Categorization in Labor Markets: Evidence from the Indian Administrative Service*

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Abstract

In this article, we study the career effects of getting diverse versus specialized experience. Macro-level research on the restructuring of work argues that the breakdown of formal job ladders necessitates "job-hopping"; therefore, workers must acquire diverse experience across organization, functions and industries. Conversely, recent research on social classification finds that "boundary-spanners" with diverse experience get ignored or devalued by the people or organizations that evaluate them. Thus, there is a basic tension in how a sociologists might give career advice. To address this tension, we develop a typology of labor-market conditions under which specialist or generalist experience would be rewarded. We then examine the relationship between specialized experience and career outcomes using rich longitudinal data on the careers of Indian Aministrative Service Officers, members of the Republic of India's elite bureaucratic organization. Our results strongly support the assertion that specialized experience bestows greater career benefits at both early and late career stages.

1 Introduction

Careers and status attainment have been central phenomena to the sociology of organizations for decades. Yet there is a basic tension in how sociologists might give career advice. Macro-level research on the restructuring of work has underlined how formal job ladders have atrophied and how retraining and "job hopping" have become more important (Arthur & Rousseau 1996, Cappelli 1999*b*, Cappelli 1999*a*). This work often concludes that, in an increasingly "boundaryless" economy, workers with more diverse experiences will have what it takes to get ahead. Meanwhile, micro-level research on social classification has repeatedly found that "boundary-spanners" get ignored or devalued by the people and organizations who evaluate them (Zuckerman 1999, Negro, Koçak & Hsu 2010). What then is a worker to do?

In this paper we study the career effects of getting diverse versus specialized experiences in an internal labor market. The sociological literature on categorization is full of career-type references to "Jacks of all trades," "Renaissance men" and "dilettantes," but the number of studies that have actually had individual careers as the outcome of interest is quite limited (Zuckerman 1999, Negro, Koçak & Hsu 2010, Hsu, Hannan & Koçak 2009, Hsu 2006). This is understandable given four serious empirical issues that bedevil such research. First, how much a person moves around in their career may be a function of their underlying ability, which the researcher rarely observes (Jovanovic 1979, Jovanovic 1984). Second, people may have different propensities to switch jobs; this risks mistaking self-selection for the independent effect of diversification. Third, controlling the career context enough to have a comparable outcome measure typically restricts the substantive variation in jobs needed to test diversification's effects. Fourth, diverse careers usually involve moving across organizations, which makes diverse careers harder to observe. Considered together, these empirical issues have limited the claims researchers can make about the impact of "social categorization" on individuals' career trajectories.

We explore a unique empirical setting that minimizes these four problems and lets us make stronger inferences about diversification's effects on individuals' careers. We

study the career histories of 3,122 members of the Indian Administrative Service (IAS), the elite civil service of the Republic of India. Members of the IAS are chosen through an extraordinarily rigorous screening process that limits the resulting variation in individual ability. We also have detailed data on IAS officers' human capital upon their admission to the service. IAS officers have substantial variation in their careers: an officer might spend a year working on finance, then move to forestry, then regulate the mines, even as her fellow officer spends three years in the finance ministry. What is more, for most of their early careers this variation in officers' jobs is exogenous, because officers are moved based on the needs of the bureaucracy. Despite this range of jobs, IAS officers have common career goals: promotion from the states to the central-government ministries in New Delhi, and later appointment as joint secretaries atop these ministries. Finally, because service in the IAS was long one of the most prestigious careers on the subcontinent, the IAS's recruits remained in the service until retirement. These features of the IAS bureaucracy substantially reduce the opportunities for self-selection and survivor bias while offering genuine variation that can be used to explore theoretical claims about diversification's effects on careers.

We begin this article by briefly reviewing previous work on careers and specialization. We develop a typology of labor-market conditions under which specialist or generalist experience would be rewarded. We then describe the empirical setting and the details of our research design. We explore the effects of diversity and specialization in one's career on attaining two major milestones in the IAS: promotion to New Delhi and becoming a joint secretary. We find that IAS officers who get diverse rather than specialized experience early in their careers are less likely to be promoted to New Delhi and less likely to become joint secretaries. Such a finding is all the more remarkable given that the IAS itself is nominally committed to producing general administrators with broad-based skill and experience. That we find such strong penalties even in this conservative setting lends strong support to the idea that processes of social categorization constrain choices not merely among organizations but also at the individual level. We conclude by discussing the implications of our findings for studies of labor markets. We describe some of the conditions under which diverse experience is more likely to be rewarded and propose

directions for future research.

2 Careers and diversification

Research on the transformation of careers has shown that internal labor markets, with their attendant job ladders and incentives to develop deep specialization, are breaking down (Arthur & Rousseau 1996, Cappelli 1999*b*, Cappelli 1999*a*, Jacoby 1999). People who might once have spent their careers doing one type of work in one organization now find themselves repeatedly entering the external labor market, where they have to be flexible not only with regard to the terms of their employment but also to the type of work that they do. In such "boundaryless" careers, it follows that people who accumulate diverse experiences will be more appealing to potential employers and will have better career outcomes (Arthur & Rousseau 1996). In this work there is a clear assumption that employees' diverse backgrounds will be more valued in the external labor market than in the internal (Zuckerman 2005).

Research on categorization takes a very different view. Because the quality of potential workers is hard to discern and because the only available information often consists of people's past work experience, workers face strong pressures to create easily understandable identities by specializing in particular types of work (Zuckerman, Kim, Ukanwa & von Rittman 2003). Employees in an internal labor market, by contrast, have more opportunities to interact with and be evaluated by their employers, and therefore face less risk in trying new types of work than they would if they also had to switch employers (Doeringer & Piore 1971, Stewman & Konda 1983). This research has some support in the older literature on internal labor markets, which recognized skill development but also emphasized mobility clusters and rotation of personnel within organizations (Stewman 1985). In *these* literatures, there is a clear assumption that employees' diverse backgrounds will be more valued in the internal labor market than in the external.

These two literatures make different predictions about how a person with a diverse career history will perform in the external labor market, relative to someone with a specialized career history. They also make different predictions about how *common* people

with diversified and specialized careers will be in internal and external labor markets. Neither devotes much attention to how people with diverse and specialized career histories will fare relative to one another in an *internal* labor market. Given this theoretical confusion, it is worthwhile to sketch out a model of the labor-market conditions under which specialized or diverse experiences are more likely to be valued. We think that a useful starting point for understanding the heterogeneity of possible labor markets is to consider their variation along two dimensions: the *skill requirements* of the jobs that workers are expected to perform, and the *social boundaries* that have been constructed between different types of jobs.

We propose that categorization systems in labor markets have three components: jobs, workers and mobility patterns. In our model, job requirements range along a skill dimension, from requiring specific skills to requiring general skills. Selection procedures for jobs that require specific skills will favor workers with specialized experience in a related line of work. Conversely, jobs requiring only general skill will prefer the general-skill worker; specialized skill will not help and may hinder if it comes at the cost of general skills.

Jobs are linked through patterns of worker mobility. Jobs range along this mobility dimension. On one hand, mobility can be fluid; employees move costlessly from one kind of work to another. On the other hand, mobility may be severely restricted; either specific skills create transfer costs or formal and informal rules mean that workers can engage in only a few types of work without violating social codes. These two dimensions of variation—in jobs and in mobility patterns—define four basic regions of worker-job matching, depicted in table 1. They also specify how relatively common specialists and generalists will be in each region, as we discuss below.

[Table 1 about here.]

In region I, jobs require specific skill and jurisdictional boundaries restrict inter-job mobility. To be competent at these jobs, workers have to invest considerable time and resources. Given that formal credential requirements also exist, moving from one kind of work to another in this region is difficult even when job candidates accumulate the skills to do multiple types of work. Thus, specific-skill/low-fluidity scenarios prevent the

appearance of generalists. What generalists do appear are either low-skilled dilettantes or exceptionally talented renaissance men, residing at the tails of the ability distribution. Thus in region I generalism is the result of (typically unobserved) heterogeneity in ability. An empirical implication of this is that, in settings like these, generalists are often *correctly* penalized as low-ability, and so it is hard to know whether the evaluator biases that much categorization research has specified are the real mechanisms. Supply-side decisions by workers about how to allocate their time and attention may explain any penalty of diversifying

In region II, jobs do not require specific skills but moving across different types of work is still rare. Region-II scenarios appear when participants or third parties define, formally or informally, acceptable patterns of mobility across categories of work. Most union work rules that cover unskilled labor fall in this category. Informal racial or ethnic segmentation of work do as well. An extreme case is the Indian caste system, where social boundaries determine the type of work you can do before you are born. There are two implications for the appearance and fate of generalists in this region. First, because mobility is restricted, amassing diverse experience is uncommon and generalists are rare. Where actors *do* get diverse experience, they need not represent the tail ends of the ability distribution, because skill requirements are low. Socially constructed boundaries rather than skill-based hurdles limit their inter-job mobility. Region-II generalists perforce violate whatever social codes are in place. Thus, the mechanism that penalizes generalists in region II originates from the demand side. Evaluators impose penalties because candidate identities are incoherent or violate jurisdictional codes.

In region III, work opportunities require general skill and mobility patterns are fluid. The spot market for manual labor is in this region; indeed it is hard to imagine internal labor markets in region III. Because mobility across different kinds of work is common, generalist skill can be readily accumulated. Specialized skill does not garner significantly higher returns because jobs do not require skilled workers. Therefore, we expect that generalists are unexceptional in this context and that the returns to specialization are low. In fact, workers with specific skill should ideally leave for labor markets where their skills are valued more.

Region IV, where we focus in this study, includes scenarios where job opportunities require specific skills and institutional rules allow or encourage mobility across jobs. As one would expect, these contexts are rare. Unlike the general-skill/high-fluidity labor markets, specific-skill/high-fluidity markets require employee pools that have high average ability. This requirement ensures that workers are able to perform at acceptable levels of quality. Examples of such markets include managerial leadership programs in firms such as General Electric, the larger consulting firms like McKinsey, and generalist civil-service outfits like the World Bank or the Indian Administrative Service. These systems rotate employees through different positions in different functional areas and industries. Because institutional programs such as these legitimize high levels of mobility, workers acquire diverse career experience. Thus generalists need not be rare in region IV. Two implications of such regimes are useful to consider. First, unlike in region I, diverse career histories need not signal high or low ability in region IV. The institutions themselves sanction rotation across diverse career experiences and workers have high ability. Thus, we need not expect an *a priori* correlation between ability and career diversity. Second, the formal endorsement of rotation across functions and industries indicates an audience that tolerates identities that span multiple categories. Penalization of generalists in region IV is therefore puzzling. Unlike in region II, generalists violate no norms by moving around; like most people in region I, these workers have high ability. This means that "obvious" evaluator biases or "simple" incompetence cannot adequately explain why specialists would be favored here.

Why focus on region IV? In addition to the theoretical distinctions mentioned above, this region has several empirical advantages. First, people might move between jobs *either* because they are supremely capable and want to keep challenging themselves *or* because they are incompetent and cannot master any one job. Thus we might label a "penalty of diversification" what is actually simple incompetence, or identify opportunities in "job-hopping" from a sample that only includes high-ability workers. This phenomenon is less likely in region IV than in region I because the expectation of needing to rotate workers across many jobs leads region-IV employers to screen more rigorously on ability. Indeed our examples of region-IV organizations are all known for their rigorous entry screening.

Second, even where ability might be known, there are usually limits on how much diversity is possible in a "respectable" career. Take for example a physician. Entering the labor market is very hard; once you have entered, you still need certification for specific types of work; switching between practices is institutionally discouraged. This implies that anyone who amasses real substantive variation did something *odd* in their career, and that any unfavorable outcomes that the researcher observes may be more attributable to this oddness than to the diversification as such. In region IV, mobility does not in and of itself bespeak of oddness. Finally, these same limits on mobility can also imply different metrics for performance among different jobs. Only labor markets that encourage many people to work many jobs offer the possiblity of comparable outcome measures.

We predict that, while generalists will be more common in region IV than in any other region save III, they will be penalized relative to specialists. Workers in region IV may accumulate diverse career experience by virtue of their rotation through different types of work, but jobs still have labels and are in many ways specialized. That is, the labor market organizes jobs according to function or industry. As experience accumulates through rotations, some workers acquire concentrated experience in one or a few categories while others have more diverse careers.

At later stages of their career, these differentiated workers compete for coveted vacancies. These vacancies, as before, have labels that identify them as belonging to a specific function or industry. When evaluators fill vacancies, they face a selection problem that pits category specialists against generalists. There are several reasons to believe that specialists will still have the upper hand, even in this context. First, although those workers considered for promotion may not differ in underlying ability, evaluators may assume that variance in specialization *implies* variance in ability and thus prefer specialists to generalists. This is the basis for the typecasting process (Zuckerman et al. 2003).

Two mechanisms are important to consider when thinking about evaluation processes in region IV. The first operates when evaluators compare candidates who differ in the amount of category-specific experience they posses. All else being equal, evaluators would pick the candidate with more domain-specific knowledge (Becker 1962, Spence 1973). Thus category specialists should be favored; category generalists, less so. This

mechanism suggests that skill differences, and thus expectations of performance in the focal category, motivate the preference for specialists. A second mechanism driving the preference for specialized candidates is the overall coherence of the range of experience candidates accumulate. Consider two candidates competing for a promotion. Even if they have equivalent amounts of experience with the type of work that the vacancy requires, diversity in their remaining experiences may still induce penalties. Three potential sub-mechanisms for such penalties come to mind. First, candidates with diverse experience have less coherent identities; these candidates lack the necessary "fit" with the cognitive models used by evaluators (Hsu, Hannan & Koçak 2009). Second, candidates with diverse experiences have weaker relationships with their evaluators. The latter may in turn care less about the candidate and not recommend them as strongly. Differences in ratings should then translate into a higher likelihood of promotion for specialists. Third, high and persistent levels of mobility may signal low levels of specific-investment behavior that is either "intentional or a result of inefficiency in job matching" (Jovanovic 1979, Jovanovic 1984). In this third mechanism, penalties produce mobility rather than the other way around. Much of the prior theoretical work that has examined the effects of boundary spanning and career mobility therefore leads us to believe that even when generalists are common, as in region IV, specialists will nonetheless be preferred. Thus, we hypothesize:

> **Hypothesis 1**. *Ceteris paribus*, individuals who acquire concentrated career experience will be promoted at a higher rate than those with more diverse experience.

As we have said, settings like these are rare. An ideal setting has the following properties: strong selection on ability; institutionally encouraged, substantive variation in experiences; and comparable career hurdles. One such setting is the Indian Administrative Service (IAS), the elite bureaucratic organization of the Republic of India.

3 Careers in the Indian Administrative Service

Since its formation in 1946, the IAS has been considered one of if not the most prestigious careers in India. The IAS consists of several thousand men and women who are recruited through a highly competitive annual examination process. A *New York Times* article describes the selection process, perhaps the most competitive in the world:

> More than 200,000 people take the first phase of the examinations, a number that is winnowed down to some 12,000 when the final exam is held six months later. Of those, only 2,000 or so will be invited to an interview, and then only about 80 people will be offered posts with the service... (Gargan 1993)

Once admitted, officers enjoy lifelong tenure.

IAS officers follow a standard career ladder. Early career experiences include formal training at the National Academy of Administration in Massoorie, followed by a posting where the officer manages the affairs of a small district, often as a sub-magistrate (in our data, such experience is coded as "Land Revenue Management & District Administration"). Junior IAS officer work includes enforcing laws or managing local development projects. Once promoted to the senior scale, officers are posted in sundry positions that include managing districts, publicly run enterprises, and government ministries. In each post, officers gain experience in substantive areas such as finance, rural development, or human resource management.

After their fourth year in the service, officers may begin to compete for a deputation to a central government post in New Delhi, known as "the Centre." During central deputation officers join ministries' senior staffs and play a larger role in formulating policy. Most IAS officers desire a central posting as it gives them exposure to national-level policymaking and is considered an important career milestone (Shurmer-Smith 1998).

Promotion to Joint Secretary in the Central Government, or "empanelment," is the next milestone. The Government of India's Department of Personnel and Training defines empanelment as "the process of assessing the suitability for appointment at the level

of Joint Secretary and above as well as equivalent posts in the Government of India" (Department of Personnel and Training 2007*a*). Promotion to joint secretary is highly competitive and an important step towards becoming Secretary to the Government of India, the highest bureaucratic position in the country. Not all IAS officers are empaneled, even those with high levels of performance in their prior postings. The Department of Personnel and Training, in their *Empanelment Guidelines*, justifies empanelment in these terms:

> Empanelment should be considered not as a reflection of the intrinsic merit or otherwise of an officer but the suitability of an officer to occupy senior levels in the Central Government. Given the background and experience of an officer, she or he may be highly suited to occupy senior positions in State Government. Likewise, another officer, in view of the background and experience, may be considered more suitable for Central Government posts (Department of Personnel and Training 2007*b*).

The selection committee evaluates candidates for empanelment based on information in those candidates' Annual Confidential Reports (ACR). The ACR includes career histories, background information, and evaluations by the officers' superiors at each stage. According to the Department of Personnel's documentation, qualities such as "general reputation, merit, competence, leadership and a flair for participating in the policy making process to recommend the list of officers to be included in the panel" are looked upon favorably (Department of Personnel and Training 2007*b*).

The specialization of an IAS officer's experience can vary widely. Because the IAS is a generalist organization, officers are rotated through a variety of ministries both within their state and in New Delhi. During their tenure in a given post, officers acquire one of several dozen "major experiences" such as rural development, finance, or land revenue management. Changes in postings occur at regular intervals and most officers are rotated frequently. The rate at which IAS officers move between postings has remained steady throughout the service's existence. Scholars have observed that IAS officers in the 1980's changed postings as frequently as their predecessors in the Indian Civil Services, the IAS's

British colonial equivalent; this rate of change continues today (Krishna 2010, Potter 1986).

Due to the frequency of transfers, the accumulated experience of IAS officers can display significant variety. Qualitative evidence suggests that officers' superiors rotate them with little concern for their specialization, particularly early in their career. Postings are primarily made according to the needs of the bureaucracy, the officers' location on the seniority scale and the availability of vacancies at that level. An IAS officer is supposed to be a generalist who through a variety of postings acquires a broad skill set that makes them a more effective administrator. Mishra (2001), in describing the generalist nature of the Indian Administrative Service, says:

> The civil service is dominated by generalists and the basic philosophy guiding its initial setting up, and later its continuation, advocates the belief that civil servants have to face any challenge posed them. Consequently, they should have the general skills to exploit and manoeuvre for problem solving. Within this generalist approach, there has been an effort to allow civil servants in the central Government to specialize in certain areas. However, more frequently than ever, civil servants are given assignments without regard to their specialization (Mishra 2001, pg. 123).

All of these institutional features make the IAS a particularly useful setting for examining the trade-offs between specialization and generalism in careers. First, the IAS itself controls for the ability of the officers through its rigorous selection system. IAS officers are among the brightest men and women in India, and as such, their variation in underlying skill is minimal compared to more fluid labor markets. Second, the dossiers of IAS officers exhibit significant exogenous variation in the accumulation of major experiences, both at earlier and at later stages of the career. The variation results more often from the needs of the bureaucracy and the idiosyncratic appearance of vacancies than from their own desire for specialization. What is more, despite this range of jobs, IAS officers have common desired career outcomes: promotion from the states to the Centre, then later empanelment as joint secretaries and ultimately running these ministries.

A final important feature of the IAS is that non-retirement exits from the service are extremely rare. The IAS offers lifetime employment and the vast majority remain in the service until they retire. Unlike many other labor markets, survivor bias is not a significant issue here. Table 2 compares the total number of "regular recruitment" officers in our data and the total number of IAS officers recruited in that year from 1995 until 2008 (we explain regular recruitment below). More than 96 percent of the officers who were recruited into the IAS starting in 1980 appear in our data.

[Table 2 about here.]

4 Data and Empirical Approach

4.1 Data

We assembled data from the administrative records of the 4,259 Indian Administrative Officers who began their careers between 1974 and 2008. Individuals can enter the IAS through two different routes. The first route is through "regular recruitment." These officers enter the IAS through the competitive examination process described above, beginning their careers in their mid to late 20's as junior officers. The second route is through promotion from a state civil service. Such promotees enter the IAS much later in their career. We exclude promotee IAS officers from our analysis because their career profiles are often quite different from regular-recruitment IAS officers in terms of their access to vacancies in New Delhi and their experience. Our final sample consists of the 3,122 officers who entered through regular recruitment.

Our analytic strategy is to understand the effect of variation in career experience on the likelihood that an IAS officer clears two critical promotion hurdles. The first hurdle is the first promotion to a central-government post in New Delhi. We focus on promotion to New Delhi for two reasons. First, not all IAS officers are promoted to Delhi, although it is a goal for most. Second, promotion to Delhi as a junior officer is the required first step to the upper echelons of the Indian bureaucracy. The second hurdle we analyze is whether a promoted officer is later empaneled as a Joint Secretary to the Government of

India. The process of empanelment is highly competitive and not all officers achieve this distinction. We describe variables relevant to each of these hurdles below.

4.2 First Promotion to the Centre

Dependent variable: We model promotion to the Centre as the first transition from a state-level posting to a Centre posting. In our data, we observe 2,083 transitions to the Centre by regular-recruitment officers, resulting in an overall promotion rate of approximately 66 percent. Because transitions in postings occur monthly, we model promotion based on individual-month observations.

Independent variables: We observe each individual's complete career history since their entry into the IAS. Each posting spell includes information on whether the officer was employed in the Centre or in the states, their seniority level, the start- and end-dates for the posting and the *major experience* they acquired during the spell. To construct our main independent variable, we calculate the degree of specialization in major experiences using a Herfindahl index. For each individual i in each time period t we observe the number of months the individual has previously worked in one of forty experiences m. These experiences and the distribution of monthly experience for all individuals in our sample among these majors are described in Table 3. We calculate the individual's shares in experience at each time period. We denote S_{imt} as the total months in each experience within t months of experience in the IAS, S_{it}. The Herfindhal score H_{it} is then calculated by summing the squared shares of all major experiences through time period t for each individual i.

$$H_{it} = \sum_{m} \left(\frac{S_{imt}}{S_{it}} \right)^2$$

Herfindahl indices can range from 0 to 1. Smaller scores indicate greater variety in major experience while larger scores imply increased specialization. We postulate that there will be a positive relationship between specialization and promotion to New Delhi. To avert any bias introduced by the skewness of the Herfindahl index, our estimations use the natural log of the Herfindahl score as our measure of specialization (our results

are substantially unchanged if the raw index is used).

[Table 3 about here.]

Control variables: We include a substantial set of control variables to account for other sources of heterogeneity among the officers that may affect their first transition into a Centre posting. First, we control for the number of academic degrees that an officer holds. More highly educated officers should have better skills and knowledge. Human-capital theory predicts that these factors should increase opportunities and thus should increase the likelihood of promotion. We also account for the academic performance of the officer in their first degree by including a variable indicating whether the officer graduated in the first division of their class.

Increasing evidence in economics suggests that college major is an important factor in determining wages in the labor market (Black, Haviland, Sanders & Taylor 2006). We have available to us the college and graduate majors of the IAS officers. Thus the models include two types of college- or graduate-degree major controls. The first set are dummy variables indicating whether the officer's major was engineering, humanities, medicine, professional, science, business or law (the omitted category is social science). The second control is the count of the different subjects that the officers majored in across their various degrees. The number of different subjects is included for two reasons. On the one hand, it is a measure of interdisciplinary education, which may benefit generalists like IAS officers. On the other hand, it may reflect a pre-existing preference for variety in experience, which would lead toward self-selecting variety if possible.

Human-capital theory also suggests that work experience affects job performance and outcomes (Becker 1962, Quiones, Ford & Teachout 1995). Since the IAS is usually the first and only career for most regular-recruitment officers, our data represent their complete career histories. To measure experience, we control for the number of prior postings and its square for each officer in each time period. We expect an inverted-U shaped relationship between number of postings and the probability of being promoted to the Centre. Two reasons exist for expecting a non-linear relationship. First, junior officers cannot access Centre postings until they have at least four years of tenure in the IAS. After

this period, the likelihood of a Centre posting should increase as experience increases. However, since promotion to the center is not guaranteed for all officers, we expect that the likelihood of promotion should decrease for more experienced officers who are not promoted within a reasonable time window.

India is composed of several distinct regional and ethnic groups that serve important functions in Indian work and social life. Membership in a linguistic group offers an important source of shared identity and consequently a useful network of contacts (Portes 1998). We expect that officers who speak a dominant Indian language, and are thus associated with that identity, can leverage that identity. Thus, we expect membership in such a group to increase the chances of promotion to the Centre. Our models include control variables indicating whether officers speak Hindi, Bengali, Telugu, Marathi and Tamil. Speakers of these five languages constitute 69.2 percent of the Indian population and 77 percent of the officers entering the IAS through regular recruitment.

Our data include two basic demographic characteristics of officers: their age and their gender. We expect that age, like experience, should exhibit an inverted-U shaped relationship with promotion rates. We also include a control variable for gender (Ridgeway & Correll 2004). Given the paucity of research on gender and labor-market outcomes in India, particularly in the government bureaucracy, we do not have bases for making directional predictions. We also include a control indicating the number of months the officer has served in the IAS.

Finally, our sample is composed of officers who were recruited into the IAS in different years and were assigned to different state "cadres." To address the possibility that careers vary by era and by the states in which the careers unfold, we include fixed effects for the five-year cohort to which the IAS officers belong (e.g., 1970-1974 or 1985-1989; estimates are robust to yearly cohort dummies), the cadre to which they have been allocated and the calendar year. All estimates therefore explicitly control for any unobserved heterogeneity between cohorts, states and years. Summary statistics for this analysis are presented in Table 4.

[Table 4 about here.]

4.3 Empanelment as Joint Secretary to the Government of India

Dependent variable: We examine whether officers promoted to the Centre were subsequently empaneled. We focus on the 1,220 officers who entered the IAS between 1794 and 1989 and were ever promoted to the Centre.[1] Of these, 407 or about one third were subsequently empaneled. We model the process of empanelment using logistic regression with individual-month observations.

Independent variables: For each of the focal individuals in our sample we compute two measures of specialization, representing two distinct periods in the officer's career. The first, *early specialization*, is the officer's cumulative major-experience Herfindahl index of from their entry into the IAS until the time they were first promoted to New Delhi. This variable measures the degree to which the early postings of an officer were concentrated by experience. The second variable, also a Herfindahl index, measures the degree of specialization since the first promotion to the Centre. Somewhat surprisingly, early specialization and *post-Centre specialization* have a low correlation of .0214.

Control variables: The control variables used for this analysis are the same used in the analysis of the first promotion to the Centre. These include controls for age and tenure, human capital, language and basic demographic characteristics. Summary statistics for this analysis are presented in Table 5.

[Table 5 about here.]

5 Results

5.1 Promotion to the Centre

For our first analysis we use logistic regression to estimate discrete-time event-history models of the first promotion to a posting in the Centre. In addition to our main variable of interest, *career specialization*, we include control variables that provide information about an officer's education, experience and demographic characteristics and the fixed

[1] As of 31 December 2008, when our data end, no member of a cohort that entered the IAS after 1989 had been promoted to joint secretary. The statistical routines we use drop cohorts whose outcomes are perfectly predicted by their cohort fixed effect.

effects of their entry cohort, cadre and year. We cluster standard errors in all regressions at the individual level because of the repeated individual observations.

Table 6 presents the estimated models. Column 1 shows that, as expected, both number of postings and age have inverted-U shaped relationships to the log-odds of promotion. The relationship between promotion to the Centre and age indicates that the promotion probability peaks at age 46. Column 2 presents the model with the basic ascriptive controls. We find that individuals from the major linguistic groups represented in the IAS are more likely to be promoted to the Centre. The effect of gender is not significant in this model, though its size increases in later models. The results in column 3 include controls for human capital. We find strong evidence of the effect of educational performance on promotion to New Delhi. In particular, officers who graduated in the first division of their undergraduate class are are more likely to be promoted to the Centre. There is also evidence that officers with more degrees experience greater likelihood of promotion. IAS officers with medical or science backgrounds appear less likely to be promoted.

[Table 6 about here.]

Column 4 presents the model with our key independent variable measuring career specialization. The variable is positive and significant, suggesting that a greater degree of specialization during the early stages of an IAS officer's career increase his or her chances of promotion to the Centre. A one-standard-deviation increase in specialization results in a 101.5 percent increase in an IAS officer's probability of promotion to a Centre posting (exp(5.263*.0925)). By comparison, having graduated in the first division increases the probability of a centre posting by 34.7 percent. All else equal, the returns to specialization in this labor market outstrip the benefits of high levels of academic achevement, even among a highly qualified pool of competitors.

5.2 Empanelment as Joint Secretary

The second analysis we conduct examines whether an officer who has been promoted to the Centre is eventually empaneled as a joint secretary. As in the first stage we use logistic

regression to estimate discrete-time event-history models of empanelment. We examine the effect of two key independent variables: early and post-Centre specialization. The estimated models, presented in Table 7, include the same controls as the models for first promotion to the Centre.

[Table 7 about here.]

Column 1 presents the control variables. As expected, we find inverted-U shaped relationships between number of postings and the probability of empanelment. A similar relationship is found to exist with age. The probability of empanelment peaks at age 49. This age profile corresponds to the tenure expectations for achieving the post of Joint Secretary in the Centre: the minimum tenure requirement is 20 years and the mean age at entry for regular recruits is 27.3 years. The the ascriptive variables have no significant effect on the probability of empanelment. However, human capital, particularly the effect of graduating in the first division, tends to increase the probability that an IAS officer is empaneled as a Joint Secretary. Having graduated in the first division increases the probability of empanelment by approximately 75 percent. We also find some effect of having a larger number of degrees, though these predictors are not as significant as having graduated in the first division. We should also note that we do not find any relationship between degree majors and the probability of empanelment. Presumably by this stage in an officer's career the human capital acquired within the service dominates the more general human capital from their school years, though the first division's proxy for ability still appears to shine through.

Columns 2 and 3 add in two key independent variables separately into the model. There is a positive and significant relationship between career specialization after the first promotion to the Centre and the likelihood that an IAS officer is empaneled. The relationship between specialization *before* first promotion and empanelment, however, is not significant in column 3. We think this non-significance is due to the aforementioned low correlation between officers' pre- and post-promotion specialization. Once we stratify on their level of post-promotion specialization, as in column 4, we find that early specialization is also associated with a higher rate of empanelment. Using the estimates in column

4, results indicate that a one-standard-deviation increase in specialization after the first promotion to New Delhi increases the probability of empanelment by 42.1 percent.

One reservation about these results is that, while we can observe multiple measures of human capital and work experience, we cannot observe more job- and organization-specific measures of individual potential and fit with the organization. People may be more likely to be promoted to Delhi because they are expected to do well in Delhi, and more importantly may *not* be promoted when their superiors think that their prospects for further career advancement are poor. If an individual's potential is correlated with the diversity of their experience, as would happen either if rising stars were rotated through jobs or if poor performers were shuffled among positions, then our estimate of specialization's effect would be biased. Ideally we would model such endogeneity between the two stages explicitly with something like a seemingly unrelated logit, where the residuals between the two stages were allowed to be correlated. However, models for correlated discrete-time event-history models have not yet been developed. In the interim, another option is to include for each individual who was promoted their *predicted* probability of promotion from the first-stage model. The logic behind this is straightforward: someone who is promoted to New Delhi because they have potential that our first-stage model does not capture will have a large residual in that first stage, and thus a low predicted probability of promotion. More "typical" candidates will have a higher predicted probability of promotion and a smaller residual, because they have less exceptional potential net of observables. Predicted probability of promotion to the Centre should thus be negatively correlated with empanelment as a Joint Secretary. Our estimation in column 5 includes this predicted probability from the first stage. The predicted probability of promotion is indeed negatively and significantly correlated with empanelment. However, including it does not significantly alther the size or significance of specialization. This suggests that, while potential star officers may be fast-tracked to promotion, that fast-tracking does not involve exceptional mobility through different types of career experience. We again find that specialization after promotion to New Delhi increases the likelihood that an IAS officer will be promoted to the level of Joint Secretary in the Centre. In this estimation we also see that individuals with high concentration early in their career, before their first

promotion to the Centre, are 29.4 percent more likely to be empaneled.

Both sets of results indicate that specialization increases the likelihood that IAS officers pass important and increasingly difficult career hurdles. Net of several other sources of career heterogeneity among IAS officers, we find evidence that early-career specialization increases the likelihood that IAS officers are promoted to a Centre posting in New Delhi. In fact, the effect of concentration in career experience is greater than that of having graduated in the first division of their undergraduate class. Similarly, we find a positive and significant effect of career specialization after first promotion on the probability that an IAS officer is eventually promoted to Joint Secretary. Thus our results support the assertion that specialists experience greater career progression than generalists. Observing this relationship in a setting such as the Indian Administrative Service, an ostensibly generalist organization, is particularly striking.

5.3 Robustness Checks

We had two motives in performing the various robustness checks we describe below. First, we wanted to rule out alternative explanations for the effect of specialization on promotion and empanelment that we observed in the main models. Our chief worry in this regard is spurious correlation between the diversification of an officer's career experience and her chances of promotion, due to correlation with an unobserved third variable. Second, we wanted to understand better what mechanisms might be responsible for the observed effect. In this regard we are interested in finding theoretically relevant variables that mediate specialization's effect on career outcomes.

5.3.1 Does homophily drive promotion?

One potential confounding process in our analysis is homophily. Specifically, if a ministry in New Delhi already has a number of staffers from an IAS officer's cadre or several of his fellow cohort-recruits, then that officer might be more likely to be promoted into that ministry. Such homophily need not affect how much an officer moves around early in his career and thus need not automatically be correlated with specialization as well. However,

homophily often produces unofficial segmentation in career paths, and any social process that limits the variability of IAS officers' *potential* moves and also raises their chances of promotion would if unobserved overstate specialization's purported effect.

To control for this possibility, we calculated each cadre's share of the positions in each ministry in each month. Thus for example we calculated the share of Gujaratis working in forestry in New Delhi in January 1993, as well as the share of Keralites, Punjabis and so on. We then include those shares of ministry employment as independent variables in the main models. This approach has one distinct limitation: our data cover everyone who joined the IAS after 1976, but we do not observe everyone who was *in* the IAS after 1976. People who joined the IAS earlier than 1976 and retired before our data were collected do not appear. Thus as we go back in time our calculations of these cadre shares become more prone to survivor bias. To minimize that effect here, we focus on those officers who joined the IAS after 1990. We calculate similar shares of ministry employment for each cohort. In the case of cohorts our data are not subject to survivor bias, so we can use the full sample, but in addition we estimated this variable on the post-1990 subsample as well, so as to be able to compare cohort homophily to cadre homophily.

Table 8 reports results from these models. Contrary to what we would expect if regional homophily were strongly influencing promotions, column 1 shows that the effect of one's cadre's share of a ministry's posts in New Delhi is *negatively* correlated with promotion. This at least suggests that the IAS's official goal of filling central government posts with a geographically balanced group of personnel is carried out in practice. Similarly, column 2 shows that one's cohort's share is also negatively correlated with promotion to New Delhi. Rather than homophily among fellow recruits, this negative relationship suggests that crowding-out is more likely. (Examining all years for cohort share yields a smaller but still significant $\beta = -.914$, $p = 0.001$.) Column 3 includes both measures in the model; cadre share is marginally significant once accounting for cohort share. Most importantly, in none of these models does the estimated effect of specialization change significantly from that in the main model. Homophily or simple favoritism by geographic region or among fellow recruits does not appear to drive career specialization or its effect on promotion.

[Table 8 about here.]

5.3.2 Do officers self-select into diverse jobs?

We discussed above that IAS officers, particularly early in their career, are shuffled about based on the needs of the bureaucracy rather than on their individual preferences. The picture is slightly more complicated, though. Officers have limited choice about *when* they move, because they are usually appointed for fixed-term assignments in various state agencies. They have limited choice about *where* they move, because they can only bid for transfer to jobs that have vacancies when they in turn are coming up for transfer. Within those constraints, though, it is possible that savvy recruits could choose more or less similar jobs to their current one, depending on their inclination toward diversity. Thus some weaker potential for self-selection still exists in these data.

Controlling for this possibility would require data on all the vacancies that are available whenever each officer is eligible for transfer, as well as the jobs upon which each officer bid at each stage—data that simply is unavailable. We can get some suggestive evidence though by considering what officers' career trajectories look like before and after they were promoted. If officers can self-select into more or less diverse trajectories earlier in their career, then presumably there will be significant correlation between the diversity of their experiences before they are promoted to New Delhi and the diversity of their experiences *after* they are promoted, when they have some more control over the jobs they take. Conversely, if officers have little control over their early careers, then there should be less correlation between their pre- and post-promotion diversification.

To test this, we focused on the 1,024 IAS officers in our population who were promoted to New Delhi and who had accumulated at least five years of work experience since their promotion. We calculated their specialization at the time of promotion and their specialization five years after promotion, in the latter case taking into account solely the positions they had held since promotion. The correlation between these two measures is only 0.0131 and is not statistically significant. Table 9 also shows the confusion matrix for the two variables. Here we have clustered the specialization measures into five equally-

spaced bins. Self-selection would imply greater frequencies in the cells along the principal diagonal of the confusion matrix, yet there is no visible pattern in the frequencies. A χ^2 test of the independence of the matrix's rows and columns produces a score of only 17.42 ($df = 16, p = 0.36$). The IAS is designed such that a particular officer's interests should not determine their early career experiences; these data appear to reflect that design.

[Table 9 about here.]

5.3.3 Are some experiences more important than others?

We have argued that what influences one's odds of promotion in the IAS is how spread across the typical types of experience one's career is. We are agnostic as to what those specific experiences *are*. An alternative interpretation of our findings is that senior ministries in New Delhi look for particular types of accumulated experience, and that IAS officers who move between different types of work are less likely to acquire the right type of experience than officers who specialize. This would imply that it is not diversity of experience *per se* that affects an officer's chances of promotion to the Center but rather the amount of experience that they have accumulated in specific areas. To test this explanation, we re-estimated our main models from tables 6 and 7 with controls for the number of months of each type of experience that an officer has accumulated prior to time t.[2] Including these 39 additional covariates does not affect the direction or the significance of our main results either for promotion to the Centre or for empanelment as a Joint Secretary. In fact, the coefficent on specialization in the promotion analysis increases in magnitude. These experience variables are jointly significant in both models (Promotion: $\chi^2 = 154.43$, p $\leq$ .001; Empanelment: $\chi^2 = 82.83$, p $\leq$ .001), which suggests that specific types of accumulated experience *do* matter for career outcomes, but that our observed effect of specialization is not simply a function of such accumulation.

[2]These controls are mathematically identical to specifying officers' grades of membership (Hannan, Pólos & Carroll 2007) in each type of experience. We do not report these full results here because of length; they are available upon request.

5.3.4 Does specialization just reflect tracking?

Our analysis presumes that the probability of moving between any two types of jobs within the IAS is constant. In practice, there could exist modal careers or tracks within the service, such for example that an officer who is working in Finance is more likely to move to External Affairs than to Youth Affairs and Sports. The existence of such "mobility clusters" could seriously bias the results that we have found. To understand why, imagine two hypothetical tracks, "Economics" and "Human Development." Economics involves two types of experience: Finance and External Affairs. Human Development involves five types: Rural Development, Social Justice and Empowerment, Women and Child Development, Agriculture and Cooperation, and Health and Family Welfare. Imagine furthermore that the Economics jobs are considered higher-status within the IAS than the Human Development jobs. Officers in the Economics track will have more specialized experience than officers in the Human Development track and will be promoted more often than officers in the Human Development track, but it will not be specialization as such that causes their promotion. Rather, their being on a higher-status track through the service influences both their specialization and their promotion prospects.

We conducted several investigations to understand what if any types of career tracks exist within the IAS. First, we checked whether the types of positions into which officers were promoted had changed over time. Figure 1 shows the counts of promotions to New Delhi, clustered by the fifteen most common types of job experience, over time. What jumps out in figure 1 is that the absolute number of promotions has increased with time. This is not due to changes in the IAS but rather to the properties of our dataset. We have information on all the IAS officers who joined the service after 1976. In 1980, *most* promotions to New Delhi were granted to IAS officers who joined *before* 1976. Accordingly, as time moves forward the share of all promotions won by officers in our dataset increases. The secular trend in figure 1 should therefore not be given too much consideration. More useful is to consider the *shares* of experiences among the promotions that our observed officers did receive. Figure 2 displays these—simply rescaling the bars from figure 1 to be the same length. Save for some shift from Defense to

Personnel and General Administration after the early years, figure 2 shows no statistically significant growth or decline in any one experience's share of promotions. As more of the observed IAS officers received promotions, they did so by virtually the same distribution of experiences over the years. This suggests that, to the extent any tracking exists, it has been stable over time in the IAS.

[Figure 1 about here.]

[Figure 2 about here.]

We next explored the sequences in which officers accumulated their experience. We focused on the first four years of experience, because this is the period during which most officers are ineligible for promotion to New Delhi; any sort of sequence matching that included later periods would be influenced by resulting promotions and thus select on the dependent variable. Figure 3 shows the 48-month career histories of 2,667 IAS officers (those who entered through regular recruitment and had amassed four years' experience by 31 December 2008), color-coded by experience. The sequences have been ordered based on their Levenshtein distance (Brzinsky-Fay, Kohler & Luniak 2006) from the modal sequence, that of 48 months in Land Revenue Management and District Administration. No major patterns are visible in figure 3. The absence of patterns is telling; if there were important career tracks in the IAS, we would see much more clustering in figure 3. We can get a better handle on what patterns there are by ignoring the amount of time that each officer spends in each position and simply focusing on the *order* in which they enter different positions. Figure 4 shows such a "same-order" sequence plot. Some patterns are clearer here. Most officers spend their first four years in the IAS accumulating only one or two types of experience. Furthermore, fifteen of the forty possible types of experience acount for more than 90 percent of officers' early postings; The navy-blue block in figure 4 comprises the other twenty-five. Finally—though this is admittedly harder to discern visually—most of the officers who accumulated more than two types of experience moved from one of the "common" experiences into another "common" one.

[Figure 3 about here.]

[Figure 4 about here.]

This evidence led us to suspect that these common experience types might constitute a mobility cluster. We therefore constructed a 40×40 symmetric matrix tallying the observed movements between each pair of experiences. Figures 5 and 6 show the graph of that matrix (We have excluded Land Revenue Management & District Administration, which is connected to every other experience type because virtually all IAS officers start out as district administrators). We then tried increasing the threshold for a tie between two experience types, by requiring more mobility events to constitute a tie. At a threshold of five transitions,[3] a striking partitioning occurs: the graph splits into a connected component that contains all of the most common types of experience and twenty-five isolates (See figures 7 and 8).[4] There does therefore appear to be some tracking in the IAS: either recruits move into the "mainstream" cluster of experiences, between which there is considerable mobility, or they move into rarer specialties which have almost no mobility to other types of work.

[Figure 5 about here.]

[Figure 6 about here.]

[Figure 7 about here.]

[Figure 8 about here.]

Because those rare experiences involve little mobility, anyone working in them would appear specialized by our measure. We therefore re-estimated our main model with a dummy variable for whether an IAS officer's *second* type of experience was one of the rare ones. Accumulating rare experience *is* positively correlated with likelihood of promotion to the center; indeed the effect size ($\beta = 1.32, p \leq 0.001$) is comparable to what we have found for specialization.[5] Yet the specialization effect persists even in this model.

[3]Note that this is not five transitions per person or per year, but five transitions anywhere in the IAS by the 32 observed cohorts between 1976 and 2008. Thus as a threshold, five is quite low.

[4]In figure 8 we have included Land Revenue Management & District Administration because, in the absence of *any* ties, most graph-visualization routines cannot choose a stable arrangement of the nodes.

[5]A model that includes fixed effects for officers' second experiences, not reported here, gives substantively identical results.

Similarly specialization's effect is still significant when we estimate the full model only on those officers who moved into the main mobility cluster after their initial experience ($\beta = 1.26, p \leq 0.001$).

When these pieces are considered together, there seems little evidence that the sort of benefits for specialization that we see here are being produced by differential career tracks within the IAS. One powerful source of promotion advantage comes from having rare types of experiences; it follows logically that administrators in New Delhi would have to choose from a smaller pool of candidates to work in such jobs in the Centre. Yet even among those IAS officers who accumulate "common" types of work experience, those who specialize *within* that main mobility cluster are more likely to be tapped for promotion than those who are more diversified.

5.3.5 Other robustness checks

We conducted several other investigations that have less to do with theoretical reservations than with specification of the particular models we estimated. For example, officers from different cadres or cohorts may follow different career sequences. Opportunities within state-level IAS cadres could constrain the postings to which officers have access; their career specialization would reflect this, but by collapsing our analysis across states and cohorts we would mask this variation and incorrecty attribute the effect to specialization as such. In our models we include cadre and cohort fixed-effects. Both with and without these controls our variables of interest retain their directions, magnitudes and levels of significance. We also estimated within-cohort models to address concerns about cohort-specific career patterns. Results for both career milestones are presented in Table 10. All estimations include the controls from the full models in table 6 and 7. Specialization remains positive and significant in all models, indicating that the effects of specialization on career progression are robust even within cohorts. A related analysis was conducted for male and female subsamples, with results that also support our main hypothesis.

[Table 10 about here.]

Finally, we tried several different specifications of the empanelment models. A common reservation about the use of Herfindahl indices in dynamic models is that the index is correlated with, and indeed has to change with, time. One way to break this correlation is to dispense with the event-history framework and instead use a simpler specification of time. We therefore estimated simple logit models of whether an officer who was promoted to New Delhi was *ever* empaneled in the ten-year period following their promotion. In these models we included a snapshot of their post-promotion specialization, operationalized as their specialization score five years after their promotion. No officers were empaneled in fewer than five years after their first promotion, so this seemed a reasonable window to use. These models yielded substantively similar results to our main models, as do ones that use slightly different time windows for the snapshot of specialization and empanelment. Models that use a snapshot of *early*-career specialization after four years (when officers are first eligible for promotion to New Delhi) and that ask whether an officer was ever promoted to New Delhi in their first ten years in the service also yield results that are comparable to our first-stage analysis.

6 Discussion

Our analysis of Indian Administrative Service officers suggests that specializing has profound effects on careers. IAS officers, India's elite generalist bureaucrats, ironically experience greater career rewards if they accumulate less general experience. Concentrated early-career experience nearly doubles their likelihood of promotion to the Centre and raises their eventual empanelment chances by 42.1 percent. This setting precludes several potential explanations for this effect, such as unobserved variation on ability or self-selection into diverse careers by the officers themselves. With such "supply-side" variation ruled out by the context, our findings strongly suggest that "demand-side" mechanisms penalize diversified officers. Even when we include more detailed controls for individual variation than have been included in prior research, we find that being moved around by the IAS bureaucracy early in officers' careers reduces the chance that their evaluators will select them for a coveted job in New Delhi. That penalty persists when

we look at later career hurdles, such as becoming a joint secretary. Notably, this happens in an institutional setting where generalists are nominally encouraged.

The conflict between the IAS's stated goals for its officers' careers and its actual promotion practices raises an obvious question: why might this promotion bias exist? That empirical question has a theoretical counterpart: what mechanisms best account for these observed penalties to "boundary-spanning?" After all, these officers *are* in an internal labor market, which should provide their evaluators with more information about these candidates, and that internal labor market is one that promotes breadth rather than depth in skills. If we were to see any benefit to diversification, it seems like we should see it here.

We theorize that, to some exent, this puzzle stems from theoretical confusion about the effects that social categorization will have on the *prevalence* of generalists versus the *treatment* of generalists. Zuckerman (2005) for example argued that generalists would be more likely to appear in internal labor markets than in external ones, and we agree with this idea. Few IAS officers get "typecast" in their early careers, especially compared to film actors. Yet we think that at any given level of generalist prevalence, all else equal specialists might still be favored. Indeed, an environment where generalists are the norm—what we call a "Region-IV" labor market—can help clarify some of the reasons why evaluators would prefer specialists in this and other contexts.

At the most basic level, consider a manager who must choose between promoting two subordinates. Each has worked a variety of jobs, but one has spent more time doing the relevant type of work than the other. All else being equal, why *wouldn't* the manager choose the one with more relevant experience? Their doing so would not by itself undermine the organization's commitment to generality; in fact they might think that both subordinates' other experiences give them wisdom or skills that an even more specialized candidate would lack. Yet such small choices, such incentives to defect from the collective norm, easily aggregate to produce a perverse effect: were we to give career advice to that subordinate, we would tell them to make every effort they could to specialize, organizational norms notwithstanding.

Yet is all else equal? Employment is often thought of as an experience good, where

the full value of a job both to a worker and to an employer is only discovered after hiring. The highest informational hurdle in a labor market is guessing the quality of the potential match. Our existing theory both about categorization and about internal labor markets suggests that employers and workers will have more information about one another inside organizations than they would in the external labor market. Yet while this is likely the case, we should wonder whether the types of information available through such channels will eliminate the penalties on diversification seen here. The greater the substantive variation in work performed in the internal labor market, the less informative good performance in any one job is for predicting performance in another job.

Moving between different types of experience often means moving between different groups of co-workers and evaluators. This calls for separating two types of experience that work on diversity and on social networks often conflate (Burt 1992, Zuckerman et al. 2003). When we began this research, we expected that diverse experience would make IAS officers less likely to be promoted to the Centre but that, of those who *were* promoted, those with more diverse backgrounds would be *more* likely to advance to positions like joint secretary. We based our expectation on the research on brokerage, which in multiple contexts has demonstrated that being tied to multiple groups who are not otherwise connected lets one capture gains from trade. The effects of such brokerage are indeed often cited as one of the *justifications* for the programs of professional rotation that characterize region-IV labor markets. Here though we find no such effects. It is probably relevant that the IAS created its system of regular rotation of recruits both to give them more experiences *and* to limit the growth of close personal ties that could foster corruption in the Administrative Service. Depending on your perspective, the personal ties that characterize dense social networks can *either* be useful vehicles for personal advancement *or* mechanisms for organizational corruption. Any organizational practice that tries to reduce the potential for corruption will *also* probably reduce the potential for *tertius gaudens* as an unintended consequence. We point this out not to say that the IAS's policy is self-defeating. It is possible that the service does see gains from rotating its officers through different experiences. However, those officers do not seem able to capture those gains for themselves. In that sense, organizational benefits from diversification may exist

alongside individual penalties for the same.

We unfortunately do not have data on each IAS officer's individual contacts during their time in the service. This discussion does suggest the empirical weakness of assuming that similar institutional experience is a sound proxy for similar social networks. Future research, even in settings like this one where generalists should be more common, would do well to gather data both on relevant experiences *and* on orthogonal social ties. That second type of information would serve two purposes: in addition to helping explain the presence or absence of any gains to brokerage as mentioned above, it could help to parcel out which demand-side mechanisms are most likely to drive any benefits of specialization. For example, is it that specialized candidates develop closer ties to their evaluators, and those evaluators therefore rate them better over time? Or is it that specialized candidates happened to get jobs that are better matches, such as their evaluations are better from the start even if their evaluators change? We think that recent work on systematic biases in performance evaluations suggests ways to explore such questions in the context of specialization and diversification.

We conclude with a note on theory. Much of the work on social categorization has presumed that the mechanisms that produce penalties for generalist candidates are essentially cognitive: boundary-spanners have unclear identities, seem like less legitimate members of the consideration set and thus shouldn't be considered. An empirical setting like the Indian Administrative Service should make us skeptical that such mechanisms really explain what is going on. The Service collects some of the most promising young talent in India, screens it rigorously and then grants it life tenure. If these individuals are not legitimate members of the consideration set, who are? We have demonstrated as carefully as possible that audience-side biases seem to affect these candidates' chances of career advancement. Future research should take that effect for granted and, rather than being content to demonstrate it, work to distinguish which mechanisms most likely produce the effect.

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Table 1: Types of worker-job-matching processes

Mobility	Types of jobs: Specific skill	Types of jobs: General skill
Jurisdiction	I Generalists are rare and at the tail ends of the ability distribution.	II Generalists are rare but not necessarily at the tail ends of the ability distribution. Penalized because they violate codes.
No Jurisdiction	IV Both generalists and specialists in distribution. All else equal, because jobs require specific skill specialists are preferred to generalists.	III Both generalist and specialists in distribution. Specialists are not valuated higher because opportunities only require general skill.

Table 2: Comparison of IAS officers admitted (from Indian Personnel Ministry Annual Reports, 1995–2008) to IAS officers in data set

Allotment Year	Actual Admitted	In data	Difference
1995	80	79	1
1996	80	78	2
1997	76	76	0
1998	55	55	0
1999	55	51	4
2000	56	55	1
2001	59	58	1
2002	59	59	0
2003	70	71	-1
2004	89	88	1[(1)]
2005	91	90	1
2006	87	86	1
2007	89	89	0
2008	111	109	2[(2)]
Total	1057	1044	15

1. One person transferred to the Indian Foreign Service after entry.
2. The initial allocation of two candidates was provisional due to non-clearance.

Table 3: Distribution of monthly experience by type for IAS officers 1974-2008

Experience	Frequency	Percent	Cumulative
Land Revenue Mgmt and District Admn	189452	31.57	31.57
Personnel and General Admn	46060	7.67	39.24
Finance	42840	7.14	46.38
Not Applicable	40862	6.81	53.19
Industries	32878	5.48	58.66
Agriculture and Cooperation	27136	4.52	63.19
Urban Development	24282	4.05	67.23
Human Resource Dev	18279	3.05	70.28
Rural Dev	16623	2.77	73.05
Social Justice and Empowerment	15086	2.51	75.56
Home	14294	2.38	77.94
Health and Family Welfare	12246	2.04	79.98
Energy	10915	1.82	81.8
Consumer Affairs, Food and PD	10757	1.79	83.59
Commerce	9941	1.66	85.25
Transport	9322	1.55	86.8
Planning and Prog Implementation	7365	1.23	88.03
Textiles	6401	1.07	89.1
Water Resources	6005	1	90.1
Tourism	5359	0.89	90.99
Labour and Employment	5095	0.85	91.84
Local Self Govt	5091	0.85	92.69
Environment and Forests	5074	0.85	93.53
Law and Justice	4848	0.81	94.34
Women and Child Dev	4446	0.74	95.08
Information and Broadcasting	3992	0.67	95.75
Communications and Information Technology	3459	0.58	96.32
Mines and Minerals	3411	0.57	96.89
Defence	3404	0.57	97.46
Culture	3168	0.53	97.99
Science and Technology	2892	0.48	98.47
Youth Affairs and Sports	2572	0.43	98.9
Public Works	2388	0.4	99.29
Petroleum and Natural Gas	1581	0.26	99.56
Staff Officers	1150	0.19	99.75
Chemicals and Fertilizers	569	0.09	99.84
Parliamentary Affairs	467	0.08	99.92
External Affairs	241	0.04	99.96
Corporate Management	193	0.03	99.99
Development of NER	35	0.01	100

Table 4: Summary Statistics: First promotion to central government analysis

	count	mean	sd
Promotion to Centre	434438	0.003	0.056
Postings	434438	4.056	4.255
Age	434438	34.457	6.868
Female	434438	0.135	0.341
Hindi	428439	0.521	0.500
Bengali	428439	0.036	0.186
Telugu	428439	0.070	0.256
Marathi	428439	0.033	0.178
Tamil	428439	0.075	0.264
First Division	434438	0.664	0.472
Engineering	434438	0.232	0.422
Humanities	434438	0.315	0.465
Medicine	434438	0.046	0.209
Professional	434438	0.138	0.345
Science	434438	0.318	0.466
Business	434438	0.185	0.388
Law	434438	0.078	0.268
No. of Subjects	434438	1.705	0.833
Two degrees	434438	0.433	0.496
Three degrees	434438	0.191	0.393
Four degrees	434438	0.092	0.289
Specialization	434438	-1.693	0.537
Observations	434438		

Table 5: Summary statistics: Empanelment to Joint Secretary analysis

	count	mean	sd
Empanelment as Joint Secretary	164874	0.002	0.050
Postings	164874	8.571	4.085
Age	164874	41.950	5.871
Female	164874	0.148	0.355
Hindi	164434	0.485	0.500
Bengali	164434	0.070	0.256
Telugu	164434	0.055	0.229
Marathi	164434	0.025	0.156
Tamil	164434	0.089	0.285
First Division	164874	0.627	0.484
Engineering	164874	0.149	0.356
Humanities	164874	0.401	0.490
Medicine	164874	0.016	0.126
Professional	164874	0.216	0.411
Science	164874	0.365	0.482
Business	164874	0.226	0.418
Law	164874	0.082	0.274
No. of Subjects	164874	1.921	0.865
Two degrees	164874	0.423	0.494
Three degrees	164874	0.274	0.446
Four degrees	164874	0.160	0.367
Specialization (Pre)	164874	-1.522	0.362
Specialization (Post)	164874	-1.748	0.490
Observations	164874		

Table 6: Logistic Regression Predicting First Promotion to Central Government Post in New Delhi

	(1)	(2)	(3)	(4)
Promotion to Centre				
Postings	0.470***	0.472***	0.458***	0.573***
	(0.0381)	(0.0384)	(0.0391)	(0.0377)
(Postings)^2	-0.0161***	-0.0163***	-0.0158***	-0.0171***
	(0.00224)	(0.00224)	(0.00226)	(0.00215)
Age	1.027***	1.033***	1.067***	0.819***
	(0.0868)	(0.0867)	(0.0881)	(0.0868)
(Age)^2	-0.0115***	-0.0114***	-0.0115***	-0.00820***
	(0.00113)	(0.00112)	(0.00114)	(0.00112)
IAS Tenure	-0.0128***	-0.0127***	-0.0139***	-0.0185***
	(0.00209)	(0.00212)	(0.00216)	(0.00221)
Female		0.198*	0.235*	0.435***
		(0.101)	(0.107)	(0.106)
Hindi		0.542***	0.506***	0.550***
		(0.0910)	(0.0919)	(0.0936)
Bengali		0.510**	0.485**	0.560**
		(0.168)	(0.168)	(0.170)
Telugu		0.199	0.142	0.160
		(0.146)	(0.147)	(0.151)
Marathi		0.0135	0.0486	0.0691
		(0.244)	(0.247)	(0.244)
Tamil		0.393**	0.363*	0.482***
		(0.143)	(0.148)	(0.146)
First Division			0.321***	0.284***
			(0.0762)	(0.0766)
Engineering			0.00512	-0.0197
			(0.110)	(0.111)
Humanities			-0.215	-0.226
			(0.117)	(0.119)
Medicine			-0.589**	-0.660**
			(0.193)	(0.209)
Professional			0.184	0.168
			(0.119)	(0.120)
Science			-0.275**	-0.278**
			(0.0940)	(0.0962)
Business			0.0459	0.0811
			(0.104)	(0.105)
Law			-0.265	-0.315*
			(0.135)	(0.140)
No. of Subjects			0.106	0.121
			(0.0812)	(0.0820)
Two degrees			0.120	0.164
			(0.102)	(0.106)

Three degrees			0.232	0.269*
			(0.130)	(0.133)
Four degrees			0.352*	0.334
			(0.164)	(0.171)
Specialization				1.304***
				(0.111)
Observations	423672	420676	420676	420676
ll	-8275.7	-8189.0	-8134.9	-8045.5

Standard errors in parentheses

All models include fixed effects for cadre, cohort and year

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Logistic Regression Predicting Empanelment as Joint Secretary

	(1)	(2)	(3)	(4)	(5)
Empanelment as Joint Secretary					
Postings	0.207*	0.250**	0.237**	0.294**	0.360***
	(0.0890)	(0.0913)	(0.0914)	(0.0941)	(0.0947)
(Postings)^2	-0.00615	-0.00665	-0.00671	-0.00746*	-0.00841*
	(0.00349)	(0.00356)	(0.00355)	(0.00363)	(0.00362)
Age	4.998***	4.889***	4.974***	4.851***	4.902***
	(0.416)	(0.415)	(0.416)	(0.414)	(0.414)
(Age)^2	-0.0501***	-0.0489***	-0.0499***	-0.0485***	-0.0487***
	(0.00445)	(0.00444)	(0.00444)	(0.00442)	(0.00442)
Female	-0.00124	0.0118	0.0571	0.0896	0.201
	(0.203)	(0.201)	(0.204)	(0.202)	(0.202)
Hindi	0.350*	0.323*	0.360*	0.336*	0.511**
	(0.154)	(0.154)	(0.155)	(0.156)	(0.163)
Bengali	0.411	0.374	0.444	0.417	0.540*
	(0.263)	(0.267)	(0.263)	(0.265)	(0.275)
Telugu	-0.564	-0.551	-0.566	-0.553	-0.443
	(0.341)	(0.348)	(0.345)	(0.354)	(0.362)
Marathi	0.614	0.565	0.563	0.496	0.454
	(0.531)	(0.526)	(0.545)	(0.542)	(0.560)
Tamil	-0.213	-0.262	-0.202	-0.252	0.0246
	(0.254)	(0.260)	(0.253)	(0.259)	(0.266)
First Division	0.714***	0.689***	0.710***	0.676***	0.774***
	(0.140)	(0.140)	(0.140)	(0.139)	(0.140)
Engineering	0.144	0.0942	0.117	0.0571	0.0618
	(0.234)	(0.235)	(0.235)	(0.238)	(0.247)
Humanities	-0.0629	-0.0835	-0.0662	-0.0878	-0.164
	(0.217)	(0.221)	(0.217)	(0.221)	(0.223)
Medicine	-0.238	-0.209	-0.216	-0.182	-0.231
	(0.495)	(0.498)	(0.509)	(0.516)	(0.508)
Professional	0.0473	0.0253	0.0317	-0.0000219	0.0258
	(0.199)	(0.201)	(0.199)	(0.202)	(0.205)
Science	-0.0815	-0.101	-0.103	-0.128	-0.192
	(0.172)	(0.172)	(0.173)	(0.173)	(0.175)
Business	-0.238	-0.246	-0.242	-0.248	-0.271
	(0.188)	(0.192)	(0.188)	(0.191)	(0.193)
Law	0.221	0.268	0.201	0.246	0.128
	(0.247)	(0.248)	(0.249)	(0.251)	(0.250)
No. of Subjects	0.00302	0.0325	0.00177	0.0318	0.106
	(0.146)	(0.148)	(0.145)	(0.147)	(0.148)
Two degrees	0.393	0.385	0.399	0.389	0.441
	(0.250)	(0.254)	(0.249)	(0.252)	(0.262)
Three degrees	0.661*	0.642*	0.672*	0.653*	0.739**
	(0.273)	(0.276)	(0.272)	(0.274)	(0.284)

Four degrees	0.746*	0.692*	0.746*	0.691*	0.798*
	(0.322)	(0.327)	(0.322)	(0.326)	(0.333)
Tenure since promotion	-0.00903*	-0.0105**	-0.00961**	-0.0114**	-0.0117**
	(0.00362)	(0.00369)	(0.00362)	(0.00370)	(0.00367)
Specialization (Post)		0.634***		0.693***	0.910***
		(0.154)		(0.158)	(0.173)
Specialization (Pre)			0.354	0.467*	0.655**
			(0.207)	(0.210)	(0.215)
P(Promotion to Centre)					-26.53***
					(6.929)
Observations	139075	139075	139075	139075	139075
ll	-2433.5	-2424.4	-2431.6	-2421.2	-2407.0

Standard errors in parentheses

All models include fixed effects for cadre, cohort and year

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Logistic Regressions of First Promotion to Central Government, Controlling for Region and Cohort Homophily

	(1)	(2)	(3)	(4)
Promotion to Centre				
Postings	0.498***	0.470***	0.472***	0.470***
	(0.0418)	(0.0415)	(0.0415)	(0.0416)
(Postings)^2	-0.0142***	-0.0123***	-0.0124***	-0.0123***
	(0.00226)	(0.00221)	(0.00221)	(0.00221)
Age	0.771***	0.673***	0.673***	0.675***
	(0.0898)	(0.0904)	(0.0906)	(0.0906)
(Age)^2	-0.00767***	-0.00656***	-0.00657***	-0.00660***
	(0.00114)	(0.00114)	(0.00114)	(0.00114)
Female	0.395**	0.332**	0.341**	0.335**
	(0.125)	(0.125)	(0.125)	(0.126)
Hindi	0.646***	0.639***	0.636***	0.635***
	(0.110)	(0.109)	(0.109)	(0.109)
Bengali	0.398	0.377	0.363	0.365
	(0.224)	(0.230)	(0.231)	(0.231)
Telugu	0.235	0.190	0.194	0.195
	(0.163)	(0.160)	(0.160)	(0.160)
Marathi	0.0660	0.0240	0.0196	0.0191
	(0.286)	(0.292)	(0.294)	(0.293)
Tamil	0.640***	0.603***	0.608***	0.601***
	(0.182)	(0.183)	(0.182)	(0.183)
First Division	0.358***	0.336***	0.334***	0.334***
	(0.0880)	(0.0876)	(0.0875)	(0.0875)
Engineering	0.0109	-0.0237	-0.0199	-0.0221
	(0.124)	(0.124)	(0.124)	(0.124)
Humanities	-0.272	-0.287*	-0.286*	-0.285*
	(0.142)	(0.141)	(0.141)	(0.141)
Medicine	-0.657**	-0.678**	-0.690**	-0.683**
	(0.212)	(0.210)	(0.211)	(0.211)
Professional	0.0707	0.0750	0.0814	0.0835
	(0.137)	(0.138)	(0.138)	(0.138)
Science	-0.290**	-0.285**	-0.286**	-0.286**
	(0.112)	(0.110)	(0.110)	(0.110)
Business	0.0482	0.0250	0.0263	0.0280
	(0.118)	(0.118)	(0.118)	(0.118)
Law	-0.384*	-0.400*	-0.400*	-0.400*
	(0.167)	(0.166)	(0.166)	(0.166)
No. of Subjects	0.208*	0.218*	0.214*	0.213*
	(0.0950)	(0.0953)	(0.0954)	(0.0954)
Two degrees	0.103	0.111	0.104	0.106
	(0.113)	(0.113)	(0.114)	(0.114)
Three degrees	0.191	0.175	0.168	0.169

	(0.148)	(0.148)	(0.148)	(0.148)
Four degrees	0.210	0.211	0.207	0.206
	(0.195)	(0.192)	(0.192)	(0.192)
Specialization	1.153***	1.332***	1.348***	1.348***
	(0.130)	(0.130)	(0.130)	(0.130)
IAS Tenure	-0.0157***	-0.0173***	-0.0172***	-0.0172***
	(0.00246)	(0.00246)	(0.00246)	(0.00246)
Cadre share in Centre		-0.929*		-0.827
		(0.452)		(0.469)
Cohort share in Centre			-2.393***	-2.359***
			(0.618)	(0.624)
Observations	320186	246454	250295	246454
ll	-6110.6	-5917.6	-5911.4	-5909.4

Standard errors in parentheses

All models include fixed effects for cadre, cohort and year

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: Confusion matrix for pre- and post-promotion specialization

Quintiles of firstherf	Quintiles of postherf											
	1		2		3		4		5		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	46	4.5	47	4.6	44	4.3	28	2.7	40	3.9	205	20.0
2	39	3.8	32	3.1	36	3.5	56	5.5	42	4.1	205	20.0
3	37	3.6	43	4.2	41	4.0	45	4.4	39	3.8	205	20.0
4	44	4.3	40	3.9	37	3.6	40	3.9	44	4.3	205	20.0
5	39	3.8	43	4.2	47	4.6	38	3.7	37	3.6	204	19.9
Total	205	20.0	205	20.0	205	20.0	207	20.2	202	19.7	1024	100.0

Pearson $\chi^2(16) = 17.4208$, Pr = 0.359

Table 10: Logistic regressions predicting first promotion to central government and empanelment as joint secretary, by 5-year cohorts

	Promotion		Empanelment	
	β	N	β	N
Cohort	s.e.	ll	s.e.	ll
1975–1979	2.201***	76074	0.861*	59173
	(0.245)	-1922.4	(0.377)	-889.5
1980–1984	1.003***	102635	1.456***	43458
	(0.198)	-2129.8	(0.400)	-700.6
1985–1989	1.411***	96881	1.545***	27607
	(0.242)	-1883.2	(0.466)	-322.5
1990–1994	1.425***	58157		
	(0.401)	-890.5		

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

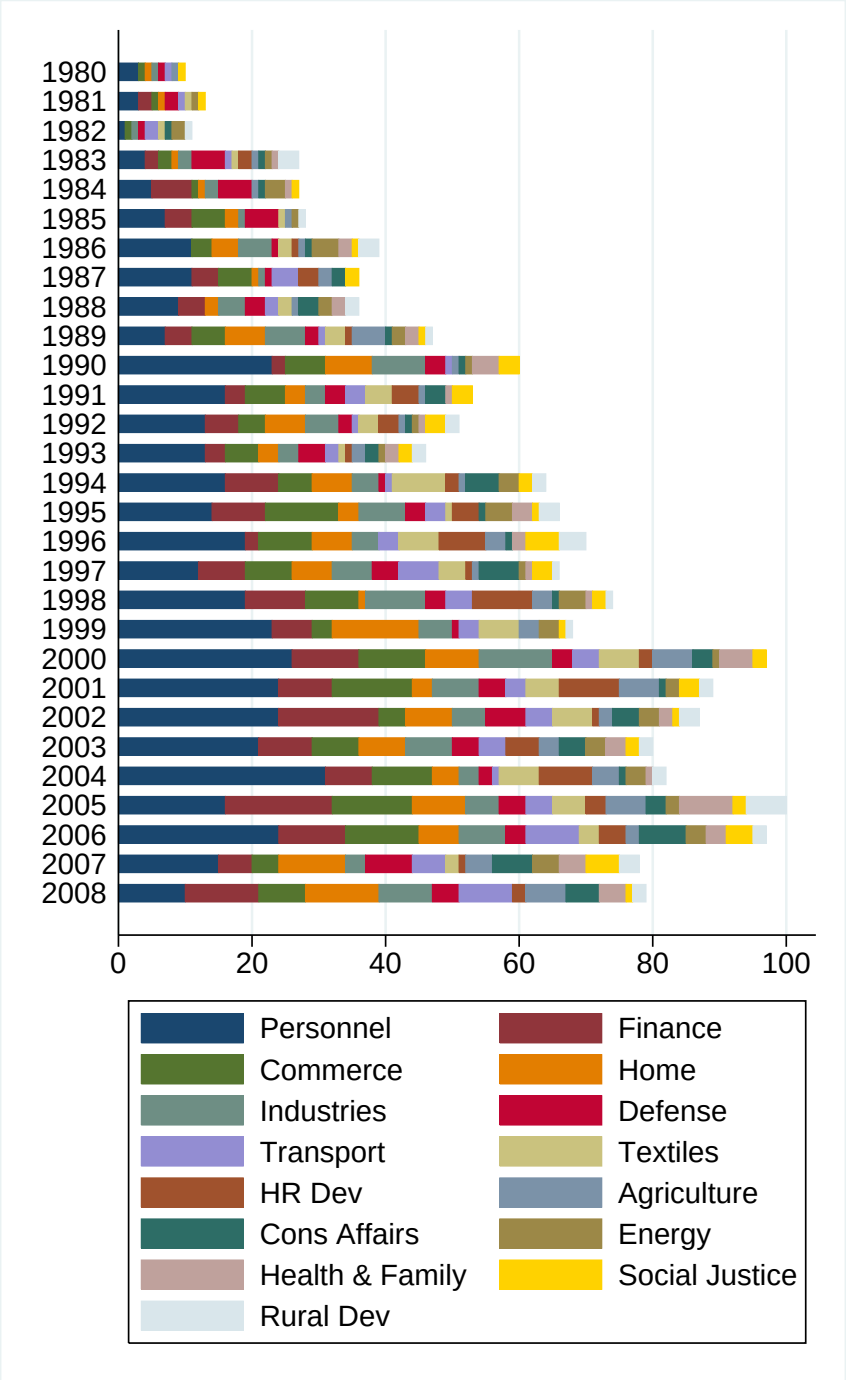

Figure 1: Top 15 types of promotions to New Delhi, by year

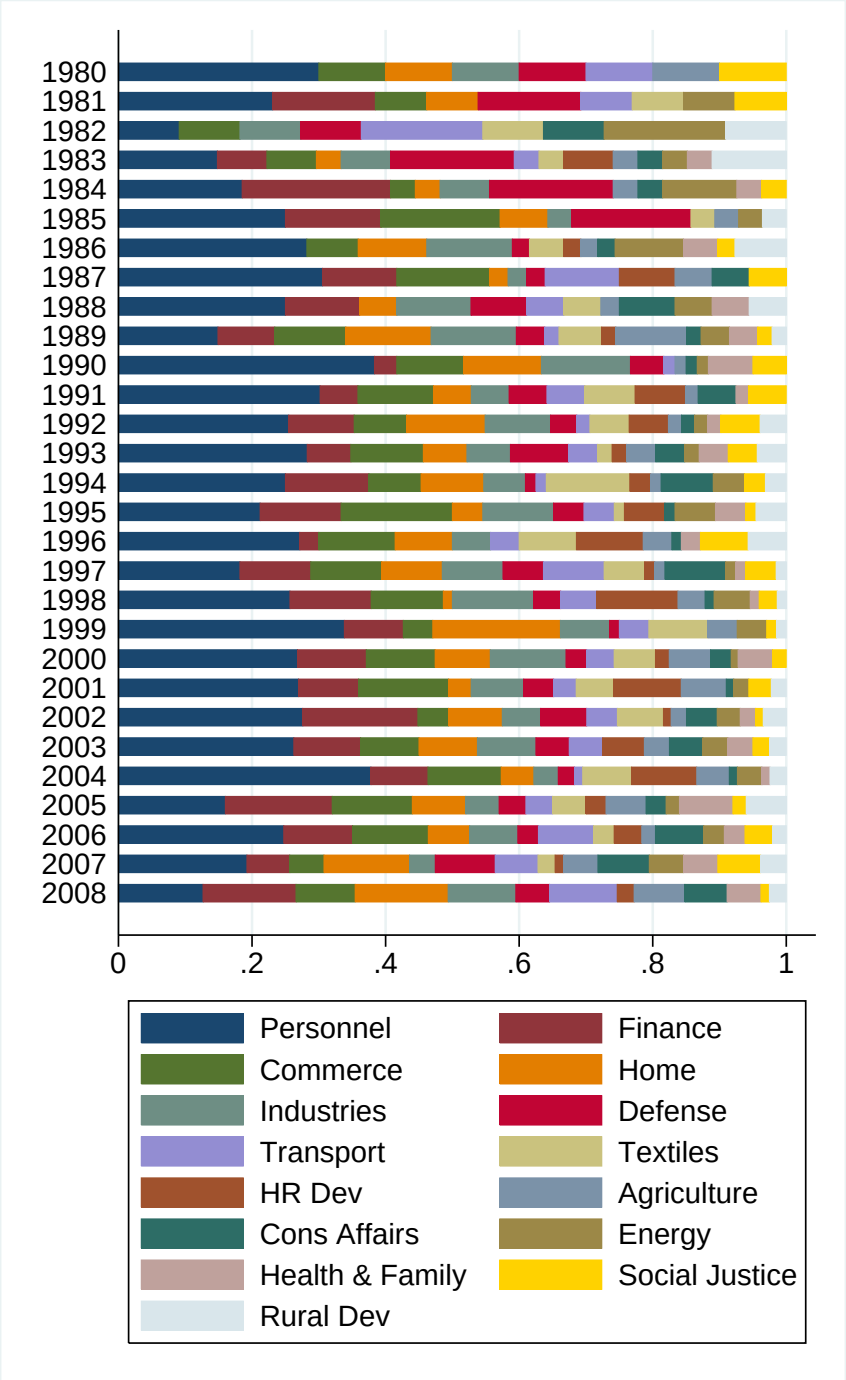

Figure 2: Shares of top 15 types of promotions to New Delhi, by year

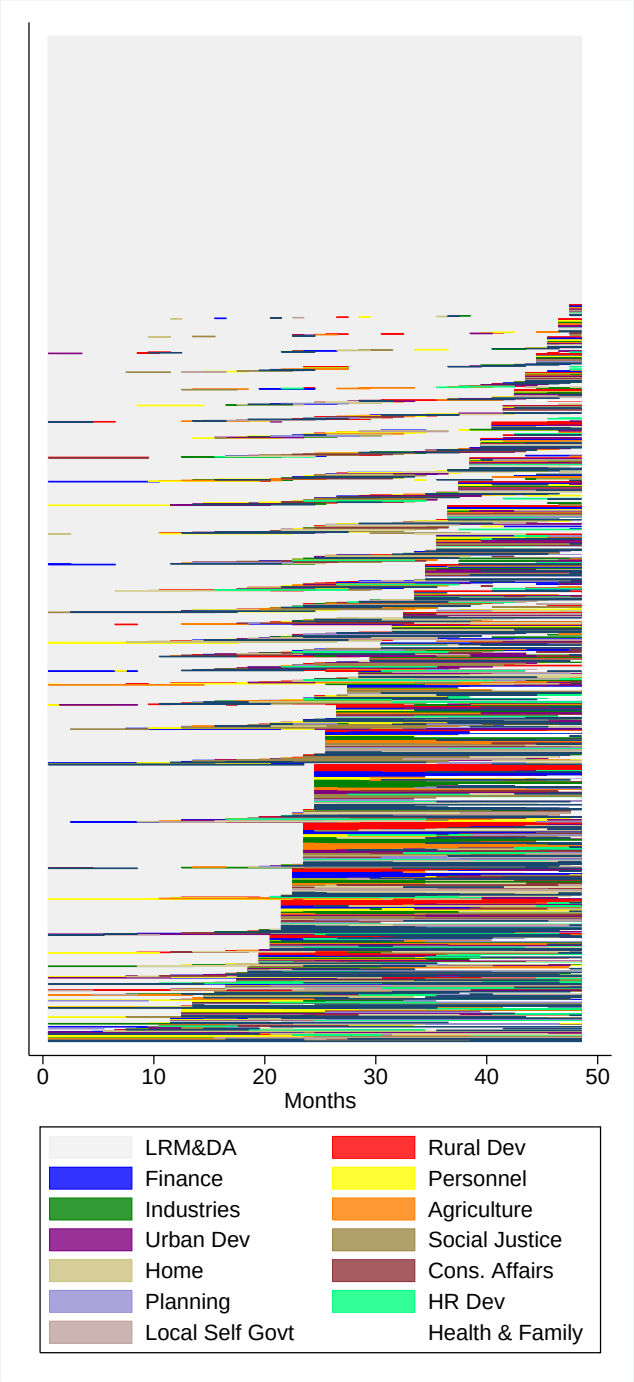

Figure 3: Career sequences for 2,667 IAS Officers. Sequences are ordered by their Levenshtein distance from the modal career, 48 months in Land Revenue Management & District Administration.

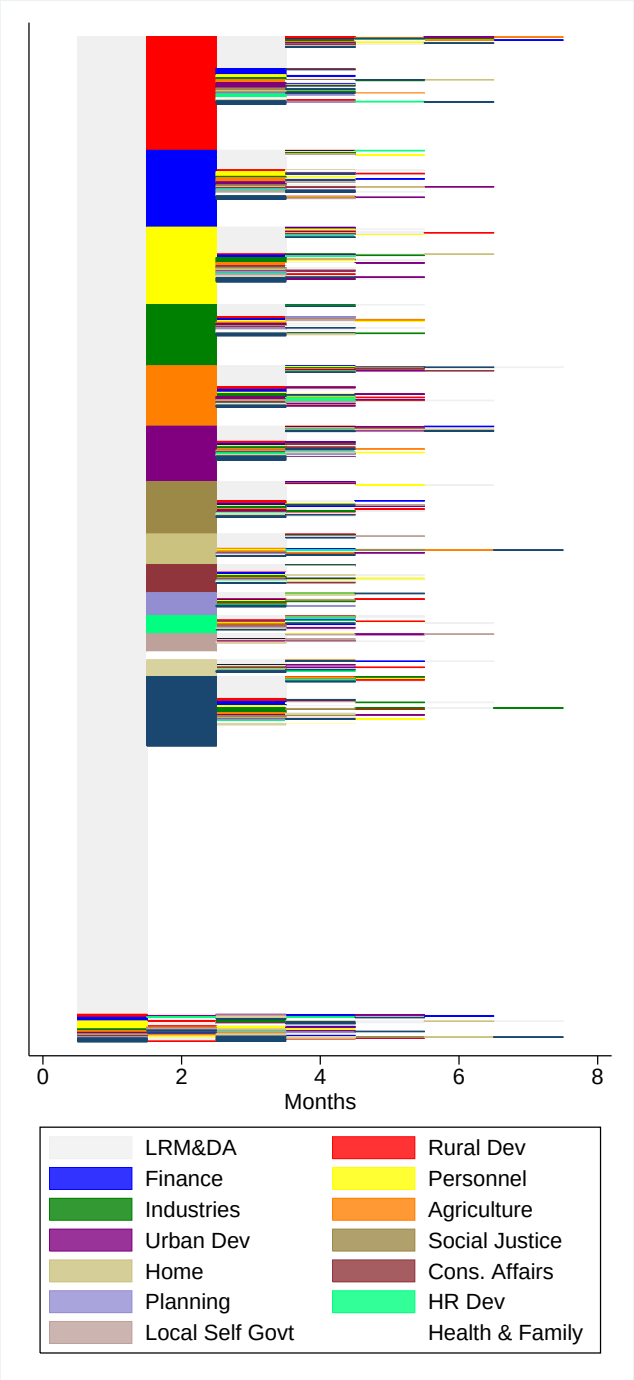

Figure 4: Same-order career sequences for 2,667 IAS Officers.

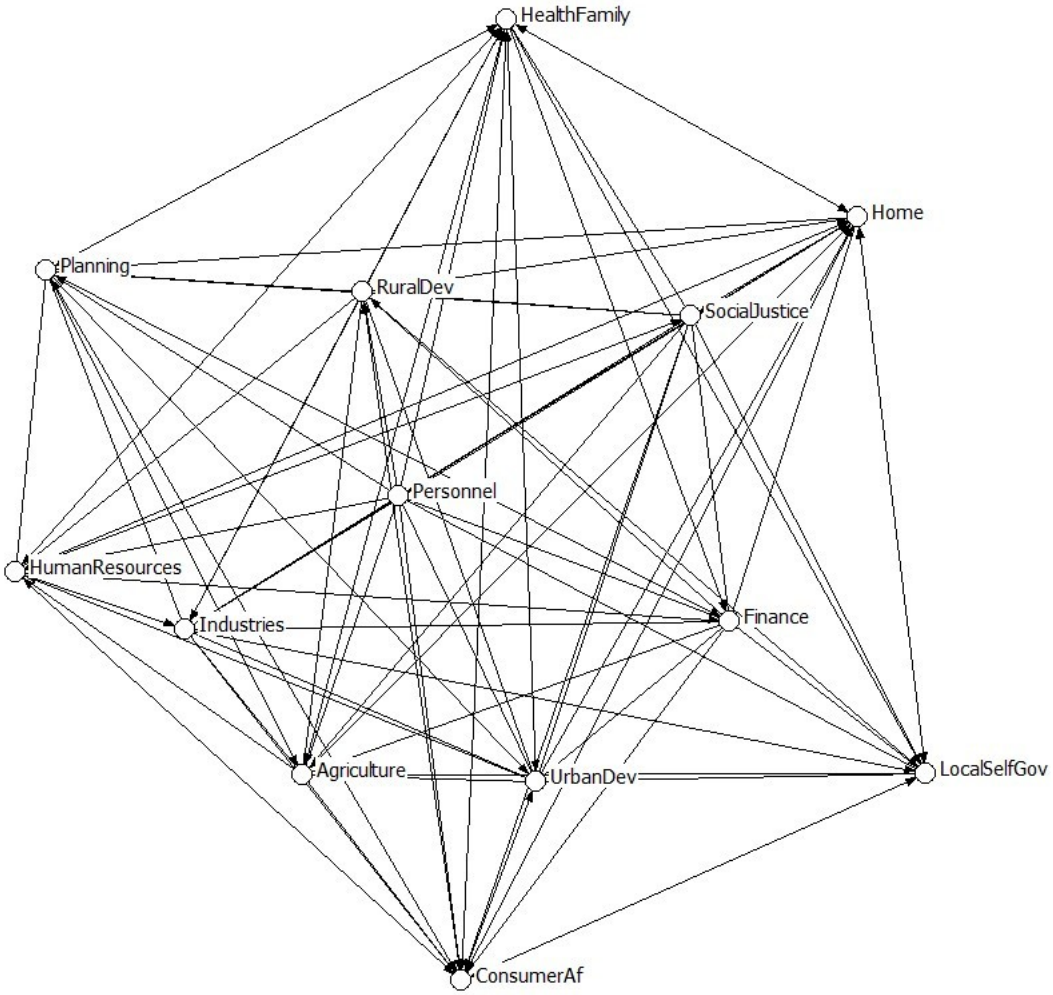

Figure 5: Mobility between IAS experiences: main graph component

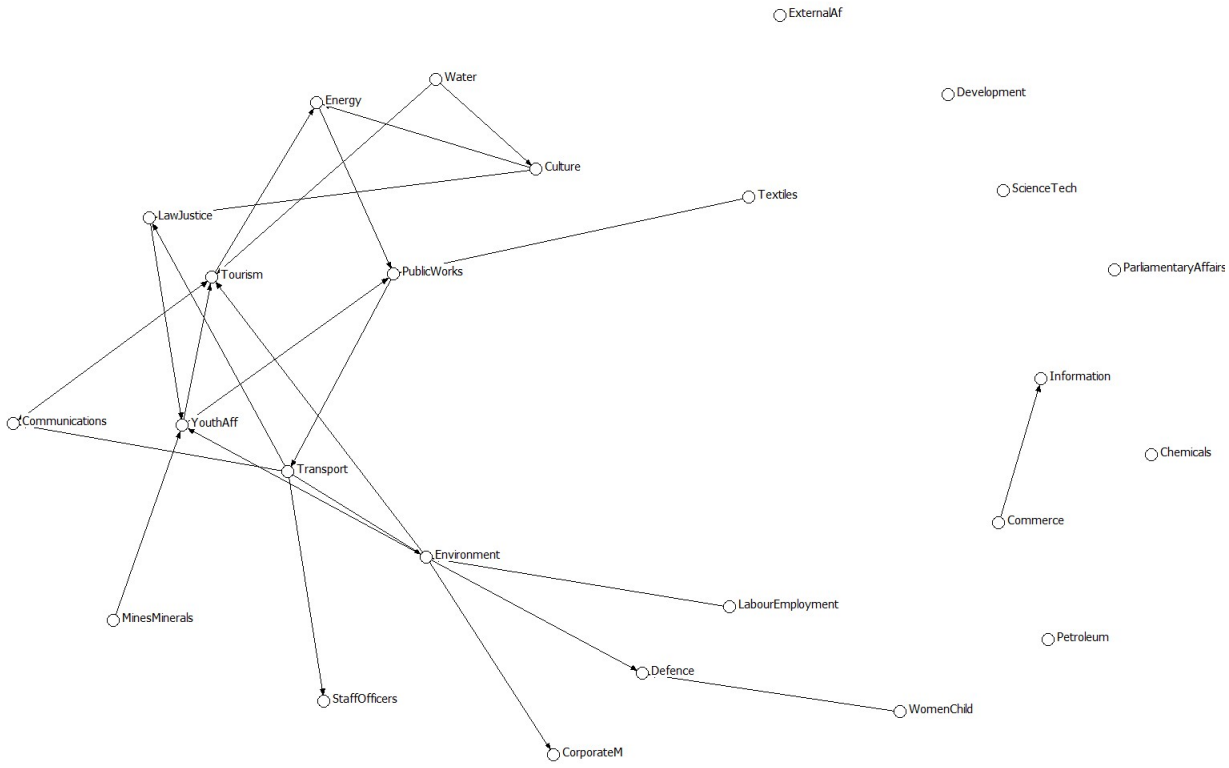

Figure 6: Mobility between IAS experiences: remaining graph components

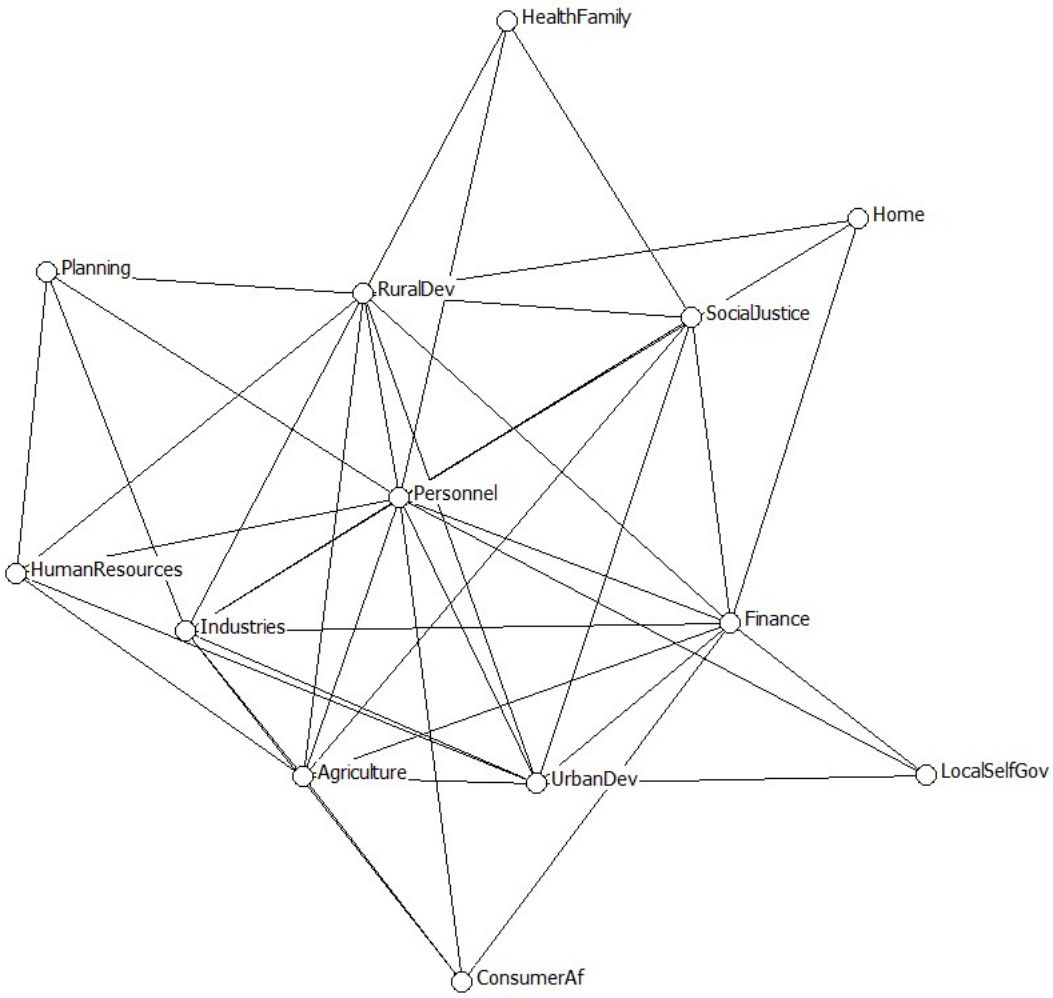

Figure 7: Repeat mobility between IAS experiences: main component. An edge represents five or more moves between 1976 and 2008.

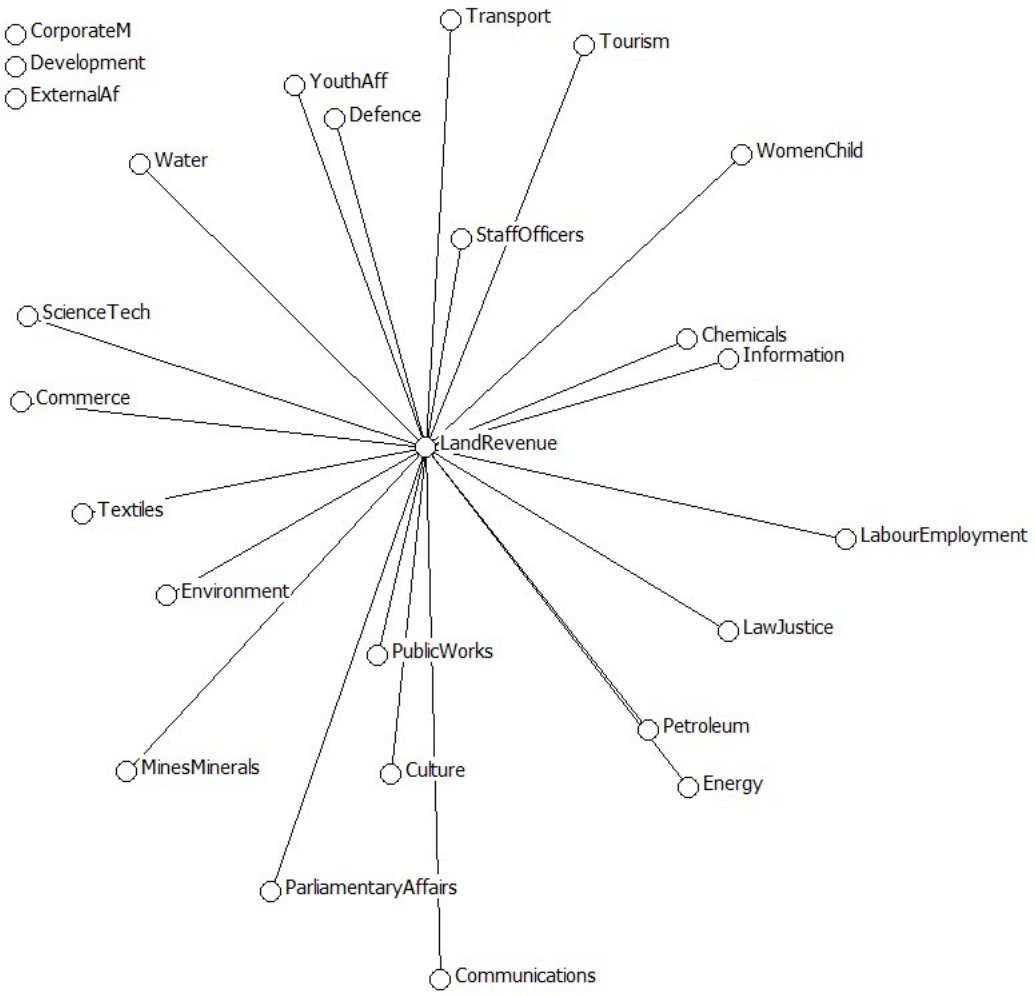

Figure 8: Repeat mobility between IAS experiences: remaining components. An edge represents five or more moves between 1976 and 2008.