the quasi-random manner in which officers are allocated to states at the start of their careers, variation in the extent to which a state cadre is constrained from reaching the top paycales in a given year is unrelated to contemporaneous state-level economic performance. Consistent with the individual level results we find that having a state cadre which contains a higher fraction of IAS officers that are career capped adversely affects state-level economic performance but that this effect is weakened after the pension reform.

Taken together, we find compelling evidence that the career incentives bureaucrats face influence their effectiveness. Our paper thus shines a light on the costs associated with rigid progression rules in organizations (Ke et al. 2016). Given that a range of public services from health and education through to the diplomatic services are organized like the IAS, understanding these costs and gaining insights into how bureaucrats might be better motivated represents an important undertaking. Indeed, it is central to improving the implementation of public policy, to promoting economic performance and to improving societal outcomes. As such, the results resonate with the literature on firm performance, where the practice of fast-tracking high performers is often considered to be “good” management practice (Bloom et al. 2013, Bloom et al. 2016).

The remainder of the paper is organized as follows. Section 2 provides details about the institutional background and introduces our data sources. Section 3 contains our main results on the links between career incentives and bureaucrat performance. Section 4 concludes.

2 Background and Data

2.1 The Indian Administrative Service

The Indian Administrative Service (IAS), the successor of the Indian Civil Service (ICS), is the elite administrative civil service of the Government of India. In 2014, the IAS had an overall strength of around 3,600 centrally recruited officers. These officers are civil service leaders, occupying key positions critical for policy implementation. The most senior civil service positions - the Cabinet Secretary of India, the Chief Secretary of States, heads of all state and federal government departments - are all occupied by IAS officers. Senior IAS

officers also oversee major state-owned enterprises and state-run corporations. Senior IAS officers are known and publicly visible.

The recruitment of officers is based on performance in the Civil Service Exam, which is organized annually by the Union Public Service Commission (UPSC). Entry into the IAS is extremely competitive, with several hundred thousand applicants competing for a small number of spots. In 2015, for example, 465,882 UPSC exam takers applied for only 120 IAS slots. The highest performing exam takers are typically offered slots in the IAS. Those who do not qualify for the IAS may obtain positions in less competitive civil service streams such as the Indian Police Service (IPS), the Indian Forest Service (IFS), the Indian Revenue Service (IRS) or the state civil services. There are quotas for the reserved castes, namely the Other Backward Castes (OBC), Scheduled Castes (SC) and Scheduled Tribes (ST).

To be eligible for the IAS, candidates must be aged between 21 and 30 in the year of the competitive exam.⁷ This constraint is relaxed for reserved groups, who can enter up to 35 years of age. Once selected, IAS officers are allocated to a state cadre in the subsequent year. The assignment to a state is typically fixed for life,⁸ and officers are attached to their state cadre even when serving in Delhi or abroad. After selection and allocation to the state cadre, IAS officers undergo training at the Lal Bahadur Shastri National Academy of Administration (LBSNAA) and in the states they have been assigned to. The two-year training consists of one year of academic training at the LBSNAA (“course work”) and one year of practical training (“district training”). After training, recruits are initially placed in the district administration (e.g. as district collectors), and are subsequently promoted to higher level positions. Promotion is seniority-based occurring after 4, 9, 13, 16, 25 and 30 years and all officers have to achieve these years of service to be eligible for the next payscale. The discrepancy between minimum and actual tenure required to enter a higher payscale increases for later promotions (Figure 1), which are subject to more stringent performance review and depend on the availability of vacancies (see Appendix Table A1). Finally, retirement occurs at 60 years of age for both male and female officers (58 years before 1998). Figure 4 shows the distribution of age at exit for the set of retired IAS officers. There is very little exit before the designated retirement age – 20% of all officers exit before 58 years of age, and only 8% of officers exit with fewer than 50 years of age.

A wide entry age window, combined with seniority-based progression and a fixed retirement age implies that those who enter older will face barriers to attaining the glittering prize of reaching the senior payscales. This may disincentivize effort and lower the effectiveness of capped officers, as attaining the senior payscales brings significant benefits. Moving from the penultimate payscale to the highest payscale is associated with a salary gain of up to 60% (Appendix Table A1) and the final salary pensions which officers enjoy are directly tied to the last payscale attained.⁹ These pecuniary benefits are amplified by the profes-

⁷The cut-off date is 1 August in the year of the exam. Admitted officers enter in the next year.

⁸The only exception which allows for transfers across states is in the case of marriage to another IAS officer. These cases, however, have to be approved on a case-by-case basis and are rare.

⁹See 18(1) of the All India Services (Death-Cum-Retirement Benefits) Rules of 1958. Senior IAS officers also enjoy substantial perks, such as subsidized housing, driver and other amenities. Retired officers who occupied senior positions often pursue lucrative advisory roles, acting as board members for both private

sional and social prestige that comes from reaching the top tier of the Indian Administrative Service.

The potential cost of this bureaucratic rigidity, indeed, has been acknowledged by both the Government of India and the media. The 10th Report of the Administrative Reform Commission, for example, points out that a higher age at entry mechanically implies a “shorter service span, which means [old entrants] may not have adequate opportunities to contribute to policy-making at higher levels”.¹⁰ Similarly, media reports frequently point to the disadvantages of combining seniority-based promotion with a fixed retirement age, suggesting that “seniority is an objective basis for promotion but often an ineffective one”¹¹ and “the problem goes down to the age of entry, since [...] promotions go as much by seniority as merit alone.”¹² In line with the recommendations of the Administrative Reform Commission, these media articles call for more flexibility, concluding that the service must “put the best people, irrespective of age, in the right positions”, and that “from [an] age-based [retirement] system, we should move to fixed tenures [...] for all irrespective of joining age”.¹³ However, despite repeated calls by these Commissions and other bodies to lower the maximum age at which officers can enter the service,¹⁴ the actual window has been widening over time (Appendix Figure B1).¹⁵

2.2 Measuring bureaucrat performance

We designed and implemented a large-scale survey to collect cross-sectional data on the subjective assessments of IAS officers in the 14 main states of India¹⁶ for 2012-13. IAS officers were assessed on five dimensions: (i) effectiveness on the job, (ii) probity,¹⁷ (iii) ability to withstand illegitimate political pressure, (iv) pro-poor orientation, and (v) overall rating.¹⁸ All dimensions are scored on a 5 point integer scale, where 1 is the lowest and 5

and public companies.

¹⁰Administrative Reform Commission (ARC, 2008), Chapter 5, page 96.

¹¹The Indian Express (1 April 2015), “A new kind of babu”, by Manish Sabharwal.

¹²The First Post India (22 December 2012), “Quotas: How bias in favour of SC/STs works against them”, by R. Jagannathan.

¹³The Hindu (8 September 2012), “Fixed tenure a way forward on promotions”, by Vivek Katju.

¹⁴See Administrative Reform Commission (2008), p.105.

¹⁵The age at entry window for the Indian Civil Service (ICS), the colonial precursor of the IAS, was fixed between 21 and 24 years of age just before Independence and geared primarily towards fresh British graduates from Oxford and Cambridge. After Indian Independence this narrow window was maintained into the early 1970s; however, mounting political pressure to include poor and disadvantaged candidates and those from non-elite academic institutions (who it was argued need more preparation time) has pushed the entry window steadily outwards and away from the 19-25 window recommended by Northcote-Trevelyan (1854). The pressure to extend age at entry continues today – the age limit was extended to 32 years for general candidates and 37 years for reserved groups in 2014.

¹⁶These states are: Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. We excluded joint cadres (Union Territories, Assam - Meghalaya, Manipur - Tripura), as well as the smaller states (Jammu & Kashmir, Nagaland) and the new cadres resulting from state splits in 2000 (Jharkhand, Uttarakhand, Chhattisgarh) from the sample.

¹⁷Note that a higher value on the scale corresponds to less corruption.

¹⁸The exact questions are: (i) “How would you rate his/her effectiveness in his/her assignment?” (ii) “How much do you feel this officer uses his/her official position for making money?” (iii) “How much do you feel this officer can withstand illegitimate political pressure?” (iv) “How sensitive is this officer to the needs of the poor and weaker sections in society?” (v) “What is your overall rating of this officer?”.

the highest performance.

To obtain assessments from a wide range of stakeholders, we elicited these subjective assessments from respondents of six societal groups in each state: (i) a random sample of IAS officers, (ii) a random sample of state civil servants, (iii) politicians, drawn from a random sample of members of the legislative assembly (MLA), (iv) industry, business and professional associations, comprised of the highest representatives for the major associations,¹⁹ (v) print and TV media, comprised of key journalists covering politics for the largest newspapers and TV stations by circulation and viewership respectively, and finally (vi) civil society, comprised of the highest representatives of major NGOs, trade unions²⁰ and think-tanks. For each state, we sampled about 10 respondents from each of the groups.²¹

We compiled a list of all centrally recruited IAS officers for each state. In each state, interviewers then systematically worked through the list, asking respondents to provide assessments for each known candidate. We excluded junior officers with less than 8 years' tenure as they are often in district postings and less visible. Finally, we recorded the source of information to account for reporting biases, differentiating between information obtained through personal exposure, friends or social networks, or the media.

Table 1 provides summary statistics of the 360 degree²² measures. The sample sizes range from $N = 15, 153$ for the probity measure to $N = 17, 753$ for the effectiveness measure. The number of complete assessments across all dimensions is $N = 14, 037$. We were able to elicit scores for about 70% of all IAS officers in our sample.²³ All dimensions are correlated, with the highest correlation being between pro-poor orientation and the ability to withstand illegitimate political pressure.

A known concern regarding subjective measures is whether these capture actual information or merely biased perceptions (Baker et al. 1994, Prendergast and Topel 1996). Respondents, when providing assessments, may compress ratings around norms or systematically provide positive or negative ratings to all assessed officers ("centrality bias"). In the presence of halo effects, a respondent's overall impression of an officer may also affect the assessments on each of the performance dimensions. Respondents may also base their assessment on public information, such as media reporting, generating an "echo chamber."

We address concerns of reporting biases in three ways. First, we purge respondent-specific biases in measurement. Accounting for level differences in reported effectiveness is important: IAS officers, for example, tend to rate their colleagues more highly, while media representatives provide, on average, more negative ratings (Appendix Table A3). Second, we control for source of information fixed effects to alleviate "echo chamber" biases, namely that those who did not know IAS officers personally merely repeat (potentially biased) perceptions originating in the media. For example, IAS officers known personally by a

¹⁹Confederation of Indian Industry (CII), the Federation of Indian Chambers of Commerce and Industry (FICCI), the Associated Chambers of Commerce and Industry of India (ACCI).

²⁰All India Trade Union, Secretariat Employees Union.

²¹For logistical reasons, we were unable to survey state civil servants in Gujarat and IAS officers in Punjab.

²²The term "360 degree" feedback refers to multi-source feedback used by organizations to elicit information about employees' work-related performance.

²³See Appendix Table A2 for the determinants of non-response. Section 3.3 addresses concerns of sample selection by validating our results using administrative data available for all IAS officers.

respondent tend to receive higher effectiveness rating than those rated based on knowledge through media or social networks (Appendix Table A4). Third, we account for interviewer fixed effects to ensure our results are not driven by artifacts of the data collection method. Finally, in Section 3.3., we also provide evidence on actual suspensions, a relatively clear-cut objective measure of (non-)performance, to complement the subjective measures.

Before concluding the discussion of our measurement framework, it is worthwhile to reflect on what the subjective measures capture. As subjective measures, our cross-sectional 360 measures will not only capture contemporaneous performance of officers but also their past performance. As survey respondents are likely to gradually update their beliefs about the performance of individuals (Frederiksen et al. 2017), these elicited measures will tend to be highly persistent. As Appendix Table A5 indeed shows, our performance measures are correlated both with contemporaneous as well as past suspensions, a direct measure of (non-)performance. The cumulative nature of the 360 scores will be important when studying the pension reform in Section 3.2.

2.3 Administrative data

To study the determinants of effectiveness, we combine our 360 degree survey data with administrative data obtained from the LBSNAA, the facility where IAS recruits undergo training before their first posting. We use three sources of administrative data.

First, we draw upon the descriptive rolls of 5,635 IAS officers who entered between 1975-2005. This dataset contains a rich set of individual background characteristics ranging from year and location of birth to caste, family background, and educational degrees and work experience, allowing us to examine how pre-determined characteristics at point of entry into IAS correlate with later effectiveness.

Second, we use data on internal rankings²⁴ which covers 4,107 IAS officers from 1972-2009. This dataset provides information about the initial allocation of officers to cadres, the size of their cohorts in a given entry year, their scores on the entry exam as well as their marks on the training courses.

Finally, on-the-job outcome measures are derived from the executive record sheets of 10,817 IAS officers who entered between 1949-2014. These record sheets contain detailed information about the postings (e.g. job title, department and duration) and payscales of each officer throughout his or her career. This dataset allows us to track suspension episodes for each officer. The data is provided by the Ministry of Personnel, Grievances and Pensions and is publicly available.

Table 2 summarizes the IAS officers' background characteristics for the cross-section of 2012-13, providing a snapshot of the IAS at the time of our survey. The typical IAS officer is about 25.5 years old at the time of entry into the IAS. A large majority of IAS officers are male (86 percent). More than a quarter of IAS officers are drawn from minority castes (OBC = 8 percent; SC = 14 percent; ST = 5 percent). Nearly three quarters of the IAS officers come from an urban background. A large share of IAS officers (32%)

²⁴In the IAS, these lists are referred to as the "inter-se-seniority" lists.

had previously obtained tertiary degrees in Science, Technology, Engineering, Mathematics, Statistics (STEM) or Economics. Among those that have worked prior to joining the IAS, a third held public sector jobs.²⁵ About 3 percent of IAS officers had previously worked in another branch of the All India Services (AIS), such as the Indian Police Service (IPS) or the Indian Forest Service (IFS) before joining the IAS.

Finally, in order to examine the effects of bureaucratic effectiveness on state-level outcomes, we construct a state-year panel covering the 14 Indian states for which we collected survey data. We assemble state-level time series for GDP covering the period 1980-2011 from data published by the Reserve Bank of India (RBI).²⁶ When relevant, we use population data from the decennial Census of India to derive per capita measures.²⁷

3 Career Incentives and Bureaucrat Performance

3.1 Age at entry and individual effectiveness

In presence of bureaucratic rigidities, we hypothesize a negative association between age at entry and the perceived effectiveness of IAS officers. Compared to individuals who enter younger, those entering older and less likely to reach the top may be less motivated to do well on the job. To empirically investigate this, we estimate following relationship between age at entry and the subjective performance scores:

$$score_{ij} = \alpha \times age_entry_i + \mathbf{x}_i' \beta + \theta_j + \varepsilon_{ij} \quad (1)$$

where $score_{ij}$ is the subjective rating of officer i given by respondent j . The key explanatory variable age_entry_i denotes the officer's entry age. The vector \mathbf{x}_i contains officer-specific background characteristics. The coefficients θ_j are respondent fixed effects. These fixed effects confine the comparison among officers rated by the same individual, thus removing respondent-specific differences in scoring. As no respondent rates officers in more than one state, these respondent fixed effects also control for any state-specific differences in ratings. Finally, ε_{ij} is the error term, which is clustered at the officer level i .²⁸

We consider four sets of background characteristics in the vector \mathbf{x}_i that may have some bearing on how effective bureaucrats are in performing their duties. These include individual socio-economic background characteristics, education, work experience and entry exam and training scores. Individual socio-economic background characteristics include gender, dummies for the reserved caste, and a dummy for whether the IAS officer is coming from an urban area. The set of education characteristics include a dummy for a STEM or Economics degree as well as a dummy for having received an academic distinction, as measured by a first-class honours in undergraduate or a distinction in graduate studies (equivalent to a GPA above 3.0). The previous work experience controls include dummies

²⁵The most frequent jobs in this category comprise junior positions in the Indian Railway Service, Income Tax Service, Customs and Telecommunications.

²⁶The data is obtained from the RBI's online Data warehouse, available at <http://dbie.rbi.org.in>.

²⁷We (log-)linearly interpolate the annual state-level population between the Census years.

²⁸Our results are also robust when clustering on the respondent level j .

for a prior job in education and research, the private sector, the non-AIS public sector or the AIS (IPS and IFS).²⁹ We include entry and training scores: the standardized UPSC score, the standardized training score, as well as a dummy that is 1 if the officer did better in training than on the entry exam. The UPSC and training scores are standardized within each intake year, thus indicating the relative position of an officer in a given cohort. The dummy $improved_i$ equals 1 if the officer’s relative position during training - measured as standard deviations from the mean - improved compared to the UPSC score. Finally, we include state \times intake year fixed effects (e.g. entry cohort of Gujarat-1990) to confine the comparison to officers who entered in the same year and were allocated to the same state. In a cross-section, this is equivalent to absorbing state and tenure specific profiles in ratings.

The results are summarized in Table 3. All columns estimate the same regression described in equation (1), except that we vary the dependent variable of interest to span all of the five subjective performance measures considered in our 360 degree survey. To streamline the exposition, we first report the results for the sample of officers who entered before the 1998 pension reform before presenting the full sample results in Table 4. To keep the table succinct, we only report coefficients for selected controls.³⁰ Confirming the visual evidence in Figure 3, there is a negative and statistically significant relationship between age at entry and perceived effectiveness when comparing among assessments provided by the same respondent (Panel A, Column 1). The relationship is quantitatively similar when comparing only within the officer’s cohort (Column 2) and controlling for the battery of individual characteristics (Column 3).

The results are comparable for the remaining 360 scores. Older entrants are perceived as less able to withstand illegitimate political pressure (Panel B, Column 3), and are perceived to perform lower overall (Column 5). While there is no significantly negative association between age at entry, probity and pro-poor orientedness, the coefficient is negative suggesting that - if anything - older entrants are perceived as more corrupt and less pro-poor (Column 2 and 4). The estimated elasticities are also economically relevant. For effectiveness, the impact of moving age at entry from 22 to 30 implies a 3% decline in perceived effectiveness relative to the mean of the dependent variable. This corresponds to a decline in the perceived effectiveness rating by around 0.1 standard deviations. The magnitudes are comparable for the remaining 360 measures.

Of course, despite the battery of controls in Table 3, we cannot rule out other explanations beyond career incentives that might explain a negative correlation between age at entry and bureaucratic performance.³¹ We propose in the following sections alternative empirical tests that make more direct use of the variation in the extent to which the bureaucratic rigidity limits career progression, and, in particular, we leverage the variation induced by the pension age reform. However, before proceeding to these alternative tests, we note that the patterns in Figure 2 suggests that, if it is indeed career incentives that

²⁹The All India Services comprise the Indian Administrative Service, the Indian Police Service and the Indian Forestry Service which are, in that order of importance, the elite branches of the civil service in India.

³⁰Appendix Table A7 reports the full set of coefficients.

³¹Appendix Table A6 provides a comparison of old vs. young entrants based on our battery of controls.

drive the relationship between age at entry and bureaucratic performance, the relationship might not be the linear one currently estimated.

In particular, based on the evidence in Figure 2, very young IAS officers (aged 22-23 at entry) have virtually the same high probability of reaching the top while very old IAS officers (aged 28-30 at entry) have nearly the same low probability of reaching the top. There is a large drop in the probability of reaching the top going from aged 24 at entry to 27. This observed non-linear relationship between the probability of reaching the top and age at entry suggests a refinement of the analysis of Table 3 where we can assign to each officer, based on his or her age at entry, a probability of reaching the top of the bureaucracy. This refinement is useful in that there is no *a priori* reason to expect that alternative explanations for a relationship between age at entry and bureaucratic performance would follow the specific non-linear mapping between age at entry and probability of reaching the top of the bureaucracy. Moreover, by focusing on the probability of reaching the top by age at entry, we can also linearly control for age at entry and hence directly account for alternative explanations that may drive a more linear negative correlation between age at entry and performance. This is what we do in Columns 4 and 5 of Panel A in Table 3. The variable “reaching top,” is computed as the share of all retired officers by 2012-13 with the same age entry who reached the highest payscale, the Chief Secretary level.³² This is the payscale for which officers only become eligible after serving at least 30 years. Consistent with the bureaucratic rigidity explanation, and with the demotivating effect for older officers of having a lower likelihood of attaining the glittering prize of attaining the Chief Secretary level, we observe a strong positive correlation between “reaching top” and bureaucratic performance.

3.2 Age at entry, pension reform and individual effectiveness

To provide more direct evidence that being more likely to reach the upper echelons of the bureaucracy improves performance, we exploit a pension reform in 1998. While the pension age had been kept at 58 for nearly 40 years,³³ this reform extended the retirement age to 60 for all serving officers (see Figure 4). Figure 5 shows the probability of reaching the top by age at entry broken down by those who retired before and those who retired after the pension reform. The figure shows a clear “outward” shift in the probability of reaching the top across all age at entry bins. If the positive relationship between individual effectiveness and the probability of reaching the top payscale indeed captures differential incentives induced by the progression cap, we expect the performance gap between older and younger entrants to be smaller after the reform. This elongation of an officer’s working life could enhance the career incentives (and hence performance) of officers, particularly those who had been constrained in reaching the uppermost echelons of the bureaucracy. By making this glittering prize more attainable the reform should close the gap in performance between older and younger entrants.

³²See Appendix Table A8 for the exact shares computed by bin. These are also shown visually in Figure 2 (pooled) and broken out by pre and post-reform cohorts in Figure 5.

³³The last pension reform before 1998 was in 1962, when the retirement age was raised from 55 to 58.

We note that this could reflect two separate mechanisms. First, it is possible that older age entrants will exert more effort on the job when faced with a longer expected tenure post-reform. Second, it is possible that the self-selection of older age entrants will improve post-reform, with more motivated older individuals deciding to apply to the IAS when the retirement age is raised to 60 years old. Given the cross-sectional nature of the 360 performance data (recall that all subjective performance measures were collected in 2012-2013), we cannot empirically separate these two mechanisms. In particular, given the nature of the data, we can only ask whether the impact of age at entry is weaker among officers that joined the IAS after 1998 compared to the officers that joined prior to 1998. Any such change could be driven by differential self-selection by age at entry after the reform. It could also be driven by differential changes in effort by age at entry after the reform holding self-selection constant in that the pre-reform cohorts of older IAS officers have only operated under the new regime for a subset of their career while the post-reform cohort of older IAS officers have only operated under the new regime.

In practice, we implement this test by augmenting equation (1) with an interaction term between age at entry and a dummy that is 1 if the officer entered the IAS after the pension reform in 1998, 0 otherwise:

$$score_{ij} = \alpha \times age_entry_i + \beta \times age_entry_i \times Post98_Cohort_i + \mathbf{x}_i' \delta + \theta_j + \varepsilon_{ij} \quad (2)$$

where $Post98_Cohort_i$ is the reform dummy that is 1 for cohorts who entered in 1998 and after. The other variables remain as described in equation (1). Specifically, we include the same set of individual background controls and the same respondent fixed effects θ_j . Departing from the original equation (1), however, the augmented specification allows the impact of age at entry to vary by whether the officer entered in a cohort before or after the 1998 pension reform. As before, the standard errors are clustered at the individual officer level.

The results are reported in Table 4. We first report the estimates separately for the pre- and post-reform cohorts. Consistent with the hypothesis that the pension reform improved the relative performance of older-at-entry IAS officers by relaxing the constraint in career progression, the results show that the negative performance gap between an older and younger entrant is driven by the pre-reform period. While IAS officers who entered a year older are deemed, on average, to perform 0.013 points lower pre-reform (Panel A, Column 1), the negative relationship reverts for post-reform cohorts (Column 2). The reversal of the gap is confirmed in the full sample, where the impact of age at entry is allowed to vary by pre- and post-reform cohorts (Column 3).

To alleviate the concern that officers who entered after the reform will also be mechanically less experienced and that there might be a systematic relationship between tenure and performance by age at entry, Column 4 allows the impact of age at entry to linearly vary with number of years of experience by including the interaction $age_entry_i \times intake_year_i$. This additional control in fact increases the size of the estimated coefficient on the variable of interest (interaction of age at entry with post 98 cohorts). Finally, Column 5 interacts

all individual background controls with the reform dummy. The post-reform reversal in the performance gap between older and younger entrants remains robust, and the interactions between the individual background characteristics and the reform remain jointly insignificant.

Panel B of Table 4 shows that we obtain qualitatively similar results throughout the five subjective performance measures: while younger officers who entered pre-reform are seen as less corrupt, more able to withstand illegitimate political pressure, more pro-poor and deemed to perform higher overall, this positive performance gap vanishes among officers who joined after the pension reform. Finally, Figure 7 provides visual evidence by plotting the impact of the propensity to reach the top on effectiveness by year.³⁴ Given the small number of observations in this cross-section, the years are binned to increase the precision of the estimates. While there is a negative performance gap between older and younger entrants, the gap vanishes after the pension reform. All in all, the evidence in Tables 3 and 4 suggest that IAS officers who enter older are indeed less motivated in the pre-reform period but by elongating the careers of all IAS officers the pension reform reduces this source of differential performance.³⁵

Table 5 highlights that the results above are primarily driven by the age at entry groups we expect to be most affected by the pension reform. Figure 6 shows the number of years a given IAS officer is formally eligible for promotion to the highest payscale by age at entry. Prior to the pension reform, individuals who entered the IAS at age 28 or 29 were mechanically capped out of the highest payscale; under the old retirement age of 58, these officers had to retire by the time they served for more than 30 years and hence qualified for the promotion to the top. The pension reform, extending the retirement age by two years, therefore lifted this cap for this marginal group. In contrast, while the reform also extended the career of those entering at 30 or more years of age by 2 years, this older age group is infra-marginal in that it remains mechanically excluded from the highest payscale post-reform. Hence, in Table 5, we break down the impact of the reform into (i) those who were uncapped both before and after the reform (entry age 22-27) (ii) those who were capped before and uncapped after the reform (entry age 28-29; labeled as “marginal” group) and (iii) those who remain capped before and after the reform (30+; labeled as “too old” group). We find that the average impact in Table 4 is mainly driven by the 28-29 age at entry bin. In contrast, the impact of the reform is statistically the same for the two inframarginal groups (i.e. those too young, and those too old at entry), except for the probity outcomes (Column 2). Again, this non-linearity in the impact of the reform is particularly compelling

³⁴The same figures are reproduced for the remaining 360 measures in Appendix Figure B5.

³⁵The magnitude of the interaction coefficient raises the question why the negative performance gap between older and younger entrants not only vanishes but reverses post-reform. We view the “overshooting” as an artifact of the cumulative nature of the cross-sectional 360 scores: since scores capture both past and present performance, scores are harder to adjust for those longer in service. An officer who entered old and has been in service for a long time, for example, will already have established a reputation that is hard to change even post-reform (when he or she is more incentivized). For an officer who entered old but is in service for a shorter time, in contrast, the adjustment is easier, thus generating a positive gap even if contemporaneous performance levels are the same. This explanation is consistent with the fact that we do not find “overshooting” in the panel setting with suspensions (Section 3.3).

as it is exactly the marginal age at entry groups which appears affected by the pension reform.

As we indicated above, these findings could reflect differential self-selection into the IAS by age at entry induced by the career incentives.³⁶ Alternatively, it is also possible that these career incentives are not salient to individuals at the time they apply into the IAS, limiting self-selection, but that these career incentives become an important driver of differential effort by age at entry once the individuals have joined the ranks of the bureaucracy. There is unfortunately not much we can do given the constraints of the performance data and the nature of the test to separate these mechanisms. At best, we can assess the relevance of the self-selection mechanism by comparing observable background characteristics of IAS officers by age at entry, separately for the pre- and post-reform cohorts. We do this in Appendix Tables A10. Overall, we do not observe much change in how observable background characteristics correlate with age at entry (Column 1) or with belonging to the marginal age at entry group (28-29; Columns 2-3) after the reform. Of course, the rich and complex dimensions of ability and motivation that drive the decision to apply to the IAS are not observable and hence we do not view the evidence of Appendix Table A10 as definitive.

3.3 Suspensions as an alternative measure of individual effectiveness

While capturing five dimensions of individual performance, the 360 scores also have limitations. A first potential concern relates to the quality of subjective ratings, and whether these perceptions indeed reflect actual performance differences.³⁷ A second concern relates to the purely cross-sectional nature of the 360 performance data and how this may interfere with the measurement of the impact of the pension reform. Recall that all 360 scores were collected in 2012-13, i.e. in the post-pension reform period. In other words, all rated officers evaluated in 2012-2013 were operating under the extended pension age regime. The variation we exploit in Tables 4 and 5 is that some of the officers were selected into and worked in the IAS under the old pension regime while others were selected into and only worked in the IAS under the new regime. Optimally, we would also like to directly measure differential performance by age at entry, with performance directly measured under the old pension regime versus the new pension regime.

To address both of these concerns, we turn to administrative data on suspensions. Unlike the subjective assessments, data on suspensions is available for all IAS officers, providing an

³⁶By comparing older and younger entrants, a related concern is that the reversal of the performance gap post-reform may reflect younger entrants being disincentivized due to increased competition. In Appendix Figure B4, we plot the effectiveness levels by age at entry bins for different years of intake. If anything, the figure suggests an increase in effectiveness post-reform across all age at entry groups. The larger increase among the marginal group we estimate would therefore even understate the impact of the reform.

³⁷While systematic biases might likely exist in the ratings when it comes to background characteristics (e.g. negative views against women or minority castes might translate into negative subjective performance assessment absent evidence for such negative assessments), it is more difficult to think about such systematic biases driving the ratings for a variable such as age at entry \times pension reform. In other words, while there might be unfair discrimination against some groups of officers, it is difficult to imagine what would drive systematic biases against older officers after the reform.

additional robustness check to alleviate concerns of sample selectivity. In particular, using the publicly available executive record sheets, we can study suspensions for all centrally recruited IAS officers over the period 1980-2012, the period for which the executive record sheets cover all IAS officers.

As Appendix Table A5 shows, reassuringly, officers that have been suspended in the past are indeed perceived to perform worse on all five 360 dimensions. Officers that are under suspension in 2012-2013 are rated as less effective, more corrupt, less able to withstand political pressure, less pro-poor and have lower overall evaluation ratings. While objective in terms of measurement, we however note that these measures have their own limitations as suspensions may be politically motivated. An officer that is unwilling to go along with the corruption of top state politicians, for example, may be more likely to be suspended. We also note that suspensions are rare events and hence would only provide a very crude measure for an officer’s effectiveness. In fact, it is our lack of confidence in what these measures are capturing that originally motivated the plan to carry on the 360 degree evaluation.

Table 6 presents our analysis of the suspension data. We extend the cross-sectional specification (2) to the panel setting. For individual i in state s in year t , we estimate the following regression:

$$y_{ist} = \alpha \times age_entry_i + \beta \times age_entry_i \times Post98_t + \mathbf{x}_i' \delta + \theta_s + \tau_t + \mu_{K(i)} + \varepsilon_{ist} \quad (3)$$

where the dependent variable y_{ist} is a dummy variable that equals 1 if officer i in state s was suspended in year t , and 0 otherwise. The main coefficient of interest β captures the differential impact of age at entry on the propensity to be suspended after 1998. The standard errors are clustered at the individual-level to take into account the serially correlated nature of the panel data. The regression also includes state fixed effects (θ_s), year fixed effects (τ_t) and cadre fixed effects ($\mu_{K(i)}$ where $K(i) = k$ returns the year of intake for officer i). The vector \mathbf{x}_i contains flexible dummies for each year of experience and a dummy for female.³⁸ Identical to the sampling frame of our 360 measures, we estimate equation (3) on the full panel of IAS officers covering all centrally recruited IAS officers allocated to the 14 main states of India over the period 1980-2012 with at least 8 years of service. We however exclude from the sample all officer-year observations in which the officer is older than 58, the retirement age before the pension reform. This ensures that our results are not contaminated by the fact that officers are mechanically older in the post-pension reform period than in the pre-pension reform period.

We start in Table 6, Column 1 by reporting on the relationship across all years (e.g. pre and post-pension reform years) between age at entry and likelihood of suspension in a given year. Consistent with the findings in Table 3, we find that IAS officers that enter the service older are more likely to be suspended in any given year. Column 2 also focuses on the across year variation but leverages the non-linear relationship between the probability

³⁸The individual level controls are limited when we extend the analysis to all centrally recruited officers over the period 1980-2012 as our background characteristics only go back to 1975.

of reaching the top and age at entry that was observed in Figure 2.³⁹ In particular, as in Column 4 of Table 3, we compute, based on age at entry, the probability of reaching the top of the bureaucracy for all officers in the pre-reform period. Recall that another benefit of focusing on the probability of reaching the top by age at entry is that we can also linearly control for age at entry and hence directly account for alternative explanations that may drive a more linear negative correlation between age at entry and performance. Again, we find that a positive correlation between “reaching top” and bureaucratic performance: officers that are less career capped are also less likely to be suspended in any given year. On average, an uncapped IAS officer is about 0.65% point less likely to be suspended than a career constrained officer. Compared to the unconditional probability of being suspended (0.95%), this decline is economically large. The coefficient is insignificant once we control for linear age at entry but remains, in terms of point estimate, nearly identical (Column 3).

Column 4 presents the result of the estimation of equation (3) above. Again consistent with the analysis in Tables 4 and 5, we find a reduced impact of age at entry on the likelihood of suspension in the post pension-reform years. The estimated β coefficient is however not statistically significant. In Column 5, we further allow for the effect of age at entry on suspension to follow a linear time trend. Again, we find a positive effect of age at entry on suspension in the pre-reform years and evidence that the effect is smaller in the post-reform years. The estimated β coefficient however remains statistically insignificant.

Finally, in the last two columns of Table 6, we fully exploit the panel structure of the data by adding individual fixed effects to equation (3). The benefit of controlling for individual officer fixed effects is that we can hold selection into the IAS constant and hence focus on changes in behavior (e.g. suspension) for a given officer after the pension reform. We can also, by focusing on the subset of officers that join the IAS under the old pension regime as we do in Column 7, see how the odds of suspension for these officers change after the reform based on their age at entry. In both columns, we find again a relatively larger reduction in the likelihood of suspension post pension reform among those officers that entered old into the IAS and were more likely to be career-capped under the old pension regime. The point estimates are if anything larger than in Column 5, and we achieve statistical significance in Column 6 and 7. The results in these last two columns suggest that the pension reform is not solely improving the incentives of officers that would have been career capped under the old regime via a change in the self-selection of such officers into the IAS.

To further assess whether the results in Table 6 are indeed driven by the pension reform, we also estimate a more flexible version where we allow the age at entry coefficient to vary year by year. Figure 8 summarizes the results by plotting the estimated coefficients of age at entry for each year. The figure provides evidence consistent with the view that the diminishing effect of age at entry on suspension coincides with the pension reform. While the impact of age at entry is flat over time in the pre-reform period, we observe a large and discontinuous decrease after the pension reform. Overall, the fact that the pattern of effects line up across subjective and objective performance measures is reassuring and adds

³⁹In the panel setting, we use the probabilities of reaching the top computed based on the pre-reform cohorts (Appendix Table A8).

to our confidence that IAS officers are indeed incentivised by having a higher probability of reaching the uppermost echelon of the bureaucracy.

3.4 Cohort entry age composition, pension reform and effectiveness

In all of the tests performed so far, a concern remains that the variation we exploit for career incentives (age at entry, probability of reaching the top, belonging to the marginal age at entry group), even when this variation is interacted with the pension reform, may also be picking up on other unobserved factors that drive a relationship between individual effectiveness and age at entry, even a non-linear one.

In this section, we therefore propose to exploit a different source of variation in career incentives across IAS officers. In particular, we exploit variation in the age composition of the set of officers that are allocated to a given cadre in each cohort. Recall that the allocation of officers to a given cadre (e.g. state) in each year is a quasi-random process (see Appendix C1 and Section 3.5 for the detail). This means that, holding an officer's age at entry and the size of his or her cohort (e.g. total number of officers allocated to a cadre in a year) constant, there will be as good as random variation in the share of officers in the batch that are younger or older than the given officer. This variation can be exploited to assess the impact of the bureaucratic rigidity on effectiveness. Indeed, having many officers in one's cohort that will reach retirement age later than oneself mechanically decreases one's chance of reaching the highest bureaucratic echelons while having many officers in one's cohort that will reach retirement age earlier than oneself mechanically increases one's chance of reaching the highest bureaucratic echelons. Indeed, in Appendix Figure B2 we show those who enter with a larger number of younger IAS officers are less likely to reach the top payscales. Hence, we would expect an officer to perform worse as the number of younger officers in his or her cohort increases. The appeal of this additional test is that it can be implemented by holding constant age at entry as the test only relies on the comparison of relative age among officers in the same cohort.

Appendix Table A11 formally tests for the quasi-random allocation of the IAS officers across the 14 main states of India. For this table, the sample of officers is restricted to the group for which we have rich individual background data - those officers we observe in the descriptive rolls and internal ranking data. This corresponds to all intake years between 1972 and 2005. We regress individual officers' characteristics on assignment state fixed effects and entry year fixed effects. We then test for the equality of the estimated state fixed effects. The corresponding p -values of the test are presented in Column 1 of Appendix Table A11. Based on our rich set of observable individual characteristics, we cannot statistically reject that states receive, on average, officers that are statistically indistinguishable as regards age at entry, gender, rural/urban background, caste affiliation, education, work experience, scores on the entry exam and training marks.

We then proceed in Panel A of Table 7 by testing whether officers that have a larger number of younger officers than them assigned to their cadre at the time of entry into the IAS receive lower performance ratings. The regressions we estimate in Columns 1 to 5

include the same of controls as in Columns 3 and 4 of Table 3. In particular, we include as controls all individual background characteristics, survey respondent fixed effects, as well as fixed effects for the state-specific cohort an officer entered in. Importantly, the regression also includes age at entry fixed effects.

We find that officers who entered at the same age but have a larger number of younger officers in their cohort are deemed statistically significantly less effective (Column 1) and less able to withstand illegitimate political pressure (Column 3). While the remaining performance measures are insignificant, the point estimates are negative.

In Panel B of Table 7, we then ask whether the pension reform succeeded in weakening the disincentive effects associated with competing with a larger number of younger IAS officers. We do this by further interacting “number of younger officers” with a dummy that equals 1 for the post-98 cohorts. Mirroring the specification in Column 5, Table 4, we also fully interact all background characteristics with the post-98 cohorts dummy. Consistent with the pension age extension relaxing some of the constraints of competing with a larger number of younger officers, the estimated coefficient on “number of younger officers” interacted with the post-98 cohorts dummy is positive and statistically significant (Column 3-5).

Overall, we view the evidence in Table 7 as providing complementary evidence on how the combination of seniority-based promotion and a fixed retirement age may distort the career incentives of officers that join the IAS at a relatively older age. As discussed above, the main benefit of this complementary evidence is that we obtain these results not from age at entry variation (which we hold constant), but from variation in age at entry composition in a cohort induced by the IAS rule regarding allocation of officers to states.⁴⁰

3.5 State-level entry age composition, pension reform and economic performance

The quasi-random allocation of officers to states allows us to test whether the state-level entry age composition of all officers serving in a state cadre affects state level outcomes.⁴¹ This test serves as a consistency check on the individual results in the previous sub-sections as we would expect that having a greater share of older entering (and hence demotivated) officers in a state cadre might negatively affect performance but that this should be mitigated by extending the retirement age.⁴²

To do this we want to run the aggregate state-year equivalent of the individual-year regression of Section 3.3. For this state-level exercise, we focus on the same period of 1980

⁴⁰By studying the performance difference between older and younger entrants in Section 3.2, we are unable to fully disentangle if the results are driven by younger working less or older working more. The fact that we are finding consistent results when holding age at entry constant and comparing across the exposure to different numbers of younger officers hence provides corroborating evidence that the differential performance between older versus younger entrants is not merely driven by the (non)-performance of younger entrants.

⁴¹See Appendix C1 for details on the allocation rule.

⁴²Looking at whether proxies of officer career incentives, when aggregated to the state cadre level, influence state level performance makes sense in this context because IAS officers run all the government departments in a state. Their influence on the design and implementation of policies which might influence aggregate performance is therefore disproportionately large relative to other types of bureaucrats.

to 2011 and cover the same 14 main states of India. For state s and time t , we estimate the following reduced form state-level regression:

$$y_{st} = \alpha \times \bar{x}_{st} + \beta \times \bar{x}_{st} \times Post98 + \mathbf{z}'_{st} \delta + \theta_s + \tau_t + \varepsilon_{st} \quad (4)$$

where the dependent variable y_{st} is the state-level outcome of interest (such as log state-level GDP per capita), and the key independent variable, \bar{x}_{st} , is the aggregation of career incentives across all centrally recruited IAS officers operating in that state-year cell.⁴³ In particular, we use both average age at entry and the average probability of reaching the top in a given state and time (\bar{top}_{st}). In the spirit of the results in Section 3.3., we also compute in each state-year cell the fraction of marginal entry age officers (e.g. 28-29). This is the age at entry group whose performance we expect to be more positively impacted by the pension reform. Following the standard specification in growth regressions, we add state fixed effects (θ_s) and year fixed effects (τ_t). The vector \mathbf{z}_{st} includes the (log) total number of active IAS officers. We also allow the impact of the aggregate career incentive to linearly trend by including the interaction between our measures of aggregate career incentives and year. The standard errors are clustered at the state-level. We compute bootstrapped standard errors to account for the small number (14) of clusters.

The validity of this test relies on the quasi-random allocation of officers to states.⁴⁴ In this process (i) officers are assigned serial numbers in order of merit, as determined by the civil service exam, (ii) vacancies determine the number of officers needed in each state and (iii) officers are then allocated to these vacancies by cycling through the list of states. Separate number lines denoting caste status and insider/outsider status are used to match officers to vacancies.⁴⁵ The order of states rotates across years, ensuring that all states have their turn at receiving the best talent. As a result states receive, on average, officers that are statistically indistinguishable as regards age at entry, gender, rural/urban background, caste affiliation, education, work experience, scores on the entry exam and training marks (Appendix Table A11). However, as Appendix Figure A10 shows for age at entry, due to the relatively small number of officers assigned to a state each year, there will be variation in officer characteristics within states over time, and within intake year across states. In other words, by chance, a given state may have a disproportionate share of older entering officers serving in its ranks at a given year. This variation is exogenous to state economic

⁴³In computing these state-year means, we ignore transfers to the central government or leave abroad (e.g. a posting at an international organization or training assignment), which do not affect membership of the state cadre. As secondments to Delhi and leaves are likely to be endogenous to current state economic conditions, we focus on the variation in the average share of reaching the top induced by all state cadre officers irrespective of whether they are present in the state or not. A potential concern, however, lies in the endogenous exit or transfers of IAS officers to other states. If older officers are more likely to exit or transfer when growth is fast, the state-level correlation between age at entry and cohort size may be spurious. Since compliance with the strict retirement age is high and transfers to other state cadres are de facto negligible, we argue that this is unlikely to be a major source of bias. We also verified that deviations from the retirement age are not correlated with contemporaneous state-level economic performance.

⁴⁴This allocation takes place before the officers enter the training academy so that they can learn the local language of a state.

⁴⁵While IAS officers can indicate their preference for home state, the quasi-random allocation process ensures that only a small minority of IAS officers are allocated to their home state.

outcomes at that point in time. This is true both because of the quasi-random allocation process at entry but also because this allocation process takes place many years before these officers have reached the positions from which they implement state-level policies.

The results from running equation (4) for state GDP per capita are presented in Table 8. We first briefly comment on the estimated coefficients of the direct impact of average age at entry and the average probability of reaching the top (Columns 1 and 2). In the individual-level analysis, we showed that both measures were associated with lower levels of performance. While we argued that this correlation might in part be driven by the lower career incentives older entrants face due to the bureaucratic rigidity, we also discussed the obvious issues in separating such incentive effects from issues related to selection and omitted variable biases. These interpretational concerns are also present in these state-level regressions as we cannot control for the rich vector of other individual level characteristics as we could in Section 3 due to data constraints.⁴⁶ In particular, a direct impact of average age at entry, or of the average probability of reaching the top on state outcomes may reflect an effect of other average characteristics of the active IAS officers that are correlated with their entry age.

Consistent with the individual-level results, there is a negative association between average age at entry and state-level GDP, though the relationship is statistically insignificant (Column 1). On average, there is no association between the aggregate probability of reaching the top and state economic performance (Column 2). When breaking down the associations by pre- and post-reform years, however, we find that state-level GDP per capita is lower in years with more older entrants, but that this impact is mitigated after the pension reform of 1998 (Column 3). Column 4 repeats the same exercise with the average share of officers reaching the top, which better takes into account the non-linear mapping between age at entry and career incentives. Consistent with previous results, states who rely on a greater fraction of officers with a lower probability of reaching the top grow more slowly prior to the pension reform (pre-1998), and this effect disappears after the pension reform (Column 4). Mirroring the individual-level results, the aggregate results are consistent with the hypothesis that the career incentives of IAS officers serving in state cadre translate into differential state-level economic performance.

While providing suggestive evidence, the magnitudes of the point estimates raise a puzzle. Taking Table 8, Column 4 at face value suggests that the increase in the share of uncapped officers by 1% point is associated with a 2.2% increase in state-level GDP per capita prior to the pension reform of 1998. This difference reverts post-reform, with an increase in the share of uncapped officers decreasing state-level GDP per capita by 1.2%. While these year-on-year magnitudes appear large, it is worthwhile noting that the actual residualized variation within states is small: the interquartile range of the residualized

⁴⁶While we would in practice like to include in \bar{x}_{st} other characteristics of the average IAS officer active in a state in a given year, the only other characteristic available for this state-level analysis is gender. This is because the descriptive rolls and internal ranking data, which contain the rich individual level characteristics, only start with the 1972 intake. Many officers active in the 1990s and even the early 2000s had joined the IAS before 1972.

variation in the average share of officers reaching the top is only 1.49%.⁴⁷ Similarly, the interquartile range in the residualized average entry age of a state-cadre is only 0.1 years. Extrapolating beyond the identifying residual variation is thus likely to overstate the state-level magnitudes. While there are many potential channels through which the impact of individual leaders can translate into large aggregate outcomes (Jones and Olken, 2005; Bertrand 2009), exploring the exact mechanisms is beyond the scope of the current paper. Indeed understanding how the organization of the state and, in particular, how the career incentives that civil service leaders face impact economic performance is an area of research that is just opening up (Xu 2017).

In the remaining columns of Table 8, we further exploit the fact that it is those IAS officers in the age at entry group 28-29 that are most marginal to the pension reform, following up on the discussion and analysis in Section 3.2. In particular, we compute in each state-year cell, the share of IAS officers that are too young to be impacted by the reform (less than 28), marginal to the reform (28-29) and too old to be impacted by the reform (30 or more), and interact these 3 shares with the pension reform dummy. Again, consistent with the individual-analysis, the improvement in economic performance post-pension reform is concentrated in those cases where a relatively greater share of the IAS body is between 28 and 29 years of age (Column 6). While providing suggestive evidence for state-level impacts, the results are robust to a host of sensitivity checks.⁴⁸ Examining the breakdown, we find that variation in our measure of aggregate incentives is most strongly associated with the service sector (Appendix Table A13). This is a sector of the Indian economy over which IAS officers exert significant control and which that has undergone rapid growth following the economic liberalization in the early 1990s.

4 Conclusion

The organization of the state has attracted increasing attention within economics as a central determinant of economic performance (Besley and Persson 2009, Finan et al 2015). A recent wave of papers has studied the selection (Ashraf et al. 2016; Callen et al. 2015; Dal Bo et al. 2013; Deserranno 2017; Weaver 2017) and incentives (Callen et al. 2014; Khan et al. 2015; Ornaghi 2016; Nath 2016, Gulzar and Pasquale 2017; Rasul and Rogger 2017) of frontline providers. Senior bureaucrats however have remained understudied owing to the difficulty of measuring their performance.

By fielding a large-scale survey in fourteen states of India in 2012-13, we introduce a new measurement framework that has enabled us to open the black box of what determines

⁴⁷The residualized variation in the average share of reaching the top is computed by partialling out the same controls as in equation (4): log total state cadre size, state FEs and year FEs.

⁴⁸All three measures of performance are robust to the inclusion of state-level trends (Appendix Table A13). The results are also robust when dropping the Indian states that split after 2001 (Appendix Table A14, Columns 1-3) and when confining the sample to the post-liberalization period after 1990 (Appendix Table A14, Columns 4-6). The results also remain robust to a tighter set of fixed effects, where we absorb state \times decade FEs or region \times year FEs (Appendix Table A15). Finally, the results are not driven by outliers and remain in terms of magnitude nearly identical when dropping each of the states separately (Appendix Table A16).

bureaucrat performance. Our results suggest that the career incentives bureaucrats face influence their performance and that of the states over which they exert jurisdiction. Our results therefore connect the recent literature on the incentives and selection of bureaucrats with the older literature that sees bureaucrats as central to the industrialization and growth processes (Weber 1922, Tullock 1965, Rauch 1995, Rauch and Evans 2000).

More specifically, our results shine light on the costs associated with rigid promotion rules that prevent older entrants from reaching the highest echelons of the bureaucracy. By studying the pension reform that enabled older entrants to reach the glittering prizes of attaining the senior-most positions, our results provide evidence that personnel policies can be a powerful driver of organizational performance. Given a range of public services from health and education through to diplomatic services that are organized like the IAS, understanding these costs and gaining insights into how bureaucrats might be better motivated represents an important undertaking.

Our study points to costs, both at the individual and aggregate level, of seniority-based promotion rules which restrict career progression. However, set against these costs are the potential benefits of clear progression rules in terms of avoiding the patronage and favoritism which characterized earlier bureaucracies (Northcote and Trevelyan 1854). The rule based nature of professional, modern bureaucracies arose in large part because of the difficulties in measuring the performance of generalist civil servants who performed a range of duties over their careers (Weber 1922). Future work will therefore need to focus on how best to protect the benefits of this system (for example by devising clear and impartial rules for progression which are not based solely on seniority) whilst minimizing costs (for example by fast tracking officers that are deemed to be high performing by these rules).

By examining the incentives of civil service leaders through the prism of organizational economics (Baker et al. 1994; Dewatripont 1999; Gibbons and Roberts 2013; Bloom et al. 2013), this paper connects the literatures on private sector (Bertrand and Schoar 2003; Kaplan et al. 2012), political (Jones and Olken 2005, Yao and Zhang 2015, Martinez-Bravo et al. 2017, Persson and Zhuravskaya 2016, Jia 2017) and public sector (Xu 2017) leaders. These different types of leaders all run large organizations and so the career incentives they face may impact both organizational performance and a wider set of economic outcomes. The IAS officers we study, for example, hold positions at the apex of government that grant them significant influence over the implementation of policies, rules and regulations in a country of over a billion people. Future work could therefore focus on exploring the mechanisms through which civil service leaders can affect aggregate economic outcomes. Particularly interesting here would be to examine how the career incentives of senior bureaucrats affects their subordinates' performance and hence the overall implementation of public policies. This is a particular concern for countries across the developing world engaged in large-scale economic reforms aimed at raising the living standards of billions of people.

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Table 1: Descriptive statistics of subjective evaluations

	(1)	(2)	(3)	(4)	(5)
	Mean	SD	Ratings	Officers	Coverage
Effectiveness on the job	3.730	1.077	17,753	1,472	72.01%
Probity of IAS officer	3.670	1.105	15,153	1,451	70.98%
Withstanding illegitimate pressure	3.523	1.094	16,728	1,471	71.96%
Sensitive towards poorer	3.527	1.141	17,047	1,471	71.96%
Overall rating	3.646	1.057	17,698	1,472	72.01%

Subjective evaluations for the cross-section of IAS officers in 2012-13. Reporting the descriptive statistics (mean and standard deviation) for the performance scores, where the scores range from 1 (lowest) to 5 (highest). The questions used to elicit the subjective ratings are: How would you rate his/her effectiveness in his/her assignment? How much do you feel the officer uses his/her official position for making money? How much do you feel this officer can withstand illegitimate political pressure? How sensitive is this officer to the needs of the poor and weaker sections in society? What is your overall rating of this officer? Column 3 and 4 report the total number of ratings and the total number of rated officers. Column 5 reports the coverage rate for the sample population of all active, centrally recruited IAS officers with at least 8 years of tenure in 2012/13.

Table 2: Individual characteristics of IAS officers in 2012

	(1)	(2)	(3)	(4) Percentile			(5)	(6)
	Mean	SD	25%	50%	75%	Obs.		
Age at entry	25.474	2.088	24	25	27	1,472		
Female	0.141	0.349	0	0	1	1,472		
Other backward caste (OBC)	0.081	0.273	0	0	0	1,472		
Scheduled caste (SC)	0.141	0.349	0	0	1	1,472		
Scheduled tribe (ST)	0.052	0.222	0	0	0	1,472		
Urban background	0.737	0.439	0	1	1	1,472		
Academic distinction	0.326	0.468	0	0	1	1,472		
STEM or Economics degree	0.602	0.489	0	1	1	1,472		
Previous job: Education/research	0.168	0.374	0	0	1	1,472		
Previous job: Finance/banking	0.056	0.230	0	0	1	1,472		
Previous job: Private/SOE	0.121	0.326	0	0	1	1,472		
Previous job: Public sector	0.324	0.468	0	0	1	1,472		
Previous job: Public AIS	0.033	0.181	0	0	0	1,472		
UPSC score (standardized)	0.070	0.913	-0.187	0.147	0.505	1,472		
Training score (standardized)	0.048	0.946	-0.476	0.092	0.646	1,472		
$\mathbf{1}[\text{Training} > \text{UPSC score}]$	0.328	0.469	0	0	1	1,472		
Cohort size	7.334	3.971	4	7	9	1,472		
Younger peers	2.294	2.513	0	2	3	1,472		

Descriptive statistics (mean, standard deviation and percentiles) of IAS officers in 2012-13. Sample covers the cross-section of centrally recruited IAS officers in 2012-13 for which performance ratings have been collected. Age at entry is the age the IAS officer entered the service. Urban background denotes officers from urban areas, Academic distinction is a dummy for having received an academic distinction. STEM is a dummy for graduates of Science, Technology, Engineering and Mathematics and Economics degrees. Previous job denotes the sector of employment previous to entry into IAS (Education/research, Finance/banking, Private sector/State-owned-enterprise, Public sector-Non All India Service, Public sector-All India Service). UPSC score is the (intake year) standardized score in the competitive entry examination. Training score is the (intake year) standardized score in the training period. $\mathbf{1}[\text{Training} > \text{UPSC score}]$ is a dummy that is 1 if the officer improved the relative rating between training and competitive exam. Cohort size is the overall number of officers that entered the IAS in the same year and were allocated to the same state. Younger peers is the number of those who are younger than the officer.

Table 3: Effectiveness, age at entry and probability of reaching top

Panel A	(1)	(2)	(3)	(4)	(5)
		Effectiveness (1 low, 5 high)			
Mean of dep. var	3.734	3.734	3.734	3.734	
Age at entry	-0.014*** (0.005)	-0.013** (0.005)	-0.013** (0.006)		0.019 (0.018)
Reaching top				0.118*** (0.044)	0.253* (0.138)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs		Y	Y	Y	Y
Controls			Y	Y	Y
Sample	Pre-reform cohorts				
Observations	15,396	15,396	15,396	15,396	15,396
Panel B	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-poor	Overall
Mean of dep. var	3.734	3.677	3.526	3.533	3.646
Age at entry	-0.013** (0.006)	-0.008 (0.007)	-0.014** (0.005)	-0.004 (0.005)	-0.011* (0.006)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Sample	Pre-reform cohorts				
Observations	15,396	13,129	14,512	14,782	15,340

Unit of observation is the score for a given IAS officer in 2012-13 with at least 8 years of tenure. Relating the cross-section of perceived effectiveness (Panel A), probity, ability to withstand illegitimate political pressure, pro-poor orientedness and overall scores (Panel B) to age at entry and the probability of reaching the top. Age at entry is the age the IAS officer entered the service. Reaching top is the share of retired officers who reached the top payscale (Chief Secretary level, requiring at least 30 years of tenure) for a given age at entry (see Appendix Table A8). Respondent FEs are fixed effects for each survey respondent. State \times Intake year FEs are fixed effects for the state-specific cohort the officer entered in. Individual controls are: female dummy, caste dummies (OBC, SC, ST), a dummy for coming from an urban area, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for the (UPSC) entry and training scores, as well as a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam. The sample comprises all IAS officers in 2012-13 who entered before the pension reform of 1998. Standard errors are clustered at the individual-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Performance, age at entry and entering before/after the pension reform

Panel A	(1)	(2)	(3)	(4)	(5)
			Effectiveness (1 low, 5 high)		
Mean of dep. var	3.734	3.701	3.730	3.730	3.730
Age at entry	-0.013** (0.006)	0.027* (0.016)	-0.012** (0.006)	-0.040*** (0.013)	-0.040*** (0.012)
Age at entry \times Post reform cohort			0.031*** (0.011)	0.066*** (0.018)	0.067*** (0.020)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Age at entry \times Intake year				Y	Y
Controls \times Post reform cohort					Y
Sample	Pre	Post	Pre & post-reform cohorts		
Observations	15,396	2,186	17,749	17,749	17,749
Panel B	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-poor	Overall
Mean of dep. var	3.730	3.671	3.524	3.528	3.647
Age at entry	-0.040*** (0.012)	-0.049*** (0.016)	-0.040*** (0.013)	-0.022* (0.013)	-0.033** (0.014)
Age at entry \times Post reform cohort	0.067*** (0.020)	0.076*** (0.024)	0.039** (0.019)	0.029 (0.020)	0.057*** (0.021)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Age at entry \times Intake year	Y	Y	Y	Y	Y
Controls \times Post reform cohort	Y	Y	Y	Y	Y
Sample	Pre & post-reform cohorts				
Observations	17,749	15,133	16,717	17,042	17,694

Unit of observation is the score for a given IAS officer in 2012-13 with at least 8 years of tenure. Relating the cross-section of perceived effectiveness (Panel A), probity, ability to withstand illegitimate political pressure, pro-poor orientedness and overall scores (Panel B) to age at entry and cohorts entering before/after the pension reform. Age at entry is the age the IAS officer entered the service. Post reform cohort is a dummy that is 1 if the IAS officer entered in the year of the pension reform 1998 or after. Respondent FEs are fixed effects for each survey respondent. State \times Intake year FEs are fixed effects for the state-specific cohort the officer entered in. Individual controls are: female dummy, caste dummies (OBC, SC, ST), a dummy for coming from an urban area, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for the (UPSC) entry and training scores, as well as a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam. Age at entry \times Intake year is the interaction between (linear) age at entry and the (linear) intake year, with the officer's year of intake centered around the pension reform of 1998. Controls \times Post reform cohort interacts all individual background controls with the reform dummy. Standard errors are clustered at the individual-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Performance and the impact of the pension reform by entry age bins

	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-poor	Overall
Mean of dep. var	3.730	3.671	3.524	3.528	3.647
Marginal \times Post reform cohort	0.337*** (0.124)	0.342** (0.158)	0.178 (0.127)	0.251** (0.127)	0.404*** (0.138)
Too old \times Post reform cohort	0.240 (0.194)	0.600** (0.269)	0.305 (0.217)	0.039 (0.182)	0.093 (0.196)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs	Y	Y	Y	Y	Y
Age at entry FEs	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Marginal/too old \times Intake year	Y	Y	Y	Y	Y
Controls \times Post reform cohort	Y	Y	Y	Y	Y
Sample		Pre & post-reform cohorts			
Observations	17,749	15,133	16,717	17,042	17,694

Unit of observation is the score for a given IAS officer in 2012-13 with at least 8 years of tenure. Relating the cross-section of perceived effectiveness, probity, ability to withstand illegitimate political pressure, pro-poor orientedness and overall scores to age at entry bins (marginal/too old) and cohorts entering before/after the pension reform. Post reform cohort is a dummy that is 1 if the IAS officer entered in the year of the pension reform 1998 or after. Marginal is a dummy that is 1 for officers entering aged between [28,29]. The dummy too old is a dummy that is 1 if officers entered with at least 30 years of age. The omitted category are IAS officers who are aged 22-27 at entry and hence too young to be affected by the reform. Respondent FEs are fixed effects for each survey respondent. State \times Intake year FEs are fixed effects for the state-specific cohort the officer entered in. Age at entry FEs are dummies for each entry age. Individual controls are: female dummy, caste dummies (OBC, SC, ST), a dummy for coming from an urban area, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for the (UPSC) entry and training scores, as well as a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam. Marginal/too old \times Intake year are the interactions between the marginal and old dummies and the (linear) intake year, with the officer's year of intake centered around the pension reform of 1998. Controls \times Post reform cohort interacts all individual background controls with the reform dummy. Standard errors are clustered at the individual-level. Standard errors are clustered at the individual-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: Suspension, age at entry and pension reform

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
			IAS officer is suspended ($\times 100$)					
Mean of dep. var	0.953	0.953	0.953	0.953	0.953	0.954	0.957	
Age at entry	0.069*		0.001	0.102***	0.133**			
	(0.035)		(0.989)	(0.494)	(0.059)			
Reaching top		-0.645**	-0.637					
		(0.295)	(0.612)					
Age at entry \times Post reform				-0.071	-0.132	-0.184**	-0.182*	
				(0.055)	(0.088)	(0.093)	(0.093)	
Intake year FEs	Y	Y	Y	Y	Y			
State FEs	Y	Y	Y	Y	Y			
Experience FEs	Y	Y	Y	Y	Y	Y	Y	
Year FEs	Y	Y	Y	Y	Y	Y	Y	
Age at entry \times Year					Y	Y	Y	
Individual FEs						Y	Y	
Sample		Pre & post-reform cohorts				Pre-reform		
Observations	86,112	86,112	86,112	86,112	86,112	86,017	84,503	

Unit of observation is the IAS officer in a given year. Relating suspension to age at entry, the probability of reaching the top, and the pension reform of 1998. The dependent variable suspended is a dummy that is 1 if the IAS officer is suspended in a given year (rescaled by $\times 100$). Age at entry is the age the IAS officer entered the service. Reaching top is the share of pre-reform retired officers who reached the top payscale (Chief Secretary level, requiring at least 30 years of tenure) for a given age at entry (see Appendix Table A8). Post reform cohort is a dummy that is 1 if the IAS officer entered in the year of the pension reform 1998 or after. Intake year FEs are dummies for each year of intake, state FEs are dummies for the states officers are allocated in, experience are dummies for each year of tenure in the IAS, and year FEs are dummies for each year. Age at entry \times Year is the (linear) interaction between age at entry and a linear time trend normalized around the pension reform year of 1998. The sample is the universe of centrally recruited IAS officers with 58 years of age or below (the pre-1998 retirement age) and having served at least 8 years in service for the period of 1980-2012. Column 7 restricts the sample to cohorts who entered before the pension reform. Standard errors are clustered at the individual-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Effectiveness, exposure to younger cohort members and reform

Panel A	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-poor	Overall
Mean of dep. var	3.730	3.671	3.524	3.528	3.647
Younger	-0.036** (0.017)	-0.025 (0.020)	-0.034** (0.016)	-0.029 (0.018)	-0.021 (0.019)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs	Y	Y	Y	Y	Y
Age at entry FEs	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Sample	Pre & post-reform cohorts				
Observations	17,749	15,133	16,717	17,042	17,694
Panel B	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-poor	Overall
Mean of dep. var	3.730	3.671	3.524	3.528	3.647
Younger	-0.054*** (0.019)	-0.037 (0.023)	-0.049*** (0.018)	-0.041** (0.021)	-0.046** (0.022)
Younger \times Post reform cohort	0.091** (0.043)	0.047 (0.052)	0.094** (0.045)	0.075 (0.046)	0.133*** (0.044)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs	Y	Y	Y	Y	Y
Age at entry FEs	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Younger \times Intake year	Y	Y	Y	Y	Y
Controls \times Post reform cohort	Y	Y	Y	Y	Y
Sample	Pre & post-reform cohorts				
Observations	17,749	15,133	16,717	17,042	17,694

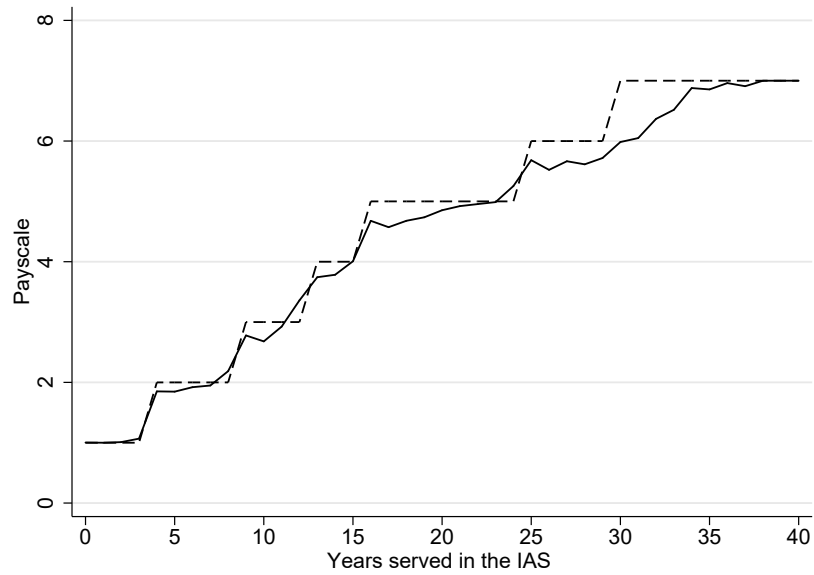
Unit of observation is the score for a given IAS officer in 2012-13 with at least 8 years of tenure. Relating cross-section of perceived effectiveness, probity, ability to withstand illegitimate political pressure, pro-poor orientedness and overall scores to the number of younger cohort members for cohorts entering before/after the pension reform. Younger is the number of IAS officers in the same cohort (i.e. the same allocated state and intake year) who are younger than the IAS officer. Post reform cohort is a dummy that is 1 if the IAS officer entered in the year of the pension reform 1998 or after. Respondent FEs are fixed effects for each survey respondent. State \times Intake year FEs are fixed effects for the state-specific cohort the officer entered in. Age at entry FEs are dummies for each entry age. Individual controls are: female dummy, caste dummies (OBC, SC, ST), a dummy for coming from an urban area, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for the (UPSC) entry and training scores, as well as a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam. Younger \times Intake year is the (linear) interaction of the number of younger officers and the intake year. Controls \times Post reform cohort interacts all individual background controls with the reform dummy. Standard errors are clustered at the individual-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: State GDP per capita, aggregate career incentives and reform

	(1)	(2)	(3)	(4)	(5)	(6)
	log(Total state-level GDP per capita)					
Avg. age at entry	-0.034 [0.770]		-0.340 [0.174]			
Avg. reaching top		0.000 [0.944]		0.022 [0.234]		
Avg. age at entry \times Post reform			0.424*** [0.004]			
Avg. reaching top \times Post reform				-0.034*** [0.006]		
Share marginal					-0.016 [0.364]	-0.037* [0.058]
Share too old					0.014 [0.588]	0.001 [1.000]
Share marginal \times Post reform						0.040** [0.014]
Share too old \times Post reform						0.023 [0.242]
Year FEs	Y	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y	Y
Controlling for (log) total officers	Y	Y	Y	Y	Y	Y
Average entry age \times Year			Y			
Average reaching top \times Year				Y		
Share marginal/too old \times Year						Y
Observations	435	435	435	435	435	435

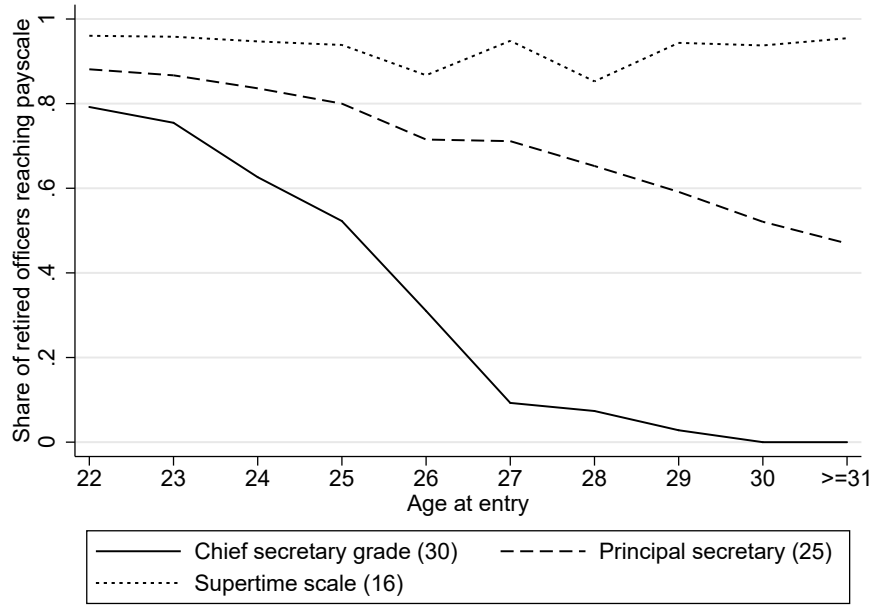
Unit of observation is the state-year. Relating (log) state-level nominal GDP per capita to average age at entry, the average share reaching the top, age at entry bins and the pension reform. Average age at entry is the average entry age of all IAS officers active in a given state and year. Average share of reaching the top (%) is the average share of officers retiring pre-reform (1998) who reached the top payscale (Chief Secretary level, requiring at least 30 years of tenure) in a given state and year. Share of marginal (%) is the share of all active IAS officers in a given state and year that are aged between [28, 29]. Share too old (%) is the share of all active IAS officers in a given state and year that are aged at least 30 at entry. The omitted category is the share of officers who are too young (with age at entry of 22-27). Post reform is a dummy that is 1 in the pension reform year 1998 and after. Log total officers is the (log) number of all active officers in a given state and year. Average age at entry \times Year is the interaction between average age at entry of all active officers in a given state-year and the linear time trend (centered around 1998). Average reaching top \times Year is the same interaction using the average share of officers reaching the top payscale, and share marginal/too old \times Year is the same interaction using the share of those aged 28-29 at entry and those with at least 30. The sample is the universe of centrally recruited IAS officers in the 14 main states of India 1980-2011. Bootstrap standard errors (Cameron et al., 2008) are clustered at the state-level, with p-values reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 1: Seniority based progression: Average payscale and years of tenure



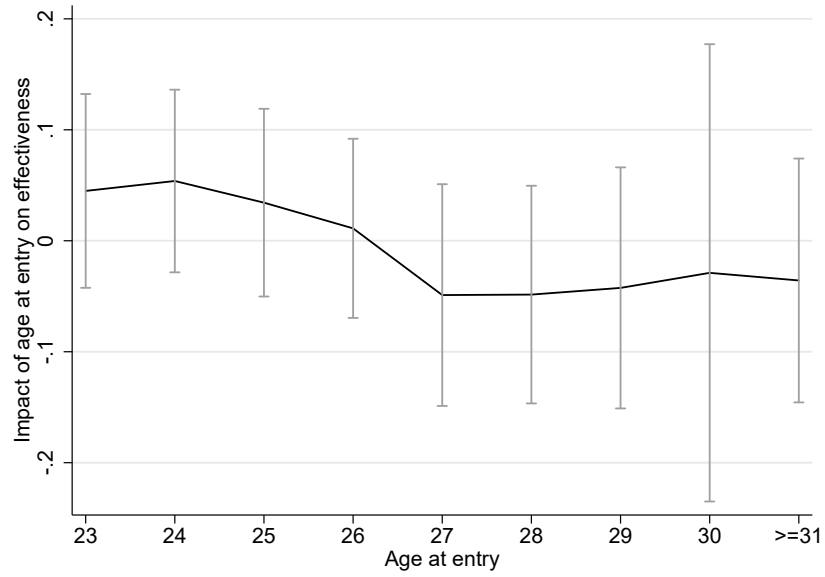
Average payscale of IAS officers as a function of the years served in the IAS (solid line) for the cross-section of all centrally recruited IAS officers active in 2012. The dashed line marks the payscale as predicted using the IAS promotion guidelines.

Figure 2: Share of retired officers reaching senior paycales as a function of age at entry



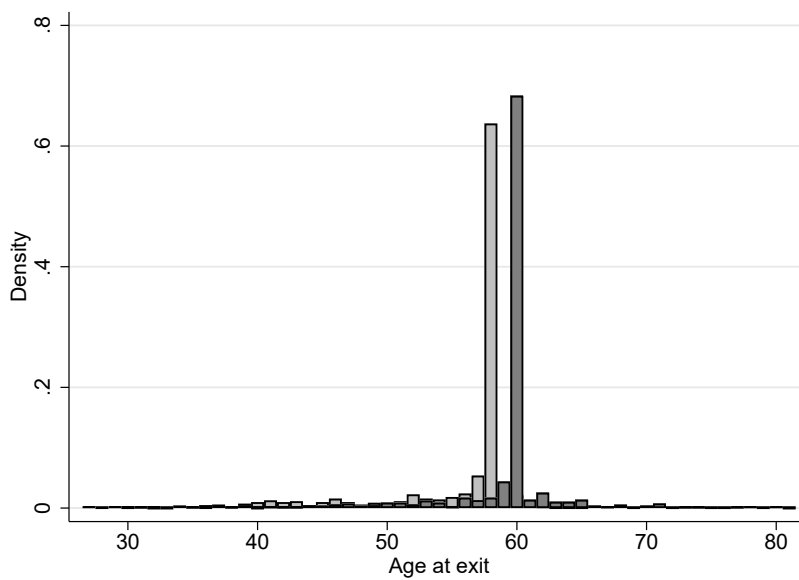
Share of retired officers in 2012 reaching senior paycales as a function of age at entry. Number in parentheses indicates the minimum number of years to qualify for promotion to the position.

Figure 3: Effectiveness and age at entry (pre-reform)



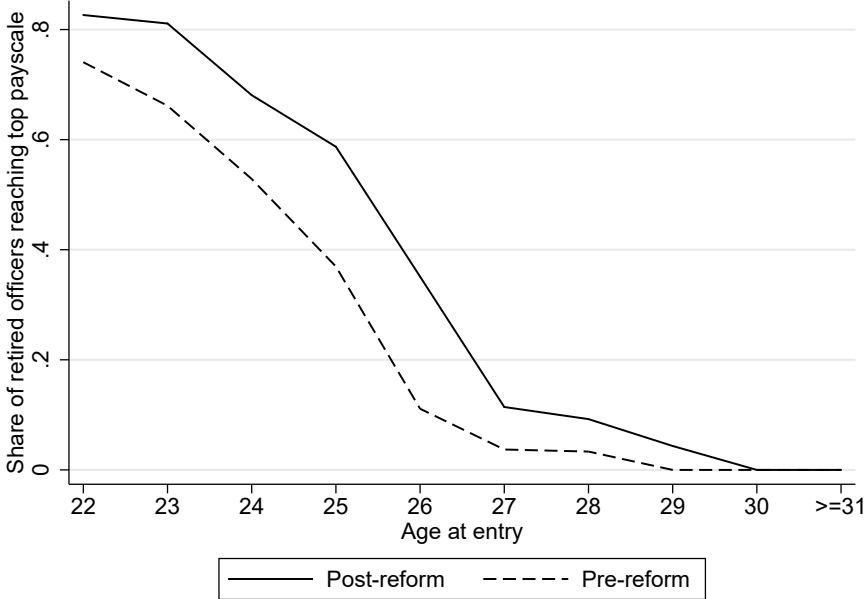
Relationship between effectiveness and age at entry after partialling out respondent fixed effects for sample of officers entering before the 1998 pension reform. 90% confidence intervals, with standard errors clustered at the individual-level.

Figure 4: Distribution of age at retirement pre/post-1998



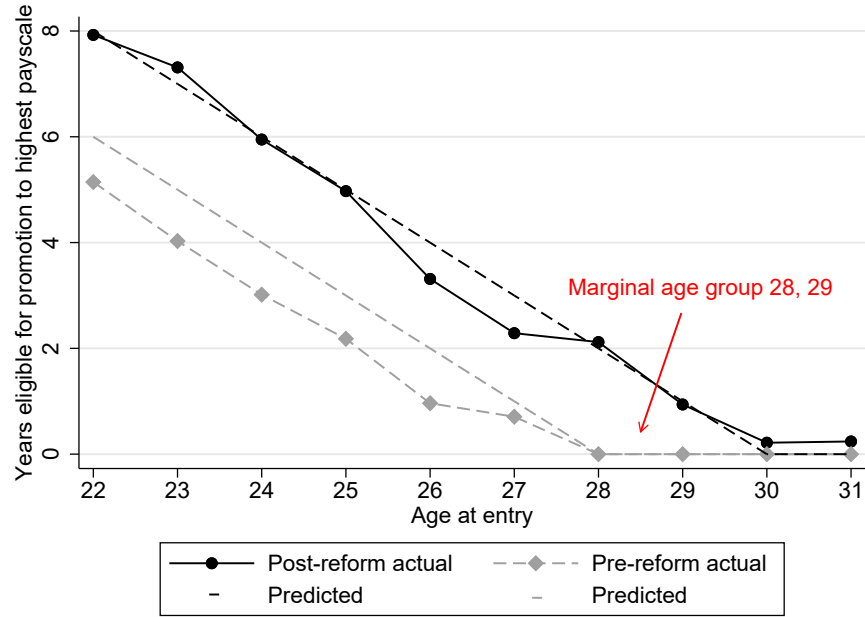
Distribution of age at exit from IAS among retired officers in 2012. Grey (black) bars denote retirement before (after) 1998. The retirement age was raised from 58 to 60 in 1998.

Figure 5: Share of retired officers reaching top scale by age at entry, pre/post reform



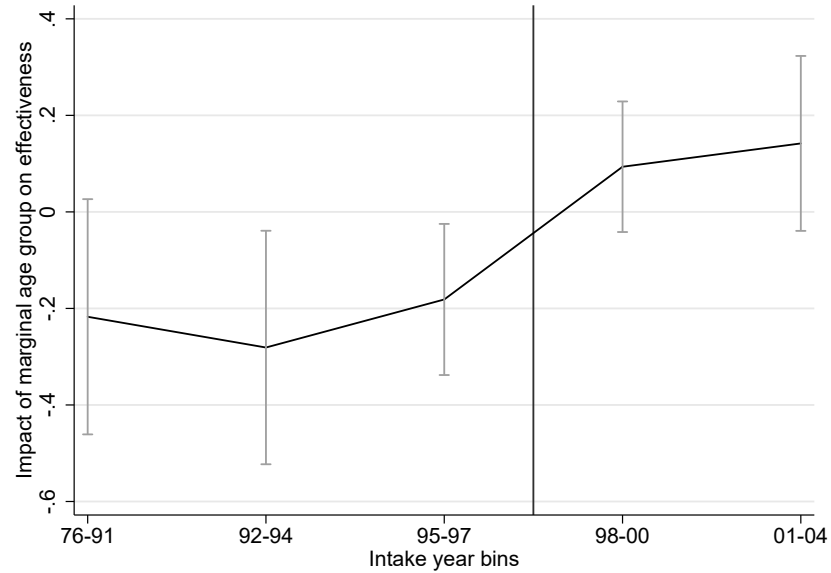
Share of retired officers by 2012 reaching the topayscale (30 years minimum tenure) as a function of age at entry, broken down by those retiring pre/post 1998 retirement reform.

Figure 6: Years eligible for promotion to highest payscale, pre/post reform



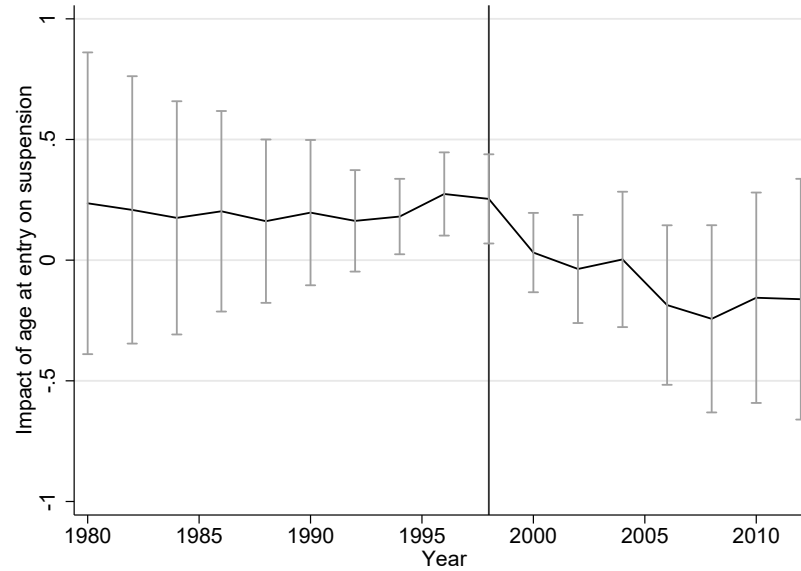
Years eligible for promotion to highest payscale (requiring at least 30 years of service). Dashed lines indicate the predicted number based on the pre/post reform retirement ages (58 pre-reform, 60 post-reform). The solid lines mark the observed years.

Figure 7: Effectiveness and pension reform 1998, by intake year



Summarizing the coefficients of a regression of the effectiveness score on a dummy for being in the marginal group (age at entry of [28,29]) interacted with intake year bins between 1976-2004. The regression also allows being in the old group (age at entry of at least 30) to vary by intake year, and includes all individual background controls (female dummy, caste dummies, dummy for urban background, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for entry and training scores, a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam), respondent fixed effects and state cadre FEs, and dummies for being in the marginal/too old group interacted with intake year (centered around 1998, See Table 5, Column 1). The solid line marks the year of the pension reform. Standard errors used for computation of the 90% confidence intervals are clustered at the individual-level.

Figure 8: Suspension and pension reform 1998



The impact of age at entry on suspensions by two-year bins. The regression includes year FEs, cadre FEs, experience/tenure FEs, and age at entry interacted by year (centered around 1998), see Table 6, Column 5. The coefficients are rescaled by 100 to improve readability. The solid line marks the year of the pension reform. Standard errors used for computation of the 90% confidence intervals are clustered at the individual-level.

5 Appendix (for online publication)

Table A1: IAS Promotion Guidelines - Seniority based progression

Level	Years	Description	Grade	Basic pay (Rs.)	Grade pay (Rs.)
Junior time scale	0	Entry level	Jr. Time Scale	15,600-39,100	5,400
Senior time scale	4	Committee of Chief Secretary and two supertime scale officers to evaluate and decide suitability of promotion - subject to vacancies	Sr. Time Scale	15,600-39,100	6,600
Jr. Admin. Grade	9	Non-functional, admissible without any screening except when disciplinary proceedings are pending against the officer	Under Secy, Dy Secy Level/JAG, Dy Secy Equiv, Dy Secy, Under Secy Equiv, Under Secy Level	15,600-39,100	7,600
Selection Grade	13	Committee of Chief Secretary and two supertime scale officers (or above) to screen - subject to vacancies	Dir Level/SLJAG, Directory Equiv, Director	37,400-67,000	8,700
Supertime scale	16	Committee of Chief Secretary and two principal secretaries (if unavailable, seniormost supertime scale officer) to screen - subject to vacancies	JS Level/Level-I, Joint Secy, Joint Secy (Ex-Off), Joint Secy Equiv, Addl Secy Level, Addl Secy, Addl Secy (Ex-Off)	37,400-67,000	10,000
Principal secretary	25	Committee of Chief Secretary and one senior most officer on the Chief Secretary level to screen. Subject to vacancies.	Secretary, Secy (Ex-Off), Secy Equiv	37,400-67,000	12,000
Chief Secretary	30	Committee of Chief Secretary, one officer in same grade within state, one officer serving at Centre	Above Secy Level, Cab Secy	80,000	0

IAS Promotion Guidelines (2000): No. 20011/4/92/AIS-II. IAS payscale in 2012 according to the 6th Pay Commission (See also document No 14021/1/2008-AIS-II). The salary is adjusted for a dearness allowance (DA) which accounts for inflation. At time of survey (January 2013) this was 80% of the combined basic pay and grade pay.

Table A2: 360 scores - non-response by individual characteristics

	(1)	(2)	(3)	(4)
	Score for IAS officer is		Difference (1)-(2)	
	Non-missing	Missing	Raw diff	Within resp.
Age at entry	25.404	25.734	-0.330*** (0.060)	-0.179*** (0.064)
Female	0.147	0.156	-0.009 (0.011)	-0.005 (0.012)
Other backward caste (OBC)	0.074	0.085	-0.011 (0.007)	-0.020*** (0.006)
Scheduled caste (SC)	0.134	0.141	-0.007 (0.008)	-0.010 (0.007)
Scheduled tribe (ST)	0.044	0.055	-0.011** (0.005)	-0.015*** (0.004)
Urban background	0.732	0.744	-0.013 (0.012)	-0.004 (0.011)
Academic distinction	0.335	0.317	0.018 (0.013)	0.009 (0.011)
STEM or Economics degree	0.589	0.593	-0.004 (0.014)	-0.007 (0.014)
Previous job: Education/research	0.188	0.164	0.025** (0.010)	0.025** (0.010)
Previous job: Finance/banking	0.055	0.059	-0.004 (0.007)	0.001 (0.006)
Previous job: Private/SOE	0.121	0.120	0.001 (0.009)	0.000 (0.008)
Previous job: Public sector	0.324	0.321	0.003 (0.013)	0.004 (0.011)
Previous job: Public AIS	0.030	0.034	-0.004 (0.004)	-0.002 (0.004)
UPSC score (standardized)	0.114	0.060	0.054** (0.025)	0.104*** (0.019)
Training score (standardized)	0.126	0.032	0.094*** (0.024)	0.078*** (0.021)
1[Training > UPSC score]	0.326	0.329	-0.002 (0.013)	-0.023** (0.011)
Observations (Minimum obs.)	17,961	94,519 (71,931)	112,480 (89,892)	109,702 (89,725)

Unit of observation is the 360 score provided by a respondent about the perceived performance of an IAS officer. Comparing means of non-missing vs. missing observations. Column 3 shows the raw difference and Column 4 shows the difference within a respondent. Sample covers the cross-section of centrally recruited IAS officers in 2012-13 with performance ratings. Urban background denotes officers from urban areas, Academic distinction is a dummy for having received an academic distinction. STEM is a dummy for graduates of Science, Technology, Engineering and Mathematics and Economics degrees. Previous job denotes the sector of employment previous to entry into IAS (Education/research, Finance/banking, Private sector/State-owned-enterprise, Public sector-Non All India Service, Public sector-All India Service). UPSC score is the (intake year) standardized score in the competitive entry examination. Training score is the (intake year) standardized score in the training period. 1[Training>UPSC score] is a dummy that is 1 if the officer improved the relative rating between training and competitive exam. Standard errors clustered at the IAS officer level.

Table A3: 360 degree measures of effectiveness, by stakeholder group

		(1)	(2)	(3)	(4)	(5)
		Subjective ratings				
		Effective	Probity	Pressure	Pro-Poor	Overall
IAS	Mean	3.921	3.918	3.835	3.882	3.879
	SD	0.990	1.072	0.985	0.992	0.996
	N	4,932	4,217	4,767	4,752	4,955
State Civil Service	Mean	3.943	3.810	3.532	3.802	3.839
	SD	0.988	1.116	1.108	1.089	1.061
	N	2,571	2,041	2,422	2,468	2,611
Large firms	Mean	3.748	3.704	3.553	3.530	3.724
	SD	1.057	0.983	1.040	0.977	0.982
	N	2,708	2,402	2,541	2,575	2,661
MLAs	Mean	3.642	3.518	3.258	3.302	3.512
	SD	1.138	1.185	1.183	1.313	1.036
	N	2,595	2,164	2,367	2,473	2,580
NGOs	Mean	3.535	3.528	3.307	3.283	3.455
	SD	1.125	1.141	1.172	1.162	1.076
	N	1,927	1,694	1,816	1,856	1,930
Media (Print & TV)	Mean	3.421	3.350	3.322	3.060	3.258
	SD	1.116	1.047	1.039	1.124	1.075
	N	3,020	2,635	2,815	2,923	2,961
Pooled	Mean	3.730	3.670	3.523	3.527	3.646
	SD	1.077	1.105	1.094	1.141	1.057
	N	17,753	15,153	16,728	17,047	17,698

Descriptive statistics (mean, standard deviation (SD) and sample size) of 360 degree measures of effectiveness, broken down by the assessing stakeholder group. The abbreviation MLAs stands for members of the legislative assembly. NGOs stands for non-governmental organization.

Table A4: 360 degree measures of effectiveness, by source of information

		(1)	(2)	(3)	(4)	(5)
		Subjective ratings				
		Effective	Probity	Pressure	Pro-Poor	Overall
Personal interaction	Mean	3.928	3.772	3.665	3.671	3.786
	SD	0.979	1.069	1.056	1.118	1.038
	N	9,751	8,325	9,407	9,492	9,724
Friends & Networks	Mean	3.179	3.546	3.328	3.306	3.461
	SD	1.239	1.152	1.108	1.107	1.062
	N	3,149	2,673	2,770	2,884	3,143
Media	Mean	3.689	3.545	3.347	3.371	3.486
	SD	1.022	1.124	1.119	1.165	1.052
	N	4,853	4,155	4,551	4,671	4,831
Pooled	Mean	3.730	3.670	3.523	3.527	3.646
	SD	1.077	1.105	1.094	1.141	1.057
	N	17,753	15,153	16,728	17,047	17,698

Descriptive statistics (mean, standard deviation (SD) and sample size) of 360 degree measures of effectiveness, broken down by source of information. Personal interaction are assessments provided by respondents who know the rated officer personally. Friends & networks are those known through friends or social (work) networks, and media are those known through television, radio or newspaper.

Table A5: Subjective performance measures and present/past suspensions

Panel A	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-Poor	Overall
Mean of dep. var	3.730	3.671	3.524	3.528	3.647
Suspended	-0.388** (0.152)	-0.506*** (0.183)	-0.558*** (0.156)	-0.386** (0.159)	-0.571*** (0.185)
State \times Intake year FEs	Y	Y	Y	Y	Y
Respondent FEs	Y	Y	Y	Y	Y
Observations	17,749	15,133	16,717	17,042	17,694
Panel B	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-Poor	Overall
Mean of dep. var	3.730	3.671	3.524	3.528	3.647
Mean past suspensions	-0.842** (0.418)	-1.195** (0.589)	-0.849*** (0.326)	-0.213 (0.337)	-0.768* (0.413)
Respondent FEs	Y	Y	Y	Y	Y
State \times Intake year FEs	Y	Y	Y	Y	Y
Observations	17,750	15,138	16,719	17,043	17,695

Unit of observation is the score for a given IAS officer in 2012-13 with at least 8 years of tenure. Suspended is a dummy that is 1 if the IAS officer is suspended in 2012-13. Mean past suspension is the cumulative number of suspensions up to the year before the survey (2011) divided by the total years in service. Respondent FEs are fixed effects for each survey respondent. State \times Intake year FEs are dummies for the state-specific cadre the IAS officer entered with. Standard errors in parentheses, clustered at the respondent level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A6: Individual characteristics, by age at entry

	(1)	(2)	(3)
	Age at entry		
	Below median (22-25)	Above median (> 25)	Diff (1)-(2)
Female	0.159	0.120	-0.038** (0.018)
Other backward caste (OBC)	0.043	0.128	0.084*** (0.014)
Scheduled caste (SC)	0.091	0.205	0.114*** (0.018)
Scheduled tribe (ST)	0.032	0.076	0.044*** (0.011)
Urban background	0.832	0.619	-0.213*** (0.022)
Academic distinction	0.347	0.294	-0.053** (0.024)
STEM or Economics degree	0.619	0.294	-0.037 (0.145)
Previous job: Education/research	0.165	0.171	0.006 (0.756)
Previous job: Finance/banking	0.039	0.075	0.035*** (0.012)
Previous job: Private/SOE	0.113	0.132	0.019 (0.263)
Previous job: Public sector	0.271	0.390	0.118*** (0.024)
Previous job: Public AIS	0.036	0.031	-0.004 (0.638)
UPSC score (standardized)	0.249	-0.148	-0.397*** (0.046)
Training score (standardized)	0.100	-0.021	-0.121** (0.049)
$\mathbf{1}[\text{Training} > \text{UPSC score}]$	0.250	0.420	0.170*** (0.024)
Observations	802	663	

Reporting means for entrants below median age (22-25) and those above (> 25). Sample covers the cross-section of centrally recruited IAS officers in 2012-13 with performance ratings. Urban background denotes officers from urban areas, Academic distinction is a dummy for having received an academic distinction. STEM is a dummy for graduates of Science, Technology, Engineering and Mathematics and Economics degrees. Previous job denotes the sector of employment previous to entry into IAS (Education/research, Finance/banking, Private sector/State-owned-enterprise, Public sector-Non All India Service, Public sector-All India Service). UPSC score is the (intake year) standardized score in the competitive entry examination. Training score is the (intake year) standardized score in the training period. $\mathbf{1}[\text{Training} > \text{UPSC score}]$ is a dummy that is 1 if the officer improved the relative rating between training and competitive exam. Cohort size is the overall number of officers that entered the IAS in the same year and were allocated to the same state. Younger peers is the number of those who are younger than the officer.

Table A7: 360 measures and age at entry - Full controls

	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-poor	Overall
Mean of dep. var	3.734	3.677	3.526	3.533	3.646
Age at entry	-0.013** (0.006)	-0.008 (0.007)	-0.014** (0.005)	-0.004 (0.005)	-0.011* (0.006)
Entry score	0.046*** (0.017)	0.039** (0.019)	0.019 (0.017)	0.033 (0.023)	0.039** (0.019)
Training score	0.020* (0.012)	0.025* (0.014)	0.030** (0.012)	-0.001 (0.016)	0.015 (0.013)
Improved (Entry > Training score)	0.095*** (0.028)	0.034 (0.033)	0.043 (0.027)	0.046 (0.031)	0.043 (0.030)
Female	0.005 (0.029)	-0.006 (0.036)	-0.012 (0.029)	0.048 (0.033)	0.004 (0.036)
Caste: OBC	-0.119 (0.080)	-0.152* (0.090)	-0.152** (0.074)	-0.061 (0.082)	-0.082 (0.088)
Caste: SC	0.035 (0.034)	0.035 (0.041)	0.072** (0.035)	0.044 (0.036)	0.077* (0.040)
Caste: ST	-0.099* (0.051)	-0.093 (0.066)	-0.055 (0.050)	-0.082 (0.054)	-0.103* (0.058)
Urban background	-0.022 (0.022)	0.011 (0.026)	0.027 (0.020)	0.006 (0.024)	-0.009 (0.023)
Academic distinction	0.020 (0.021)	0.024 (0.024)	0.022 (0.018)	0.006 (0.021)	0.013 (0.023)
STEM or Economics	0.014 (0.021)	-0.022 (0.026)	0.012 (0.021)	0.009 (0.022)	0.013 (0.023)
Previous: Education/Research	0.053* (0.030)	0.005 (0.035)	0.044 (0.029)	0.023 (0.032)	0.010 (0.033)
Previous: Finance/Banking	0.026 (0.046)	-0.038 (0.049)	0.024 (0.040)	0.059 (0.044)	0.022 (0.049)
Previous: Private/SOE	0.057* (0.035)	0.026 (0.041)	0.044 (0.032)	0.041 (0.038)	0.043 (0.036)
Previous: Public	0.033 (0.028)	-0.009 (0.033)	0.024 (0.027)	-0.014 (0.032)	-0.024 (0.032)
Previous: AIS	-0.050 (0.050)	-0.009 (0.064)	0.018 (0.049)	-0.089* (0.053)	-0.087 (0.055)
Respondent FEs	Y	Y	Y	Y	Y
State × Intake year FEs	Y	Y	Y	Y	Y
Sample	Pre-reform cohorts				
Observations	15,396	13,129	14,512	14,782	15,340

Unit of observation is the score for a given IAS officer in 2012-13 with at least 8 years of tenure. Relating the cross-section of perceived effectiveness (Panel A), probity, ability to withstand illegitimate political pressure, pro-poor orientedness and overall scores (Panel B) to age at entry and the probability of reaching the top. Age at entry is the age the IAS officer entered the service. Reaching top is the share of officers retiring pre-reform (1998) who reached the top payscale (Chief Secretary level, requiring at least 30 years of tenure) for a given age at entry. Respondent FEs are fixed effects for each survey respondent. State × Intake year FEs are fixed effects for the state-specific cohort the officer entered in. Individual controls are: female dummy, caste dummies (OBC, SC, ST), a dummy for coming from an urban area, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for the (UPSC) entry and training scores, as well as a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam. The sample comprises all IAS officers in 2012-13 who entered before the pension reform of 1998. Standard errors are clustered at the individual-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A8: Probability of reaching top and age at entry

	(1)	(2)	(3)
Age at entry	Pooled all cohorts	Pre-reform cohorts	Post-reform cohorts
22	0.792	0.737	0.827
23	0.754	0.672	0.798
24	0.626	0.532	0.673
25	0.522	0.363	0.585
26	0.310	0.111	0.351
27	0.092	0.041	0.109
28	0.073	0.035	0.089
29	0.028	0	0.040
30	0	0	0
> 30	0	0	0
Observations	2,159	706	1,453

Share of retired officers who reached the top payscale by age at entry. Column 1 shows the average for all cohorts. Column 2 shows the average for those who retired before the 1998 pension reform. Column 3 shows the average for those who retired after the pension reform.

Table A9: Performance and pension reform, by age at entry bins

	(1)	(2)	(3)	(4)	(5)
	Effective	Probity	Pressure	Pro-poor	Overall
Mean of dep. var	3.730	3.671	3.524	3.528	3.647
Marginal	-0.201**	-0.199*	-0.173*	-0.211**	-0.214**
	(0.083)	(0.113)	(0.091)	(0.086)	(0.100)
Too old	-0.193	-0.404**	-0.273*	0.018	-0.065
	(0.142)	(0.193)	(0.157)	(0.125)	(0.154)
Marginal \times After 1998	0.318***	0.319**	0.176	0.222*	0.387***
	(0.123)	(0.160)	(0.129)	(0.128)	(0.140)
Too old \times After 1998	0.253	0.547**	0.302	0.030	0.087
	(0.194)	(0.263)	(0.213)	(0.173)	(0.209)
State \times Intake year FEs	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Marginal/too old \times Intake year	Y	Y	Y	Y	Y
Controls \times After 1998	Y	Y	Y	Y	Y
Sample	Pre & post-reform cohorts				
Observations	17,749	15,133	16,717	17,042	17,694

Unit of observation is the score for a given IAS officer in 2012-13 with at least 8 years of tenure. Relating the cross-section of perceived effectiveness (Panel A), probity, ability to withstand illegitimate political pressure, pro-poor orientedness and overall scores (Panel B) to age at entry bins (marginal/too old) and cohorts entering before/after the pension reform. Post reform cohort is a dummy that is 1 if the IAS officer entered in the year of the pension reform 1998 or after. Marginal is a dummy that is 1 for officers entering aged between [28,29]. The dummy too old is a dummy that is 1 if officers entered with at least 30 years of age. The omitted category are IAS officers who are aged 22-27 at entry and hence too young to be affected by the reform. Respondent FEs are fixed effects for each survey respondent. State \times Intake year FEs are fixed effects for the state-specific cohort the officer entered in. Individual controls are: female dummy, caste dummies (OBC, SC, ST), a dummy for coming from an urban area, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for the (UPSC) entry and training scores, as well as a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam. Marginal/too old \times Intake year are the interactions between the marginal and old dummies and the (linear) intake year, with the officer's year of intake centered around the pension reform of 1998. Controls \times Post reform cohort interacts all individual background controls with the reform dummy. Standard errors are clustered at the individual-level. Standard errors are clustered at the individual-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A10: IAS cadre characteristics by age at entry, before/after reform

	(1)	(2)	(3)
	Age at entry	Marginal	Too old
Female	-0.006 (0.017)	0.068 (0.084)	-0.047 (0.098)
Caste: OBC	0.037*** (0.011)	0.077 (0.070)	0.164 (0.161)
Caste: SC	-0.030* (0.016)	-0.113 (0.098)	-0.194 (0.121)
Caste: ST	-0.010 (0.012)	-0.005 (0.043)	-0.151* (0.086)
Urban	0.022 (0.015)	0.196*** (0.067)	0.092 (0.091)
Academic distinction	0.009 (0.016)	0.008 (0.088)	0.090 (0.143)
STEM or Economics	0.039** (0.016)	0.154** (0.064)	0.305** (0.121)
Previous: Education	-0.005 (0.009)	-0.090 (0.058)	0.055 (0.071)
Previous: Finance & Banking	-0.014* (0.008)	-0.014 (0.038)	-0.135 (0.086)
Previous: Private/SOE	0.026** (0.011)	0.102 (0.078)	0.134 (0.086)
Previous: Public	0.016 (0.016)	0.137** (0.051)	0.043 (0.150)
Previous: Public AIS	0.004 (0.003)	0.007 (0.037)	0.013 (0.011)
UPSC score	0.032 (0.042)	0.264 (0.220)	0.384* (0.206)
Training score	-0.018 (0.023)	-0.104 (0.137)	0.124 (0.254)
1[Training > UPSC]	-0.011 (0.024)	-0.135 (0.092)	-0.089 (0.161)
Observations	1,472		1,472

Testing for average difference in IAS officer characteristics before and after the reform for the sample of officers for which we collected subjective ratings in 2012-13. Each row reports the interaction coefficients estimated from a regression of individual characteristics on age at entry FEs, year of intake FEs and (i) age at entry \times post reform 98 cohort dummy (Column 1) or (ii) marginal/too old dummies \times post reform 98 cohort dummy (Columns 2-3). Standard errors are clustered at the year of intake-level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A11: Test for (quasi-)random allocation across states

p -value for H_0 : Random allocation across	(1) State groups	(2) 14 main states
Age at entry	0.799	0.418
Female	0.903	0.974
Other backward caste (OBC)	0.345	0.865
Scheduled caste (SC)	0.175	0.117
Scheduled tribe (ST)	0.093*	0.105
Urban background	0.992	0.710
Academic distinction	0.921	0.305
STEM and Economics degree	0.031**	0.370
Previous job: Education/research	0.576	0.355
Previous job: Finance/banking	0.723	0.247
Previous job: Private/SOE	0.332	0.411
Previous job: Public sector	0.831	0.466
Previous job: Public AIS	0.790	0.530
Ranking in year of intake	0.195	0.157
UPSC score	0.545	0.176
Training score	0.485	0.237
Improved	0.669	0.643
Observations	2,130	1,730

Test for random allocation across states for each year of intake between 1972-2005. The test is implemented by regressing the individual characteristics of the IAS officers on a set of state fixed effects and cadre fixed effects, and then testing the equality of the estimated state fixed effects. State groups are dummies for the grouping used to allocate officers in the assignment process (See Appendix Section C1). Robust standard errors. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A12: State-level GDP per capita, aggregate career incentives and reform

Panel A	(1)	(2)	(3)	(4)	(5)
	log State-level GDP per capita				
Avg. age at entry	-0.042 [0.782]	-0.033 [0.770]	-0.339 [0.214]	-0.340 [0.174]	-0.077 [0.664]
Avg. age at entry × Post reform			0.420 [0.248]	0.424*** [0.004]	0.319*** [0.002]
Log total IAS officers		0.294 [0.514]	0.091 [0.850]	0.092 [0.874]	0.089 [0.464]
Year FEs	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y
Avg. age at entry × Year				Y	Y
State FEs × Year					Y
Observations	435	435	435	435	435
Panel B	(1)	(2)	(3)	(4)	(5)
	log State-level GDP per capita				
Avg. reaching top	0.001 [0.910]	0.000 [0.944]	0.027 [0.110]	0.022 [0.234]	0.007 [0.518]
Avg. reaching top × Post reform			-0.043 [0.162]	-0.034*** [0.006]	-0.024*** [0.002]
Log total IAS officers		0.297 [0.518]	0.036 [0.912]	0.018 [0.934]	0.087 [0.460]
Year FEs	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y
Avg. reaching top × Year				Y	Y
State FEs × Year					Y
Observations	435	435	435	435	435
Panel C	(1)	(2)	(3)	(4)	(5)
	log State-level GDP per capita				
Share marginal	-0.017 [0.404]	-0.015 [0.364]	-0.022 [0.318]	-0.037* [0.058]	-0.008 [0.196]
Share marginal × Post reform			0.012 [0.708]	0.040** [0.014]	0.029*** [0.000]
Share too old	0.015 [0.546]	0.014 [0.588]	0.010 [0.730]	0.001 [1.000]	-0.001 [0.896]
Share too old × Post reform			0.002 [0.892]	0.022 [0.242]	0.010 [0.378]
Log total IAS officers		0.154 [0.732]	0.156 [0.728]	0.176 [0.714]	0.047 [0.672]
Year FEs	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y
Share marginal/too old × Year				Y	Y
State FEs × Year					Y
Observations	435	435	435	435	435

Unit of observation is the state-year. Relating (log) state-level GDP (and subcomponents) per capita to measures of aggregate incentives and the pension reform. The sample is the universe of centrally recruited IAS officers in the 14 main states of India 1980-2011. Post reform is a dummy that is 1 in the pension reform year 1998 and after. Avg. reaching top is the average share (%) of IAS officers in a given state-year reaching the highest payscale (Chief Secretary level, requiring at least 30 years of service). The marginal age group is the share of officers (%) entering aged between [28,29]. The age group that is too old is the share of officers (%) entering with at least 30 years of age. Bootstrap standard errors (Cameron et al., 2008) are clustered at the state-level, with p-values reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A13: Sectoral GDP per capita, aggregate career incentives and reform

Panel A	(1)	(2)	(3)	(4)
	Sectoral (log) state GDP per capita			
	Total	Agriculture	Industry	Services
Average age at entry	-0.340	-0.045	-0.201	-0.475*
	[0.174]	[0.758]	[0.396]	[0.066]
Average age at entry \times Post reform	0.424***	0.300	0.128	0.506***
	[0.004]	[0.284]	[0.598]	[0.000]
Year FEs	Y	Y	Y	Y
State FEs	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Observations	435	435	435	435
Panel B	(5)	(6)	(7)	(8)
	Sectoral (log) state GDP per capita			
	Total	Agriculture	Industry	Services
Average share reaching top	0.022	0.000	0.018	0.033
	[0.234]	[0.986]	[0.428]	[0.124]
Average share reaching top \times Post reform	-0.034***	-0.019	-0.008	-0.043***
	[0.006]	[0.374]	[0.622]	[0.002]
Year FEs	Y	Y	Y	Y
State FEs	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Observations	435	435	435	435
Panel C	(9)	(10)	(11)	(12)
	Sectoral (log) state GDP per capita			
	Total	Agriculture	Industry	Services
Share marginal	-0.037*	-0.017	-0.025*	-0.048**
	[0.058]	[0.342]	[0.092]	[0.046]
Share marginal \times Post reform	0.040**	0.055***	0.017	0.038***
	[0.014]	[0.002]	[0.424]	[0.010]
Share too old	0.001	0.005	0.013	-0.004
	[1.000]	[0.790]	[0.510]	[0.854]
Share too old \times Post reform	0.022	0.013	0.002	0.023
	[0.242]	[0.200]	[0.906]	[0.376]
Year FEs	Y	Y	Y	Y
State FEs	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Observations	435	435	435	435

Unit of observation is the state-year. Relating (log) state-level nominal GDP per capita and its sectoral breakdown to average age at entry (Panel A), the average share reaching the top (Panel B), age at entry bins (Panel C) and the pension reform. Average age at entry is the average entry age of all IAS officers active in a given state and year. Average share of reaching the top is the average share of officers (%) retiring pre-reform (1998) who reached the top payscale (Chief Secretary level, requiring at least 30 years of tenure) in a given state and year. Share of marginal (%) is the share of all active IAS officers in a given state and year that are aged between [28, 29]. Share too old (%) is the share of all active IAS officers in a given state and year that are aged at least 30 at entry. The omitted category is the share of officers who are too young (with age at entry of 22-27). Post reform is a dummy that is 1 in the pension reform year 1998 and after. Controls are: for all specifications the (log) number of all active officers in a given state and year; for Panel A controls include in addition: Average age at entry \times Year is the interaction between average age at entry of all active officers in a given state-year and the linear time trend (centered around 1998); for Panel B controls include in addition: Average reaching top \times Year is the same interaction using the average share of officers reaching the top payscale; for Panel C controls include in addition: share marginal/too old \times Year is the same interaction using the share of those aged 28-29 at entry and those with at least 30. The sample is the universe of centrally recruited IAS officers in the 14 main states of India 1980-2011. Bootstrap standard errors (Cameron et al., 2008) are clustered at the state-level, with p-values reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A14: State-level GDP per capita and aggregate incentives - sample selectivity

	(1)	(2)	(3)	(4)	(5)	(6)
	log State-level GDP per capita					
	Drop post-state split			Drop pre-1990		
Avg. age at entry	-0.252			-0.514**		
	[0.198]			[0.042]		
Avg. age at entry × Post reform	0.356***			0.490***		
	[0.002]			[0.000]		
Avg. reaching top		0.019			0.040**	
		[0.192]			[0.030]	
Avg. reaching top × Post reform		-0.027***			-0.037***	
		[0.002]			[0.002]	
Share marginal			-0.023**			-0.055**
			[0.042]			[0.038]
Share marginal × Post reform			0.029***			0.043***
			[0.000]			[0.000]
Share too old			-0.012			-0.000
			[0.522]			[0.940]
Share too old × Post reform			0.024			0.017
			[0.140]			[0.302]
Log total IAS officers	0.890***	0.832***	0.831***	-0.173	-0.266	-0.189
	[0.000]	[0.006]	[0.000]	[0.828]	[0.682]	[0.780]
Year FEs	Y	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y	Y
Avg. age at entry × Year	Y	Y	Y	Y	Y	Y
Observations	405	405	405	305	305	305

Unit of observation is the state-year. Relating (log) state-level GDP (and subcomponents) per capita to measures of aggregate incentives and the pension reform. Columns 1-3 drop the Indian states (Bihar, Madhya Pradesh and Uttar Pradesh) that split after 2001. Columns 4-6 drop the pre-reform period. The sample is the universe of centrally recruited IAS officers in the 14 main states of India 1980-2011. Post reform is a dummy that is 1 in the pension reform year 1998 and after. Avg. reaching top (%) is the average share of IAS officers in a given state-year reaching the highest payscale (Chief Secretary level, requiring at least 30 years of service). The marginal age group is the share of officers (%) entering aged between [28,29]. The age group that is too old is the share of officers (%) entering with at least 30 years of age. Bootstrap standard errors (Cameron et al., 2008) are clustered at the state-level, with p-values reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A15: State-level GDP per capita and aggregate incentives - additional FEs

	(1)	(2)	(3)	(4)	(5)	(6)
	log State-level GDP per capita					
	Region \times Year FEs			State \times Decade FEs		
Avg. age at entry	-0.267			-0.136		
	[0.346]			[0.332]		
Avg. age at entry \times Post reform	0.425*			0.318***		
	[0.052]			[0.000]		
Avg. reaching top		0.029			-0.022	
		[0.162]			[0.248]	
Avg. reaching top \times Post reform		-0.042***			0.028	
		[0.002]			[0.420]	
Share marginal			-0.028			-0.015**
			[0.108]			[0.034]
Share marginal \times Post reform			0.022*			0.025***
			[0.098]			[0.000]
Share too old			0.004			-0.013
			[0.866]			[0.144]
Share too old \times Post reform			0.016			0.023**
			[0.218]			[0.010]
Log total IAS officers	0.206	0.051	0.196	-0.034	-0.026	0.009
	[0.506]	[0.860]	[0.318]	[0.178]	[0.690]	[0.918]
Avg. age at entry \times Year	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y	Y
State FEs \times Year				Y	Y	Y
Region FEs \times Year FEs	Y	Y	Y			
Observations	405	405	405	305	305	305

Unit of observation is the state-year. Relating (log) state-level GDP (and subcomponents) per capita to measures of aggregate incentives and the pension reform. Columns 1-3 drop the Indian states (Bihar, Madhya Pradesh and Uttar Pradesh) that split after 2001. Columns 4-6 drop the pre-reform period. The sample is the universe of centrally recruited IAS officers in the 14 main states of India 1980-2011. Post reform is a dummy that is 1 in the pension reform year 1998 and after. Avg. reaching top (%) is the average share of IAS officers in a given state-year reaching the highest payscale (Chief Secretary level, requiring at least 30 years of service). The marginal age group is the share of officers (%) entering aged between [28,29]. The age group that is too old is the share of officers (%) entering with at least 30 years of age. Region FEs are: Eastern (Bihar, Orissa, West Bengal), Northern (Haryana, Punjab, Rajasthan, Uttar Pradesh), Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu) and Western (Gujarat, Madhya Pradesh, Maharashtra). Bootstrap standard errors (Cameron et al., 2008) are clustered at the state-level, with p-values reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A16: State-level GDP per capita and aggregate incentives - dropping states

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	log State-level GDP per capita													
Estimates when dropping state of	AP	BH	GJ	HY	KN	KL	MP	MH	OR	PB	RJ	TN	UP	WB
Panel A														
Avg. age at entry	-0.367 [0.112]	-0.346 [0.174]	-0.347 [0.294]	-0.315 [0.238]	-0.353 [0.178]	-0.282 [0.302]	-0.287 [0.166]	-0.366 [0.176]	-0.494** [0.014]	-0.399** [0.518]	-0.316 [0.194]	-0.367 [0.136]	-0.363 [0.166]	-0.283 [0.456]
Avg. age at entry × Post reform	0.387*** [0.008]	0.426*** [0.006]	0.441** [0.042]	0.428*** [0.004]	0.467** [0.028]	0.355 [0.106]	0.424** [0.010]	0.416** [0.022]	0.591*** [0.000]	0.399** [0.014]	0.392*** [0.008]	0.421** [0.010]	0.376*** [0.004]	0.361*** [0.001]
Panel B														
Avg. reaching top	0.025 [0.178]	0.023 [0.228]	0.022 [0.296]	0.022 [0.252]	0.023 [0.224]	0.022 [0.310]	0.023 [0.126]	0.025 [0.244]	0.032* [0.074]	0.009 [0.706]	0.017 [0.362]	0.027 [0.172]	0.023 [0.180]	0.014 [0.620]
Avg. reaching top × Post reform	-0.031*** [0.006]	-0.035*** [0.006]	-0.035** [0.022]	-0.035*** [0.008]	-0.035** [0.036]	-0.031** [0.036]	-0.032*** [0.004]	-0.033** [0.012]	-0.044*** [0.002]	-0.034** [0.026]	-0.029** [0.016]	-0.036** [0.014]	-0.032** [0.022]	-0.030** [0.022]
Panel C														
Share marginal	-0.039 [0.138]	-0.037* [0.086]	-0.044* [0.058]	-0.034* [0.066]	-0.037 [0.116]	-0.014 [0.448]	-0.034*** [0.002]	-0.044 [0.118]	-0.040* [0.054]	-0.033 [0.182]	-0.038* [0.082]	-0.044** [0.014]	-0.033** [0.040]	-0.035* [0.096]
Share marginal × Post reform	0.043** [0.030]	0.040** [0.020]	0.053** [0.046]	0.036** [0.018]	0.040** [0.014]	0.046** [0.044]	0.029*** [0.000]	0.041** [0.048]	0.036** [0.014]	0.045*** [0.010]	0.039** [0.024]	0.039** [0.018]	0.039** [0.028]	0.039** [0.014]
Share too old	-0.001 [0.914]	0.001 [1.000]	0.000 [1.000]	-0.004 [0.814]	-0.002 [0.928]	-0.000 [0.976]	-0.000 [0.966]	0.001 [1.000]	-0.007 [0.734]	0.024 [0.330]	0.005 [0.896]	0.012 [0.656]	-0.011 [0.574]	0.005 [0.904]
Share too old × Post reform	0.018 [0.292]	0.022 [0.236]	0.023 [0.276]	0.033 [0.316]	0.024 [0.248]	0.004 [0.726]	0.023 [0.188]	0.022 [0.234]	0.034 [0.304]	0.020 [0.250]	0.028 [0.160]	0.021 [0.314]	0.018 [0.262]	0.017 [0.314]
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Incentives × Year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	403	416	403	403	403	403	403	403	403	403	403	403	403	403

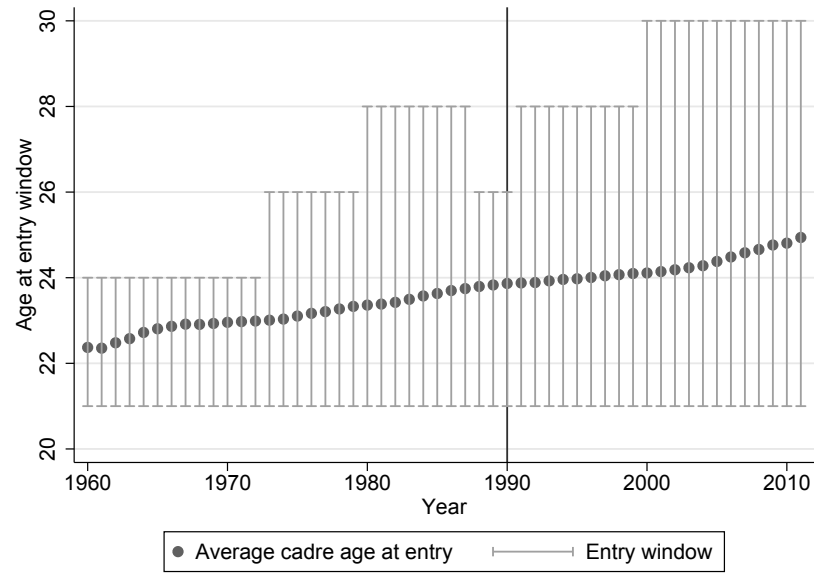
Unit of observation is the state-year. Relating (log) state-level GDP (and subcomponents) per capita to measures of aggregate incentives and the pension reform. Each column drops a state and reports the resulting estimates for all three measures of aggregate incentives (mean age at entry, mean share reaching the top and the share of marginal/too old entrants). The sample is the universe of centrally recruited IAS officers in the 14 main states of India 1980-2011. Post reform is a dummy that is 1 in the pension reform year 1998 and after. Avg. reaching top (%) is the average share of IAS officers in a given state-year reaching the highest payscale (Chief Secretary level, requiring at least 30 years of service). The marginal age group is the share of officers (%) entering aged between [28,29]. The age group that is too old is the share of officers (%) entering with at least 30 years of age. Bootstrap standard errors (Cameron et al., 2008) are clustered at the state-level, with p-values reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A17: Service GDP per capita breakdown, aggregate career incentives and reform

Panel A	(1)	(2)	(3)	(4)
	State-level GDP breakdown service sector			
	Construction	Transport	Retail	Banking
Avg. age at entry	-0.936**	-0.405***	-0.638	-0.214
	[0.036]	[0.008]	[0.136]	[0.148]
Avg. age at entry \times Post reform	0.644*	0.699***	0.567*	0.436***
	[0.078]	[0.000]	[0.090]	[0.006]
Year FEs	Y	Y	Y	Y
State FEs	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Observations	435	435	435	435
Panel B	(1)	(2)	(3)	(4)
	State-level GDP breakdown service sector			
	Construction	Transport	Retail	Banking
Avg. reaching top	0.078*	0.019	0.044	0.016
	[0.058]	[0.262]	[0.126]	[0.464]
Avg. reaching top \times Post reform	-0.047	-0.056**	-0.043*	-0.041***
	[0.142]	[0.012]	[0.058]	[0.008]
Year FEs	Y	Y	Y	Y
State FEs	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Observations	435	435	435	435
Panel C	(1)	(2)	(3)	(4)
	State-level GDP breakdown service sector			
	Construction	Transport	Retail	Banking
Share marginal	0.015	-0.092***	-0.027	-0.051**
	[0.776]	[0.010]	[0.292]	[0.012]
Share marginal \times Post reform	0.008	0.076***	-0.003	0.065***
	[0.870]	[0.000]	[0.750]	[0.006]
Share too old	-0.062*	0.003	-0.026	0.016
	[0.078]	[0.876]	[0.588]	[0.508]
Share too old \times Post reform	0.065*	0.033	0.028	-0.005
	[0.056]	[0.100]	[0.118]	[0.866]
Year FEs	Y	Y	Y	Y
State FEs	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Observations	435	435	435	435

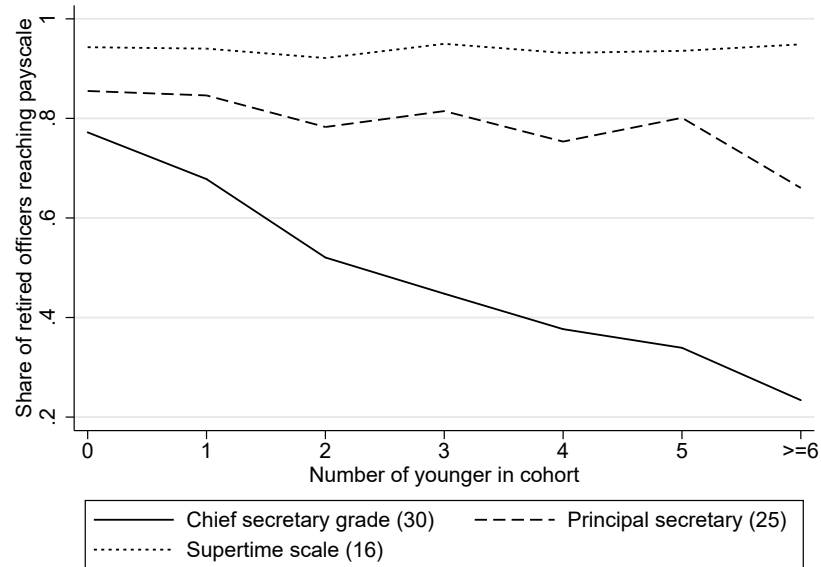
Unit of observation is the state-year. Relating (log) state-level GDP (and subcomponents) per capita to age at entry groups and the pension reform. The sample is the universe of centrally recruited IAS officers in the 14 main states of India 1980-2011. Post 98 is a dummy that is 1 in the pension reform year 1998 and after. Avg. reaching top (%) is the average share of IAS officers in a given state-year reaching the highest payscale (Chief Secretary level, requiring at least 30 years of service). The marginal age group is the share of officers (%) entering aged between [28,29]. The age group that is too old is the share of officers (%) entering with at least 30 years of age. Controls are: log(total cadre size of all active officers in a given state-year) and share marginal/too old interacted with year. Bootstrap standard errors (Cameron et al., 2008) are clustered at the state-level, with p-values reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure B1: Statutory age at entry window of the IAS over time



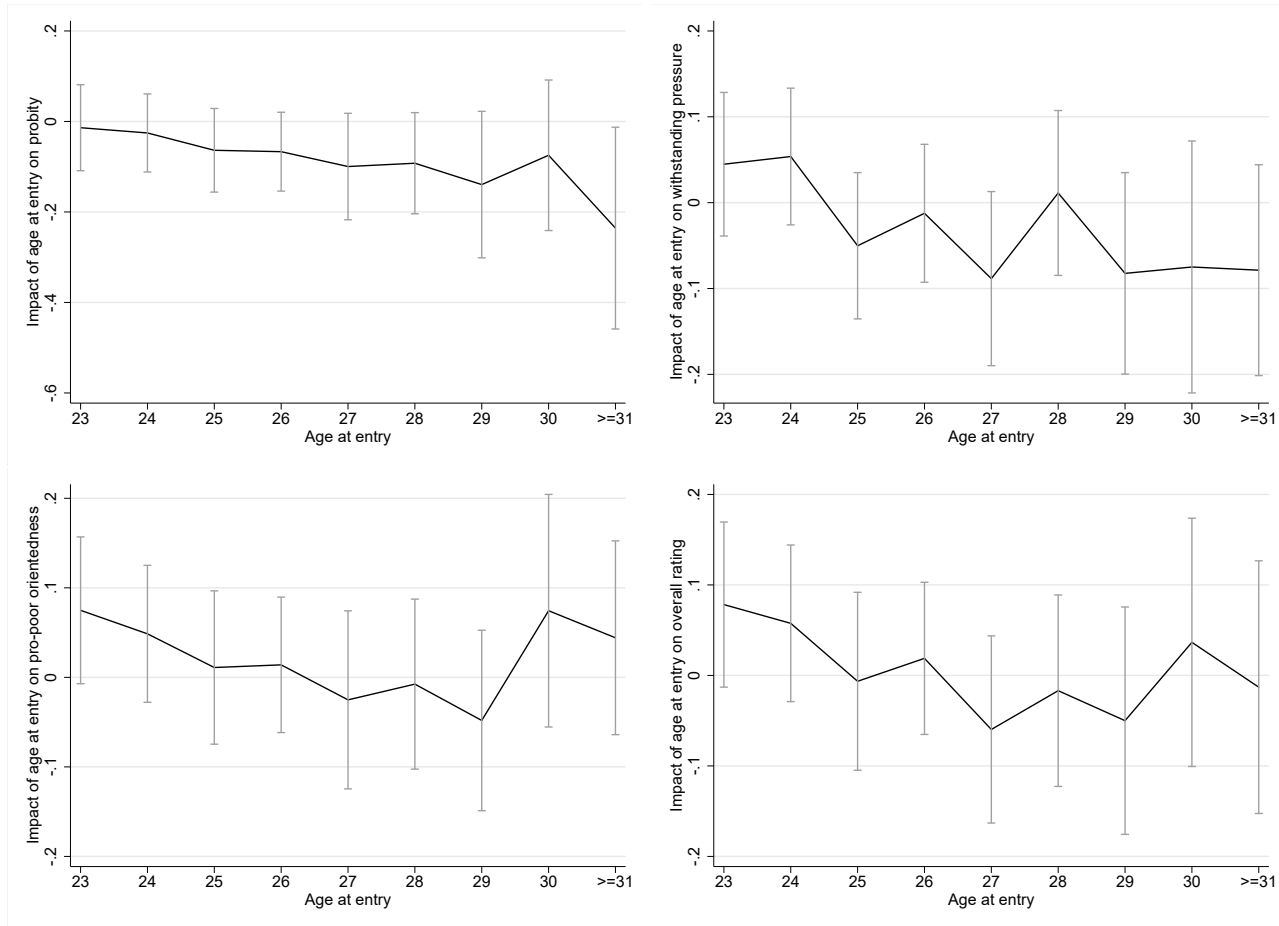
Statutory age at entry window for general candidates of the IAS over time. Solid line marks beginning of the sample period for the state-level panel.

Figure B2: Share of retired officers reaching top and number of younger peers



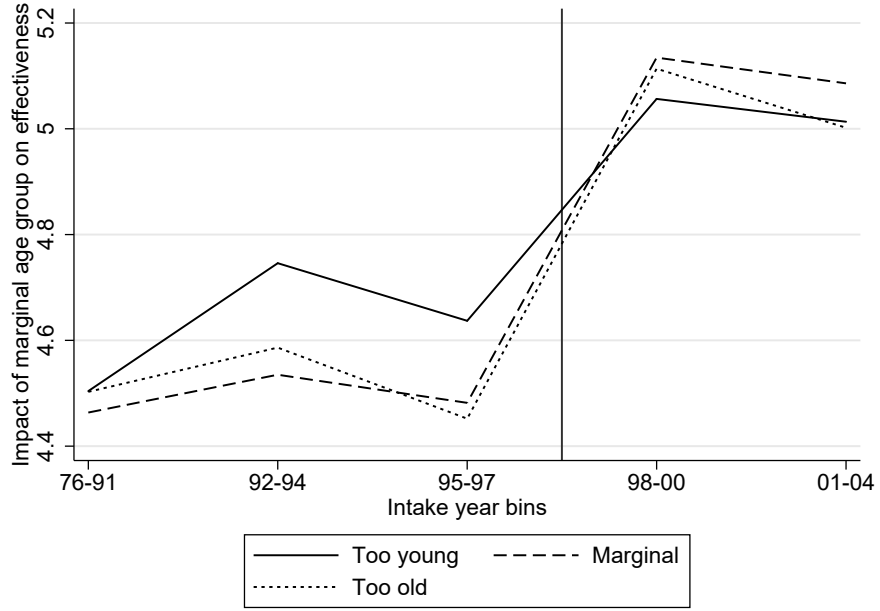
Share of retired officers in 2012 reaching senior pay scales as a function of the number of younger peers allocated to the same state and year of intake. Number in parentheses indicates the minimum number of years to qualify for promotion to the position.

Figure B3: 360 performance measures and age at entry, pre-reform



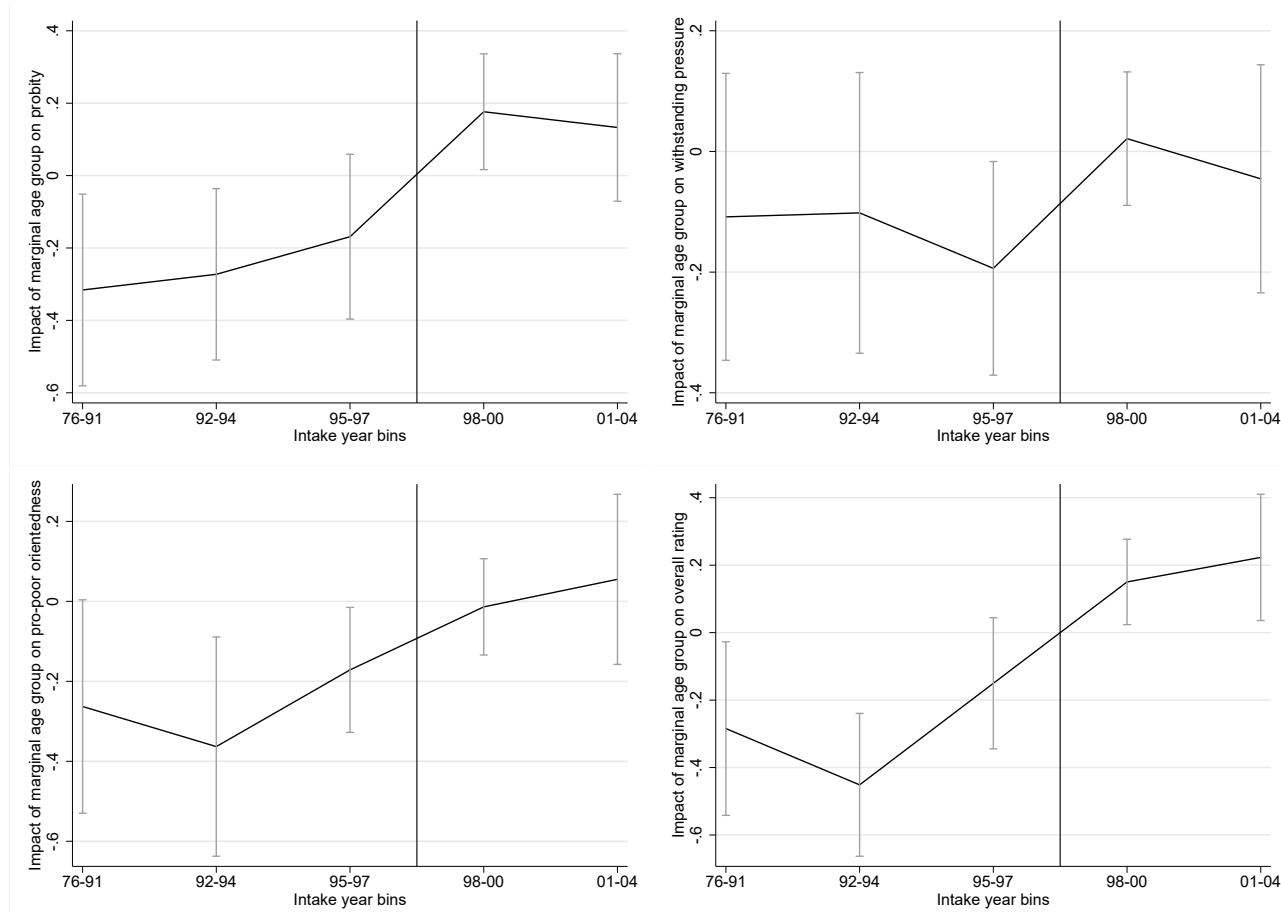
Relationship between probity score (left, top), ability to withstand illegitimate political pressure score (right, top), pro-poor orientations core (left, bottom), and overall rating (right, bottom) and age at entry for IAS officers who entered before the 1998 reform. The coefficients are based on partialling out respondent fixed effects. Standard errors used for computation of the 95% confidence intervals are clustered at the individual-level.

Figure B4: Effectiveness levels by age at entry group and intake years



Relating effectiveness to age at entry groups (too young, marginal, too old) and binned intake years. Specification partials out respondent fixed effects, state \times intake year fixed effects and background characteristics interacted with a dummy that is 1 for post 1998 cohorts (see specification of Table 5). Too young are defined as officers entering between 22-27. Marginal are those who enter between 28-29 and too old are officers entering with at least 30 years of age. Solid vertical line marks the year of the pension reform.

Figure B5: 360 perception measures and the impact of the marginal group by year of intake



Summarizing the interaction coefficients for a regression of the probity score (left, top), ability to withstand illegitimate political pressure score (right, top), pro-poor orientations core (left, bottom), and overall rating (right, bottom) on the dummy for the marginal age group [28,29] interacted with entry cohort year bins between 1976-2004. The regression includes all individual background controls (female dummy, caste dummies, dummy for urban background, having received an academic distinction, a STEM or Economics degree, having worked in education/research, private sector/SOEs, public sector, public AIS, standardized scores for entry and training scores, a dummy that is 1 if the officer improved the ranking in the training relative to the entry exam) in levels and interacted with the post-reform dummy, respondent fixed effects and state \times intake year FEs. The solid line marks the year of the pension reform. Standard errors used for the calculation of the 95% confidence intervals are clustered at the individual-level.

Figure B6: Determination of vacancies: Example 2006

Cohort size determined by Department of Personnel and Training (DoPT) with states based on vacancies

Insider-outsider category fixed in 2:1 ratio by looping through list in the order O-I-O

State	Vacancy ID	Category	Insider/outsider
....			
Chhatisgarh	25	OBC	O
Gujarat	26	OBC	I
Gujarat	27	GEN	O
Gujarat	28	GEN	O
Gujarat	29	SC/ST	I
Gujarat	30	OBC	O
Gujarat	31	GEN	O
Haryana	32	GEN	I
Haryana	33	OBC	O
Haryana	34	SC/ST	O
Himachal Pradesh	35	GEN	I
....			

Caste category of the vacancy determined by a predefined roster (number line)

Illustrating the assignment of categories (caste and home preference) to vacancies through the roster randomization for the year 2006. Vacancies are earmarked by caste status (O.B.C. denotes other backward castes, S.C./S.T. scheduled castes/tribes and unreserved the general castes) and home state (“I” denotes insider vacancies reserved for applicants from the same state; “O” denotes outsider vacancies reserved for applicants from other states). The assignment occurs through a number line.

Figure B7: Assignment of categories (caste and home preference) to vacancies through roster randomization

Cadre Allocation - 2006

Distribution of vacancies to be filled in various cadres/joint cadres of Indian Administrative Service (IAS) on the basis of Civil Services Examination 2006, among Insider and Outsider Vacancies and between categories.

Sl. No.	Name of the State Cadre / Joint Cadre	Unreserved Insider	Unreserved Outsider	OBC Insider	OBC Outsider	SC/ST Insider	SC/ST Outsider	Total
1	A G M U T	1	2	1	0	0	1	5
2	Andhra Pradesh	1	1	0	0	0	0	2
3	Assam Meghalaya	1	2	0	1	1	0	5
4	Bihar	2	1	0	2	1	1	7
5	Chhatisgarh	0	3	1	1	1	0	6
6	Gujarat	0	3	1	1	1	0	6
7	Haryana	1	0	0	1	0	1	3
8	Himachal Pradesh	1	0	0	0	0	0	1
9	Jammu & Kashmir	0	1	0	0	0	0	1
10	Jharkhand	0	1	0	0	0	0	1
11	Karnataka	0	1	1	0	0	1	3
12	Kerala	1	0	0	1	0	0	2
13	Madhya Pradesh	2	1	0	1	0	1	5
14	Maharashtra	1	2	0	1	1	0	5
15	Manipur Tripura	0	3	0	1	1	0	5
16	Nagaland	0	1	0	1	1	0	3
17	Orissa	1	1	0	1	0	1	4
18	Punjab	0	1	1	0	0	1	3
19	Rajasthan	0	1	1	0	0	1	3
20	Sikkim	0	0	1	0	0	1	2
21	Tamil Nadu	0	1	1	0	0	0	2
22	Uttar Pradesh	1	2	0	2	1	1	7
23	Uttaranchal	1	0	0	1	0	1	3
24	West Bengal	0	3	1	0	0	1	5
		14	31	9	15	8	12	89

The final distribution of vacancies by state and caste/home quota for the year 2006. Vacancies are earmarked by caste status (O.B.C. denotes other backward castes, S.C./S.T. scheduled castes/tribes and unreserved the general castes) and home state (insider vacancies are reserved for applicants from the same state; outsider vacancies are reserved for applicants from other states).

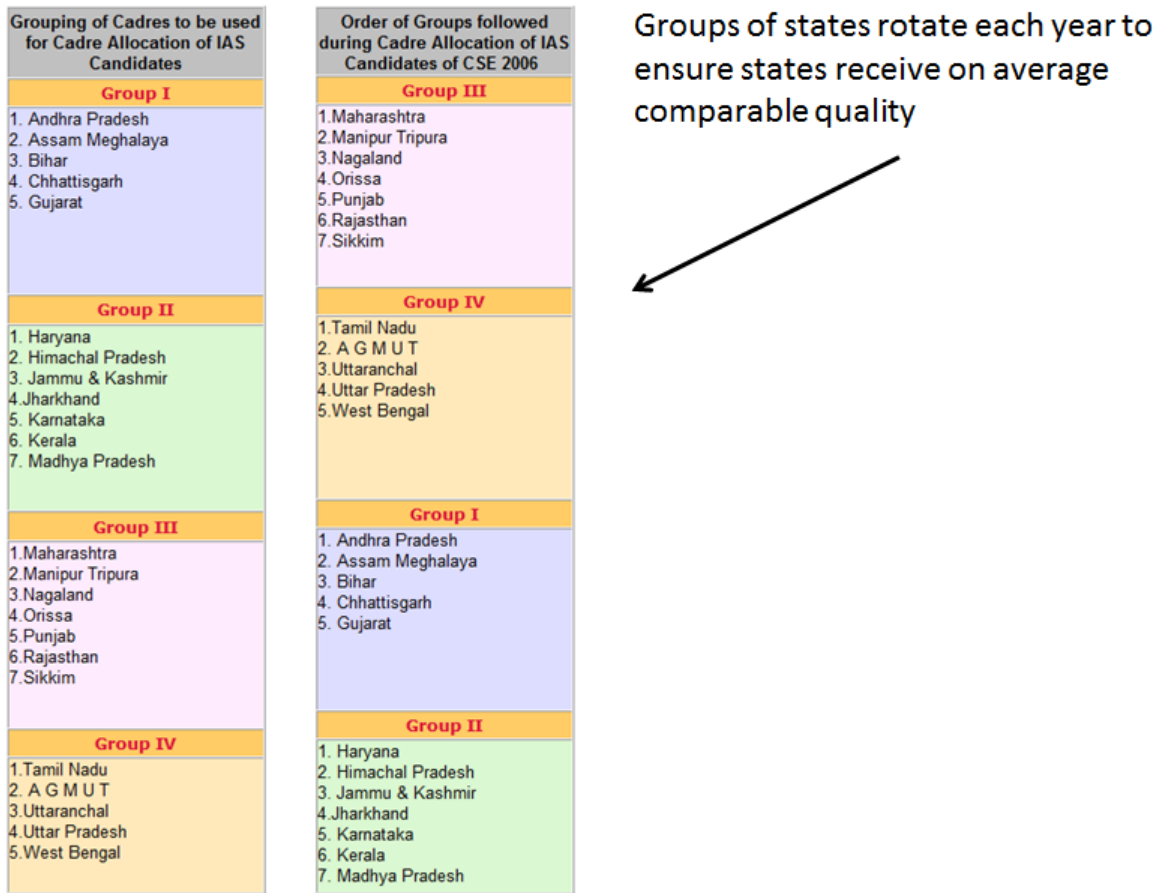
Figure B8: Merit-based (UPSC rank) allocation based on caste and home preference match

**Master Statement in respect of candidates allotted to
Indian Administrative Service on the basis of
Civil Services (Main) Examination, 2006 for purpose of their Cadre Allocation**

Sl. No.	Rank	Name of the Candidate	Home State	Category	Whether Home State Opted?
1	1	MUTYALARAJU REVU	Andhra Pradesh	O.B.C*	Yes
2	2	AMIT SAINI	Punjab	General	Yes
3	3	ALOK TIWARI	Uttar Pradesh	General	Yes
4	4	PRASANTH N	Kerala	General	Yes
5	5	SHASHANK MISRA	Uttar Pradesh	General	Yes
6	6	VYASAN R	Kerala	General	No
7	8	ANINDITA MITRA	Chhatisgarh	General	No
8	9	ARAVIND AGRAWAL	Orissa	General	Yes
9	10	JUHI MUKHERJEE	Chandigarh	General	Yes
10	11	BISHNU CHARAN MALLICK	Orissa	S.C.	Yes
11	12	DEEPAK RAWAT	Uttaranchal	General	Yes
12	13	NILA MOHANAN	Kerala	General	Yes
13	14	JAI SINGH	Uttar Pradesh	General	Yes
14	15	MOUMITA BASU	West Bengal	General	Yes
15	16	SHAMMI ABIDI	Uttar Pradesh	General	Yes
16	17	REMYA MOHAN MOOTHADATH	Kerala	General	Yes
17	18	SHRIMAN SHUKLA	Madhya Pradesh	General	Yes
18	19	SHEETAL VERMA	Uttar Pradesh	S.C.*	Yes
19	20	SHAINAMOL A	Kerala	O.B.C*	Yes
20	21	YASHA MUDGAL	Rajasthan	General	Yes
21	22	ATUL KUMAR	Haryana	General	Yes
22	23	SHUCHI TYAGI	Uttar Pradesh	General	Yes
23	24	ANURAG TEWARI	Uttar Pradesh	General	Yes
24	25	UDIT PRAKASH	Uttar Pradesh	General	Yes
25	26	SACHINDRA PRATAP SINGH	Uttar Pradesh	O.B.C	Yes

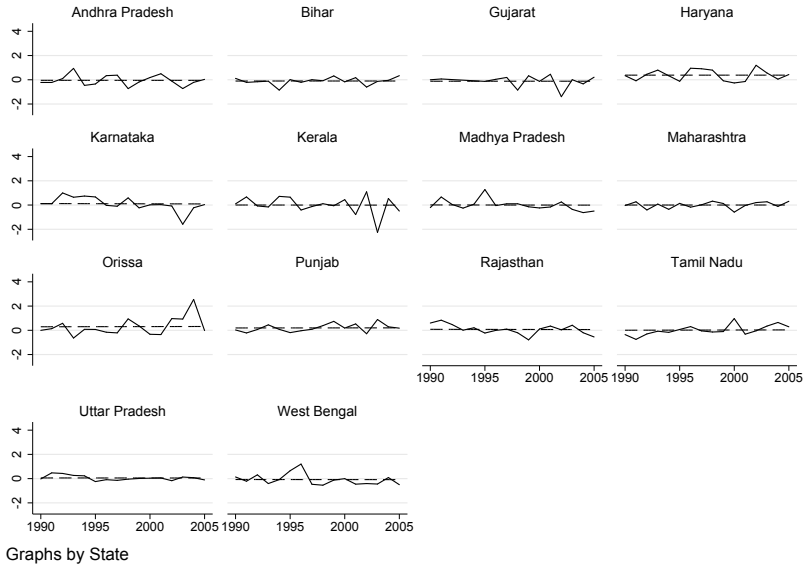
Illustrating the ranking of candidates using the intake year of 2006. Candidates in a given year of intake are ranked in descending order based on the UPSC entry exam score. Home state denotes the state from which the candidate applied from. Category denotes the caste of the candidate, where O.B.C. denotes other backward castes, S.C. scheduled castes, S.T. scheduled tribes and General the unreserved castes. Whether home state opted denotes if the applicant indicated a preference to be allocated to the home state.

Figure B9: Rotation of state groups over years



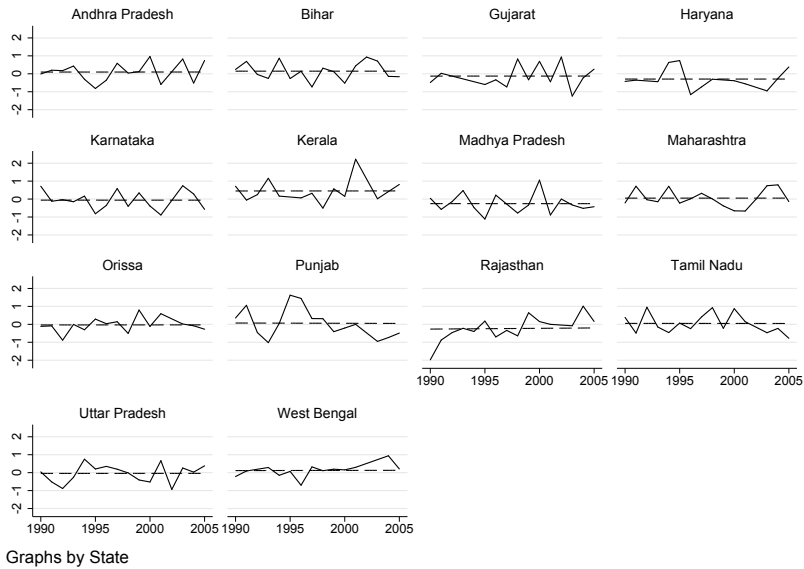
Division of state cadres into four groups and the rotation of groups in the order of IAS officer allocation over time, as illustrated by the group order in 2006. The groups of states rotate each year. In 2007, for example, the order changes to Group II, Group III, Group IV, Group I.

Figure B10: Quasi-random allocation across states: UPSC (entry) score



Average UPSC score of IAS officers (standardized relative to their year of intake) allocated to states 1972-2009. The trend line is fitted as a non-parametric local polynomial.

Figure B11: Quasi-random allocation across states: Age at entry



Average age at entry of IAS officers (standardized relative to their year of intake) allocated to states 1972-2009. The trend line is fitted as a non-parametric local polynomial.

C1 Allocation rule

Key to our empirical analysis is the rigid rule that determines the allocation of IAS officers and the cohort sizes of each state’s intake. Here, we briefly summarize the allocation rule. A detailed documentation can be found in the IAS guidelines.⁴⁹ Coinciding with our sample period, we focus on the pre-2008 allocation rule, paying particular attention to the sources of variation that give rise to the observed quasi-random allocation of IAS officers across cadres.

After entering the IAS following the UPSC exams, centrally recruited IAS officers are allocated to 24 cadres. These cadres typically map directly into the Indian states. Smaller states, however, are grouped into three joint cadres, which are Assam-Meghalaya, Manipur-Tripura and AGMUT (Arunachal Pradesh, Goa, Mizoram and Union Territories (Delhi)). We did not survey states with pooled cadres due to logistical constraints. The cadres we study therefore map directly onto the 14 major states which contain the majority of India’s population.

The allocation process can be broadly divided into three steps: In the first step, IAS applicants are asked to declare their preference to remain in their home state (referred to as “insider” preference). In the second step, the overall number of vacancies and the corresponding quotas for castes and “insiders” are determined. In the final step, vacancies and officers are matched in the actual allocation process where merit (as defined by the ranking in the UPSC entry exam), caste status and locational preferences are all taken into account. The interplay of idiosyncrasies in each of these steps gives rise to the observed quasi-random allocation of IAS officers across cadres.

Step 1. IAS officers can declare their cadre preferences by first stating their preference to remain in their state of residence. Nearly all IAS officers exercise this option. The declared preferences however do not guarantee the actual allocation. The actual allocation depends on the availability of vacancies.

Step 2. The total number of vacancies is determined by the state government with the Department of Personnel and Training. Typically, the overall number of vacancies in a given year depend on the shortfall from the total number of IAS officers designated to a state (the cadre strength). This cadre strength is defined by the “cadre strength fixation rules”, whereby larger states are assigned more IAS officers. These rules are seldom revised so the designated state cadre strength is fixed over longer periods. The vacancies are then broken down by quotas on two dimensions: caste and home preference. There are three categories for castes: General (unreserved) caste, Scheduled Caste/Tribes (SC/ST) and Other Backward Castes (OBC). The designation of vacancies to these caste categories are made based on predefined national quotas. The actual assignment of each vacancy to a caste is randomized using a rotating roster. In terms of preferences, vacancies are broken down into “insider” and “outsider” vacancies. Insider vacancies are to be filled by IAS officers from

⁴⁹For full details, refer to the original official notifications 13013/2/2010-AIS-I, 29062/1/2011-AIS-I and 13011/22/2005-AIS-I published by the Department of Personnel and Training, Ministry of Personnel, Public Grievances and Pensions, Government of India.

the same state who declared their home state preference at time of application. The ratio of insider to outsider vacancies is 1:2, with the assignment of vacancies to “insider” or “outsider” category following the repeating sequence O-I-O. The determination of vacancies is illustrated in Appendix Figure B6. The result of this procedure is a list denoting the number of vacancies for each state and the corresponding quotas by caste status (SC/ST/OBC) and home state (insider/outsider) as shown in Appendix Figure B7.

Step 3. The final allocation process is based on merit as determined by the ranking in the UPSC entry exam, the vacancies available and the preference stated.

Before the officers are allocated, the candidates are ranked and assigned a serial number in the order of merit, as determined by the UPSC exam. Appendix Figure B8 shows this ranking along with the officers’ caste and home preference. The highest scoring candidate for the 2006 intake, for example, was Mutyalaraju Revu who belongs to the OBC category and indicated his preference to be assigned to Andhra Pradesh.

The allocation proceeds sequentially. First, the insider vacancies are allocated as far as exact matches along caste and home state preference permit. If the number of matches exceed the vacancies, the higher ranking IAS officer is given preference. Given the exact match along caste and home state required for slotting, however, many insider vacancies typically remain unfilled. In this case, the caste requirement is successively relaxed. In presence of open unreserved insider vacancies, the unreserved insider vacancy can be allocated to insider IAS officers from SC/ST and OBC (following the exact order) if there is an SC/ST (or OBC) outsider vacancy to allow for the exchange: For example, if Gujarat has received two unreserved insider vacancies but only one Gujarati general caste to fill the first slot, the second slot is opened to Gujarati SC/ST insiders, and if those are not available, to OBC insiders. The reallocation, however, is only permitted when there is a corresponding outsider vacancy that can be converted to an unreserved outsider vacancy to maintain the quota among the caste vacancies. A Gujarati insider SC/ST then can only fill the unreserved insider vacancy if a SC/ST outsider vacancy is available for exchange. Similar rules apply for unfilled SC/ST or OBC insider vacancies. Open SC/ST insider vacancies that could not be filled are first relaxed to allow for OBC insider candidates and then to general candidates. Open OBC vacancies, similarly, can first be filled by SC/ST insider candidates and then by general candidates (in both cases provided there is a corresponding outsider slot for exchange). Any remaining open insider vacancies that could not be filled despite the relaxation of the quotas are converted to outsider vacancies to ensure all vacancies are filled.

The allocation of the outsiders and those who failed to be allocated to their preferred home state (and are consequently converted to outsiders) is done according to a rotating roster system. The roster is created by arranging all 24 cadres in alphabetical order and dividing them into four groups. These groups are devised on the basis of an average intake by each group, which over a period of time is roughly equal:

1. Group I: Andhra Pradesh, Assam-Meghalaya, Bihar, Chhattisgarh and Gujarat
2. Group II: Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka,

Kerala and Madhya Pradesh

3. Group III: Maharashtra, Manipur-Tripura, Nagaland, Orissa, Punjab, Rajasthan and Sikkim
4. Group IV: Tamil Nadu, AGMUT (UT Cadre), Uttaranchal, Uttar Pradesh and West Bengal

The outsider candidates are allocated in the order of merit across the four groups for the outsider available vacancies (including those that have been converted from insider vacancies). In the first cycle, all candidates are allocated to their matching caste vacancy in the four states of Group I, starting with Andhra Pradesh. In the second cycle, the remaining candidates are allocated to their matching caste vacancies in Group II and so on. Since states who receive officers earlier in the allocation process will receive higher ranked recruits, the order of the groups shuffles each year to ensure that all states receive officers of comparable quality. In Appendix Figure B9, for example, Group III is the first group in 2006, followed by Group IV, Group I and Group II. In the subsequent year, the groups will rotate and the allocation of outsiders will commence with Group II first, followed by Group III, Group IV and Group I.