

# **THE ANATOMY OF RETENTION IN THE FEDERAL GOVERNMENT:**

## **WHY DO PRODUCTIVE WORKERS STAY?**

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### **Abstract**

People are an organization's most important asset. Employees substantially influence organizational performance, and worker turnover imposes considerable costs on organizations. We examine both the intent to retire and the intent to leave the agency (retention), apart from retirement, but we focus on retention. While private organizations can employ a complex mix of high-powered incentives to retain workers, public organizations often lack comparable incentives, making retention more challenging. Fortunately, public employees frequently possess stronger intrinsic motives—a finding that implies public organizations can rely on other means to retain workers. Results indicate discretionary authority and goal and role clarity may be especially useful tools upon which the federal government can rely to retain employees. We also find that the intent to leave rises with each level of education, perhaps indicating more educated employees have better opportunities elsewhere. We also find substantial “lemming” effects: when others in the agency seek to leave, the average individual agency employee is also more likely to report the intention to leave. Findings also point to the need for additional research on public sector turnover and retention.

## Introduction

Employee turnover imposes considerable costs on organizations. In fact, one estimate suggests employee replacement costs can be up to 50 percent of the annual salary of an entry-level worker, 150 percent for mid-level employees, and 400 percent for highly specialized workers (Partnership for Public Service, 2008, p. 3). While comparable statistics have been reported elsewhere (see *e.g.*, Schlesinger & Heskett, 1991), these estimates tend to be fairly conservative insofar as they neglect many of the other direct and indirect costs that arise from employee turnover.<sup>1</sup> As an example, the Partnership for Public Service (2008) reports it can take a year for the federal government to fill existing vacancies (p. 3). While vacancies exist, agencies may experience reductions in productivity and declines in employee motivation and morale (Partnership for Public Service, 2008; Moynihan & Landuyt, 2008; Meier & Hicklin, 2008).<sup>2</sup> Turnover can also bring about harmful losses in institutional memory and knowledge that ultimately hamper organizational efficiency and effectiveness (Staw, 1980; Moynihan & Pandey, 2008; Llorens & Stazyk, 2011).

Despite its apparent importance, very little energy has been directed toward an examination of employee turnover and retention in *public* organizations (see *e.g.*, Meier & Hicklin, 2008; Moynihan & Landuyt, 2008). We separate turnover due to retirement from other aspects of retention that are likely to be more responsive to policies regarding the design of a job,

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<sup>1</sup> Such estimates are generally restricted to separation costs and those costs associated with new employee recruitment and training. Other costs are left out.

<sup>2</sup> Notably, reductions in employee motivation and morale are likely to cause other employees to consider leaving an organization as well (Partnership for Public Service, 2008).

including pay levels. Thus, the paper focuses on retention, but it does not ignore retirement intention. Our paper adds to existing research by examining a wider range of factors likely to influence turnover and retention in the federal government. More specifically, we consider what sort of impact various wage and incentive systems, employee discretion, goal and role clarity, intrinsic and extrinsic motivation, and numerous individual and organizational characteristics play in shaping employee turnover intentions. In doing so, we are able to offer a more holistic picture of the anatomy of retention across the federal government.

### **Background**

Whether public or private, organizations face considerable challenges in their efforts to recruit new employees. At the very least, recruitment is incredibly expensive, requiring organizations weigh several [possibly competing] factors. For instance, recruitment necessitates organizations balance the need for a new employee against existing budgetary constraints, severance costs, unionization issues, adjustment costs, training requirements, new capital costs, and general labor market conditions, including the compensation package offered by competing employers (Barron & Bishop, 1985). There are also specific costs associated with the search process itself, including the time and money spent recruiting (*e.g.*, advertising), screening, and interviewing applicants (Barron & Bishop, 1985). Added to these considerations are issues of adverse selection and information asymmetry. It is difficult for organizations to accurately gauge an employee's potential level of productivity. Individuals looking for work know their own level of performance better than the prospective employer. Those who apply for jobs may not be the highest quality: applicants may be seeking employment because they are not performing well in their current organization and face the threat of dismissal or, alternatively, no bonus or promotion opportunities.

When coupled with the direct and indirect costs stemming from employee replacement, recruitment challenges and uncertainties create strong incentives for organizations to retain productive workers. Unfortunately, retaining good employees is difficult since financial bonuses and promotion are costly. All organizations face budget and promotion constraints, meaning rewards for one [productive] employee frequently exhaust opportunities for other employees. In such cases, turnover is more likely, subsequently requiring organizations engage in costly efforts to recruit, select, and train replacements. In response to these challenges, private organizations rely on a complex mix of economic incentives to efficiently manage the recruitment-retention dilemma; this mix includes fixed salaries and efficiency wages that require the threat of dismissal as well as performance-related pay or promotion<sup>3</sup>—both of which induce the exertion of effort through competition (see *e.g.*, Frederiksen & Takats, 2009).

In comparison, public organizations operate in a human capital environment that is more difficult to navigate for at least four reasons. First, public organizations often lack the flexibility private organizations possess to assemble optimal contracts with employees. In large part, this is because performance is harder to measure and there is more disagreement about what constitutes “good” performance in the public sector (Langbein, 1998). Second, dismissal can be more difficult in the public sector because public employees may have property rights to their jobs (Klingner, Nalbandian, & Llorens, 2010). Third, opportunities for promotion and performance-related pay are severely constrained in the public sector, especially for employees near the top of the “heap” (see *e.g.*, Kellough & Lu, 1993; Perry, Engbers, & Jun, 2009). Finally, performance-related pay is more controversial in the public sector. Citizens frequently find the notion of paying public servants performance “bonuses” contrary to the notion of good government

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<sup>3</sup> The structure of performance-related pay can be in the form of a bonus or a piece-rate (Frederiksen & Takats, 2009).

(Kellough & Lu, 1993). Moreover, because the public sector does not sell services at a unit cost set to maximize profit and public sector workers cannot personally retain residual profits, pay for good performance inevitably becomes a zero-sum game, inviting opportunities for sabotage (Carpenter, Matthews, & Schirm, 2010).

Despite these difficulties, there are strong reasons to suspect public organizations may be better able to capitalize on the non-pecuniary aspects of employment than private organizations. Compared to private organizations, public organizations frequently attract employees who are more intrinsically motivated (Weibel, Rost, & Osterloh, 2010; Perry & Hondeghem, 2008; Moynihan, 2008; Perry et al., 2009; Houston, 2009). Further, information asymmetry between political principals and bureaucratic agents makes tenure (*i.e.*, job security) a low cost way for uninformed political principals to retain experts (Gailmard & Patty, 2007).

Low powered incentives may also be a cost effective way for public agencies to retain productive employees. Low powered incentives include non-monetary rewards, and one such incentive may be particularly effective in [public] organizations: autonomy on the job (Frey, 1993, 1997; Frey & Oberholzer-Gee, 1997; Frey & Osterloh, 2005; Weibel et al., 2010; François, 2000). It is often rational for uninformed and disagreeing legislative principals to give (some) discretion to bureaucratic agents; top-level supervisors may also find it rational to give (some) discretion to lower-level employees (Gailmard & Patty, 2007; Gailmard, 2009; Langbein, 2010; Swank & Visser, 2006).

Building on these points, Langbein (2000) provides evidence that public sector employees may have more discretion than comparable private sector workers. More autonomy may be a substitute for pecuniary rewards for these employees; it also reduces the need for an organization to hire supervisors. However, complete autonomy is not possible. Employees need

to be told what to do, but they should have the discretion to figure out how to do it. In fact, research consistently demonstrates that organizational performance is enhanced when employees have clearly delineated goals and understand their individual roles within an organization (Chun & Rainey, 2005; Locke & Latham, 2002; Rizzo, House, & Lirtzman, 1970; Pandey & Rainey, 2006; Wright, 2004; Stazyk, Pandey, & Wright, 2011). Supervisors are crucial in setting and clarifying organizational goals and individual roles for employees. In fact, research suggests supervisors' direct involvement in the goal-setting process may be even more important than participative approaches affording employees opportunities to set their own goals (Latham, Mitchell, & Dossett, 1978; Terborg & Miller, 1978; Fisher & Gitelson, 1986). However, there is also evidence suggesting supervision can reduce the trust and performance of those who are supervised (Gneezy, Meier, & Rey-Bel, 2011).

We add to previous public sector research by considering a wider range of factors likely to influence turnover intentions. Most of the existing research is relatively narrow in scope, primarily emphasizing the role individual-level characteristics (*e.g.*, sex and ethnicity) and a relatively small subset of work characteristics (*e.g.*, workload and job satisfaction) play in shaping turnover (Llorens & Stazyk, 2011; Pitts et al., 2011; Moynihan & Landuyt, 2008; Meier & Hicklin, 2008). For example, previous research shows that demographic characteristics and “job satisfaction” are critical determinants of turnover intention (*e.g.*, Pitts et al., 2011; Llorens & Stazyk, 2011). However, studies tend to overlook education's substantial signaling effect in both the internal and external labor market: employees with more education have more opportunities and are more likely to be searching for another place to work (in either the external or internal labor market) if they are dissatisfied.<sup>4</sup> Further, turnover studies often neglect many of

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<sup>4</sup> Several exceptions exist (*e.g.*, Moynihan & Landuyt, 2008; Meier & Hicklin, 2008). However, on balance, the role education plays in shaping turnover remains an understudied element in public administration research.

the factors responsible for shaping job satisfaction (*e.g.*, Pitts et al., 2011). We argue that the components of job satisfaction are not confined to salary; they include other extrinsic (*e.g.*, benefits; time off) and intrinsic (*e.g.*, liking the work, importance of the mission) elements. In addition, we contend that job satisfaction also reflects structural properties of the job. Structural properties refer to the “rules” or “norms” of the job. Two important rules define what the job is: who enforces a rule, and who tells an employee how to do a job.

For most employees, knowing what a job entails (mission clarity and clear performance measures) and having the discretion to carry out the job are important structural properties of their position. These “rules” are likely to be more important to “white collar” employees (GS and SES) than to production-level employees (WS, or wage system employees) (see *e.g.*, Latham et al., 1978; Terborg & Miller, 1978). Our research examines whether these structural characteristics of the job, along with performance-related pay, salary, and intrinsic and extrinsic job satisfaction, affect the incentive of federal employees to search for another job. We also incorporate numerous control variables, including education and characteristics of the agency in which the employee works (*e.g.*, indicators of agency structure and norms) to account for differences in outside employment opportunities and agency “cultures” that vary among employees within and between federal agencies. For example, high-education NIH employees can find employment in universities, hospitals, and in the pharmaceutical industry; they may be particularly likely to seek outside employment opportunities when everyone else in the agency is looking for a way out also. By contrast, white-collar employees in the Social Security Administration process cases that are not likely to have many private market, or public, substitutes, but they will not ignore peer effects. Additionally, along with general and specific

aspects of mission clarity, we also focus on the importance of discretion at both the individual and organizational level in affecting the incentive of employees to consider leaving their job.

We test the hypotheses that, in the public sector, clarity of the job and discretion are both non-monetary components of the intent to search for alternative employment; we also examine whether performance pay (and current salary) are monetary components of the intent to search for alternative employment. Furthermore, we examine if public organizations are more likely to use autonomy when it is most likely to be valued by the employee. Employees select the type of job they apply for, and agency managers select the type of employee who is likely to do the job best at the least cost. Agency managers can select high-level employees at lower cost by giving them more discretion. It is also likely that more educated workers place relatively more value on autonomy than production workers; educated workers earn more, and if monetary incentives diminish at the margin, then non-monetary incentives become increasingly attractive. Educated workers are more likely than those with less education to select and be selected by other knowledge-based organizations; the reverse is likely to be true for production-based organizations (see *e.g.*, Latham et al., 1978; Terborg & Miller, 1978).

Specifically, in the public sector, knowledge-based organizations are likely to be more decentralized than production-oriented organizations, and to give workers with education more discretion. Further, discretion (along with a clear understanding of mission and the job) will be more valuable to knowledge workers (those with more education or those in administrative or professional jobs) than to productive workers. Preliminary results from a survey of U.S federal government employees suggest that, compared to salary, seniority, mission clarity, and intrinsic and extrinsic motivation, less discretion is the most important determinant of intent to leave the (sub)agency by resigning federal employment or by looking for a new job in another federal



agency. Moreover, the impact of discretion on intent to stay is higher for knowledge workers and for high-level managers, compared to production workers. Specifically, the impact of discretion on intent to leave for the highest level employees (SES and GS) is statistically and substantively important, while discretion has no significant relation with intent to leave employees, holding other variables in the equations constant. Salary has no impact on intent to leave for white collar SES and GS employees, and a marginally (negative impact) for WS employees: higher salaries slightly (but significantly) reduce the intent to leave. Neither intrinsic nor extrinsic motivators, nor mission clarity, affect the intent of WS or SES employees to leave. For mid-level GS employees, mission clarity and clarity of performance measures reduces the intent to leave, but intrinsic motivators appear to increase the intent to leave. The “lemming effect” (the average intent to leave score in the respondent’s sub-agency) raises WS and GS employee’s intent to leave, but not SES employees.

### **Data, Measurement, and Methods**

We examine this issue using data from the 2005 Merit Systems Protection Board survey of workers in 56 (sub)agencies of the U.S. federal government.<sup>5</sup> We measure intent to leave the agency with responses to the question: “How likely is it that you will leave your agency in the next 12 months?” with responses that vary from “Very likely” (5) to “Very unlikely” (1).<sup>6</sup> A followup question asks, “If you plan to leave, would you be retiring (1/0); resigning (1/0); moving to another job within the Federal government (1/0).” (We do not examine intent to switch within the federal government in this analysis.) To measure intent to leave federal

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<sup>5</sup> The survey was mailed to a randomly selected sample of 74,000 employees in 24 federal agencies, and produced a response rate of 50%. The MSPB reports that the demographic characteristics of respondents did not differ significantly from the characteristics of the survey population (van Rijn, 2005).

<sup>6</sup> These codes are reversed from those in the original survey. Also, we included responses of “Don’t know/Cant’ Judge” with the middle category of “Neither likely nor unlikely.”

employment we multiply the responses to “intent to leave” ( coded from 1 to 5) by the dummy variable “plan leave by resigning from federal service”; thus respondents with no intent to leave federal employment score 0, while those who intend to leave federal service are coded with the 1-5 level of responses to intent to leave. Similarly, respondents who have no intention to retire, are coded with (0). We then measure intent to retire by multiplying the 1-5 level responses to the question “How likely is it that you will leave your agency in the next 12 months?” with the dummy variable for “plan to leave by retiring.” Thus we separate those who intend to leave (but still work somewhere else) from those who intend to retire. The result is a 0-5 response scale for both groups. Both groups require substantial search and replacement costs by the agencies they leave, but we suspect that retirement is more likely to be driven by age, while looking for other employment opportunities is more subject to aspects of the employee’s compensation package, including aspects of the design of the employee’s job. If productive employees are among the most likely to leave, this may be a net loss to the agency.

We measure only turnover intent, not actual turnover. Past research indicates turnover and turnover intent are related, and that turnover intent is useful in predicting actual turnover (see *e.g.*, Griffeth, Hom, & Gaertner, 2000; Tett & Meyer, 1993; Ajzen & Fishbein, 1980; Hom & Griffeth, 1995; Kim, Price, Mueller, & Watson, 1996; Mobley, Griffeth, Hand, & Meglino, 1979; Price & Mueller, 1986; Steers & Mowday, 1981). If a productive (*e.g.* educated, high salary) worker leaves the agency, regardless of the reason, the agency bears the costs of recruiting and training a new worker to replace the leaver. Given the fixed budget of an agency, these costs represent other, foregone, uses of the agency’s limited resources.

Using the 0 to 5 scale, the overall mean probability of looking for another job is .97; most respondents (61%) have no intention of search, but 12% report that search is either somewhat or

very likely. (See Table 1). The two agencies with the lowest means are the FAA (.51) and the SSA (.52); employees in both agencies have few substitute opportunities in the private sector. Two other agencies with the next lowest means also have employees with (relatively) few outside opportunities (in 2005): the Natural Resources and Conservation Service in the Department of Agriculture (.63) and NASA (.65). The agencies with the highest means are in DHS: the highest is the Coast Guard (1.59), with Transportation Security Administration (TSA) (1.51), FEMA (1.30), and the Immigration and Customs Enforcement (ICE) (1.29) not too far behind.

Retirement search is similarly uncommon: 65% express no intent to retire, and the mean response on the 0-5 scale is 0.85. (See Table 1.) Agencies with the lowest means include the Patent and Trade Office in Commerce (.36), and also two agencies in DHS with the high means on intent to leave: Coast Guard (.37) and TSA (.48). Employees in these agencies are probably among the youngest. The two agencies with the highest means on intent to retire are the same as the agencies with the lowest means on intent to look for jobs elsewhere: FAA (1.44) and SSA (1.22). Recall that employees in these agencies are likely to have many employment opportunities outside the agency. Relatively high means for intent to retire are also found among employees of the IRS and the Veterans Benefit Administration (both at 1.13).

Our focal theoretical independent variables describe the structure of the job. The first structural property is discretion. We measure job discretion by the sum of responses to two items. Each item records responses from strongly disagree to strongly agree, or 1 to 5 respectively to a statement. The first item is the response to the statement: “My opinions count at work.” The second is the degree of agreement with the statement: “Creativity and innovation are rewarded.” The possible range is from 2 to 10. The responses to these items are highly

related:  $r = 0.66$ . The mean is 6.8 (s.d. = 2), the median is 7, and the observed range is from 2 to 10 (see Table 1).<sup>7</sup> The agencies with the highest levels of individual employee discretion include NASA (7.6) and NOAA (7.2); the agencies with the lowest levels of employee discretion include the Patent and Trade Office (5.4), TSA (5.8), and Immigration and Customs Enforcement (5.9) in DHS.

The second structural property defines two aspects of the rules of the job, both of which set forth what the job is: mission clarity and clear performance measures. We include two indicators of mission clarity: 1) whether the employee understands the agency mission, and 2) clarity of the link between the respondent's job and agency mission. We measure mission clarity with a 10 point scale that is the sum of responses to two items: "I understand my agency's mission" (ranging from strongly disagree = 1 to strongly agree = 5) and "I understand how I contribute to my agency's mission" (measured with the same scale).<sup>8</sup> The correlation between these two items is 0.70. Individual responses range from 2 to 10, but the overall mean is very high, at 9.0 (see Table 1). Agency means vary from lows of 8.3 in DHS (FEMA and ICE), and highs of 9.4 in the Executive Office of the U.S. Attorney (in DOJ) and 9.3 in the Veterans Benefits and Health Administration.

The second structural aspect of the rules of the job refers to clear performance measures. We create a scale that measures the perceived clarity of the performance measurement system, but not how closely it is tied to pay. Specifically, we sum the responses to two questions. The first item asks how many rating levels (from 2 to 6) are used in the respondent's performance appraisal system, and the second asks how objective the measures are, ranging from 1 (least objective) to 5 (most objective). The expectation is that the number of rating levels is an

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<sup>7</sup> The scores for these items are also inversions of the original MSPB scale.

<sup>8</sup> These codes are reversed from those in the original survey.

indicator of how detailed the rating system is, and the perceived objectivity of the system is an indicator of reduced uncertainty about the job (but possibly greater likelihood of goal displacement). We sum the responses to these two items to create an indicator of how clearly the respondent views the performance measurement of his job (measurement clarity).<sup>9</sup> The resulting scale ranges from 2 to 10, with a mean of 6.1 and a median of 6 (Table 1). SSA and FDIC have among the lowest average values on this scale, with means of about 4.2, while GSA and Interior have among the highest values, with means slightly over 7. The correlation between the two structural properties of the job (mission clarity and clarity of performance measures that pertain to respondent's own job) is quite low ( $r = 0.14$ ). Thus, it may be common for respondents to work where they see a clear mission, but the rules for measuring their own performance are not so clear.

As we noted above, the scale measuring the perceived clarity of the performance measurement system does not measure how closely performance measurement is tied to pay. In many areas, employees prefer to have a job that not only has a clear measure of performance, but also closely links pay to performance. We suspect that, particularly in the federal government, where most jobs are hard to define (in contrast with many jobs in the state and local government, and in contrast with many production-type jobs in the private or public sector), a close link between pay and performance will have little effect on retention, and may even increase the propensity of federal employees to leave the current place of work. We measure the perceived link between pay and performance using two separate measures. The first question (credibility or closeness of the link) asks: "If your team performs well, how likely is it that you will receive a

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<sup>9</sup> The two measures are orthogonal ( $r = 0.04$ ). We combine them not because we believe that they are linear indicators of a common, unmeasured concept, but because the concept of clear performance measures implies both detail and objectivity, even if they are independent.

cash award or pay increase?” The responses range from 1 (very unlikely) to 5 (very likely). The second measure (clarity of the link) is the response to the question: “I understand how my pay relates to my job performance.” Responses range from “Strongly agree” (5) to “Strongly disagree” (1).<sup>10</sup> The mean score for the first measure (likelihood of cash award) is 3.1 (Table 1) and the median is 3; the observed range is from 1 to 5, with a variance of 1.95.<sup>11</sup> The observed range for the second measure is also 1 to 5; the mean is 3.6 (Table 1) and the median is 4; the variance is slightly over 1.0. The two measures are positively but weakly correlated ( $r = 0.28$ ).

Perceptions of a credible (close) link between team performance and pay (likelihood of cash award) clearly vary across federal agencies, but the pattern does not show that the means are higher in agencies with “clear” goals (*e.g.*, Social Security Administration) or in agencies with Title 5 exemptions from civil service rules (*e.g.*, DOD and DHS) (Yang & Kassekert, 2010). Employees in Commerce, EPA, NASA, and SSA report the highest scores on the likelihood of a cash award. Understanding the link between pay and performance also varies across agency, but the differences are not as large as those reported for the likelihood of a cash award.

In addition to the variables above, specific indicators of job satisfaction include both intrinsic (consumption-related) aspects of the job and extrinsic (instrumental, or money-related) aspects of the job. Two separate scales measure employee ratings of the importance of intrinsic and extrinsic values. Intrinsic values include consumption goods: actions that people take because it makes them feel good (or even because it is fun). The first scale (intrinsic values) is the sum of responses to 4 items that ask, on a 1 to 5 scale, how important each one is in

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<sup>10</sup> These also are inversions of the original MSPB scale.

<sup>11</sup> Most respondents report that they face some pay-for-performance, not unlike private sector workers in the U.S. (Bloom & Van Reenen, 2010). This study focuses not on the presence or absence of PFP but on the effectiveness of increasingly tightly or loosely linked pay-performance incentives in fostering retention.

motivating the respondent to do a good job for internal rewards: agency mission; duty as a public employee; desire to help the work unit meet its goals; and personal pride or satisfaction with the work.<sup>12</sup> The highest possible value is 20, and the lowest is 4. As a measure of scale reliability,  $\alpha = 0.70$ . As a measure of construct validity, indicative that the scale measures one underlying concept, the eigenvalue in a principal component analysis is 2.11 out of 4. This means that, together, the 4 items explain more than half of the total factor space. The scale mean = 18, s.d. = 1.8, with an observed range of 4 to 20 (Table 1). Most respondents like their work.

The second scale measures extrinsic value. Extrinsic values refer to the instrumental reasons that we work: to earn money, to minimize effort for the same salary, or to get more money for the same effort. It is the sum of responses to 4 items that ask, on a 1 to 5 scale, about the importance of money and leisure: a cash award of \$100, a cash award of \$1000, desire for a good performance rating, and a time off reward of 8 hours. The highest possible value is 20, and the lowest is 4. With  $\alpha = 0.75$ , the scale is reliable. The eigenvalue in a principal component analysis is 2.3 out of 4, meaning that the items explain nearly 60% of the factor space, suggesting that the 4 items are measuring the same underlying concept. The scale mean is 14 (s.d. = 3.1), with an observed range of 4 to 20 (see Table 1). Most respondents like their pay (or time off), but, since the mean (and median) of scores on the intrinsic value scale is higher than on the extrinsic value scale, they value the consumption aspects of their job more than the instrumental components. The two scales appear to measure separate dimensions: their correlation is only 0.17.

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<sup>12</sup> This scale is undoubtedly correlated with the public duty component of Perry's Public Service Motivation Scale (PSM) (Perry, 1996), but PSM itself is a component of intrinsic motivation. Intrinsic motivation is not necessarily a desire for public service or policy goal, but just liking a work activity (*e.g.* studying rocks), regardless of sector (Interior Dept. or petroleum industry). A large body of theory and evidence suggests that both are related to the nature of the pay system (Perry et al., 2010).

We include numerous other properties of the respondent's job and the respondent's demographic characteristics, since these variables are likely not only to affect the propensity to leave the agency, but are also likely determinants of autonomy on the job. For example, high-level supervisors have more discretion; they are also more likely than lower level employees to have outside job opportunities, and hence more likely to report that they may leave the agency in the next year. Four dummy variables measure supervisory status. Relative to having no supervisory status (the reference group), we include an indicator variable for whether the respondent is a team leader (an informal supervisory role) (13%), a supervisor (30%), a manager (who oversees other supervisors) (19%), or an SES or equivalent (3%). (See Table 1.)

We also control for whether the respondent is a production-level worker, paid under the wage system (WS), a white-collar worker (administrative or professional/technical), paid under the general system (GS), a top-level supervisor who can easily be moved from one agency to another (SES), or any of the other pay systems in the federal government. For the pay plan, GS is the reference; there are separate indicators for the wage system (4%), the SES (2.5%), and other types of pay plans (10%) (Table 1). We further examine whether the importance of discretion and other variables is different for employees in different types of pay plans; we suspect that discretion is less important for WS employees than for GS or SES employees.

We suspect that education is a particularly important source of discretion, and also a likely predictor of the intention to leave the agency. Specifically, workers with advanced degrees (MA and PhD) are likely to have more discretion on the job, but they are also likely to have more employment opportunities outside their current agency. We measure education with separate indicators for associate degree (11%), college degree (38%), master's degree (22%), and PhD degree (9%), with high school or less as the reference (Table 1). We also control for actual salary



(in thousands) as a potential source of both discretion and propensity to leave. The mean of salary in the sample is (in thousands) 87 (s.d. = 41) (Table 1).<sup>13</sup> Years of service in the agency may be related to discretion; it surely affects the propensity to leave the agency in the next year, and it is likely to be particularly important in determining intent to retire. We suspect that workers with long careers in the agency (more than 30 years, about 16% of the sample) are very likely to retire, but less likely to search for employment outside the agency. Compared to the reference group of the youngest workers, workers with 11 to 20 or with 21 to 30 years of service (about 33% of the sample in each group) may be more likely to stay, once other variables are held constant (Table 1). The reference group is the youngest group of workers, with 10 or few years of service at the agency.

We also control for gender (61% male) and for race/ethnicity with separate indicators for Asian (3%), Black/African American (12%), and white (77%), with Hispanic/Latino and other as the reference group (see Table 1).

We also examine some specific agency characteristics that may affect retention. For example, large agencies may have more alternative employment opportunities within them, reducing the incentive to leave the agency. We measure sub-agency size indirectly. Recall that the sample is a simple random sample of respondents. It follows that larger sub-agencies will have more respondents in the sample than smaller sub-agencies. Consequently, our indicator of (relative) agency size is the number of respondents from each sub-agency. The mean is 595 (Table 1), ranging from 263 (HUD) to 934 (Contract Management Agency in DOD).

We also regard discretion as a structural property of the (sub)-agency. We measure this as the number of high-level supervisors (levels 4 and 5) to the number of lower level employees in

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<sup>13</sup> We also estimated the results reported below using the log of salary (in thousands) and using a polynomial specification (salary and its square) to capture non-linear effects. Neither alteration changed the results reported below, nor did it improve the model fit.

each agency. Hierarchy can help to clarify jobs and missions, and may reduce the incentive to leave the agency; hierarchy can also make direct communication between employees more costly, increasing the incentive to leave the agency. In either case, we include it as a sub-agency level control variable. The mean ratio is .06, ranging from 0 to .4. (See Table 1.) In addition to agency size and structure, we also consider agency norms. We measure agency norms first by considering the salary structure in the agency: specifically, we include the average agency salary and the standard deviation. Previous research (Card et al., 2012) suggests that peer salaries and inequality can affect retention.<sup>14</sup> We have no a priori hypothesis about the sign of these variables: employees in high paying agencies may be more likely to stay or leave. If the employee earns less than the mean and believes she is paid fairly relative to the mean (or median), she is probably more likely to stay; if she believes she is paid unfairly, she may see to leave. Likewise, employees who earn more than the mean are probably more likely to stay, but, if they are more productive than average, they may also have more alternative employment opportunities. Similarly, the variance in agency pay can be a source of either painful or gainful diversity (Card et al., 2012; Page, 2005; Trevor, 2012). The second indicator of agency culture is the intent of peers: employees tend to copy their fellow employees. We measure peer effects as the mean agency score for intent to retire (in the retirement equation) and the mean agency score for intent to consider employment outside the agency (in the intent to leave the agency equation). Previous research finds that greater retirement by peers increases the employee's propensity to retire (Brown and Laschever, 2012), and we expect the same applies to the incentive to consider employment elsewhere.

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<sup>14</sup> We do not directly measure relative income, but when we do, the results do not differ from those reported. **NOTE: Next version: Measure this as >mean; < mean; non-linear relation.**

We report the results from regressions of the 6-point ordinal measure of intent to leave the agency on the set of independent individual level variables and agency level properties. Given the large number of theoretical relevant agency-level properties, we do not use sub-agency fixed effects. However, we do cluster the estimates of standard errors within each sub-agency. We briefly summarize the results from the analysis of retirement. We also estimated the results using ordinal logit. The results reported below do not change when we use this maximum likelihood estimator; further, the goodness of fit is consistently poorer. Since theory cannot determine the best estimator in this case, we report only the regression estimates below.

### **Results**

The results in Table 2 confirm the role of discretion in reducing the incentive of the average federal employee to leave an agency, holding constant the other variables in the regression. Specifically, for each additional point on the 10-point discretion scale, the six-point intent-to-leave scale drops by 0.11. While this is not a large value in absolute terms, the beta weight associated with discretion is 0.16. Next to indicators of age, this is the single largest beta weight among the results. It is consistently significant and negative, even with an ordinal logit estimator. At the level of one average individual, a 0.11 reduction in the intent-to-leave scale is not large, but it means that, for every 10 (average) employees, there is over a 1-point reduction in intent to leave among them collectively.

Mission clarity and clarity of job performance measurement are also important, but not as important as discretion. Specifically, for each additional point on the 10-point mission clarity scale, the 6-point intent to leave scale decreases by nearly .03 point. The magnitude is not large, and nor is the beta weight of -0.02. Like mission clarity, clear performance measurement, also measured on a 10-point scale, has a small, significant regression coefficient (-0.02) and a small

beta weight (also -0.02). Together, the relative collective importance of mission clarity and performance measurement clarity is the sum of their beta weights (Gujarati & Porter, 2009, p. 158). Together, they are less important than discretion in reducing the intent of the average employee to leave her current agency of employment.

Given the large N, and related to the issue of instrumental or extrinsic rewards, it is theoretically significant that the measures of a close and clear link between pay and performance, are *not* statistically significant. It is also theoretically significant that the actual level of pay is not (statistically) significant. This does not mean that pay is irrelevant for retention; rather, it implies that, once we control for education, supervisory status, and years of agency service, pay has no additional direct effect on retention.<sup>15</sup> Extrinsic elements of the job (the importance of a cash award of \$100, a cash award of \$1000; desire for a good performance rating; and importance of a time off reward of 8 hours) are also not significant. By contrast, intrinsic aspects of the job (importance of agency mission; duty as a public employee; desire to help the work unit meet its goals; and personal pride or satisfaction with the work) are clearly significant in affecting retention. However, the regression coefficient has an unexpected positive sign. For each point on the 4-20 point scale, the intent to leave increases by .02 (beta = .03).

Education (beyond the BA degree) clearly matters. Specifically, compared to having no higher-level degree, any degree (AA through PhD) score significantly higher on the intent to leave scale (the regression coefficients range from .12 to .31, and the betas range from 0.03 to .08). Among the degree holders, having an MA appears to be the largest driver of intent to leave. It is likely that those with higher degrees have more job opportunities outside the agency where

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<sup>15</sup> This is true if we use log pay, or if we use a polynomial functional form.

they currently work.<sup>16</sup> Similarly, those with relatively low-level supervisory responsibilities (level one) are (slightly) more likely to leave the agency. Specifically, compared to those with no supervisory responsibilities, those with level one responsibilities are more likely to express intent to leave, scoring, respectively, 0.12 (beta = 0.03) higher on the 6-point intent-to-leave scale.

Years of service at the agency is also clearly important: compared to those with 10 years or less of experience at the agency, those with 11 to 20; 21 to 30 years of experience; and over 30 years of experience score about 0.1, 0.3, and 0.7 points lower, respectively, on the intent-to-leave scale (the betas range from -0.03 to -.18, correspondingly, for each variable). Age is, of course, related to years of experience, and it has the same effect: each 10 years of age reduces intent to stay by .3 on the 0-6 scale (beta = -.19). Summing the beta-weights for age and experience implies that, overall, age-related variables are far more important than discretion. But, while important as a statistical control, prior experience and age are pre-conditions, and not subject to direct policy intervention. While it is possible to change the age mix of an agency, it is not possible to change individual age. The focus of this study is on likely current experience on the job within the agency, especially among its most educated employees.

Agency characteristics are somewhat important. The lemming effect is quite prominent: those who work in agencies with large proportions of others who intend to leave are themselves more likely to consider leaving ( $b = .83$ ,  $b = .83$ ,  $\beta = .12$ ). This suggests that agency norms may drive the behavior of individuals. Larger agencies (slightly) increase the incentive of employees to leave, while hierarchical agencies (with a higher ratio of top level supervisors to others in the agency) has no effect on the incentive of employees to leave. Compared to

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<sup>16</sup> Adding the interaction of higher-level education and discretion does not improve the model fit. Thus, education and discretion appear to have independent, direct effects.

Hispanics, African-Americans are more likely to express interest in leaving their agency of employment in the next year, while males are less likely to do so.

Type of work (wage system, career employees in the general system, or senior executives) appears to have only a marginal direct effect on intent to leave; compared to peers in the GS pay schedule, wage system employees are slightly less likely to consider leaving their agency for another job ( $b = -.15$ ;  $\beta = -.02$ ). However, the following tables show that the impact of structural properties of the job on intent to leave varies with the type of work. Specifically, the impact of discretion has no impact on reducing the intent to leave for WS employees, but it is important for GS and SES employees. The results of a Chow test to see if the separate models, with one model for each type of wage system (WS, GS, and SES), support the argument that the impact of structural properties of the job (and possibly other variables too) depends on the wage system. Specifically, the F-test value of 2 (with a large sample size) clearly rejects the null hypothesis of no difference between the models ( $p = .000$ ). Accordingly, we discuss the results for the separate models below.<sup>17</sup>

Consider first the results for the  $N = 960$  sample of production-level (WS) employees in the federal government (see Table 3). Discretion is not important to them: the regression coefficient is clearly not significant. One significant driver of intent to leave for this group is having a BA (which slightly increases intent to leave, with  $b = .32$ ,  $\beta = .08$ ). Having a higher salary (slightly) reduces the intent to leave. Employees with more than 30 years of service are less likely to intend to leave ( $b = -0.55$ ,  $\beta = -0.14$ ); nearly the same is true for employees with 20-30 years of service. The lemming effect is quite prominent: a one unit change in the average sub-agency score leads to an increase of .8 at the individual level ( $\beta = 0.11$ ).

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<sup>17</sup> We report betas for the separate models, but we do not compare betas across models; betas are only comparable within the same model.

Consider next the results (Table 4) for the largest group of federal workers (sample N = 16,695), including career administrators, technical professionals, and mid-level managers. Since this group of GS employees dominates the full sample results reported in Table 2, it is not surprising that for this group, a unit increase in discretion also reduces the incentive to leave by 0.12 points on the 1 to 5 scale (beta = -.16). Mission clarity also reduces the incentive to leave by the same magnitude as that in the full sample (b = -0.03); the same is true for job clarity (b = -0.02). Like the full sample, a clear and close link between pay and performance has no impact on intent to leave, and nor does salary or extrinsic aspects of the job, while desirable intrinsic characteristics (very slightly) increase the incentive to leave (b = .02). **HERE** Also, like the full sample, age and experience matter: compared to workers who younger, or who are earlier in their career, mid-career workers are less likely to intend to leave, while workers at the end of their career are even less likely to intend to leave the agency than their younger peers. Mobility is most probable in the first 10 years of federal service, independent of age. Also, GS workers in high salary agencies are less likely to intend to leave, while workers in more hierarchical (with more top-level supervisors relative to other employees) agencies are more likely to seek to leave. In other words, with respect to structural characteristics of the job, among the largest group in the federal workforce, individual discretion is an important determinant of the incentive to stay, but agency-level structure is important too: a flatter structure (with fewer top level supervisors) also appears to reduce the intent to leave. For this large group, education matters: relative to those with no formal education, those with post high-degrees are more likely to intend to leave the agency to look for another job, with the MA's showing the largest coefficients among the education indicators. Lemming effects also apply to GS workers: the higher the proportion in the agency that intend to leave, the more likely the respondent also seeks exit. The magnitude of

the effect for GS workers is the same as that for WS workers. In summary, for this group, aside from age-related factors, the most prominent factors associated with intent to leave are lack of discretion, and the “lemming” or contagion effect: when others consider leaving, the individual employee does also.

SES employees are the smallest of the 3 groups (sample N = 498), but, in many ways, they are quite different than the other two groups of employees (Table 5). Discretion is as important for them as it is for GS employees ( $b = -0.11$ ;  $\beta = -.16$ ). Like WS employees, neither mission clarity or job clarity are determinants of the likelihood of leaving. Similar to the other groups of employees, closely linking pay to performance is not important for retention of SES employees, and nor is salary or intrinsic or extrinsic aspects of the job. Supervisory status is also not important for this group because these are all top-level supervisors. Unlike GS and WS employees education is not significant. Like other groups of employees, mid-career SES employees are less likely than early-career SES employees to seek to leave their agencies, and late career employees are particularly less likely to seek to leave ( $b = -1.4$  compared to  $b = -1.1$  or  $-.7$  for those with careers from 10-30 years of experience. For this high level group of employees, agency size and hierarchy have no significant impact on their intent to leave. It is notable that there is no lemming effect for this particular sub-group.

The analysis of subgroups shows that, with one notable exception, having less discretion on the job is significantly and importantly associated with intent to leave. WS employees are the exception: for this group, discretion is not a significant factor. However, this is the only group for which salary is significant: a higher salary reduces the intent to leave among WS employees. Norms matter also: with the exception of high-level SES employees, employees



who work in agencies where others seek to leave are more likely to also look for other employment opportunities.

With respect to retirement, it is clear in all cases that age is the driving force: employees with 20-30 years of federal service score slightly higher than less experienced employees in expressing an intent to retire ( $b = .3$ ,  $\beta = .09$ ), while employees with more than 30 years of service express much higher intent to retire than those with less experience ( $b = 1.4$ ,  $\beta = .34$ ). Similarly, even controlling for years of experience, age predicts intent to retire ( $b = .06$ ,  $\beta = .33$ ). There is also some evidence of a lemming effect: the coefficient for mean agency intent to retire is statistically significant ( $p < .002$ ), but the substantive effect is not large. Salary is clearly not significant, and nor are any other indicators of job design, including discretion. These results describe each of the subgroups too (WS, GS, and SES employees), except that the lemming effect applies only to GS employees. (Tables not shown.)

### **Discussion**

What have we learned about the anatomy of retention in the federal government from this study? We believe there are three important takeaway messages arising from our research. First, the majority of our findings comport with existing research on the drivers of turnover and retention in private organizations. For instance, private sector research has consistently demonstrated agency and work-related characteristics, individual-level factors, and type of work influence employee turnover decisions in meaningful ways (see *e.g.*, Griffeth et al., 2000; Cotton & Tuttle, 1986; Steel & Ovalle, 1984; Mobley et al., 1979). In this sense, our findings on the importance of agency norms, individual-level discretion, tenure, and type of work (characterized by wage systems) are fully in line with existing private sector research. Our results also suggest private sector research can be used to help frame and advance studies of public sector turnover

and retention.

Nevertheless, given these similarities, it may be tempting to conclude additional research on turnover and retention in the public sector is unnecessary. We disagree wholeheartedly with this assertion for two reasons. First, private sector studies on turnover and retention are better developed and consider a wider range of factors than similar public sector studies. For instance, private sector studies often include as considerations labor market assessments, unionization, employee perceptions about the nature of one's job (*e.g.*, satisfaction with supervisor and co-workers), promotional opportunities, task repetitiveness, marital status and number of dependents, employee aptitude, intelligence and ability, past performance evaluations, and organizational commitment (Cotton & Tuttle, 1986; Mobley et al., 1979; Griffeth et al., 2000). Many of these topics remain unstudied in public administration turnover and retention research. Second, public administration scholars have long maintained and demonstrated public sector employment is subject to unique challenges and comes with unique opportunities (see *e.g.*, Rainey, 1982; Rainey & Steinbauer, 1999; Perry & Hondeghem, 2008). To the extent that differences exist across employment sectors, there are strong reasons to assume drivers of turnover and retention may also differ. As an example, public administration research frequently finds evidence that women and minorities are more likely to work in the public sector and less likely to report a turnover intention, suggesting sex, minority status, and ethnicity may all be uniquely related to turnover and retention in the public sector setting (see *e.g.*, Moynihan & Landuyt, 2008; Llorens & Stazyk, 2011).

Our second takeaway message relates to the point raised immediately above. Public administration research has amassed a wealth of evidence indicating public employees are more frequently motivated by altruistic intentions and a service ethic than their private sector

counterparts (Perry, 1996; Rainey & Steinbauer, 1999; Perry & Hondeghem, 2008). Public employees are also more likely to engage in prosocial behaviors valued by their organizations (Perry & Hondeghem, 2008; Moynihan, 2008; Houston, 2009). Although employees in both sectors appreciate the [intrinsic] benefits that autonomy and discretion bring to their jobs (see *e.g.*, Wright, George, Farnsworth, & McMahan, 1993), public administration scholarship clearly demonstrates discretion and autonomy are *necessary* prerequisites for public employees hoping to fulfill their altruistic intentions and engage in prosocial behaviors (Moynihan, 2008; Houston, 2009; Thompson, 2006; Perry & Hondeghem, 2008). In this sense, our finding that, for GS and SES workers, discretion reduces turnover intentions is unsurprising, but new to public administration research. More importantly, it suggests discretion may be a unique motivational lever public organizations can use to retain and motivate employees.

Finally, on whole, our results indicate federal agencies hoping to limit employee turnover should focus first and foremost on providing grants of discretion and autonomy (when appropriate) to employees. Discretion clearly matters most to employees engaged in intensive, knowledge-based (rather than production-based) work, and to highly educated employees. Less important, based on our findings, are the extrinsic elements of federal jobs: pay and performance-related pay. In many ways, this finding is incredibly useful for the federal government insofar as grants of discretion, along with efforts to introduce greater goal and role clarity, are comparatively inexpensive tools for retaining and motivating employees. Finally, our results point to the real need for additional studies on public sector turnover and retention.

### **Conclusions**

Scholars have long argued people are an organization's most important asset. Employees substantially influence organizational performance, and worker turnover imposes considerable

costs on organizations. Private organizations can employ a complex mix of high-powered incentives to retain workers. Public organizations, however, often lack comparable incentives, making retention more challenging. Fortunately, public employees frequently possess stronger intrinsic motives—a finding that implies public organizations can rely on other means to retain workers. Specifically, this paper has examined whether discretionary authority and goal and role clarity can be used to offset turnover intentions among federal employees.

Results confirm the benefits of discretionary authority and, in some cases, goal and role clarity, in reducing turnover intentions, indicating the federal government has multiple levers—beyond pay—at its disposal that can be utilized to affect employee retention. Findings also point to the need for additional research on public sector turnover and retention. While private sector research may be used to help frame future studies, unique aspects of the public sector setting are likely to affect drivers of turnover and retention among public employees.

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## Tables

Table 1. Descriptive Statistics

	Mean	Std. Dev.	Min	Max
leaveagency	0.97	1.50	0	5
retireagency	0.85	1.49	0	5
discret	6.8	2.1	2	10
missclear	9	1.3	2	10
payperfclose	3.1	1.4	1	5
payperfclear	3.6	1	1	5
hardmeas	6.1	1.8	2	10
intrinsic	18.2	1.8	4	20
extrinsic	14.1	3.1	4	20
AA	0.11	0.31	0	1
BA	0.38	0.49	0	1
MA	0.22	0.41	0	1
PhD	0.09	0.29	0	1
asian	0.03	0.18	0	1
black	0.12	0.33	0	1
white	0.77	0.42	0	1
male	0.61	0.49	0	1
supstat1	0.13	0.33	0	1
supstat2	0.3	0.46	0	1
supstat3	0.19	0.39	0	1
supstat4	0.03	0.17	0	1
WS	0.04	0.21	0	1
SES	0.03	0.16	0	1
other	0.1	0.3	0	1
salaryk	86.7	41.3	0	991*
yearsfed1~20	0.33	0.47	0	1
yearsfed2~30	0.34	0.47	0	1
yearsfed30	0.16	0.37	0	1
agencyNsize	595	169	263	934
ratioSUP45	0.06	0.06	0	0.41

\*error noted; not deleted.

Table 2. Regression of intent to leave on structural properties of job, pay-performance link, salary, and controls

	Coef.	RobustStd. Err.	t	P> t	[95% Conf. Interval]		Beta Coef.
discret	-0.112	0.008	-13.58	0.000	-0.129	-0.096	-0.11
missclear	-0.028	0.010	-2.76	0.008	-0.048	-0.008	-0.02
payperfclose	0.002	0.009	0.19	0.848	-0.016	0.019	0.00
payperfclear	-0.004	0.013	-0.34	0.736	-0.030	0.021	0.00
hardmeas	-0.020	0.007	-2.74	0.008	-0.034	-0.005	-0.02
intrinsic	0.021	0.008	2.79	0.007	0.006	0.037	0.02
extrinsic	-0.001	0.004	-0.22	0.823	-0.009	0.007	0.00
AA	0.145	0.029	4.94	0.000	0.086	0.203	0.03
BA	0.121	0.032	3.80	0.000	0.057	0.185	0.04
MA	0.305	0.037	8.29	0.000	0.231	0.379	0.08
PhD	0.163	0.048	3.37	0.001	0.066	0.259	0.03
asian	-0.075	0.076	-0.99	0.326	-0.227	0.077	-0.01
black	0.155	0.048	3.26	0.002	0.060	0.251	0.03
white	-0.047	0.035	-1.35	0.182	-0.116	0.023	-0.01
male	-0.117	0.025	-4.68	0.000	-0.167	-0.067	-0.04
supstat1	0.118	0.037	3.18	0.002	0.044	0.192	0.03
supstat2	-0.003	0.034	-0.09	0.931	-0.071	0.065	0.00
supstat3	0.066	0.039	1.71	0.094	-0.012	0.144	0.02
supstat4	-0.015	0.120	-0.12	0.901	-0.254	0.225	0.00
WS	-0.147	0.047	-3.11	0.003	-0.241	-0.052	-0.02
SES	0.202	0.128	1.58	0.119	-0.054	0.458	0.02
other	-0.021	0.053	-0.40	0.692	-0.127	0.085	0.00
salaryk	0.000	0.000	-0.20	0.846	-0.001	0.001	0.00
yearsfed1~20	-0.103	0.044	-2.33	0.023	-0.191	-0.015	-0.03
yearsfed2~30	-0.342	0.044	-7.82	0.000	-0.429	-0.254	-0.10
yearsfed30	-0.708	0.046	-15.44	0.000	-0.800	-0.617	-0.18
age	-0.033	0.002	-16.92	0.000	-0.037	-0.029	-0.19
agencyNsize	0.000	0.000	1.72	0.090	0.000	0.000	0.02
ratioSUP4_5	0.246	0.222	1.11	0.273	-0.199	0.690	0.01
meanProbLeaveAgy	0.828	0.067	12.37	0.000	0.694	0.962	0.12
meanPayk	-0.003	0.001	-2.01	0.049	-0.005	0.000	-0.02
stddevPayk	0.001	0.001	0.70	0.486	-0.002	0.004	0.01
_cons	2.843	0.201	14.13	0.000	2.440	3.246	

Number of obs = 20031

Prob > F = 0.0000

R-squared = 0.1651

Root MSE = 1.3648

Std. Err. adjusted for 57 clusters within sub-agency

Table 3. Wage system employees: Regression of intent to leave on structural properties of job, pay-performance link, salary, and controls

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	Beta Coef.	
discret	-0.018	0.025	-0.69	0.492	-0.069 0.033	-0.03	
missclear	-0.011	0.041	-0.27	0.792	-0.092 0.071	-0.02	
payperfclose	-0.058	0.034	-1.71	0.092	-0.126 0.010	-0.06	
payperfclear	0.042	0.039	1.10	0.278	-0.035 0.120	0.03	
hardmeas	-0.031	0.023	-1.34	0.186	-0.078 0.016	-0.04	
intrinsic	0.041	0.022	1.84	0.071	-0.004 0.086	0.06	
extrinsic	-0.029	0.015	-1.87	0.067	-0.059 0.002	-0.06	
AA	0.073	0.123	0.60	0.554	-0.173 0.319	0.02	
BA	0.348	0.151	2.31	0.025	0.046 0.650	0.09	
MA	0.216	0.227	0.95	0.344	-0.238 0.670	0.03	
PhD	0.092	0.241	0.38	0.705	-0.391 0.575	0.01	
asian	-0.052	0.301	-0.17	0.865	-0.655 0.552	-0.01	
black	0.039	0.200	0.19	0.848	-0.362 0.439	0.01	
white	-0.126	0.166	-0.76	0.449	-0.458 0.206	-0.04	
male	-0.070	0.097	-0.72	0.478	-0.265 0.125	-0.02	
supstat1	0.088	0.162	0.54	0.589	-0.236 0.411	0.02	
supstat2	-0.133	0.126	-1.06	0.295	-0.384 0.119	-0.05	
supstat3	-0.048	0.167	-0.29	0.775	-0.383 0.287	-0.01	
supstat4	(omitted)						
salaryk	-0.001	0.001	-2.04	0.046	-0.002 0.000	-0.04	
yearsfed1~20	-0.137	0.179	-0.76	0.450	-0.496 0.223	-0.05	
yearsfed2~30	-0.347	0.226	-1.53	0.130	-0.799 0.106	-0.12	
yearsfed30	-0.551	0.196	-2.80	0.007	-0.944 -0.157	-0.14	
age	-0.035	0.006	-6.16	0.000	-0.046 -0.024	-0.20	
agencyNsize	0.000	0.000	1.38	0.172	0.000 0.001	0.03	
ratioSUP4_5	-0.688	0.675	-1.02	0.312	-2.039 0.663	-0.03	
meanProbLe~y	0.808	0.185	4.37	0.000	0.438 1.179	0.11	
meanPayk	-0.002	0.004	-0.54	0.589	-0.011 0.006	-0.02	
stddevPayk	-0.005	0.004	-1.46	0.150	-0.013 0.002	-0.04	
_cons	2.492	0.576	4.33	0.000	1.338 3.645		

Number of obs = 960

Prob > F = 0.0000

R-squared = 0.1401

Root MSE = 1.3041

Std. Err. adjusted for 57 clusters within sub-agency

Table 4. General system employees: Regression of intent to leave on structural properties of job, pay-performance link, salary, and controls

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]		Beta Coef.
discret	-0.120	0.009	-13.52	0.000	-0.138	-0.102	-0.16
missclear	-0.029	0.011	-2.78	0.007	-0.050	-0.008	-0.02
payperfclose	0.003	0.011	0.32	0.749	-0.018	0.025	0.00
payperfclear	-0.011	0.014	-0.83	0.413	-0.038	0.016	-0.01
hardmeas	-0.019	0.008	-2.44	0.018	-0.034	-0.003	-0.02
intrinsic	0.021	0.009	2.35	0.023	0.003	0.039	0.02
extrinsic	0.002	0.004	0.41	0.681	-0.007	0.010	0.00
AA	0.140	0.028	5.02	0.000	0.084	0.195	0.03
BA	0.123	0.032	3.89	0.000	0.060	0.187	0.04
MA	0.311	0.037	8.45	0.000	0.237	0.384	0.09
PhD	0.195	0.052	3.72	0.000	0.090	0.300	0.03
asian	-0.085	0.071	-1.20	0.235	-0.228	0.057	-0.01
black	0.187	0.051	3.64	0.001	0.084	0.289	0.04
white	-0.025	0.037	-0.68	0.499	-0.099	0.049	-0.01
male	-0.117	0.029	-4.09	0.000	-0.174	-0.060	-0.04
supstat1	0.120	0.039	3.11	0.003	0.043	0.198	0.03
supstat2	0.007	0.037	0.19	0.847	-0.068	0.082	0.00
supstat3	0.083	0.042	2.01	0.050	0.000	0.167	0.02
supstat4	-0.312	0.179	-1.74	0.088	-0.671	0.048	-0.01
salaryk	0.000	0.000	0.25	0.803	-0.001	0.001	0.00
yearsfed1~20	-0.098	0.044	-2.21	0.031	-0.187	-0.009	-0.03
yearsfed2~30	-0.342	0.045	-7.67	0.000	-0.432	-0.253	-0.11
yearsfed30	-0.730	0.048	-15.25	0.000	-0.825	-0.634	-0.18
age	-0.033	0.002	-14.89	0.000	-0.038	-0.029	-0.19
agencyNsize	0.000	0.000	1.97	0.054	0.000	0.000	0.02
ratioSUP4_5	0.858	0.363	2.36	0.022	0.130	1.586	0.03
meanProbLe~y	0.886	0.077	11.54	0.000	0.732	1.040	0.13
meanPayk	-0.005	0.002	-3.12	0.003	-0.008	-0.002	-0.04
stddevPayk	0.002	0.002	1.40	0.166	-0.001	0.006	0.02
_cons	2.895	0.191	15.12	0.000	2.512	3.279	

Number of obs = 16695

Prob > F = 0.0000

R-squared = 0.1672

Root MSE = 1.3765

Std. Err. adjusted for 57 clusters within sub-agency

Table 5. Senior executive system employees: Regression of intent to leave on structural properties of job, pay-performance link, salary, and controls

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	Beta Coef.
discret	-0.113	0.049	-2.31	0.025	-0.212 -0.015	-0.16
missclear	-0.087	0.109	-0.80	0.428	-0.306 0.132	-0.05
payperfclose	-0.009	0.070	-0.13	0.897	-0.149 0.131	-0.01
payperfclear	0.019	0.081	0.23	0.816	-0.143 0.181	0.01
hardmeas	0.001	0.048	0.01	0.989	-0.096 0.098	0.00
intrinsic	0.022	0.058	0.37	0.712	-0.095 0.138	0.02
extrinsic	0.013	0.019	0.68	0.501	-0.025 0.051	0.03
AA	0.844	0.488	1.73	0.090	-0.137 1.824	0.08
BA	-0.205	0.434	-0.47	0.639	-1.077 0.667	-0.07
MA	-0.052	0.444	-0.12	0.907	-0.943 0.839	-0.02
PhD	-0.226	0.443	-0.51	0.612	-1.115 0.663	-0.08
asian	0.689	0.533	1.29	0.202	-0.380 1.758	0.08
black	0.209	0.390	0.54	0.595	-0.574 0.991	0.04
white	0.222	0.328	0.68	0.501	-0.436 0.880	0.06
male	0.014	0.146	0.10	0.925	-0.280 0.308	0.00
supstat1	1.137	0.795	1.43	0.159	-0.460 2.733	0.10
supstat2	-0.318	0.549	-0.58	0.564	-1.420 0.784	-0.02
supstat3	0.071	0.530	0.13	0.894	-0.994 1.136	0.01
supstat4	0.692	0.507	1.36	0.178	-0.326 1.710	0.13
salaryk	-0.001	0.005	-0.15	0.880	-0.010 0.009	-0.01
yearsfed1~20	-0.745	0.359	-2.08	0.043	-1.466 -0.025	-0.20
yearsfed2~30	-1.073	0.357	-3.00	0.004	-1.791 -0.356	-0.38
yearsfed30	-1.369	0.361	-3.79	0.000	-2.094 -0.644	-0.47
age	-0.042	0.011	-3.67	0.001	-0.065 -0.019	-0.19
agencyNsize	0.000	0.000	-0.39	0.697	-0.001 0.001	-0.02
ratioSUP4_5	-0.785	0.765	-1.03	0.309	-2.322 0.751	-0.05
meanProbLe~y	0.108	0.397	0.27	0.787	-0.689 0.904	0.02
meanPayk	-0.003	0.006	-0.51	0.610	-0.016 0.010	-0.03
stddevPayk	-0.004	0.005	-0.88	0.385	-0.014 0.005	-0.04
_cons	5.038	1.655	3.04	0.004	1.715 8.360	

Number of obs = 498

Prob > F = 0.0000

R-squared = 0.2303

Root MSE = 1.2471

Std. Err. adjusted for 52 clusters within sub-agency