Closing the Revolving Door

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Abstract

Regulators can leave their government position for a job in a regulated firm. Using granular payroll data on 22 million federal employees, we uncover the first causal evidence of revolving door incentives. We exploit the fact that post-employment restrictions on federal employees, which reduce the value of their outside option, trigger when the employee's base salary exceeds a threshold. We document significant bunching of employees just below the threshold, consistent with a deliberate effort to preserve the value of their outside option. The effect is concentrated among agencies with broad regulatory powers, minimal supervision by elected officials, and frequent interactions with high-paying industries. In those agencies, 31% of the regulators respond to revolving door incentives and sacrifice 15% of their wage potential to stay below the threshold. Consistent with theories of regulatory capture, we find that revolving regulators issue fewer rules and rules with lower costs of compliance. Using our findings to calibrate a structural model, we show that eliminating the restriction will increase the incentive distortion in the federal government by 1.3%. Combined, our results shed new light on the economic implications of the revolving door in the government.

Keywords: revolving doors, regulatory burden, bunching estimation, compensation incentives

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1 Introduction

Regulators can leave their government position for a job in a regulated firm. This flow, often labeled the revolving door, is at the center of an intense public debate. On one hand, the option to switch sides could incentivize government officials to regulate markets differently, for example, show excess leniency toward regulated firms. On the other hand, closing the revolving door could deter qualified candidates from entering public service in the first place. Despite the importance of the topic, there is little evidence on the prevalence of the revolving door incentive, its causal impact on the behavior of regulators, and the efficacy of policies which aim to limit that effect. In this paper, we use a new data set and a unique legal setting to start filling the gap. We obtain the employment records of 22 million federal employees over two decades, and exploit the fact that post-employment restrictions on federal employees trigger when the employee's base salary exceeds a threshold. We document significant bunching of employees just below the threshold, consistent with a deliberate effort to preserve the value of their outside option. We further find that bunching regulators show leniency toward regulated companies, by issuing fewer rules and reducing the economic burden of the remaining rules. Finally, we incorporate our findings into a structural model and evaluate the consequences of alternative policies.

Our analysis is centered on the post-employment restrictions which cover senior government employees (18 U.S.C. §207(c) and §207(f)). Regulators are barred for one year from communicating on matters that pertain to their former agency and from representing or advising foreign entities. Any violation is subject to criminal and civil fines and up to five years in prison. Crucially, the restrictions are triggered by a salary threshold: "senior" employee is one whose basic pay is greater or equal to 86.5% of level II of the Executive Schedule. This offers a rare opportunity to study how federal regulators respond to the revolving door: if they wish to preserve their outside option, they should stay below the cutoff salary and thus avoid triggering the post-employment restrictions.[1] We

[1] To our knowledge, crossing the threshold has no implications except for triggering the post-employment restriction. In Section 4.3 we document several tactics used by employees to stay below the threshold, most notably by giving up on promotions and accepting lower pay raises.

test this possibility using a new data set which covers the entire civilian workforce in the federal government. Obtained through repeated Freedom of Information Act requests, it contains comprehensive information on 22 million employees who worked in the federal government at any point between 2004 and 2021.

In the first part of the paper, we uncover causal evidence for revolving door incentives in the federal government. We exploit the discrete change in the value of the revolving door incentive around the salary threshold of §207: crossing the threshold triggers a one-year ban, which reduces the value of the outside option. If employees care about that outside option, they would avoid crossing the threshold and instead create a significant cluster just below the threshold. Using a formal bunching estimator,[2] we identify statistically significant bunching in 35 federal agencies.[3] This group includes financial regulatory agencies such as the Securities and Exchange Commission, and grant-making agencies such as the National Institutes of Health and the Small Business Administration. We compute two key parameters based on the bunching pattern: the pay cut regulators accept in order to stay below the threshold, and the share of the population who manipulate their pay. On average, 31% of the revolving agencies personnel respond to revolving door incentives and accept a $11,000 pay cut in order to stay below the threshold.

Subsequent tests confirm that bunching is a strategic response by agents who wish to preserve their outside option. First, we exploit the fact that the SEC was exempt from the restriction until 2013. If employees bunch to escape post-employment restrictions, we should see substantial bunching at the SEC only after 2013. We conduct our formal bunching estimation separately for the 2003-2013 and 2014-2021 periods, and find a significant bunching at the SEC only in the latter period. Second, the incentive to bunch increases when the agency is suddenly equipped with broader regulatory powers.[4] We

[2] Our methodology, outlined in Section 4.1, follows Kleven and Waseem (2013), Bachas, Kim, and Yannelis (2021), and Pan, Pan, and Xiao (2021). Based on conversations with federal government ethics attorneys and other federal employees, our methodology accounts for unique features of the federal government, for instance, mechanical clustering at the top of the pay grades.

[3] We use standard 5% confidence intervals, requiring the t-statistic of the estimated bunching range to be greater or equal to 1.96.

[4] The logic is similar to Lucca et al. (2014), who find more "revolving door" transitions during periods of intense enforcement: regulators accumulate more human capital during such periods, which increases the attractiveness of a government job and improves the value of their outside option.

exploit the passage of the Dodd-Frank Act in 2010, which directed 25 agencies to develop 451 new regulations. In a difference-in-difference setting, we show that bunching increased among treated agencies following Dodd-Frank by 6-10 percentage points. Third, we turn to employee-level analysis and find that bunchers exhibit superior performance during their government stint by earning more promotions, higher pay raises, and bigger bonuses. At the same time, as they come closer to the threshold, they accept fewer promotions and a slower salary progression. Combined, those tests confirm that bunching is a strategic response to outside job opportunities.

Our findings provide compelling evidence on the response to revolving door incentive. Note that the bunching is identified off employees who are close to the regulatory threshold and thus have a genuine dilemma whether to cross it or bunch below it.[5] Those are typically high-ranked executives within their respective agencies, and therefore identifying their response to revolving door incentives is particularly important. Furthermore, our findings highlight the heterogeneity across federal agencies, as some of them appear to respond more strongly to revolving door incentives. Digging deeper into this heterogeneity, we develop a simple model to understand which factors influence the decision of regulators to bunch. When the agent's earning potential exceeds the threshold, they have an option to bunch below the threshold. The cost of bunching is a lower salary in the public sector relative to the agent's earning potential. The benefit of bunching is to avoid triggering the post-employment restriction, which will reduce the future value of the private sector option. By comparing the cost and benefit and specifying the indifference condition, the model generates a set of intuitive predictions: bunching should increase with the expected pay in the private sector, the probability of receiving a private sector offer, and the duration of the post-employment restrictions.

Guided by the model, we examine three unique features of the revolving agencies (those with significant bunching).[6] *First*, employees in revolving agencies expect to earn higher pay in the private sector. We show that by computing the average pay in industries

[5] In the baseline case, we use employees within ±\$100,000 of the threshold (59% of the sample).

[6] To be clear, even if the agency as a whole does not exhibit a statistically significant bunching, it is still possible that some individuals engage in strategic bunching.

which are supervised by revolving agencies versus industries supervised by the remaining agencies, and find that the former is 14% higher than the latter. *Second*, revolving agencies enjoy far greater autonomy to exercise their regulatory powers. They enact rules without prior review by the White House, and they are free to independently file enforcement actions, manage their personnel, and charge fees from regulated companies.[7] The enhanced regulatory powers means that employees possess more desirable skills and knowledge, which likely increases the probability of receiving an outside offer and the expected private sector pay. *Third*, revolving agencies have more mandatory interactions with the public. For instance, they are more likely to establish advisory commissions. That, in turn, could increase the rate of outside job offers.

In the second part of the paper, we ask whether the revolving door incentivizes regulators to be more lenient or more aggressive. Existing studies find conflicting evidence,[8] and we formulate two competing hypotheses. The *regulatory capture* hypothesis states that outside job opportunities lead to regulatory leniency, as regulators hope to appease potential future employers. Therefore, we expect to find that agencies with significant bunching will impose lighter regulatory burden. The *schooling hypothesis*, on the other hand, argues that the regulatory burden will increase because regulators will strive to build their reputation and human capital. Consequently, we expect to find that agencies with significant bunching will impose a heavier regulatory burden.

In a broad set of tests, we find evidence consistent with the capture hypothesis. We start by using monthly data on the costs of compliance with all 36,000 federal paperwork regulations (from Kalmenovitz (2022)). We find that a typical revolving agency imposes 51% fewer regulations and those regulations are less burdensome: they require 51 million fewer paperwork forms, 2 million fewer hours, and $85 million fewer expenses. Additionally, using data from the Federal Register and the Unified Agenda,[9] we find that

[7]We rely extensively on the data collected by Selin (2015) and Selin and Lewis (2018), who analyze the structural features of each federal agency in the United States.

[8]We review the literature in Appendix A.1. For instance, patent examiners grant more patents to firms that subsequently hire them (Tabakovic and Wollmann (2018)). On the other hand, lenient banking regulators struggle to find private sector jobs (Agarwal et al. (2014) and Lucca et al. (2014)), while aggressive SEC trial lawyers are more likely to find one (deHaan et al. (2015)).

[9]The Federal Register is the official daily publication of the government, where each agency provides detailed progress reports on its rulemaking activities (see Kalmenovitz et al. (2021); Chen and

revolving agencies are 24.5% less likely to make any progress in their rulemaking activity. Conditional on having such activity, they have 5.1 fewer rules on their docket (compared to 7.2 rules for the average agency), and the decline is virtually uniform across significant and insignificant rules. In sum, revolving agencies are associated with significantly lower regulatory burden: they keep fewer rules on their books and lower the costs of compliance with the remaining rules. Combined, this is more consistent with *regulatory capture* theories, which predict that revolving door incentives lead to regulatory leniency. We emphasize, though, that bunching is not randomly assigned across agencies. The salary threshold provides causal evidence on the response to revolving door incentives: by making a deliberate choice to stay below the threshold, regulators reveal their sensitivity to the outside option. However, the choice to bunch is driven by a variety of factors which could in themselves reduce the regulatory burden.[10]

In the last part of the paper, we analyze alternative revolving door policies. We extend the baseline model by allowing an agent to make two additional choices: whether to enter the public sector, and conditional on entering, whether to show regulatory leniency to increase his potential private sector wage. From a policy perspective, imposing a post-employment restriction leads to a trade-off between labor supply and incentive distortion. For example, a longer ban limits the benefit of regulatory leniency, thus reducing the incentive distortion, but reduces fresh labor supply to the public sector. We calibrate the model using our empirical findings and quantify the impact of various policies. For instance, eliminating the post-employment restriction will increase recruitment by 0.1% but also increase regulatory leniency by 1.3%. Intuitively, the value of the private sector option increases when the cooling-off period is removed. More candidates opt in for government service and then show leniency toward regulated companies, a burden reduction which is valued at 457 million USD annually.[11]

Our work contributes primarily to the literature on incentives and performance of

Kalmenovitz (2020)). The Unified Agenda is a biannual publication which, among other things, ranks the importance of each pending regulation using a three-tier grading system.

[10]Our estimates are all conditional on time fixed effects and a large set of controls, such as expected private sector wage and agency power. Thus, we can rule out obvious alternative explanations to the reduced regulatory burden.

[11]We stay agnostic on whether the reduced burden is welfare-increasing.

regulatory agencies. We focus on a powerful incentive, the option to work in a regulated firm,[12] and advance the literature in three concrete ways. *First*, existing studies are subject to a basic limitation: they can "observe" revolving door incentives if and only if the employee has left the government. This complicates our understanding of how regulators respond to revolving door incentives while still working in the government. The most common approach is to correlate regulatory decisions with ex-post job transitions, and test whether aggressive regulators are more likely to transfer later on to the private sector.[13] In contrast, ours is the first paper to identify the real-time response to the outside option, while the regulator is still in the government. Using the sharp cutoff which triggers the post-employment restrictions, we directly observe the response to the outside option while the employee is still in the government, before they received any outside offer. With that, we are able to identify causal evidence for the existence of revolving door incentives in a large sample of federal employees.

Second, building on the unique legal setting, we uncover the heterogeneity across agencies and the broader consequences for regulatory burden. Existing papers pick specific agencies, implicitly assuming that all agencies respond to revolving door incentives in a similar manner, and study agency-specific regulatory actions such as bank supervision. In contrast, we utilize employment records of the entire federal workforce and find significant heterogeneity across agencies. Moreover, we link revolving door incentives to measures of regulatory burden which cut across the entire government and capture the burden borne by all industries and companies. Thus, we are able to document the broader implications of the revolving door incentives. Our findings are mostly consistent with theories of regulatory capture, that view regulation as a rent-seeking process where private actors advance their self-interests at the expense of the public good. We show

[12]Other studies explore the role of salaries (Dal Bó et al. (2013)), bonuses (Ashraf et al. (2014)), promotions (Kalmenovitz (2021)), intrinsic motivation (Bénabou and Tirole (2006)), and lifetime experiences (Malmendier et al. (2021) and Kalmenovitz and Vij (2021)). A related literature studies organizational features such as fee schedules (Kisin and Manela (2018)), field offices (Gopalan et al. (2021)), supervision (Hirtle et al. (2020); Eisenbach et al. (2016)), and jurisdictional overlap (Kalmenovitz et al. (2021)).

[13]See deHaan et al. (2015) and Lucca et al. (2014) versus Tabakovic and Wollmann (2018). An alternative strategy is to compare company outcomes, such as enforcement risk, before and after hiring a former regulator (Correia (2014); Lambert (2019); Heese (2022); Hendricks et al. (2022)). Either strategy is vulnerable to obvious concerns of reverse causality and selection bias.

that the option to switch sides can lead to regulatory capture and specifically to reduced regulatory burden on companies.

Third, we assess the efficacy of policies which aim to close the revolving door. Studies found that post-employment restrictions have limited impact on public utility commissioners (Law and Long (2012)) and assemblymen (Strickland (2020)), but significant impact on Congressional staffers (Cain and Drutman (2014)). Against this background, we offer two novel insights. First, threshold-based revolving door policies are prone to manipulation, given that agents can alter their position relative the threshold. In fact, a more stringent policy (for example, a longer cool-off period) will lead to even more strategic manipulation. Second, we quantify the consequences of alternative policies using a structural model, which we calibrate based on the full employment records and our reduced-form results. We document the joint impact of various policies on labor supply to the public sector, strategic manipulation of salaries, and regulatory leniency. Our results can inform the debate on how to further improve the performance of regulatory agencies.

Finally, our work relates to the bunching literature in public finance and labor economics (Saez (2010); Chetty, Friedman, Olsen, and Pistaferri (2011); Kleven (2016)). Classic studies document bunching in the income distribution, driven by discrete changes in the income tax rates. Our paper features a novel setting: bunching in the public sector wage distribution, driven by discrete changes in the revolving door incentive. Aside from documenting a new stylized fact, we illustrate how to use the bunching pattern to estimate structural parameters which affect the revolving door incentive. By doing so, we contribute to a growing literature which extends the bunching estimation technique to broader settings in economics and finance.[14]

[14] For instance, see DeFusco and Paciorek (2017); DeFusco, Johnson, and Mondragon (2020); Bachas, Kim, and Yannelis (2021); Bachas, Liu, and Morrison (2019); Buchak, Matvos, Piskorski, and Seru (2018); Dagostino (2018); Antill (2021); Alvero, Ando, and Xiao (2022); Ewens, Xiao, and Xu (2021); Pan, Pan, and Xiao (2021); Anagol, Lockwood, Davids, and Ramadorai (2022).

2 Background and setting

2.1 Institutional setting

Our analysis is centered on the post-employment restrictions specified in Title 18 of the U.S. Code, Section 207. The section was enacted by the Bribery, Graft, and Conflicts of Interest Act of 1962, and revised by the Ethics in Government Act of 1978 and the Ethics Reform Act of 1989.[15] Section 207 includes various restrictions, and we focus on the two which apply specifically to *senior* government employees: §207(c) and §207(f). The details that follow are based on public sources and legal articles (especially Gerlach (1991) and Congressional Research Service (2012)), and on interviews we conducted with two long-serving ethics attorneys in the federal government, who are responsible for implementing section 207 in their respective agencies.

Senior personnel are barred for one year from communicating with or appearing before their former agency in connection with any matter (§207(c)).[16] Additionally, they are barred for one year from representing, aiding, or advising foreign entities (§207(f)). Crucially, seniority depends on a salary threshold: senior employee is one whose basic pay, excluding other components such as bonus and locality pay, is greater or equal to 86.5% of level II of the Executive Schedule (EX-II).[17] The cutoff salary for seniority was originally set at level 17 of the General Schedule. It was later changed to level V of the Executive Schedule (1991), level 5 of the Senior Executive Service (1996), and finally to level II of the Executive Schedule (2003).[18] For simplicity, our main analysis will begin

[15] Pub. L. 87-849, 76 Stat. 1119 (1962), Pub. L. 95-521, 92 Stat. 1824 (1978), and Pub. L. 101-194, 103 Stat. 1716 (1989), respectively.

[16] "[A]ny person who is an officer or employee... of the executive branch of the United States..., who is referred to in paragraph (2), and who, within 1 year after the termination of his or her service or employment as such officer or employee, knowingly makes, with the intent to influence, any communication to or appearance before any officer or employee of the department or agency in which such person served within 1 year before such termination, on behalf of any other person (except the United States), in connection with any matter on which such person seeks official action by any officer or employee of such department or agency, shall be punished as provided in section 216 of this title."

[17] EX-II is associated with Deputy Secretaries and Administrators of programs such as the Environmental Protection Agency (5 U.S.C. §5313).

[18] Pub. L. 101-509, 104 Stat. 1441 (1990); Pub. L. 104-179, 110 Stat. 1568 (1996); and Pub. L. 108-136, 117 Stat. 1639 (2003). A transition period was set between 11/24/2003 and 11/24/2005. During that time, the restriction applied to any person whose pay exceeded SES-5, even if it was less than 86.5% of EX-II.

in 2004, when the final benchmark has been selected. Note that the Executive Schedule salaries are updated annually through an Executive Order. Consequently, the definition of seniority for the purpose of Section 207 is updated annually as well.

The §207(c) restriction applies to any matter, from specific regulatory actions to broad policy discussions, even if those were initiated after the senior employee left the government. It applies only to appearances and communications with the regulator's former agency. For example, suppose an ex-SEC attorney is hired by a law firm that defends clients in SEC proceedings. The attorney cannot litigate any case in court, even if it was initiated after she left the SEC. She cannot correspond with SEC employees or sit in a room where a meeting with the SEC employees is being held. The attorney can, however, provide behind-the-scenes advice to the firm's clients. If the firm also has a lobbying shop, the attorney cannot meet with SEC employees to discuss broad policies, nor can she write comment letters to the SEC with comments on specific SEC rule proposals, even if those rules are unrelated to her former position and were initiated after she has left the SEC. However, the attorney can advise other attorneys as they prepare to have such meetings or write such rules. She can also meet with other government agencies and with members of Congress to discuss SEC matters.

Each agency has a designated ethics office which monitors compliance and promotes awareness to the restrictions. That includes briefing new employees during the onboarding process and offering ethics counseling sessions for employees who are about to leave. Across the government, the restrictions fall under the purview of the Office of Government Ethics (OGE). The OGE publishes the implementing regulations (Title 5 of the CFR, Section 2641), and circulates an annual bulletin with legal updates. The Department of Justice, in coordination with the OGE, enforces the provisions of §207. Any violation is subject to criminal fines and additionally carries a maximum sentence of one year in prison, five for a willful violation. Moreover, a District Court may impose a civil penalty of up to $50,000 or the amount of compensation which the person received in violation of §207, whichever amount is greater.

In sum, the seniority-based restrictions reduce the value of the outside option of senior government officials. We exploit this fact to identify how regulators respond to revolving door incentives. Several things should be noted. First, we cannot separate 207(c) from 207(f), given that they both apply at the exact same cutoff. Second, we can identify only the marginal effect of seniority-based restrictions. The true effect of revolving door incentives is likely larger, because additional post-employment restrictions apply uniformly for all employees.[19] Moreover, the seniority-based restrictions do not necessarily set the outside option's value to zero. For example, the ex-senior regulator can still provide advice behind the scenes.[20] For those reasons, we believe that our estimates provide a lower bound to the true effect of revolving door incentives.

2.2 Data and descriptive

Our pivotal data set covers the entire civilian workforce in the federal government. We obtained it through repeated Freedom of Information Act requests submitted to various federal entities. It contains comprehensive information on any employee who worked in the federal government at any point between 2004 and 2021. We observe each employee's agency, occupation and date of accession, and annual information on location (state, county, city), salary, pay plan and pay grade, tenure, and bonus. To the best of our knowledge, the data set is free of selection bias and includes the universe of federal employees from that period.

The original data set consists of 21,898,624 employee×year observations working in 263 federal agencies. As we explain below in Section 4.1, for the formal bunching estimation we remove small agencies with insufficient amount of observations. That leaves a sample of 21,691,864 employee×year observations working in 151 federal agencies. Table 1 reports descriptive statistics. The average employee has 14.7 years of government service and earns \$68,230 (or \$86,423 in constant 2022 USD). The post-employment restriction

[19] A permanent bar (§207(a)(1)) prohibits communication with the former agency on matters on which the employee worked personally. A two-years bar (§207(a)(2)) applies to matters which were pending under the employee's official responsibility during his last year of government service, even if he did not work on that personally. A one-year bar (§207(b)) refers to employees who participated in international trade negotiations, and another one-year bar (§203) refers to ex-post sharing in profits earned by the private employer while the former regulator was still working at the government.

[20] We return to this point in Section 7 (see Footnote 49).

applies to 2.2% of the employees, whose basic pay exceeds the regulatory threshold. The bunching methodology utilizes observations within ±$100,000 of the threshold, and 59% of the employees fall within that range.

In Section 4.3, we conduct employee-level analysis based on a sample of employees who can be unambiguously tracked over time (regardless of how many employees work in that agency). To that end, we remove observations with incomplete names or names that appear more than once in a given year. This subsample includes 2,616,742 unique employees working in 257 agencies, total of 19,402,227 employee×year observations. In this subsample, the annual pay raise is 4.1%, the promotion rate is 15.7%, and the exit rate is 9.7%. We rely on those statistics to assess the economic magnitude of our findings, and to evaluate counterfactual scenarios in Section 7.

To get a better understanding of how binding the threshold is, we compute the number of ranks (pay grades) affected by it. Recall that each pay grade has a lower and upper bound, which are updated every year (as is the threshold). For each rank, we check whether it was at least in one year affected by the threshold. This happens if the rank's lower bound was above the threshold (fully affected), or if the threshold was nested between the rank's lower and upper bound. Out of 1,152 ranks, 20.9% (241) are potentially affected by the threshold. Managerial ranks are more likely to be affected by the threshold, relative to non-managerial ranks (29.7% versus 19.6%). Similarly, we find that 32% of the occupations in our sample (218 out of 682) are potentially affected by the threshold. In all 218 occupations, employees who hold them can be found either below or above the threshold. We list some examples in Table 1, Panel C. Some of the most populated occupations affected by the threshold include General Attorney, Financial Institution Examining, and Criminal Investigation. Unaffected occupations include Forestry Technician, Practical Nurse, and Custodial Working.

3 Theoretical framework

In this section we develop a simple wage model, to understand which factors influence the employee's decision to bunch. We consider an extension to this model in Section 7.1, allowing agents to choose a regulatory action.

3.1 Setting

The agent's type at time t is defined as z_t, which measures earning potential (based on various factors such as ability and experience). While the agent is working at the government, z_t follows a geometric Brownian motion with growth rate μ and standard deviation σ:

$$dz_t/z_t = \mu dt + \sigma dB_t.$$

The agent's wage at the regulator is $w(z_t) \leq z_t$. In the absence of any manipulation, the agent will receive $w(z_t) = z_t$. However, the agent can manipulate their wage by passing on a promotion or a pay raise, such that $w(z_t) < z_t$. Another adjustment occurs at the extensive margin, if employees choose to exit the government.

The agent's potential wage at the private sector is $\theta_t z_t$, where θ is the attractiveness of the private sector job relative to the public one. We can decompose θ into a wage multiplier of working in the private sector (m) and a subjective discount factor of working in the private sector (δ), such that $\theta = m\delta$. The subjective discount factor δ captures non-pecuniary factors such as the loss of intrinsic motivation and prestige. Note that, in the extreme case where $\theta = 0$, agents would never consider private sector jobs. Lastly, if the agent's wage in the public sector exceeds the regulatory threshold, $\underline{w}$, then the agent becomes subject to the §207 post-employment restriction. We define a state variable, x_t, which equals 1 if the agent's wage has crossed the threshold and 0 otherwise. If the restriction has been triggered, it reduces the effective private sector wage by a fraction τ. In sum, the effective wage in the private sector is $\theta z_t \cdot (1 - \tau x_t)$. We assume that the agent's flow utility is given by the effective wage:

$$u_t = w_t.$$

Define $V_g(x_t, z_t)$ and $V_p(x_t, z_t)$ as the value functions of working at the government and the private sector, respectively. x_t indicates whether the post-employment restriction has been triggered. z_t is a state variable which indicates the earning potential at time t. The value of lifetime wage at the private sector can be written as the present value of a growing annuity:

$$V_p(x_t, z_t) = \mathbb{E}_t \left[\int_t^{\infty} e^{-r(s-t)} \theta z_s \left(1 - \tau x_t\right) ds \right] = \frac{1}{r-\mu} \theta z_t (1 - \tau x_t), \tag{1}$$

where r is the discount rate. Note that, once an agent quits the public sector, they are unable to come back.[21]

3.2 Optimal bunching decision

To formulate the value of staying in the public sector, one should consider the decision to bunch. When the agent's earning potential exceeds the threshold ($z_t > \underline{w}$), they have an option to bunch below the threshold. The benefit of bunching is to avoid the imminent post-employment restriction, a restriction which reduces the future value of the private sector option by $\frac{\tau}{r-\mu}\theta z_t = V_p(0, z_t) - V_p(1, z_t)$. The cost of bunching is a lower salary in the public sector relative to the agent's earning potential, a reduction which equals to $z - \underline{w}$. If the agent has already triggered the restriction, $x_t = 1$, then the agent has no reason to bunch and hence $w_t(z_t) = z_t$. We assume that an offer to work in the private sector arrives with a Poisson rate of λ.[22] If the agent does not accept the outside offer, or does not receive any, they stay in the public sector for an additional period.

We distinguish between two scenarios. In the first case, the agent has already triggered

[21] Indeed, 1.2% of the agents return to government service after a stint in the private sector. Conditional on returning, the median time spent in the private sector is 3 years. For simplicity, we assume that wage growth in the private sector mirrors the public sector.

[22] For simplicity, we assume a constant λ which does not vary by factors such as age and talent.

the post-employment restriction ($x_t = 1$). If they now decide to stay in the public sector, their wage equals to their type (z_t), and the recursive form of the value function is:

$$V_g(1, z_t) = z_t + (1 + rdt)^{-1} ((1 - \lambda dt)V_g(1, z_{t+dt}) + \lambda dt V_p(1, z_{t+dt})) \quad (2)$$

Note that for simplicity we assume that, once the post-employment restriction has been triggered, the agent cannot fall back below the threshold.[23]

In the alternative scenario, which is the focus of this paper, the agent has not yet triggered the post-employment restriction ($x_t = 0$). If they wish to stay in the public sector, they have two options. One is to trigger the post-employment restriction, an option whose value is given by Equation (2). The second option is to avoid triggering the restriction. In that case, their wage equals the threshold ($\underline{w}$) and they have the option to trigger the restriction in the next period.[24] The recursive form of the value function is:

$$V_g(0, z_t) = \max \left\{ \underline{w} + (1 + rdt)^{-1} ((1 - \lambda dt)V_g(0, z_{t+dt}) + \lambda dt V_p(0, z_{t+dt})) , V_g(1, z_t) \right\} \quad (3)$$

The marginal agent $\overline{w}$ is indifferent between the two options: bunching (reducing the present wage in exchange for potentially higher private sector wage), or not bunching (a higher present wage in exchange for potentially lower private sector wage). In the simplest case of zero uncertainty, the marginal agent's indifference condition derived from Equation (3) is:[25]

$$\frac{\overline{w} - \underline{w}}{\overline{w}} = \frac{\Delta w}{\overline{w}} = \frac{1}{r - \mu} \lambda \theta \tau. \quad (4)$$

The intuition of Equation (4) is the following. The left-hand side represents the fraction of the wage that an agent is willing to given up to avoid crossing the threshold.

[23] In the data, 1.1% of the employees fell below the threshold at some point in their career, meaning that they were above the threshold at time t but fell below at time $t+1$. Additional 1.3% climbed above the threshold, meaning that they were below the threshold at time t but above it at time $t + 1$.

[24] In the data, the restriction will be triggered if the wage is greater or equal to the threshold while the model assumes the wage has to be strictly greater. This assumption does not affect the results because we can assume the threshold in the model is the real threshold minus an infinitely small positive number.

[25] The derivation can be found in Appendix A.2.1. We consider the case of zero uncertainty because (1) we can obtain closed-form solution for the optimal strategy; (2) it is a good approximation for the wage growth of public sector employees. We also provide the solution in the general case with uncertainty in Appendix A.2.2.

The right-hand side is the expected cost of the post-employment restriction. It increases with the probability of receiving an offer from the private sector (λ), the revolving door incentive (θ), and the restrictiveness of the post-employment restriction (τ). Multiplying by $\frac{1}{r-\mu}$ yields the present value of the lifetime restriction, which should equal the foregone wages. As mentioned above, θ measures the overall strength of the revolving door incentive. It bundles the wage multiplier (m) and the non-pecuniary discount factor (δ). If either one is zero, for instance, if human capital is non-transferable ($m = 0$), then there will be no bunching at the threshold and $\overline{w} = \underline{w}$. Formally, we can establish the following result:

Proposition 1: The optimal strategy $w(x, z)$ is given by the following equations:

$$w(0,z) = \begin{cases} z, & z \notin [\underline{w}, \overline{w}] \\ \underline{w}, & z \in [\underline{w}, \overline{w}], \end{cases}$$

and

$$w(1, z) = z,$$

where the marginal agent is determined by Equation (4).

Proof. See Appendix A.2.3.

We can also derive the value function of an agent working at the public sector. In the simple case in which there is no uncertainty in the growth of wage potential, we can derive the following expression:

Proposition 2: The value function of working at the public sector, if the post-employment restriction has not been triggered yet, is given by the following equation:

$$V_g(0,z) = \frac{\lambda\theta + r - \mu}{(r+\lambda-\mu)(r-\mu)} z - \left(\frac{1}{r+\lambda-\mu} - \frac{1}{r+\lambda}\right)\left[1 - (1-\lambda\Omega\tau)^{\frac{r+\lambda}{\mu}}\right] \underline{w}^{1-\frac{r+\lambda}{\mu}} z^{\frac{r+\lambda}{\mu}}, \tag{5}$$

for $z \leq \underline{w}$.

Proof. See Appendix A.2.1.

The first term of equation (5) is the discounted value of lifetime wages, taking into account the opportunity to transfer to the private sector in the future. Naturally, this term increases with the earning potential (z). Additionally, if there are no transitions to the private sector, then the first term becomes $\frac{1}{r-\mu}z$ which is the simple Gordon Growth formula for the wages earned in the public sector. This could happen if the arrival rate of the private sector job is zero ($\lambda = 0$) or if the private sector wage equals the public sector wage ($\theta = 1$). More broadly, the first term increases with the transition probability λ and with the wage differential θ (if $\theta > 1$), reflecting the possibility of moving to the private sector and earning a better wage.

The second term of Equation (5) captures the disutility of facing the post-employment restrictions. The disutility increases with the duration of the restriction (τ), because even when the employee transfers to the private sector, he would be forced to sit on the sidelines until the restrictions expires. For instance, if there is no restriction ($\tau = 0$), then the second terms becomes zero as there is no disutility anymore. In Section 7, we will build on those intuitions to assess how alternative policies affect the agent's value function and the outcomes associated with it. Additionally, the disutility decreases with the threshold $\underline{w}$ (note that $1 - \frac{r+\lambda}{\mu} < 0$), because a higher threshold means that the agent will be subject to the restrictions later on in their career. It increases with the probability of a private sector offer λ, since the likelihood of suffering from the restriction is higher, and with the earning potential z, because the agent will face the restriction sooner.

4 Evidence on bunching

In this section we provide causal evidence for response to outside job opportunities. We focus on the discrete change in post-employment restriction for senior employees, outlined in §207. This restriction creates an incentive for employees to remain below the specified compensation threshold. If regulators respond to outside job opportunities, they will be more likely to remain below the threshold where the post-employment restrictions are more lenient. If regulators are indifferent, they will not alter their behavior. Specifically, an elastic response will lead to "bunching" at the threshold, with excess mass below the threshold where the Section 207 restriction does not apply and missing mass above the threshold where the Section 207 restriction prevails.

4.1 Bunching estimation

To formally quantify the existence and extent of bunching, we follow the methodology outlined in Kleven and Waseem (2013) (see also Bachas et al. (2021) and Pan et al. (2021)). The key parameter we estimate is Δw, defined as the difference between the counterfactual compensation of the marginal buncher ($\overline{w}$) and the restriction threshold ($\underline{w}$). The marginal buncher is the employee who is indifferent between bunching at the threshold, thus avoiding the restriction, and being above the threshold. In other words, we ask how much was the marginal employee willing to forego in order to escape the post-employment restriction. To estimate Δw, we need to estimate the counterfactual distribution in the absence of the threshold. We follow the standard approach of fitting a flexible polynomial to the observed distribution while excluding a range around the threshold. This excluded range should incorporate the region affected by bunching responses. The fitted distribution is then extrapolated to the excluded region.

Concretely, we start by modeling each agency's pay distribution as:

$$N_j = \sum_{k=0}^{K} \beta_k (w_j)^k + \sum_{i=w_l}^{w_u} \delta_{i,j} \mathbb{1}(w_j = i) + \tau_j + m_j + \epsilon_j, \tag{6}$$

where N_j is the number of employees in salary bin j, w_j is the wage at the midpoint of interval j, and $K = 5$ is the degree of polynomials of the salary distribution. w_l and w_u are the lower and upper bound of the excluded region, and $\delta_{i,j}$ are dummies for bins in the excluded region. The counterfactual distribution, $\hat{N}_j$, is the predicted values from Equation (6). We use \$1,000 bins and restrict the analysis to employees with base pay within \$100,000 of the threshold. Thus, our sample is symmetric with 100 bins on either side of the threshold. The estimation is conducted at the agency level, based on how agencies are defined in the payroll data. For example, the Treasury Department consists of the Internal Revenue Service, the Comptroller of the Currency, the Secret service, and other sub-agencies. We treat each sub-agency as a separate unit.[26] We include in the analysis only agencies that satisfy two conditions: at least 1,000 observations in the estimation range (±$100,000 around the threshold), and at least 100 observations on each side of the threshold (100 above and 100 below). In other words, we exclude agencies where too few workers are being compensated enough to be near the threshold. While there may be bunching in the excluded agencies, we do not have sufficient statistical power to identify it.

Federal employees may cluster at the top of their pay grade, awaiting promotion to the next pay grade. As an illustration, we plot the distribution of pay for all GS (General Schedule) employees in 2007. The visible peaks in the distribution are all aligned with the top of grades GS-7 through GS-15. We also plot the distribution of pay for our entire sample (Figure A.1), and we still observe the two prominent peaks which represent the top pay in GS-14 and GS-15.[27] Many agencies have idiosyncratic pay scales but face a similar phenomenon of clustering at the top of the pay grades. To address this feature, we first verify that the threshold of §207 does not overlap with the top pay of any specific pay grade. Moreover, we augment Equation (6) with τ_j, and indicator which equals 1 if one of the agency's max pay grades is nested within bin j. With that, our counterfactual distribution accounts for mechanical clustering at those max points.[28] Additionally, some pay grades are reserved for managerial positions, which are considered competitive and perhaps too cumbersome for many career employees. Since the number of observations per grade also depends on this classification, we add the indicator m_j for pay grades that are associated with managerial positions.

The lower bound of the excluded region (w_l) is determined by visual inspection. Based on inspecting the excess mass to the left of the threshold, we choose w_l as being $5,000

[26] In unreported test we used the parent agency (Treasury) as the unit. The advantage is that we "lose" less agencies due to insufficient number of observations. However, as the example illustrates, many sub-agencies are independent from each other.

[27] For instance, the max salary for GS-15 is $23,000-$29,000 below the threshold, which corresponds to the peak around $25,000 below the threshold.

[28] Note that the top pay changes every year, while our estimation pools all years. Additionally, some agencies have multiple pay grades and some pay grades are scarcely populated. To address all those issues, we weight the indicators by the number of employees that work in that pay rank at the agency in a given year.

below the threshold.[29] To identify the upper bound (w_u), we require that the excess mass equals to the missing mass. The reason for this condition is that, in the region affected by bunching responses, there is excess mass created at or just below the threshold by agents who would otherwise be just above the threshold in the absence of restrictions. Excess mass ($\hat{E}$) is defined as the difference between observed and counterfactual bin counts, from the lower bound (w_l) to the threshold. Equivalently, missing mass ($\hat{M}$) is the difference between counterfactual and observed bin counts in the area between the threshold and the upper bound (w_u).

$$\hat{E} = \frac{1}{N} \sum_{j=w_l}^{\underline{w}} (N_j - \hat{N}_j),$$

$$\hat{M} = \frac{1}{N} \sum_{j>\underline{w}}^{w_u} (\hat{N}_j - N_j),$$

where N is the total number of observations in the sample. We determine w_u by varying the number of excluded bins to the right of the threshold, estimating Equation (6), obtaining $\hat{N}_j$, and calculating $\hat{E}$ and $\hat{M}$. Following this iterative process, we choose the w_u for which $\hat{E} - \hat{M}$ converges to 0.

At the end of the iterative process, we obtain an estimate of Δw: the number of excluded bins to the right of the threshold multiplied by bin size ($1,000 in the base case). Dividing Δw by the threshold ($\underline{w}$) yields the key parameter on the left side of Equation (4). This methodology also yields an estimate of the fraction of strategic agents who respond to the revolving door incentive. We first compute the fraction of *nonstrategic* agents, defined as the actual mass in the dominated region $(\underline{w}, \overline{w})$ divided by the counterfactual mass in the same region. The intuition is that all the agents in this region should prefer to bunch at the threshold, and those who remain there are nonstrategic. Therefore, the fraction of strategic agents is given by one minus the fraction of nonstrategic agents:

$$\hat{\alpha} = 1 - \frac{\frac{1}{N} \sum_{j>\underline{w}}^{w_u} N_j}{\frac{1}{N} \sum_{j>\underline{w}}^{w_u} \hat{N}_j},$$

[29]Using $10,000 instead yields similar results.

where the second term is the fraction of nonstrategic agents.

To calculate standard errors, we follow the bootstrapping approach in Chetty et al. (2011). We sample with replacement the residuals from Equation (6) and add them to $\hat{N}_j$ to get a new distribution of pay. We then estimate Equation (6) with this new distribution and undertake the iterative process described above to estimate Δw and $\hat{\alpha}$. We repeat this resampling process 500 times. The standard deviations of the estimates from these 500 samples are the standard errors of the respective estimates.

The validity of the bunching estimate relies on several assumptions. *First*, the counterfactual distribution would be smooth in the absence of the §207 threshold. It effectively means that there are no other policies at the threshold that would induce employees to move. *Second*, other employment terms do not change at the threshold due to the presence of the post-employment restriction. To the best of our knowledge, both assumptions are correct.[30] *Third*, bunchers come from a continuous set such that there exists a well defined marginal buncher. This is a fairly weak assumption as we require the sample to have a minimum number of observations above the threshold.

4.2 Main results

We conduct the bunching estimation separately for each agency. Figure 1 demonstrates the output of our bunching estimator for three agencies: the National Institutes of Health, the Small Business Administration, and the Environmental Protection Agency. We plot the empirical distribution of salaries (in black line) and the counterfactual distribution based on Equation (6) (in red dotted line). Salaries are expressed as the difference from the cutoff salary which triggers the post-employment restriction. For example, the value $0 is for employees whose salary equals the threshold. At the NIH and SBA, there is an unusual spike just below the threshold, over and above the spikes predicted by the counterfactual distribution (e.g., clustering at the top of the pay grades). This suggests

[30] We search the entire text of the U.S. Code for the term "86.5" (which specifies the regulatory threshold), and find only two results: our §207, as well as a measure of engine efficiency (42 U.S. Code 6313). We further search the entire text of the Code of Federal Regulations for the terms "86.5" and "pay" (jointly). Aside from the regulations implementing §207 (5 CFR 730 and 5 CFR 2641), we find no relevant regulations using this pay threshold.

that employees are willing to sacrifice a portion of their salary, in order to stay just below the threshold and preserve the value of their outside option. We then denote the lower bound (w_L) and the upper bound (w_U) of bunching agents, that is, the group of employees who give up a portion of their salary to stay below the threshold. At the EPA, on the other hand, the spikes are fully predicted by the agency's counterfactual distribution (Equation (6)). Thus, bunching acts as a revealed preference and uncovers the sensitivity of federal regulators to the outside job opportunities.

Repeating the estimation for each of the 151 agencies in our sample, we differentiate between two groups of agencies. In one group the bunching is statistically significant, using standard 5% confidence intervals. This means that the t-statistic of the estimated bunching range (Δw) is greater or equal to 1.96. The statistically significant clustering reveals that those agencies are highly responsive to revolving door incentives, and we therefore refer to those as the *revolving group*. The second group consists of agencies for which we cannot reject the null that the distribution around the threshold is smooth (no bunching).[31] In contrast to the first group, those agencies appear largely indifferent to revolving door incentives. Consequently, we refer to those as the *indifference group*.

Table 2 reports the detailed output of the bunching estimation. In Panel A, we list the composition and size of the two groups. The revolving group includes 3.2 million employees across 35 federal agencies. Several financial agencies belong to this group, including the Commodity Futures Trading Commission and the Securities and Exchange Commission, as well as agencies that are responsible for managing and distributing government funds such as the Small Business Administration, Farm Credit Administration, National Institutes of Health, Overseas Private Investment Corporation, and the Federal Retirement Thrift Investment Board. The indifference group is larger, with 18.6 million employees across 116 agencies. This group includes large cabinet departments such as Veteran Affairs and independent agencies such as the Internal Revenue Service, Social Security Administration, and Environmental Protection Agency.

Focusing on revolving agencies, Panel B of Table 2 summarizes the magnitude of the

[31] Figure A.2 in the Appendix plots the distribution of the t-statistic across agencies. Among the indifferent agencies, the median is 0 and the 90^{th} percentile is 0.74.

response to post-employment restrictions (for brevity we list only 15 agencies; the full list is in Table A.5). For each revolving agency, we report two key parameters. The first is the salary which the marginal employee is willing to give up, in order to stay just below the legal threshold (Δw). The second is the fraction of strategic employees, who are willing to sacrifice portion of their salary in order to preserve their outside job opportunities (α).[32] For example, at the National Aeronautics and Space Administration (NASA), 45% of the population respond to revolving door incentives and accept a \$3,000 pay cut in order to stay below the threshold (which is 3% of the average salary at the agency). Taking weighted average across all revolving agencies, we find that the marginal employee is willing to give up \$11,275 in annual salary or 14.9% of the average salary in their agency, to avoid triggering the post-employment restrictions. The average shares of strategic agents is around 31.2%, which means that nearly one-third of the employees in revolving agencies are actively considering the private sector jobs.

Two issues may lead us to underestimate the bunching intensity. *First*, some employees may quit their job altogether to avoid the §207 restriction.[33] Kleven and Waseem (2013) show that these extensive margin responses should only occur in a region far off the threshold, and thus the extensive margin bias will mainly enter via functional form misspecification. Per their recommendation, we estimate bunching with 6 degree of polynomials (rather than the baseline 5). Our results remain similar which suggests that extensive margin responses do not play a large role in our setting. *Second*, employees may struggle to keep their salary precisely below the threshold, and thus some employees who are further below the threshold could in fact be strategic bunchers. To address this concern, we use \$10,000 below the threshold as an alternative lower bound for the bunching region (rather than \$5,000). This accounts for the possibility of a fuzzy bunching, given that employees may not be able to stay just below the legal threshold. Our results remain similar.

[32] Note that even if the bunching range (Δw) is statistically significant, the bunching fraction (α) can be insignificant. This is because the estimation of α relies on the estimation of Δw, which inflates the standard errors.

[33] As discussed below (Section 4.3), employee-level analysis suggests that bunchers are 8 percentage point more likely to exit, compared to employees who never bunch and never cross the threshold.

Finally, note that we rely on the statistical significance of the estimated bunching range. One might be concerned that those results simply reflect noise in the payroll data. As explained in Section 4.1, we restrict the analysis to agencies with sufficient statistical power and our methodology also accounts for the unique features of the federal payroll. That includes clustering at the top of the pay grades, various definitions of agencies, and fuzzy bunching at different ranges. To add another benchmark, we test how many agencies would be identified as bunching due to noise, under the null of no bunching. To that end, we define a pseudo-threshold that is $20,000 below the true threshold (this is also 10% lower than the true threshold in 2021). We then repeat the bunching estimator for each agency around each pseudo-threshold. Only three agencies have a statistically significant bunching relative to the pseudo-threshold. This bolsters our confidence that our estimates based on the true threshold reflect strategic response rather than statistical noise.

4.3 Employee-level analysis

In this section, we exploit the granularity of our data and turn to employee-level analysis of strategic bunching. Our goal is to study the mechanisms of bunching and the unique characteristics of employees who choose to bunch. To that end, we focus on employees who can be unambiguously identified and tracked over time (as in Kalmenovitz and Vij (2021)), a sample of 2,616,742 unique employees and 19,402,227 employee×year observations. We define a potential buncher in a reduced form manner as someone within $[-\$5,000, -\$0)$ of the post-employment threshold. This value corresponds to w_l in our formal bunching estimator. Out of 2,616,742 unique employees, 25,466 or about 1% bunched at least once during their career. Conditional on ever bunching, the average employee spends 2.2 years in the bunching region.

Table 3 compares the career trajectories of bunchers (employees who were at least once in the bunching region) and non-bunchers (employees who never entered the bunching region). We restrict the sample to employees who were within $\pm\$50,000$ of the threshold at least once. Overall, bunchers appear to exhibit better performance relative to non-bunchers. They receive more promotions and higher pay raises, and obtain more bonuses that are also larger. All the differences are statistically significiant and economically large. For instance, bunchers receives nearly twice the pay raise than non-bunchers in percentage points (17.6% versus 9%). These univariate comparisons suggest that bunchers appears to be doing better than those who never bunch.[34]

Next, we turn to study the dynamic of bunching. Our interviews with ethics attorneys, as well as informal conversations with multiple federal employees, point toward two key mechanisms: passing on promotions and accepting lower pay raises. We test those mechanisms in the following OLS specification:

$$y_{i,a,t} = \alpha + \beta \cdot JustBelow_{i,t} + \gamma \cdot tenure_{i,t} + \lambda \tag{7}$$

where $y_{i,a,,t}$ is the outcome for employee i at agency a at time t. One outcome is a promotion indicator, which equals one if the employee was promoted between time $t-1$ and time t. Conditional on not receiving a promotion, we also compute the percentage change in salary between time $t-1$ and time t. The primary independent variable, $JustBelow_t$, equals 1 if the employee is in the bunching region just below the threshold at time t and 0 otherwise. We control for tenure, an important determinant of both pay and promotion, and cluster standard errors at the employee level. In this specification, we focus on a sample of employees who at time $t-1$ were within $[-\$50,000,\ -\$5,000)$ of the post-employment restriction threshold, and at year t were within $\pm\$5,000$ of the threshold. Thus, we compare employees who inched into the bunching range to those who have crossed the threshold. We add rank and year×agency fixed effects, comparing employees at the same hierarchy level and within the same agency.

Table 4 reports the results. We find a lower promotion rate among bunchers, and the differences are statistically significant and economically large: bunchers are 18 percentage points less likely to be promoted, which corresponds to 64% of the sample mean. In terms

[34]In the Appendix (Table A.1) we split the sample of never-bunchers into two subsamples: those who cross the threshold and those who never crossed the threshold. We find that bunchers have better performance than employees in both these two groups. Note that the pay is mechanically higher for those who crossed the threshold.

of pay raise, conditional on not receiving a promotion, bunchers receive an increase in base pay (adjusted pay) that is 3.8 (3.4) percentage points lower than those who cross the threshold. Again, the magnitude is significant and equals 55% of the sample mean. Interestingly, there is no difference between the two groups in the probability of receiving a performance-based bonus. This provides a nice placebo test, since the bonus is a measure of performance but has no role in the bunching decision.

Finally, we examine the decision to exit the government. On one hand, bunchers may decide to exercise their outside option early on and thus exhibit higher exit rates. On the other hand, staying for a longer period of time may increase their option value by accumulating human capital and reputation. We estimate Equation (7) with an outcome that equals 1 if the employee left government service between time t and time $t+1$. While the coefficient is insignificant, it is positive. We dig deeper into this question in two ways. First, we focus on a sample of employees who bunched at least once and never crossed the threshold. We add employee fixed effects, to examine how the employee's behavior changes as they approach the threshold from below. Here, the probability of exit increases by 19 percentage points nearby the threshold, a statistically and economically significant effect. Lastly, we focus on a sample of employees who never crossed the threshold, including those who never bunched and those who bunched at least once. Here, the probability of exit increases by 8 percentage points nearby the threshold.

In sum, the analysis highlights the likely mechanisms for bunching: as employees come closer to the threshold, they accept fewer promotions and a slower salary progression. Moreover, even though bunchers exhibit superior performance during their government stint, they are more likely to exit from the government. Taken together, the results provide additional evidence to our central argument: bunching below the threshold is a strategic choice by regulators, to preserve the value of their outside options. Finally, our findings raise the possibility that strategic bunching could be visible to the leaders of the organization. While we cannot test this directly, our conversations with government officials from various agencies provide mixed evidence on the prevalence of such awareness.

4.4 Validation tests

In this section, we present additional evidence that bunching is a strategic response of employees who wish to preserve their outside option. We start by presenting two broad tests, and then proceed to discuss specific concerns.

The OGE can exempt certain positions from the restrictions, if they create an undue hardship on the agency. During our sample period, the only agency receiving such exemption was the SEC in 2003. The agency has been transitioning to a new pay system and gave substantial pay raises across the board, which could have subjected employees to the post-employment restrictions (Kalmenovitz (2021)).[35] In June 2013, however, the agency requested to revoke all those exemptions. The request was granted and the exemptions expired effective on April 2, 2014.[36] Those changes serve as a useful validation test. If employees bunch to escape post-employment restrictions, we should see substantial bunching at the SEC after 2013, but not during 2003-2013 when employees were exempt from the restrictions. We divide the SEC sample into two periods, 2003-2013 and 2014-2021, and conduct our formal bunching estimation separately for each group. Indeed, we find a significant bunching only in the latter period. Those results are summarized in Figure 2. In the early period, the observations are scattered around both sides of the threshold with no obvious bunching. In the latter period, on the other hand, there is significant clustering just below the threshold. This is reassuring, because it shows that employees cluster below the threshold only when that threshold triggers post-employment restrictions.

In a separate test, we exploit the time-series variation in the incentive to bunch. Lucca et al. (2014), who trace career transitions of banking regulators, find greater flows between the public and private sectors during periods of intense enforcement. One possible reason is that regulators accumulate more human capital during such periods, which increases

[35] The first exemption was granted in November 2003 and covered the position of Deputy Chief Litigation Counsel in the Division of Enforcement, all SK-17 positions, and SK-16 and lower-graded SK positions if supervised by employees in SK-17 positions. In December 2003, the exemption was broadened to include all other SK positions (even those who are not supervised by SK-17 employees).

[36] See announcements in the Federal Register on March 8, 2007, October 3, 2013, and January 2, 2014. The original effective date was January 2014, but it was pushed to April to allow the SEC to educate its employees on the subject. The exempted positions are listed in Appendix A to 5 CFR 2641.

the attractiveness of a government job and improves the value of their outside option. Using a similar logic, we hypothesize that the incentive to bunch increases when the agency is suddenly equipped with broader regulatory powers. We exploit the passage of the Dodd-Frank Act in 2010, which directed several federal agencies to develop new regulations as part of a broad overhaul of the financial system. Using data from Chang et al. (2023), we identify 25 agencies working on 451 draft regulations related to Dodd-Frank. We then estimate the following regression in the employee-level sample:

$$Distance_{i,a,t}^{X} = \alpha + \beta \cdot DoddFrank_a \times Post_t + tenure_{i,t} + \lambda \tag{8}$$

The key independent variable is $DoddFrank \times Post$, where $DoddFrank = 1$ if the agency formulates rules implementing the Dodd-Frank Act, and $Post = 1$ for years after the agency started formulating the rules. $Distance^X$ takes the value 1 if the difference between the employee's pay and the threshold is between 0 and X, where X takes a range of values between -10,000 to -2,000. We expect to find that $\beta > 0$, meaning that bunching increases among treated agencies. We include fixed effects for agency-rank, employee, and year. The results are reported in Table 5. The estimates in the first three columns provide strong support for our hypothesis. Regardless of the distance below the threshold chosen, there is a strong positive and significant coefficient on the key independent variable. Following Dodd-Frank, an employee in a treated agency is 6-10% more likely to bunch. This is after controlling for the agency and rank, the year, as well as the employee's own time-invariant characteristics. In the last three columns, we look at symmetric windows on the other side of the threshold, and test if, following Dodd-Frank, there is an increase in employees with salaries just above the threshold in affected agencies. We find no evidence to this effect. This placebo test provides further support for our hypothesis since there is no strategic benefit to being just above the threshold. At the same time, this test rules out that our prior results are merely due to increased salaries in affected agencies.

In sum, we find that bunching responds to exogenous shifts in the incentive to bunch. It appears if and only if the threshold becomes binding, and it intensifies when the agency's portfolio expands which opens up more private sector opportunities. Both results are consistent with bunching as a strategic response to outside job opportunities, and any alternative explanation must be consistent with those results. We now turn to discuss two such alternative explanations. One possibility is that bunching is not strategic, but is rather driven by an omitted variable (quality): poor performers receive lower pay raises and stay below the threshold, regardless of their outside option. We believe this is inconsistent with our findings. First, as shown in Section 4.3, bunchers are in fact top performers relative to their peers and appear to strategically slow down their progression as they approach the threshold. This is inconsistent with the concern that bunchers are merely poorer-performing employees, who are unable to climb higher in the government hierarchy due to lack of available positions. Moreover, if bunching is simply a collection of poor performers, we should have observed similar clusters at values close to the threshold. We find no such clusters in our placebo exercises, suggesting that the bunching is driven entirely by the specific threshold value, and not by an omitted variable. Finally, if poor performance drives bunching, then exogenous changes in the incentive to bunch should have had no impact on the observed bunching.

A separate possibility is that bunching is driven by a promotion bottleneck: there are too few available positions above the threshold, or those positions are cumbersome. Either way, lack of suitable opportunities force excess number of employees to stay below the thresholds. We believe this explanation is insufficient. First, our counterfactual distribution already accounts for clustering at the top of the agency's pay grades due to promotion bottlenecks. It also accounts for the fact that some pay grades are reserved for managerial positions, which are more competitive and perhaps too cumbersome for many career employees (see Section 4.1). Thus, the excess clustering we identify cannot be attributed to those bottlenecks. Second, to our knowledge, there are no material changes in responsibilities specifically around the threshold. Recall that the threshold itself does not overlap with the top of any pay rank, and moreover it applies to many non-managerial ranks (Section 2.2). Third, bunching occurs only below the threshold, not at a pseudo-threshold slightly below it. If promotion bottlenecks were the concern, we should see significant bunching even further away from the true threshold. Fourth, bunching responds to exogenous changes in the applicability of the threshold (SEC post-2013) and in the allure of the private sector (Dodd-Frank). To our knowledge, those exogenous events did not affect the promotion patterns in the treated agencies, only the incentive to bunch strategically.

5 Origins of revolving door sensitivity

In Section 3, we derived the specific conditions which lead to strategic bunching behavior (summarized in Equation (4)). In Section 4, we classified federal agencies into two groups: one significantly responds to outside job opportunities (bunch), while another group is indifferent (smooth). In this section, we use the predictions from our model to explain the division inside the government. Our findings are summarized in Table 6.

5.1 Power and autonomy

One factor which may affect the revolving door sensitivity is agency power. If the agency has greater power over regulated companies, then the skills and knowledge employees develop while working at the agency have greater value from the companies' point of view. This, in turn, would increase the rate of outside offers (λ) or the public-private pay differential (θ). Either way, employees in powerful agencies have a greater incentive to remain below the regulatory threshold. The notion of power is not easy to quantify, and we rely on data from Selin (2015) and Selin and Lewis (2018), who describe the structural features of each federal agency in the United States.[37] Note that those features do not vary over time during the sample period. Therefore, our empirical strategy is to compute the difference in average characteristic across groups, and evaluate the statistical significance of the difference.

We find that revolving agencies have similar statutory powers as indifferent agen-

[37] The studies were written in close collaboration with the Administrative Conference of the United States, a federal agency tasked with studying administrative processes and procedures within the federal government. We provide more detail on the methodology in Table A.3.

cies, but they enjoy greater autonomy to exercise those powers. Revolving agencies enact regulations without OMB review,[38] file enforcement lawsuits independently,[39] and communicate directly with Congress.[40] From an operational point of view, revolving agencies tend to be standalone entities and none belongs to the Executive Office of the President. In contrast, the majority of indifferent agencies are components of cabinet departments or other large agencies. Moreover, revolving agencies are authorized to independently manage their personnel and to raise funds.[41] Additionally, the leadership of revolving agencies is better insulated from political influence: in the majority of the revolving agencies (58.3%), the leadership has fixed terms. Finally, Selin (2015) develops two comprehensive independence scores: one represents the independence of the agency's decision-making process, and another represents the independence of the agency's leadership.[42] Along both dimensions, we find that revolving agencies have a significantly higher independence scores.

5.2 Interactions with the public

An additional factor that could explain the divergence across agencies is transparency. If the agency interacts with the public more frequently, it would likely increase the rate of outside job offers (λ) and therefore encourage bunching below the threshold. Indeed, we find some evidence that revolving agencies have greater interactions with the public. First, 33% of the revolving agencies are subject to Government in Sunshine Act of 1976, compared to only 13.3% of the indifferent agencies. The Sunshine Act intends to increase the transparency of the federal government. Most importantly, covered agency must hold public meetings (rather than close-doors ones) and avoid ex-parte communications with interested parties. Second, 25% of the revolving agencies are authorized to establish

[38]They are exempt from submitting all regulatory actions to the administrator of Office of Information and Regulatory Affairs (Exec. Order No. 12866, 58 Fed. Reg. 51735 (1993); 44 U.S.C. §3502).

[39]The Attorney General (Department of Justice) has the default authority over all litigation to which the United States government is a party, unless otherwise authorized by law.

[40]Legislative bypass authority means that the agency does not have to submit its communications to Congress to OMB for coordination and clearance prior to transmittal to Congress (OMB Circular A-19). All agencies are subject to Congressional oversight, and there are no meaningful differences in terms of number of agency reports and number of committees overseeing the agency.

[41]However, no agency is able to bypass OMB budget review.

[42]Each score is a weighted average of a subset of the above-mentioned individuals parameters.

advisory commissions, while only 7.8% of the indifferent agencies have similar provisions. Advisory commissions (or committees) are typically a panel of external experts, whose role is to collectively advise the agency on various matters related to its core mission. For example, the Investor Advisory Committee advises the SEC on initiatives to protect investor interests and to promote public trust. However, in practice, a quarter of the indifferent agencies have advisory commissions.

5.3 Public-private pay gap

Finally, a key factor contributing to bunching behavior is the expected pay in the private sector. If the outside job opportunity carries a significant pay raise (high m), then employees are more motivated to stay below the threshold in order to preserve that outside option. To support this conjecture, we would need information on the salary ex-regulators expect to receive after leaving government service. That data is not in our possession. Instead, we use the following proxy for the private sector wage which regulators at agency a expect:

$$PrivateWage_{a,t} = \sum_{j \in J} \lambda_{a,j} \cdot \overline{\omega}_{j,t}, \tag{9}$$

where $\overline{\omega}_{j,t}$ is the average salary in industry j at time t, and $\lambda_{a,j}$ is the probability that ex-regulators from agency a will accept a job in industry j. To compute $\overline{\omega}_{j,t}$, we obtain the average annual wage for in each 2-digit SIC industry from the Quarterly Census of Employment and Wages (QCEW).[43] For an employee who works in agency a, not all industries are equivalent. For example, ex-attorneys at the Environmental Protection Agency are more likely to work as general counsel for a manufacturing company than for a financial services firm. We capture this heterogeneity with $\lambda_{a,j}$, which summarizes the relations between each agency a and industry j. Relying on lobbying data from

[43] A similar data set, the County Business Patterns, covers a smaller number of establishments. Note that QCEW uses NAICS codes while the lobbying data described below is in SIC codes. We convert 6-digit NAICS codes to 4-digit SIC codes using the weighted SIC-NAICS crosswalk provided by Schaller and DeCelles (2021), and aggregate the information to the 2-digit SIC level.

OpenSecrets, we compute the dollar expenses each industry has spent on each agency:[44]

$$Expenses_{a,j} = \frac{1}{Agencies_j} \cdot \frac{1}{14} \cdot \sum_{t=2008}^{2021} Expenses_{j,t},$$

where $Agencies_j$ is the number of agencies that industry j has lobbied, and $Expenses_{j,t}$ is the dollar expenses the industry has spent at time t. In words, we aggregate the lobbying expenditures of industry j across all years (2008-2021), and allocate them equally across all the agencies which the industry has been lobbying. Finally, we define the exposure of agency a to industry j as:

$$\lambda_{a,j} = \frac{Expenses_{a,j}}{\sum_{j \in J} Expenses_{a,j}}, \tag{10}$$

which is simply the fraction of agency a's lobbying expenses that originated from industry j, out of total lobbying expenses by industry j. We then merge the exposure measure ($\lambda_{a,j}$) with the wage measure ($\overline{\omega}_{j,t}$) to compute the expected private sector wage ($PrivateWage_{a,t}$). Table A.2 provides summary statistics. The median agency is lobbied by 20 industries, attracts \$1.3 million in lobbying expenditures, and expects a private sector wage of \$73,767. Note that we do not interpret this last number literally; it relies on the full wage distribution from the private sector, while we study senior federal employees who will likely land at a higher percentile of the wage distribution. Therefore, our focus is on the cross-sectional variation in the expected private sector wage, rather than on its levels.

Finally, we compare the average $PrivateWage_{a,t}$ in revolving versus indifferent agencies. The average private wage for revolving agencies ($\$83,432$) is 14% higher than the one for indifferent agencies ($\$73,352$). The difference are statistically significant and economically large. At the same time, the public sector wage among revolving agencies is also higher than indifferent agencies. Combining the two, we find that the private-public wage differential is more pronounced for revolving agencies, where the private-sector wage

[44]The database is maintained by the Center for Responsive Politics, based on periodic disclosure forms filed with the Secretary of the U.S. Senate. Data on agency contacts is available starting from 2008. Expenses and agencies are disclosed on the LD-2 form, while industry affiliation is determined by OpenSecrets based on the filer's registration form and generalized web searching.

is 92.7% of the public-sector one (compared to 91.5% in indifferent agencies). However, the latter is not statistically significant.

6 Consequences of revolving door sensitivity

So far, we have shown that some agencies respond to outside job opportunities while others do not (Section 4), and explored the reasons for this divergence (Section 5). In this section we study the consequences of our findings. Our focus is on the link between revolving doors and regulatory burden: if the agency is more sensitive to outside job opportunities, how would that affect the burden it imposes on the public?

6.1 Hypotheses

The relation between the revolving door and regulatory burden is the subject of a long literature, both empirical and theoretical. We review this literature at length in Appendix A.1. On one hand, the option to switch tracks could open the door for regulatory capture, meaning that regulators would impose lighter regulatory burden in order to carry favor with potential future employers. On the other hand, employees might choose to vigorously fulfill their duties, in order to build their reputation and human capital. In our setting, we formulate two competing hypotheses. The *regulatory capture* hypothesis states that outside job opportunities lead to regulatory leniency. Therefore, we expect to find that agencies with significant bunching will impose lighter regulatory burden. The *schooling hypothesis*, on the other hand, states that the outside option incentivizes more stringent regulation. Consequently, we expect to find that agencies with significant bunching will impose a heavier regulatory burden.

6.2 Data and variables

To test the opposing predictions, we compare the regulatory burden imposed by revolving agencies versus indifferent agencies. Quantifying regulatory burden is a difficult task and in itself a subject of a large and growing literature. We develop two sets of measures.

The first is based on the costs of compliance with all federal paperwork regulations. Using proprietary administrative data, Kalmenovitz (2022) tracks the costs of compliance with each of the 36,702 federal paperwork regulations since 1981. We download the data from the author's website and compute four basic measures of regulatory burden for each agency a at time t: number of active regulations, number of responses ("how much paperwork"), hours spent on compliance, and dollar expenses spent on compliance (e.g., hiring a compliance specialist). As discussed by the author, simple counting is a transparent and easily replicable measure, but it ignores the heterogeneity across regulations. This motivates the three alternative measures, which rely on official estimated costs.

The second set of burden measures captures rulemaking intensity. We utilize a novel dataset from the Federal Register. It is the official daily publication of the federal government, where federal agencies must provide detailed reports on their various activities (see Kalmenovitz et al. (2021); Chen and Kalmenovitz (2020)). We download all the daily editions since 2004, and count the number of documents which appear in either the "Rules" or the "Proposed Rules" sections. During the sample period, 540,464 documents were published on the Register. 20% of the documents relate to rulemaking activity, and the remaining 80% are published under the "Notices" section. Those documents pertain to a broad range of government operations which are not part of the rulemaking process, such as petitions by companies to receive a license, announcement on open meetings with the public, and lists of recently concluded enforcement actions. We aggregate the information from the Register to the agency$\times$month level, to obtain a simple proxy for the amount of rulemaking activity.

The Register does not indicate the importance of the rules promulgated by the agency. Thus, even if the agency develops more rules, it does not necessarily imply that it imposes a heavier burden. To overcome this challenge we use additional information collected by Chang et al. (2023) from the Unified Agenda. Published twice a year, the Agenda includes detailed information on each regulation which is under development.[45] From Chang et al. (2023)'s data set we obtain the agency responsible for each entry in the Agenda. We then

[45]Note that rules can appear on the Agenda even before they appear in the Register, for example, if the agency only announces its intention to issue a new rule but hasn't released a draft yet.

rely on the fact that the importance of each rule is reported based on a uniform three-tier classification scheme: routine or administrative rules (tier 1), substantive but not significant rules (tier 2), and rules that are economically or otherwise significant (tier 3). Out of 24,983 rules on the government's docket during the sample period, 7.1% are routine, 30.2% are substantive, and 61% are significant.[46] Counting the number of rules in each category, we obtain a weighted measure of rulemaking activity.

Table 1, Panel B, provides descriptive statistics for the various measures of regulatory burden. In a given month, the average agency supervises 62 paperwork regulations. To comply with those regulations, the public files 49.8 million forms and spends 1.9 million hours and $56.8 million USD to prepare the forms. That includes the time and money it takes to collect the data, analyze it, set up IT systems, train staff, and then fill in and file the reports. In a given month, only half the agencies (54.8%) make progress in their rulemaking activity. Conditional on any activity, the average agency publishes (17 rulemaking-related documents in the Federal Register. On a biannual basis, the average agency has 32 rules on its docket, and the majority of agencies (85.8%) have at least one significant rule under development. Conditional on having one, 11 rules are significant and the remaining 21 are not significant (either substantive or routine).

6.3 Empirical strategy

Armed with various measures of regulatory burden, we turn to test the competing hypotheses. In the panel of agencies, we estimate the following specification:

$$RegBurden_{a,t} = \alpha + \beta \cdot Revolver_a + \overrightarrow{X}_a + \overrightarrow{X}_{a,t} + \lambda_t + \epsilon_a, \qquad (11)$$

where $RegBurden_{a,t}$ is the burden imposed by agency a at time t, and $Revolver_a$ is an indicator which equals 1 for revolving agency and 0 otherwise. The coefficient of in-

[46]An example of a routine rule is one initiated by the U.S. Agency for International Development (USAID), which updates the name and organizational acronyms for various USAID organizations (RIN 0412-AA62). An example of tier 2 rule is one initiated by the SEC to make form 144 easier to understand and apply (RIN 3235-AH13). An example of tier 3 rule is the one initiated by the Department of Labor to update its grant regulations (RIN 1291-AA41).

terest, β, captures the average difference between revolving and indifferent agencies, net of potential confounders. According to the *regulatory capture* hypothesis, we expect revolving agencies to impose lighter regulatory burden ($\beta < 0$). According to the *schooling hypothesis*, we expect revolving agencies to impose heavier burden ($\beta > 0$).

Sensitivity to the outside option is not randomly assigned across agencies. We do not have a clean experiment to randomize the sensitivity. In fact, our analysis in Section 5 suggests that the sensitivity is driven by structural features of various federal agencies. Thus, the interpretation of β should be done with caution. To remove potential confounders, we add a large set of controls. First, we include time fixed effects (λ_t) to remove the impact of macroeconomic factors which correlate with revolving door incentives as well as regulatory burden. Thus, we focus on variation in regulatory burden across agencies within the same time period. We further control for a host of agency$\times$time factors ($\overrightarrow{X}_{a,t}$): number of employees and the average salary, tenure, and bonus. Finally, as shown in Section 5, revolving and indifferent agencies have different degrees of power, autonomy, and public exposure. We add 50 variables which reflect those differences such as an indicator for agencies that are a component of a larger organization, an indicator for agencies governed by a multi-member body, and an indicator for agencies with independent litigation powers. The full list is in Table A.3. Similar to $Revolve_a$, those factors vary across agencies but not within-agency over time. We cluster standard errors at the agency level, since the variable of interest ($Revolve_a$) is measured at that level.

6.4 Results

The results are summarized in Table 7 and Table 8 . Overall, they highlight how revolving agencies impose significantly lower regulatory burden on companies.

In Table 7, we focus on the costs of compliance with paperwork regulations. Starting with the first column, we observe that revolving agencies impose significantly fewer rules. Since the outcome variables are in logs, the coefficient indicates that revolving agencies have 51% fewer regulations ($1 - \exp(-0.71)$). The average agency has 66.6, which means that revolving agencies have 33.9 fewer rules. That alone does not imply lower burden, since the remaining rules could be particularly burdensome. We examine this directly in the next three columns, where the dependent variables capture three aspects of compliance burden: number of filings (how much paperwork), how many hours are spent on compliance, and what are the estimated dollar costs of compliance. Across all dimensions, revolving agencies impose significantly lighter regulatory burden. The regulations managed by revolving agencies are associated with 50.7 million fewer paperwork forms filed, 2.2 million fewer hours, and $84.6 million fewer expenses (measured monthly). The results are significant at the 1% level and conditional on a large set of controls and fixed effects. In the remaining columns we examine several derivations of the baseline measures. We find that the average regulation of a revolving agency is less burdensome: it requires 375 thousand fewer paperwork forms, 24 thousand fewer hours, and $561 thousand fewer expenses. Moreover, we find that each hour of work on a regulation of a revolving agency costs $54 dollars less than a regulation of a non-revolving agency.

In Table 8, we study the rulemaking activity. In Panel A, we rely on monthly data from the Federal Register. Starting with the first column, we observe that revolving agencies publish less documents in the Register. Since the outcome variables are in logs, the coefficient indicates that revolving agencies have 46.2% fewer publications in the Register. Given the average of 20 publications, which means that revolving agencies have 9.2 fewer ones. In the remaining columns we break down the publications into three categories: rules, proposed rules, and notices. We report both the extensive margin (even columns) and intensive margin (odd columns). The decline in publication is entirely driven by a decline in rulemaking activity, and in particular fewer rules that reach the finish line. Revolving agencies are 24.5% less likely to have any rulemaking activity in a given month. Conditional on having such activity, they have 5.1 less rules on their docket, compared to the average agency with 7.2 rules on the docket. Specifically, they propose 2.6 fewer new rules and finalize 3.7 fewer rules.

One shortcoming of the Federal Register is the lack of weights. In other words, revolving agencies may work on less rules and issue less final regulations, but the "surviving" rules may be more consequential and burdensome. We address this possibility in Panel B, using data from the Unified Agenda. We find that revolving agencies have significantly lighter docket, as they work on 23 fewer items (the average agency docket contains 33 items). The decline is driven by both significant rules (tier 3) and insignificant ones (tiers 1-2). We note, though, that there seems to be a shift within the agency's portfolio: significant rules capture a larger fraction (9 percentage points) of the portfolio of revolving agencies, and there is a corresponding decline in the portfolio share of non-significant rules. However, those differences are not statistically significant at conventional levels.

In sum, we find that revolving agencies impose significantly lower burden on regulated companies. This is evident in two major aspects of regulation: costs of compliance with existing regulations, and the agency's rulemaking activity (modifying existing rules and developing new ones). Combined, those findings are more consistent with *regulatory capture* theories, which predict that revolving door incentives lead to regulatory leniency toward prospective employers in the private sector.

7 Policy implications

In the previous sections, we documented the extent of strategic bunching (Section 4) and its impact on regulatory burden (Section 6). A natural question is whether a different revolving door policy would change this behavior. To answer this question, we combine the empirical findings with an extended version of the model from Section 3, and conduct a series of counterfactual exercises. Our results are summarized in Table 9.[47] As before, we report the results for 15 selected agencies and then the employment-weighted average outcome across all revolving agencies.

7.1 Methodology

In this section we describe our methodology to conduct the counterfactual analysis. First, we extend the model from Section 3 by allowing the agent to choose a costly action l.

[47]The analysis crucially relies on the results from the bunching estimation, especially the bunching region Δw, which are available only for revolving agencies. Therefore, the counterfactual exercise will focus on these agencies.

Note that the model extension is agnostic about the nature of the action. However, we denote it with l based on our findings in Section 6, which show that revolving doors are associated with regulatory leniency (reduced regulatory burden). The leniency increases the expected pay in the private sector (m), and hence we denote the revolving door incentive as $\theta(l)$ with $\theta' > 0$. However, leniency is costly for the agent because it could be discovered by a government watchdog. The expected cost is an increasing convex function of the leniency, $c(l)$, with $c' > 0$ and $c'' > 0$. The agent chooses leniency to maximize the expected utility:

$$\max_{l} V_g(l) - c(l), \tag{12}$$

where $V_g(l)$ is the value function of working in public sector defined in Equation (5) with $\theta = \theta(l)$. With this extension, we estimate the model in the following way. We start with the pay cut agents accept to stay below the threshold (Δw) and the fraction of strategic agents (α) for each agency estimated from the bunching estimation in Section 4. Then, for all agencies, we calibrate the discount rate r to 10%, the regulatory threshold ($\underline{w}$) to \$185,000, which is the 2021 threshold expressed in 2022 dollar, and the wage potential (z) is calibrated to be the same as $\underline{w}$. For each agency,[48] we compute the agency's exit rate (λ) and average salary growth (μ) from the data. The restriction penalty, τ, is calibrated to $1/(65 - 23 - T)$, where T is the agency-specific average tenure upon exit.[49] With those calibrations, we obtain from Equation (4) the revolving door incentive $\theta(l)$, which we parameterize as $\theta(l) = l$. We then parametrize the cost as a quadratic function of the leniency, $c(l) = \frac{1}{2}\gamma l^2 z$.[50] The parameter γ can be solved using Equation (12), by plugging in the value function and the costs and deriving the first-order condition.

The final piece we consider is the supply of labor to the public sector. This is important, since any revolving door policy affects the willingness of employees to enter

[48] The agency-specific parameters are summarized in Table A.4.

[49] Intuitively, τ is one year (the duration of the post-employment restrictions) divided by the present value of the remaining lifetime earnings. We assume that the employee starts the government career at the age of 23 and his/her final retirement age is 65. Note that we do not observe the employee's age. As explained in Section 2.1, the ex-senior regulator can still work during that year. To reflect that, we consider an alternative calibration where $\tau = 0.5/(65 - 23 - T)$. The results are available upon request.

[50] We scale the cost function by the wage potential so that the expected cost does not become trivial when the wage potential grows.

government service in the first place. Following Chetty (2012), we define the equilibrium labor supply to the public sector (L_g) as:

$$\ln L_g = \epsilon \ln V_g + \ln \alpha_g. \tag{13}$$

where ϵ is the elasticity of labor supply (calibrated to 0.25), V_g is the expected lifetime wages at the entry level in the public sector, and α_g summarizes other shocks to the labor supply such as preference shocks.[51]

7.2 Results

We start by considering changes to the ban duration (τ). Previous studies show that state-level restrictions have a limited impact on public utility commissioners (Law and Long (2012)) and assemblymen (Strickland (2020)). In contrast, Cain and Drutman (2014) find that similar restrictions reduce the revolving door between Congress and the lobbying industry. On the normative side, advocates argue that post-employment restrictions will limit the harmful impact which the revolving door option has on regulators. Opponents argue that this policy will deter qualified candidates from entering public service in the first place. To shed light on this debate, we examine the impact on three potential outcomes: extent of bunching below the threshold (Δw), regulatory leniency (l in $\theta(l)$), and labor supply to the public sector (L_g).

The results are in Table 9, Panel A. We first consider a longer ban of two years (rather than one). The bunching range (Δw) increases by almost 100% relative to the baseline value. Intuitively, triggering the threshold becomes more costly (more lost wages in the private sector), and therefore agents are willing to sacrifice more of their government paycheck to stay below the threshold. We further find a 0.11% decrease in leniency, reflecting the fact that the longer restriction reduces the expected benefit from leniency.[52] Note that the effect appears to be small. On one hand, those who bunch exert more

[51] For simplicity we focus on quantity, but employment could also adjust in quality (different type of employees attracted to government service).

[52] In the extreme case, where agents are completely barred from working in the private sector, they would have no incentive to exert leniency.

leniency to compensate for the higher wages they have sacrificed. On the other hand, for those who triggered the threshold, the longer restriction reduces the expected benefit from leniency. Those who are far below the threshold, and still weigh their options, face a genuine dilemma. On balance, the net effect on leniency is close zero. Finally, the longer restriction has a small negative effect on labor supply. This is because only a fraction of agents are strategic (α), meaning that they are sensitive to revolving door incentives, and if they are, they have the option to bunch and thus avoid triggering the restrictions. For completion, we study the opposite policy: eliminating the post-employment restrictions ($\tau = 0$). Under this policy, no agent would bunch because crossing the threshold is not costly anymore. Moreover, regulatory leniency increases by 1.3%, reflecting the fact that the benefits from the private sector are now more valuable. Finally, labor supply would increase by 0.11%, given that agents can use their government stint to build up their human capital. Again, the effect is rather muted given the ability to bunch in the baseline scenario.

Next, we examine a policy that strengthens the internal governance mechanisms. If agents who show leniency are more likely to get caught, the amount of leniency will decline in equilibrium. As before, the risk is that tighter monitoring will discourage employees from joining the public sector in the first place. We investigate this tradeoff in a counterfactual scenario where the cost of leniency doubles (higher γ in $c(l)$). Indeed, we find that leniency declines by 50.3%. Moreover, the tight monitoring reduces the paycheck sacrifice (Δw) by 50%. The intuition is that the higher costs of leniency reduce the benefit of a private sector job ($\theta(l)$), which reduces the incentive to bunch below the threshold. For similar reasons, supply of labor to the public sector declines by 3.0%. Overall, the results suggest that strengthening the internal governance can significantly reduce the incentive distortion resulting from revolving door incentives.

In Panel B of Table 9, we translate the changes in leniency to changes in annual regulatory burden. For example, in Table 7 we find that a revolving agency imposes 50.8% fewer regulations ($1 - \exp(-0.71)$). Since the average monthly number of regulations per agency is 71, it means that a revolving agency imposes 36.1 fewer regulations. In the counterfactual analysis, we found that doubling the restriction will reduce leniency by 0.11%. This means that the gap between revolving and indifferent agencies becomes 50.7% rather than 50.8%, and a revolving agency will impose only 36 fewer regulations. Thus, each revolving agency will add 0.1 regulations to its monthly portfolio. With 35 revolving agencies, we conclude that the annual burden imposed by all revolving agencies would increase by 2.7 regulations. Similar calculations show that the annual burden would increase by 26 million filings, 1.1 million hours, and 40.3 million USD. We conduct similar calculations for the two other counterfactual policies. When the post-employment restriction is eliminated, leniency increases and the annual burden decreases by 31 regulations, 295 million filings, 12.5 million hours, and 457 million USD. Lastly, doubling the monitoring leads to a 50.3% decline in leniency. In real terms, the annual regulatory burden would increase by 1,250 regulations and 18.4 billion USD, while labor supply to the public sector decreases by 3%.

It is interesting to compare the two policies, doubling the restriction (τ) and doubling the monitoring ($c(l)$). The first policy reduces the benefits of regulatory leniency for some agents, while the second one increases the costs of leniency across the board. Thus, in the second policy, we observe a substantial decline in leniency, as regulators do not fully utilize their government position to increase the potential private sector wage (θ). Consequently, in the second policy, fewer candidates will be joining public service in the first place (L_g). Overall, we find that the monitoring-based policy has a significantly larger impact on both regulatory leniency and labor supply. The reason is that agents can engage in bunching to avoid triggering the restriction, but they cannot escape the monitoring mechanism.

8 Conclusion

The revolving door, where employees migrate from regulatory agencies to regulated firms, is a deeply controversial issue. Critics argue that the option to switch sides leads to regulatory leniency, and in extreme cases to explicit quid-pro-quo arrangements, as regulators extend favors to potential future employers. Others contend that the revolving door would encourage more aggressive regulatory behavior, allowing regulators to hone their skills and thus increase their chances of obtaining a job in the private sector. Alas, the incentive effect of the revolving door is unobserved and can only be inferred ex-post, after the regulator quits to join the private sector. This severely complicates any causal inference regarding the impact of the revolving door.

In this paper, we aim to overcome this challenge and provide the first causal evidence on the response to the revolving door. We assembled a new data set with the full payroll information on all federal employees, nearly 22 million observations over two decades. We then exploit a unique legal setting: the post-employment restrictions on federal employees specified in Title 18, Sections 207(c) and 207(f), of the U.S. Code. Regulators are barred for one year from communicating on matters that pertain to their former agency and from representing or advising foreign entities. Crucially, the restrictions are triggered by a salary threshold. This provides a unique setting to study the impact of the revolving door in a large sample of federal regulators.

We document a significant clustering of employees just below the threshold. This is a clear indication of a deliberate effort by high-ranked employees to escape the post-employment restriction and preserve the value of their outside option. We show that the effect is concentrated among a handful of federal agencies, who have broad regulatory powers but are largely insulated from supervision by elected officials. Those agencies also tend to regulate industries which offer significantly higher pay. In the second part of the paper, we show that the strategic bunching below the threshold is associated with regulatory leniency. For example, agencies with significant bunching initiate fewer regulations and reduce the compliance costs with the remaining regulations. Finally, aided by a structural model and the empirical findings, we evaluate alternative policies that either eliminate or expand the post-employment restrictions. For example, we find that eliminating the post-employment restriction will decrease regulatory burden on companies by 1.3%: the value of a private sector job increases (no cooling-off period), motivating regulators to show more leniency toward regulated companies to improve their chances of landing a job.

Overall, our work improves our understanding of incentives and performance of regulatory agencies. We focus on a major incentive, the revolving door, and provide the first large-sample causal evidence on its existence and implications. We identify a "real-time" response of regulators to the outside option, before any specific offer has been made and before the regulator has chosen to accept it and resign. Using the sharp cutoff which triggers post-employment restriction, we directly observe the response to the outside option. We document the heterogeneous response across federal agencies, and link revolving door incentives to newly-developed measures of regulation which capture the burden borne by all industries and companies. Our findings are mostly consistent with theories of regulatory capture, that view regulation as a rent-seeking process where private actors advance their self-interests at the expense of the public good. We show that the option to switch sides can lead to regulatory capture, as regulators who are sensitive to their outside option choose to impose lighter burden on companies.

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Figure 1: **Sensitivity to outside job opportunities: Bunching estimator**

Results from estimating bunching behavior in three agencies: the National Institutes of Health, the Small Business Administration, and the Environmental Protection Agency. The procedure is described in Section 4.1. For each agency, we plot the distribution of salaries (in black line) and the counterfactual distribution based on Equation (6) (in red dotted line). Salaries are expressed as the difference from the cutoff salary which triggers the post-employment restriction in Section 207. For example, the value $0 is for employees whose salary equals the threshold. We denote the lower bound (w_L) and the upper bound (w_U) of the bunching behavior. The latter is the maximum dollar amount an agent is willing to surrender, in order to stay below the regulatory threshold.

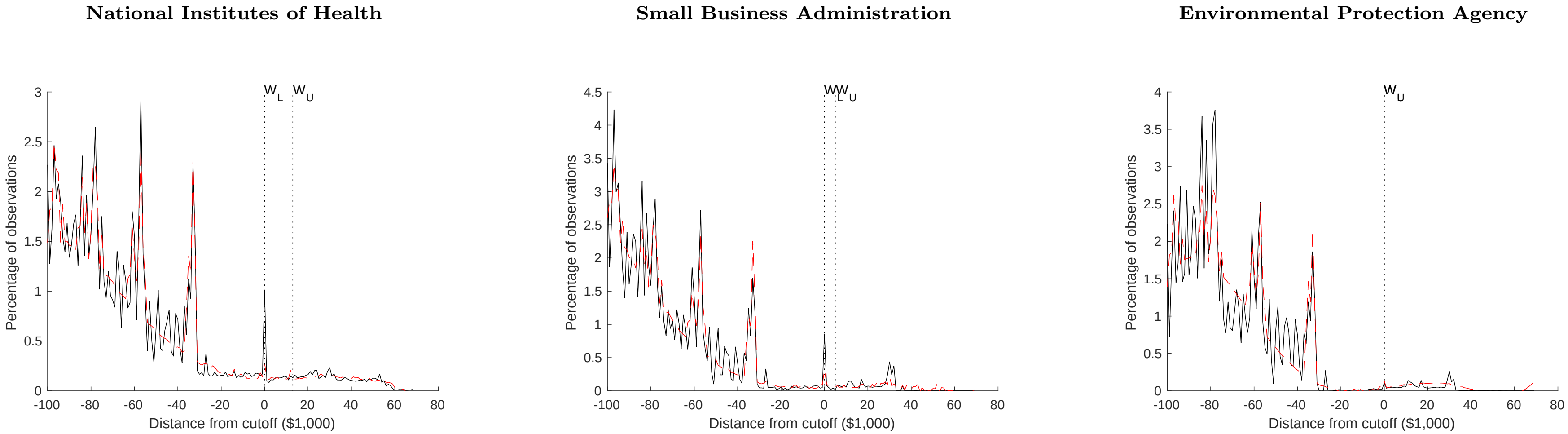

Figure 2: **Bunching to avoid post-employment restrictions: Validation**

The sample includes all SEC employees between 2003-2021, split into two periods: 2003-2013 (left panel) and 2014-2021 (right panel). In the early period, SEC employees were exempt from the post-employment restriction in Section 207 and thus had no reason to bunch below the cutoff salary (see Section 4.4). We validate it by estimating bunching behavior before and after 2013, plotting the realized distribution of salaries (in black line) and the counterfactual distribution based on Equation (6) (in red dotted line). Salaries are expressed as the difference from the cutoff salary which triggers the post-employment restriction in Section 207. For example, the value \$0 is for employees whose salary equals the threshold. We denote the lower bound (w_L) and the upper bound (w_U) of the bunching behavior. The latter is the maximum dollar amount an agent is willing to surrender, in order to stay below the regulatory threshold.

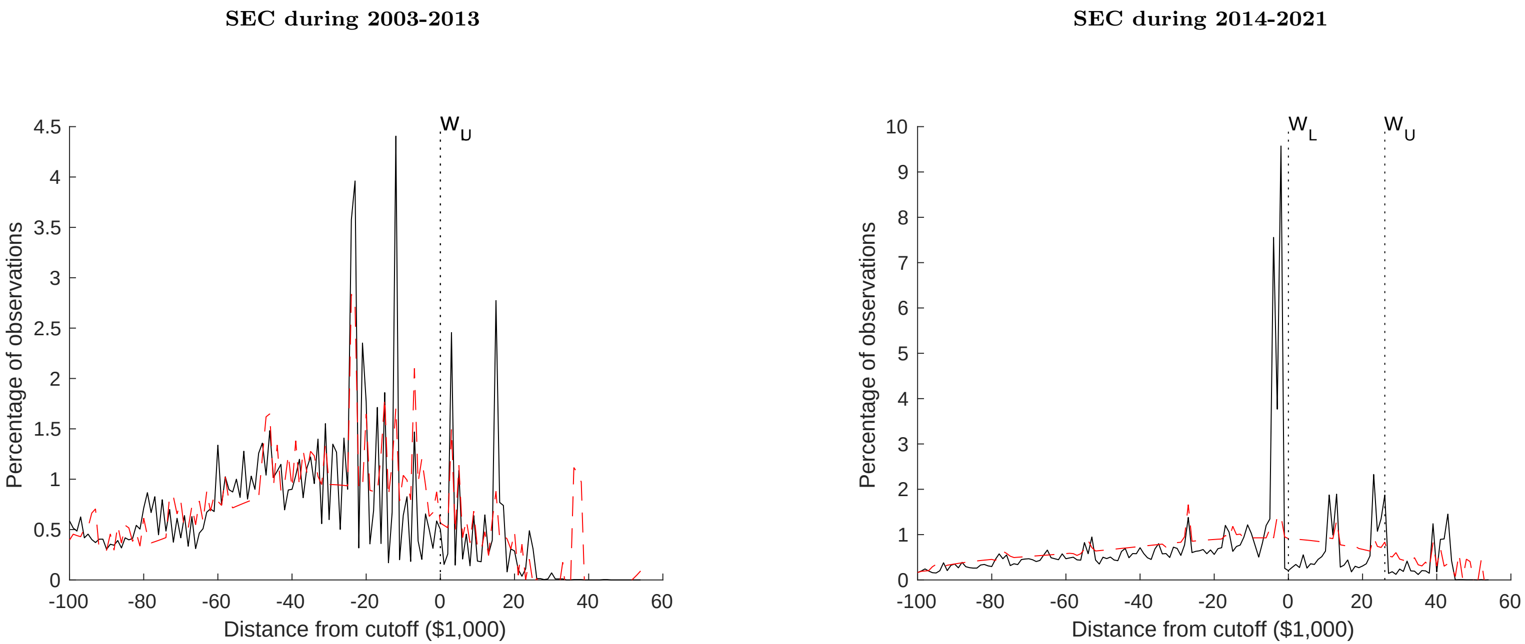

Table 1: **Descriptive statistics**

Panel A. Employee-level payroll data. The sample includes all federal employees from 2004 till 2021. *Below* (*Restricted*) equals one if the employee's base salary is below (above) the regulatory threshold specified in Title 18, Section 207, of the U.S. Code. This threshold triggers the post-employment restriction which is at the center of this paper. $Within^{\pm 100K} = 1$ if the employee's salary falls within \$100,000 of the threshold. $Manager = 1$ if the employee is an executive. $Tenure$ is the number of years in government service. *Salary* is the employee's base salary, and $Salary^{CPI}$ is *Salary* in constant 2022 USD.

Statistic:	Avg.	Median	S.D.	Min	Max	Obs.
Below	97.8	100.0	14.5	0.0	100.0	21,691,864
Restricted	2.2	0.0	14.5	0.0	100.0	21,691,864
$Manager$	0.7	0.0	8.1	0.0	100.0	21,691,864
$Within^{\pm 100K}$	59.0	100.0	49.2	0.0	100.0	21,691,864
$Tenure$	14.7	13.0	10.6	1.0	76.0	21,690,853
Salary	68,230	62,283	34,659	1	456,028	21,691,864
$Salary^{CPI}$	86,423	79,562	43,232	1	539,464	21,691,864

Panel B. Agency-level regulatory burden. The sample includes agency×month observations between 2004-2021. In Panel B.1 we use data from Kalmenovitz (2022) to compute the cost of compliance with the agency's regulations: number of active regulations (*Rules*), total filings by regulated companies (*Filings*), total hours it takes to comply with the regulations (*Hours*), and dollar expenses spent on compliance (*Dollar*); average filings, hours, and dollars per regulation ($^{Filings}/_{Rules}$, $^{Hours}/_{Rules}$, and $^{Dollars}/_{Rules}$); average hours and dollars per filing ($^{Hours}/_{Filings}$, $^{Dollars}/_{Filings}$); and average dollars per hour ($^{Dollars}/_{Hours}$). In Panel B.2 we use data from the Federal Register and report the number of documents published by the agency (*Documents*); the probability of publishing at least one notice ($\mathbb{1}(Notices)$) and one rule (proposed rule or a final one; $\mathbb{1}(Rules)$); and the number of notices and rules (*Notices* and *Rules*). In Panel B.3 we use biannual data collected by Chang et al. (2023) from the Unified Agenda. We report the number of rules on the agency's docket (*Rules*); the probability of having at least one significant or insignificant rule ($\mathbb{1}(Significant)$, and $\mathbb{1}(Insignificant)$); and the respective quantities. Variables are winsorized at the 99^{th} percentile.

Statistic:	Avg.	Median	S.D.	Min	Max	Obs.
B.1. Compliance costs:						
Rules	62.1	37.0	83.3	1.0	445.0	26,000
Filings (mill)	49.8	0.3	291.6	0.0	2,589.9	26,000
Hours (mill)	1.9	0.2	5.5	0.0	40.7	26,000
Dollars (mill)	56.8	0.1	314.4	0.0	2,802.2	26,000
$^{Filings}/_{Rules}$ (thou)	365.7	8.2	1,600.6	0.0	12,638.1	26,000
$^{Hours}/_{Rules}$ (thou)	26.3	4.1	89.4	0.0	717.7	26,000
$^{Dollars}/_{Rules}$ (thou)	427.1	2.2	1,700.2	0.0	15,024.0	26,000
$^{Hours}/_{Filings}$	2.0	0.4	5.0	0.0	37.0	26,000
$^{Dollars}/_{Filings}$	78.6	0.1	441.8	0.0	3,994.1	26,000
$^{Dollars}/_{Hours}$	48.2	0.5	284.5	0.0	2,966.3	26,000
B.2. Federal Register:						
Documents	17.6	6.0	29.6	0.0	164.0	26,117
$\mathbb{1}(Rules)$	54.8	100.0	49.8	0.0	100.0	22,907
$\mathbb{1}(Notices)$	97.2	100.0	16.6	0.0	100.0	22,907
Rules	17.0	4.5	24.4	0.0	100.0	22,907
Notices	83.1	95.5	24.2	0.0	100.0	22,907
B.3. Rulemaking:						
Rules	32.2	17.0	50.8	0.0	417.0	3,713
$\mathbb{1}(Significant)$	85.8	100.0	34.9	0.0	100.0	3,619
$\mathbb{1}(Insignificant)$	94.0	100.0	23.7	0.0	100.0	3,619
Significant	11.5	6.0	16.0	0.0	100.0	3,619
Insignificant	20.7	8.0	38.6	0.0	264.0	3,619

Panel C. Affected occupations. We identify occupations that are potentially affected by the threshold of §207. For each occupation, we check whether it was ever affected by the threshold, meaning that at least one employee holding that occupation was above the threshold. We report the number of occupation affected and unaffected, and list the 25 most populated occupations in each category.

Group	Occupations	Examples
Affected	218	General Attorney (35791); Program Management (33216); Miscellaneous Administration And Program (29423); Financial Institution Examining (9663); General Engineering (7890); Air Traffic Control (7696); Criminal Investigation (7590); Gen Natural Resources Mgt And Bio Sci (6532); Information Technology Management (6341); General Physical Science (4846); Accounting (3647); Nurse (3549); Nurse Anesthetist (Title 38) (3514); Chemistry (3479); Economist (3384); General Business And Industry (3169); Physics (2841); Financial Administration And Program (2352); Patent Attorney (2327); Management And Program Analysis (2261); Financial Management (1965); Human Resources Management (1901); Microbiology (1765); Foreign Affairs (1754); Computer Science (1671); Contracting (1491)
Unaffected	464	Contact Representative (381859); Forestry Technician (302348); Practical Nurse (251066); Secretary (227087); Nursing Assistant (214492); Custodial Working (209427); Veterans Claims Examining (197352); Tax Examining (169197); Biological Science Technician (141259); Maintenance Mechanic (129340); Legal Assistance (123079); Safety Technician (97957); Financial Clerical And Assistance (90124); Police (88564); Pharmacy Technician (82328); Soil Conservation (77054); Engineering Technical (75481); Mail And File (73989); Diagnostic Radiologic Technologist (68606); Consumer Safety Inspection (68425); Human Resources Assistance (63059); Management & Program Clerical & Assistant (62276); Accounting Technician (58762); Food Inspection (58203); Claims Assistance And Examining (56275); Cooking (56193)

Table 2: **Response to revolving door incentives**

Panel A. Extensive margin. We classify federal agencies based on their response to revolving door incentives. For each agency, we formally estimate the extent of bunching below the salary threshold specified in Title 18, Section 207 of the U.S. Code (Section 4.1). Revolving agencies are those with significant bunching below the threshold, and indifferent agencies are those with smooth distribution around the threshold. For each category, we report the number of agencies and employees and list several of the largest agencies. The full list of agencies is available upon request.

Group	Agencies	Obs.	Examples
Revolving	35	3,167,718	Federal Maritime Commission; Commodity Futures Trading Commission; Surface Transportation Board; Small Business Administration; Overseas Private Investment Corporation; Federal Retirement Thrift Investment Board; Farm Credit Administration; Federal Transit Administration; Securities and Exchange Commission; Department of Commerce; National Institutes of Health; National Aeronautics and Space Administration; U.S. Census Bureau; National Oceanic and Atmospheric Administration; National Park Service; Bureau of Land Management; Food Safety and Inspection Service; Department of Agriculture; Bureau of Reclamation; Department of Interior
Indifference	116	18,591,096	Department of Veterans Affairs; Internal Revenue Service; Social Security Administration; Federal Aviation Administration; Transportation Security Administration; Forest Service; Customs and Border Protection; Bureau of Prisons; Federal Bureau of Investigation; Department of Justice; Environmental Protection Agency; Food and Drug Administration; Immigration and Customs Enforcement; Department of Energy; Indian Health Service; General Services Administration; Department of State; Department of Health and Human Services; Natural Resources Conservation Service; Patent and Trademark Office

Panel B. Intensive margin. We focus on revolving federal agencies: agencies with significant bunching just below the threshold salary that triggers post-employment restrictions. For brevity, we selected fifteen prominent agencies. For each agency, we report the salary employees are willing to give away in order to stay just below the threshold in constant 2022 USD (Δw), and the fraction of strategic employees who choose to bunch (α). The methodology is described in Section 4.1. We also report the average estimates across all revolving agencies.

Agency	**Bunching range (Δw)**	**s.e.**	**Strategic agents (α)**	**s.e.**	**Obs.**
Federal Transit Administration	$9,000	(2,030)	10.1%	(0.202)	9,833
Securities and Exchange Commission	$40,000	(5,600)	23.9%	(0.418)	73,625
Federal Retirement Thrift Investment Board	$5,000	(1,290)	69.9%	(0.243)	3,044
Commodity Futures Trading Commission	$10,000	(2,310)	0.0%	(0.339)	11,324
Small Business Administration	$5,000	(1,310)	39.1%	(0.288)	93,930
Farm Credit Administration	$26,000	(1,480)	5.9%	(0.349)	5,137
Federal Maritime Commission	$7,000	(2,190)	58.1%	(0.352)	2,169
Surface Transportation Board	$6,000	(1,550)	62.3%	(0.269)	2,064
Overseas Private Investment Corporation	$8,000	(2,300)	32.2%	(0.314)	4,517
Department of Commerce	$6,000	(1,780)	41.6%	(0.236)	355,937
National Institutes of Health	$13,000	(1,830)	5.5%	(0.400)	335,812
National Aeronautics and Space Administration	$3,000	(550)	45.5%	(0.228)	325,061
U.S. Census Bureau	$12,000	(2,890)	10.9%	(0.212)	285,048
National Oceanic and Atmospheric Administration	$15,000	(4,000)	79.4%	(0.213)	217,948
Bureau of Land Management	$25,000	(790)	30.7%	(0.127)	199,330
Mean (all revolvers)	$11,275		31.2%		3,167,718

Table 3: **Difference of Means: employee types**

We compute the difference in means between two groups: employees who were within $[-\$5,000, -\$0)$ of the threshold at least once (*Bunched*), versus employees who were never within $[-\$5,000, -\$0)$ of the threshold (*Never Bunched*). The sample is restricted to employees who were within $\pm\$50,000$ of the threshold at least once. The first two columns present the means in each group and the third column has the point estimate and standard error (in parentheses) for a t-test comparing the means of the two groups.

	Bunched	Never Bunched	Diff of Means
Tenure (years)	22.48	21.61	0.88***
			(0.08)
Number of promotions	1.27	0.99	0.28***
			(0.01)
Number of relocations	0.50	0.39	0.11***
			(0.01)
Base Pay ($)	136,814	110,076	26,738***
			(120.98)
Adjusted Pay ($)	148,411	124,549	23,862***
			(148.43)
Base Pay Raise (%)	17.60	9.00	8.60*
			(3.43)
Adjusted Pay Raise (%)	17.89	9.70	8.18*
			(3.43)
Years with Bonus	3.47	3.18	0.29***
			(0.02)
Bonus ($) | Bonus>0	3,022	1,833	1,189***
			(36.81)
Bonus (%) | Bonus>0	2.35	1.85	0.50***
			(0.03)
Observations	24,431	295,592	320,023

Table 4: **Employee bunching behavior**

Results from estimating Equation (7). $\mathbb{1}(Promotion)$ is an indicator for the employee's rank in year t being different from the rank in $t-1$. $\Delta BasePay(\%)$ ($\Delta AdjPay(\%)$) is the percentage growth in the employee's base (adjusted) salary, conditional on not receiving a promotion. $\mathbb{1}(Bonus)$ equals one if the employee received a bonus in year t. $\mathbb{1}(Exit)$ equals one if the employee exited government service in year $t+1$. In all specifications, the key independent variable is $JustBelow$, which takes the value 1 if the employee is within $[-\$5,000, -\$0)$ of the post-employment threshold. The sample is restricted to employees who at time $t-1$ were within $[-\$50,000, -\$5,000)$ of the post-employment restriction threshold, and at year t were within $\pm\$5,000$ of the threshold. We include employee tenure as a control in all specifications. Fixed effects are as indicated. Standard errors are clustered at the employee level.

Measure:	$\mathbb{1}(Promotion)$	$\Delta BasePay(\%)$	$\Delta AdjPay(\%)$	$\mathbb{1}(Bonus)$	$\mathbb{1}(Exit)$	$\mathbb{1}(Exit)$	$\mathbb{1}(Exit)$
$JustBelow$	-0.18***	-3.77***	-3.36***	-0.00	0.01	0.19***	0.08***
	(0.01)	(0.13)	(0.13)	(0.01)	(0.00)	(0.00)	(0.00)
$Tenure$	-0.00	-0.02***	-0.02***	-0.00	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Obs.	24,620	17,379	17,366	24,620	24,620	85,407	1,818,964
R^2	0.49	0.57	0.45	0.49	0.15	0.34	0.07
Mean	0.28	6.85	6.06	0.23	0.08	0.06	0.09
Agency × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rank FE	Yes	Yes	Yes	Yes	Yes	-	Yes
Employee FE	-	-	-	Yes	-	Yes	-

Table 5: **Time-series of bunching behavior**

Dodd-Frank takes the value 1 if the agency formulates rules related to the Dodd-Frank Act, and 0 otherwise. *Post* takes the value 1 for years after the agency started formulating the rules. The dependent variable takes the value 1 if the difference between the employee's base pay and the post-employment restriction threshold is between 0 and X, where X takes six possible values indicated in the column header. For instance, in column (1), the outcome equals one if the employee is within $[-\$10,000, -\$0)$ of the post-employment threshold.

	Employee Salary - Threshold between 0 and X					
X:	-10000	-5000	-2000	2000	5000	10000
	(1)	(2)	(3)	(4)	(5)	(6)
Dodd-Frank × Post	0.10**	0.08**	0.06**	-0.01	0.00	0.01
	(0.05)	(0.04)	(0.03)	(0.01)	(0.01)	(0.02)
Tenure	-0.00	0.00	-0.00	0.00	0.00	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Obs.	2,444,150	2,444,150	2,444,150	2,444,150	2,444,150	2,444,150
R^2	0.43	0.35	0.30	0.50	0.45	0.47
Mean	0.04	0.02	0.02	0.02	0.02	0.04
Agency-Rank FE	Yes	Yes	Yes	Yes	Yes	Yes
Employee FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: **Origins of revolving door sensitivity**

We classify federal agencies based on their response to revolving door incentives, using a formal bunching estimator (Section 4.1). We then compute the average characteristics of revolving agencies ($Avg^{revolving}$), indifferent agencies (Avg^{indiff}), and the difference between the two (ΔAvg). PrivateWage is the expected private sector wage, PublicWage is the average salary in the agency, and WageGap is the ratio between the two (the methodology is described in Section 5.3). The remaining variables are constructed based on data in Selin (2015) and Selin and Lewis (2018); see description of the variables in Table A.3.

Variable	Avg^{indiff}	$Avg^{revolving}$	ΔAvg
Powers:			
Rulemaking	94.3%	100.0%	5.5%
Adjudication	16.1%	15.3%	−0.7%
Regulatory Independence:			
NoOmbRuleRev	5.0%	38.4%	33.4%***
IndepLitigating	14.0%	46.1%	32%***
NoOmbCommRev	12.3%	46.1%	33.7%***
Operational Independence:			
Cabinet	72.8%	46.1%	−26.7%**
Bureau	69.6%	46.1%	−23.4%*
IndepPersonnel	24.7%	61.5%	36.7%***
IndepFunding	44.0%	61.5%	17.3%
FixedTerms	27.3%	61.5%	34%***
Overall independence:			
Independence1	-0.1%	0.5%	0.5%**
Independence2	0.1%	1.1%	0.9%***
Public interactions:			
Sunshine	17.0%	38.4%	21.3%*
Advisory	31.9%	46.1%	14.1%
Potential wages:			
PrivateWage	$73,352	$83,432	$10,080***
PublicWage	$83,630	$95,482	$11,851***
WageGap	91.5%	92.7%	1.2%

Table 7: **Consequences of revolving door sensitivity: compliance costs**

Results from estimating Equation (11). The sample includes 151 federal agencies between 2004-2020, and the unit of observation is agency×month (for example, the SEC in February 2012). *Revolver* = 1 if it is a revolving agency based on bunching estimation (Section 4). Agency×year controls include the number of employees and the average experience, pay, and cost-of-living adjustment, and agency controls include 50 variables describing the agency's characteristics (see Table A.3). The outcome variables capture the cost of compliance with the agency's regulations based on Kalmenovitz (2022): number of active regulations (*Rules*), total filings by regulated companies (*Filings*), total hours it takes to comply with the regulations (*Hours*), and dollar expenses spent on compliance (*Dollar*). Dependent variables are in logs. We report the dependent variable's average, the effect in percentage points ($1 - exp(\beta)$), and the effect's economic magnitude multiplied by the average.

Measure:	Rules	Filings	Hours	Dollars	$\frac{Filings}{Rules}$	$\frac{Hours}{Rules}$	$\frac{Dollars}{Rules}$	$\frac{Hours}{Filings}$	$\frac{Dollars}{Filings}$	$\frac{Dollars}{Hours}$
Units:		(mill)	(mill)	(mill)	(thou)	(thou)	(thou)			
Revolver	-0.71***	-2.62***	-2.52***	-4.99***	-1.89***	-1.88***	-4.34***	-0.01	-2.55**	-2.85***
	(0.24)	(0.65)	(0.59)	(0.83)	(0.66)	(0.54)	(0.92)	(0.50)	(1.02)	(0.83)
Obs.	23,809	23,809	23,809	17,364	23,809	23,809	17,364	23,809	17,364	17,364
R^2	0.66	0.65	0.64	0.52	0.56	0.56	0.46	0.41	0.39	0.35
Mean	66.6	54.7	2.4	85.2	442.0	28.3	568.3	1.7	92.3	57.0
Effect (%)	-0.51	-0.93	-0.92	-0.99	-0.85	-0.85	-0.99	-0.01	-0.92	-0.94
Effect	-33.9	-50.7	-2.2	-84.6	-375.0	-24.0	-560.9	-0.0	-85.1	-53.7
Agency×year controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Agency controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 8: **Consequences of revolving door sensitivity: rulemaking**

Panel A. Flow of rules. Results from estimating Equation (11). The sample includes 151 federal agencies between 2004-2021, and the unit of observation is agency×month (for example, the SEC in February 2012). *Revolver* = 1 if it is a revolving agency based on bunching estimation (Section 4). Agency×year controls include the number of employees and the average experience, pay, and cost-of-living adjustment, and agency controls include 50 variables describing the agency's characteristics (see Table A.3). *Docs* is the number of documents in the Federal Register. Notices (*Notices*), Proposed Rules (*PreRules*), and Final Rules (*FinalRules*) are the number of documents in the corresponding segments of the Register. *Rules* is the sum of *PreRules* and *FinalRules*. In odd columns we use the log-transformation, conditional on non-zero values, and in even columns we use an indicator which equals one for any publication in that category.

Measure:	Docs	$\mathbb{1}(Notices)$	Notices	$\mathbb{1}(Rules)$	Rules	$\mathbb{1}(PreRules)$	PreRules	$\mathbb{1}(FinalRules)$	FinalRules
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Revolver	-0.62**	1.78	-0.46	-24.46***	-1.25***	-26.56***	-0.89***	-22.09***	-1.19***
	(0.25)	(1.74)	(0.28)	(7.03)	(0.20)	(6.01)	(0.19)	(6.57)	(0.20)
Obs.	21,664	21,664	21,043	21,664	11,888	21,664	8,064	21,664	9,525
R^2	0.56	0.10	0.51	0.32	0.59	0.29	0.59	0.29	0.62
Mean	20.1	97.1	16.5	54.9	7.2	37.2	4.4	44.0	5.3
Effect (%)	-0.46		-0.37		-0.71		-0.59		-0.70
Effect	-9.2		-6.1		-5.1		-2.6		-3.7
Agency×year controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Agency controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B. Importance of rules. Results from estimating Equation (11). The sample includes 151 federal agencies between 2004-2021, and the unit of observation is agency×edition (there are two editions every year). *Docs* is the number of items in the Unified Agenda. *Significant* is for rules designated as "Economically Significant" or "Otherwise Significant," and *Insignificant* is for rules that are designated as "Substantive but Nonsignificant", "Routine and Frequent", or "Administrative". We report the probability of having significant rule, the fraction out of total items in the Unified Agenda, and the number of rules (log-transformed). *Revolver* = 1 if it is a revolving agency based on bunching estimation (Section 4). Agency×year controls include the number of employees and the average experience, pay, and cost-of-living adjustment, and agency controls include 50 variables describing the agency's characteristics (see Table A.3).

Type:	$\mathbb{1}(any)$		%Docs		Quantity		
Measure:	Significant	Other	Significant	Other	Docs	Significant	Other
Revolver	-10.20*	-9.41	9.18	-9.20	-1.20***	-0.62*	-1.33***
	(5.89)	(6.80)	(9.86)	(9.86)	(0.20)	(0.33)	(0.27)
Obs.	3,407	3,407	3,407	3,407	3,407	2,921	3,196
R^2	0.34	0.14	0.33	0.33	0.61	0.50	0.51
Mean	85.7	93.8	41.5	58.6	33.1	13.4	22.1
Effect					-23.2	-6.2	-16.2
Agency×month controls	YES	YES	YES	YES	YES	YES	YES
Agency controls	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES

Table 9: **Policy implications**

Panel A. Base results. Results from counterfactual analysis (Section 7). We focus on 35 revolving agencies which are highly sensitive to outside job opportunities. We consider three sets of counterfactual policies, and for each one report three outcomes: the percentage changes in the bunching range (Δw), in regulatory leniency (l), and in the supply of labor to the public sector (L_g), all relative to the baseline calibration.

Counterfactual:	Tighter restriction ($\tau^* = 2$)			No restriction ($\tau^* = 0$)			Monitoring ($\gamma^* = 2\gamma$)		
Outcome:	$\Delta \ln \Delta w$	$\Delta \ln l$	$\Delta \ln L_g$	$\Delta \ln \Delta w$	$\Delta \ln l$	$\Delta \ln L_g$	$\Delta \ln \Delta w$	$\Delta \ln l$	$\Delta \ln L_g$
Agency:									
Overseas Private Investment Corporation	100.526	0.263	-0.021	-100.000	1.079	0.088	-50.324	-50.324	-2.487
Surface Transportation Board	100.502	0.251	-0.044	-100.000	1.196	0.159	-50.343	-50.343	-4.125
Securities and Exchange Commission	100.369	0.184	0.007	-100.000	0.195	0.056	-50.316	-50.316	-2.658
Federal Transit Administration	100.087	0.044	-0.016	-100.000	1.455	0.033	-50.305	-50.305	-0.796
Farm Credit Administration	100.806	0.403	0.002	-100.000	0.589	0.018	-50.368	-50.368	-0.625
Small Business Administration	100.405	0.202	-0.025	-100.000	1.065	0.086	-50.297	-50.297	-2.530
Federal Maritime Commission	99.732	-0.134	-0.111	-100.000	1.642	0.183	-50.288	-50.288	-4.093
Federal Retirement Thrift Investment Board	98.436	-0.782	-0.208	-100.000	2.020	0.206	-50.203	-50.203	-4.232
Commodity Futures Trading Commission	99.811	-0.094	0.000	-100.000	1.589	0.000	-50.285	-50.285	0.000
Department of Commerce	100.662	0.331	0.000	-100.000	0.616	0.080	-50.320	-50.320	-2.950
National Institutes of Health	100.805	0.402	0.000	-100.000	0.772	0.016	-50.371	-50.371	-0.493
National Aeronautics and Space Administration	97.563	-1.218	-0.127	-100.000	2.357	0.106	-50.178	-50.178	-1.953
U.S. Census Bureau	100.425	0.213	0.002	-100.000	0.255	0.020	-50.288	-50.288	-0.988
National Oceanic and Atmospheric Administration	100.678	0.339	-0.056	-100.000	1.157	0.283	-50.362	-50.362	-7.332
Bureau of Land Management	100.392	0.196	0.008	-100.000	0.220	0.065	-50.292	-50.292	-3.235
Mean (all revolvers)	99.779	-0.110	-0.051	-100.000	1.250	0.111	-50.288	-50.288	-2.988

Panel B. Regulatory burden. We compute the expected change in regulatory burden following three counterfactual policies: doubling the duration of the post-employment restriction (from one to two years); doubling the costs of exhibiting regulatory leniency; and lowering the threshold by 80%. For example, doubling the costs of leniency would lead to additional 1,241 paperwork regulations and increase the annual costs of compliance by $18.3 billion, relative to the baseline case. The details of the computations are in Section 7.

Outcome:	Rules	Filings	Hours	Dollars	$\frac{Filings}{Rules}$	$\frac{Hours}{Rules}$	$\frac{Dollars}{Rules}$	Documents	Rules
Units:		(thou)	(thou)	(thou)	(thou)	(thou)	(thou)		
Baseline case:									
Estimated elasticity	-0.71	-2.62	-2.52	-4.99	-1.89	-1.88	-4.34	-0.62	-1.2
Agency annual average	71	673,010	28,720	$1,045,146	5,125	317	$6,709	211	37
Total annual effect	-1,263	-21,840,453	-924,322	-$36,331,158	-152,276	-9,402	-$231,754	-3,412	-905
Tight restriction ($\tau = 2$)**:**									
Δ from baseline:	3	25,993	1,109	$40,366	198	12	$259	8	1
No restriction ($\tau = 0$)**:**									
Δ from baseline:	-31	-294,544	-12,569	-$457,410	-2,243	-139	-$2,936	-92	-16
Extra monitoring ($2 \cdot \gamma$)**:**									
Δ from baseline:	1,250	11,845,472	505,493	$18,395,339	90,204	5,579	$118,083	3,714	651

Internet Appendix

A.1 Literature review

In this section we provide a brief summary of the literature on revolving doors.

A.1.1 Theory

A theoretical strand highlights the tension between regulatory capture, meaning that regulators would impose lighter regulatory burden in order to carry favor with potential future employers, versus regulatory schooling, whereby employees choose to vigorously fulfill their duties to build their reputation and human capital (Stigler (1971); Peltzman (1976); Shleifer and Vishney (1993)).

As examples for capture theories, Hilton (1972) argues that senior regulators are concerned of not being reappointed, and consequently seek to adjust the policy to accommodate regulated companies. Adams (1981) explains that procurement officer are incentivized to demonstrate their appreciation for the industry's problems and avoid aggressive monitoring. Laffont and Tirole (1991) argue that interest groups can capture regulatory decision-making process by fostering hopes for future employment opportunities with the regulated firms. Zheng (2014) argues that regulators expand the market demand for services they would be providing when they exit the government. That includes more enforcement actions and higher penalties, as well as expanded rulemaking authority and a preference for complex rules.

On the other hand, Bond and Glode (2014) develop a labor market model, and find that young regulators accumulate human capital and the best ones switch to banking in mid-career. Bar-Isaac and Shapiro (2011) demonstrate that rating agency accuracy increases with the profitability of the investment banking sector, since analysts seek more training in order to reap a higher payoff if they move to an investment bank. Similarly, if the probability of an analyst getting a job at an investment bank is in a low region, then higher probabilities lead to more accuracy since analysts have an incentive to work harder. Finally, Zaring (2013) argues that a successful stint in the public sector enhances private sector earning potential and fosters citizen participation in government.

A.1.2 Empirical findings

Numerous studies find that companies who hire ex-regulators experience positive stock market reactions (Senate-confirmed U.S. Defense Department officials (Luechinger and Moser (2014)), EU Commissioners (Luechinger and Moser (2020)), and U.S. financial regulators (Shive and Forster (2016))). This indicates that ex-regulators add net value to the company, which could be consistent with either schooling or capture theories.

One set of empirical findings is more consistent with the schooling hypothesis. Pro-industry votes at the Federal Communications Commission are not correlated with future industry jobs (Gormley Jr (1979) and Cohen (1986)). Conversely, tough nursing home inspectors are more likely to leave the regulatory agency (Makkai and Braithwaite (1992)), aggressive SEC trial lawyers are more likely to be hired by private law firms (deHaan et al. (2015)), and state banking regulators with more enforcement have greater turnover rates into the private sector (Lucca et al. (2014) and Agarwal et al. (2014)). Finally, firms reduce their risk after hiring ex-financial regulators, suggesting that they were hired for their expertise in risk management (Shive and Forster (2016)).

However, another set of results is more consistent with the capture hypothesis. The SEC is less likely to file enforcement action against firms that hire ex-SEC employees as lobbyists (Correia (2014)), and bank regulators are less likely to file enforcement action against banks that hire revolving door lobbyists (Lambert (2019)). Similarly, firms face fewer enforcement actions after hiring active regulators (Heese (2022)), and audit firms are subject to fewer inspections after hiring former regulators (Hendricks et al. (2022)). Finally, patent examiners at the U.S. Patent and Trademark Office grant more patents to firms that subsequently hire them (Tabakovic and Wollmann (2018)).

A.1.3 Policy discussions

Law and Long (2012) study post-employment restrictions across U.S. States which pertain to public utility commissioners. They find that the restrictions temporarily dampen industrial electricity prices, but have no effect on commercial or residential prices. Moreover, the restrictions lead to commissioners serving shorter terms and struggling to find employment in the private sector, suggesting lower quality. Strickland (2020) find that longer cooling-off periods for State lawmakers do not significantly reduce the rates of revolving. Cain and Drutman (2014) study the Honest Leadership and Open Government Act in 2007, which imposed one-year ban on ex-Congressional staffers whose salary exceeded 75% of the member's salary. They find that the act reduced the share of covered staff becoming lobbyists, and equivalently increased the demand for uncovered staffers.

A.1.4 Related literatures

The focus of our paper is on the revolving door between the Executive Branch of the U.S. Government and the private sector. Others have studies the revolving door in three different settings.

From Congress to the lobbying industry - Here, the concern is that ex-congressmen and ex-staffers are hired to provide better access for their former colleagues. Blanes i Vidal et al. (2012) find that lobbyists who worked for a U.S. Senator suffer substantial earnings loss when that Senator leaves office. LaPira and Thomas (2014) find that ex-staffers who turned lobbyists represent a wider variety of economic interests than conventional lobbyists, suggesting that they are not hired for issue-specific expertise. McCrain (2018) finds that the connections between ex-staffers to their former Hill coworkers drives their revenues, more than their direct connection to a senator. Strickland (2020) study former State lawmakers who turn lobbyists, and find that their revenues decline as new legislators enter the assembly.

Equity analysts - Here, the concern is that analysts will inflate the ratings of their future employers. On one hand, Cohen et al. (2012) show that sell-side analysts who get appointed as independent directors are relatively poor performers. Cornaggia et al. (2016) show that ratings of firms who hire former credit rating analysts are inflated prior to the employment transfer, and similar findings are in Lourie (2018), Horton et al. (2017) (banking analysts), and Jiang et al. (2018). On the other hand, Kempf (2020) finds that accurate analysts are more frequently hired by underwriting investment banks.

Auditors and audited firms - Here, the concern is that the revolving door will impair the auditor independence. The evidence is mixed. On one hand, Geiger et al. (2005) find no evidence that revolving door hirings lead to more earnings management, and Geiger et al. (2008) finds no evidence that such hirings lead to poorer financial reporting quality. In an experimental study, Bhattacharjee and Brown (2018) find that auditors identify more with an alumni-affiliated manager, but are better able to identify the inappropriateness of their persuasion attempts.

A.2 Derivations

A.2.1 Value function with no uncertainty

A.2.1.1 Value function after triggering restrictions

We first solve $V_g(1, z)$, the value function after an agent triggered post-employment restrictions. To simplify notation, we drop the subscript g. Equation (2) implies

$$(r + \lambda)V = z + V'\mu z + V''\frac{1}{2}\sigma^2 z^2 + \lambda\Omega(1 - \tau)z, \tag{A.1}$$

where $\Omega(1 - \tau)z$ is the value of working in the private sector after triggering restrictions, with $\Omega \equiv \frac{\theta}{r-\mu}$.

The solution takes the form of $V = A_1 z + B_1 + a_1 z^{b_1}$. First, we plug the general solution $a_1 z^{b_1}$ into the reduced equation

$$(r + \lambda)V = V'\mu z + V''\frac{1}{2}\sigma^2 z^2. \tag{A.2}$$

We get the following

$$(r + \lambda) = b_1\mu + b_1(b_1 - 1)\frac{1}{2}\sigma^2. \tag{A.3}$$

Under the special case of zero uncertainty, $\sigma = 0$, we can get

$$b_1 = \frac{r + \lambda}{\mu} > 1. \tag{A.4}$$

Second, we plug the particular solution $A_1 z + B_1$ into the full differential equation:

$$(r + \lambda)(A_1 z + B_1) = z + A_1 \mu z + \lambda \Omega (1 - \tau) z. \tag{A.5}$$

We can derive

$$A_1 = \frac{1 + \lambda \Omega (1 - \tau)}{r + \lambda - \mu}, \tag{A.6}$$

$$B_1 = 0. \tag{A.7}$$

Third, a regularity condition is that the marginal impact of the wage potential on the value function will not diverge when the wage potential goes to infinity:

$$\lim_{z \to \infty} V' = \lim_{z \to \infty} A_1 + b_1 a_1 z^{b_1 - 1} < \infty, \tag{A.8}$$

Because $b_1 - 1 > 0$, this implies

$$a_1 = 0. \tag{A.9}$$

In summary, the value function after an agent triggered the post-employment restriction is

$$V(1, z) = \frac{1 + \lambda \Omega (1 - \tau)}{r + \lambda - \mu} z. \tag{A.10}$$

A.2.1.2 Value function above the regulatory threshold before triggering restriction

We now solve $V(0, z)$, the value function before an agent triggered the post-employment restriction. First, consider the case in which $z \geq \underline{w}$. Suppose the agent is in the continuation region. Equation (3) implies

$$(r + \lambda) V = \underline{w} + V' \mu z + V'' \frac{1}{2} \sigma^2 z^2 + \lambda \Omega z. \tag{A.11}$$

The solution again takes the form of $V = A_2 z + B_2 + a_2 z^{b_2}$. First, similar to Appendix A.2.1.1, the general solution is $a_2 z^{b_2}$ with

$$b_2 = \frac{r+\lambda}{\mu}, \tag{A.12}$$

when there is no uncertainty.

Second, we plug the particular solution $Az + B$ into the full differential equation:

$$(r+\lambda)(A_2 z + B_2) = \underline{w} + A_2 \mu z + \lambda \Omega z. \tag{A.13}$$

We can derive

$$A_2 = \frac{\lambda\Omega}{r+\lambda-\mu}, \tag{A.14}$$

$$B_2 = \frac{\underline{w}}{r+\lambda}. \tag{A.15}$$

Third, the smooth pasting condition at $\overline{w}$ is that

$$V'(0, \overline{w}) = V'(1, \overline{w}), \tag{A.16}$$

which implies

$$\frac{\lambda\Omega}{r+\lambda-\mu} + b_2 a_2 \overline{w}^{b_2 - 1} = \frac{1+\lambda\Omega(1-\tau)}{r+\lambda-\mu}. \tag{A.17}$$

The value matching condition at $\overline{w}$ is that

$$V(0, \overline{w}) = V(1, \overline{w}), \tag{A.18}$$

which implies

$$\frac{\lambda\Omega}{r+\lambda-\mu}\overline{w} + \frac{\underline{w}}{r+\lambda} + a_2 \overline{w}^{b_2} = \frac{1+\lambda\Omega(1-\tau)}{r+\lambda-\mu}\overline{w}. \tag{A.19}$$

Combining equations (A.17) and (A.19), we can derive

$$\frac{\underline{w}}{\overline{w}} = \frac{b_2 - 1}{b_2} \frac{r+\lambda}{r+\lambda-\mu}(1 - \lambda\Omega\tau). \tag{A.20}$$

Plugging in $b_2 = \frac{r+\lambda}{\mu}$, we have

$$\frac{\underline{w}}{\overline{w}} = 1 - \lambda\Omega\tau. \tag{A.21}$$

Given $\Omega \equiv \frac{1}{r-\mu}\theta$, we have

$$\frac{\overline{w} - \underline{w}}{\overline{w}} = \frac{1}{r-\mu}\lambda\theta\tau. \tag{A.22}$$

Combining equations (A.19) and (A.21), we can derive

$$a_2 = \left(\frac{1}{r+\lambda-\mu} - \frac{1}{r+\lambda}\right)(1-\lambda\Omega\tau)^{b_2}\underline{w}^{1-b_2}. \tag{A.23}$$

In summary, the value function of an agent whose wage potential is above the regulatory threshold but has not triggered the post-employment restriction is given by:

$$V(z,0) = A_2 z + B_2 + a_2 z^{b_2}, \tag{A.24}$$

where

$$A_2 = \frac{\lambda\theta}{(r+\lambda-\mu)(r-\mu)}, \tag{A.25}$$

$$B_2 = \frac{\underline{w}}{r+\lambda}, \tag{A.26}$$

$$b_2 = \frac{r+\lambda}{\mu}, \tag{A.27}$$

$$a_2 = \left(\frac{1}{r+\lambda-\mu} - \frac{1}{r+\lambda}\right)\left(1 - \frac{\theta\lambda\tau}{r-\mu}\right)^{b_2}\underline{w}^{1-b_2}. \tag{A.28}$$

A.2.1.3 Value function below the regulatory threshold

Next, consider the case in which $z < \underline{w}$. Since the restriction cannot be triggered yet, the HJB equation is simply

$$(r+\lambda)V = z + V'\mu z + V''\frac{1}{2}\sigma^2 z^2 + \lambda\Omega z. \tag{A.29}$$

The solution again takes the form of $V = A_3 z + B_3 + a_3 z_3^b$. First, similar to Appendix A.2.1.1, the general solution is $a_3 z^{b_3}$ with

$$b_3 = \frac{r+\lambda}{\mu}, \tag{A.30}$$

when there is no uncertainty.

Second, we plug the particular solution $A_3 z + B_3$ into the full differential equation:

$$(r+\lambda)(A_3 z + B_3) = z + A_3 \mu z + \lambda \Omega z. \tag{A.31}$$

We can derive

$$A_3 = \frac{\lambda\Omega + 1}{r+\lambda-\mu}, \tag{A.32}$$

$$B_3 = 0. \tag{A.33}$$

Third, the value matching condition at $\underline{w}$ is that

$$\lim_{z \to \underline{w}^+} V(0,z) = \lim_{z \to \underline{w}^-} V(0,z), \tag{A.34}$$

which implies

$$a_3 = \left(\frac{1}{r+\lambda-\mu} - \frac{1}{r+\lambda} \right) \left[(1-\lambda\Omega\tau)^{b_3} - 1 \right] \underline{w}^{1-b_3} < 0. \tag{A.35}$$

In summary, the value function of an agent whose wage potential is below the regulatory threshold is given by:

$$V(0,z) = A_3 z + a_3 z^{b_3}, \tag{A.36}$$

where

$$A_3 = \frac{\lambda\theta + r - \mu}{(r+\lambda-\mu)(r-\mu)}, \tag{A.37}$$

$$b_3 = \frac{r+\lambda}{\mu}, \tag{A.38}$$

$$a_3 = \left(\frac{1}{r+\lambda-\mu} - \frac{1}{r+\lambda} \right) \left[(1-\lambda\Omega\tau)^{b_3} - 1 \right] \underline{w}^{1-b_3}. \tag{A.39}$$

A.2.1.4 Value function without uncertainty: summary

In summary, the pre-trigger value function is

$$V_g(0,z) = \begin{cases} \frac{\lambda\theta+r-\mu}{(r+\lambda-\mu)(r-\mu)}z + \left(\frac{1}{r+\lambda-\mu} - \frac{1}{r+\lambda}\right)\left[\left(1-\frac{\theta\lambda\tau}{r-\mu}\right)^{\frac{r+\lambda}{\mu}} - 1\right]\underline{w}^{1-\frac{r+\lambda}{\mu}}z^{\frac{r+\lambda}{\mu}}, & z \in [0,\underline{w}] \\ \frac{\lambda\theta}{(r+\lambda-\mu)(r-\mu)}z + \frac{\underline{w}}{r+\lambda} + \left(\frac{1}{r+\lambda-\mu} - \frac{1}{r+\lambda}\right)\left(1-\frac{\theta\lambda\tau}{r-\mu}\right)^{\frac{r+\lambda}{\mu}}\underline{w}^{1-\frac{r+\lambda}{\mu}}z^{\frac{r+\lambda}{\mu}}, & z \in [\underline{w},\overline{w}] \\ \frac{(1-\tau)\lambda\theta+r-\mu}{(r+\lambda-\mu)(r-\mu)}z & z \in [\overline{w},+\infty] \end{cases},$$

A.2.2 Value function with uncertainty

A.2.2.1 Value function after triggering restrictions

The HJB of the post-trigger value function is:

$$(r+\lambda)V = z + V'\mu z + V''\frac{1}{2}\sigma^2 z^2 + \lambda\Omega(1-\tau)z \tag{A.40}$$

The solution takes the form of $V = Az + B + a_1 z^{b_1} + a_2 z^{b_2}$. We first solve the nonliner part az^b first by plugging $V = az^b$ into the reduced equation

$$(r+\lambda)V = V'\mu z + V''\frac{1}{2}\sigma^2 z^2,$$

We get:

$$(r+\lambda) = b\mu + b(b-1)\frac{1}{2}\sigma^2 \tag{A.41}$$

We only keep the positive root to make sure V is finite when z approaches zero:

$$b = \frac{-\left(\mu - \frac{1}{2}\sigma^2\right) + \sqrt{\left(\mu - \frac{1}{2}\sigma^2\right)^2 + 2\sigma^2(r+\lambda)}}{\sigma^2} \tag{A.42}$$

Second, we plug the particular solution $V = Az + B$ into the full differential equation:

$$(r+\lambda)(Az+B) = z + A\mu z + \lambda\Omega(1-\tau)z \tag{A.43}$$

We get:

$$A = \frac{1 + \lambda\Omega(1-\tau)}{r + \lambda - \mu},$$
$$B = 0. \tag{A.44}$$

So

$$V = \frac{1 + \lambda\frac{\theta(1-\tau)}{r-\mu}}{r+\lambda-\mu} z + a_1 z^{\frac{-\left(\mu - \frac{1}{2}\sigma^2\right) + \sqrt{\left(\mu - \frac{1}{2}\sigma^2\right)^2 + 2\sigma^2(r+\lambda)}}{\sigma^2}} \tag{A.45}$$

Notice that we have to assume $r > \mu$ to rule out infinite derivative of the value function with respect to wage potential. Then,

$$r + \lambda - \mu > 0 \tag{A.46}$$

$$2\sigma^2(r+\lambda) > 2\sigma^2\mu \tag{A.47}$$

$$(\mu - \frac{1}{2}\sigma^2)^2 + 2\sigma^2(r+\lambda) > (\mu + \frac{1}{2}\sigma^2)^2 \tag{A.48}$$

$$\frac{-\left(\mu - \frac{1}{2}\sigma^2\right) + \sqrt{\left(\mu - \frac{1}{2}\sigma^2\right)^2 + 2\sigma^2(r+\lambda)}}{\sigma^2} > 1 \tag{A.49}$$

We can apply the boundary condition $\lim_{z\to+\infty} V'(z) < \infty$ to get $a_1 = 0$

A.2.2.2 Value function above the regulatory threshold before triggering restriction

In this case, under the strategy in proposition 1, the HJB Equation of the pre-trigger value function is:

$$(r+\lambda)V = \underline{w} + V'\mu z + V''\frac{1}{2}\sigma^2 z^2 + \lambda\Omega z \tag{A.50}$$

The solution takes the form of $V = Az + B + a_1 z^{b_1} + a_2 z^{b_2}$.

Therefore, we first solve the nonlinear part az^b by plugging $V = az^b$ into the reduced equation

$$(r+\lambda)V = V'\mu z + V''\frac{1}{2}\sigma^2 z^2.$$

We get:

$$(r+\lambda) = b\mu + b(b-1)\frac{1}{2}\sigma^2 \tag{A.51}$$

We get two roots:

$$b_1 = \frac{-\left(\mu - \frac{1}{2}\sigma^2\right) + \sqrt{\left(\mu - \frac{1}{2}\sigma^2\right)^2 + 2\sigma^2(r+\lambda)}}{\sigma^2} > 1 \tag{A.52}$$

$$b_2 = \frac{-\left(\mu - \frac{1}{2}\sigma^2\right) - \sqrt{\left(\mu - \frac{1}{2}\sigma^2\right)^2 + 2\sigma^2(r+\lambda)}}{\sigma^2} < 0 \tag{A.53}$$

Second, we plug the particular solution $V = Az + B$ into the full differential equation:

$$(r+\lambda)(Az+B) = \underline{w} + A\mu z + \lambda\Omega z \tag{A.54}$$

We get:

$$A = \frac{\lambda\Omega}{r+\lambda-\mu}, \quad B = \frac{\underline{w}}{r+\lambda}. \tag{A.55}$$

Therefore, the value function is

$$V(0, z_t) = \frac{\lambda\Omega}{r+\lambda-\mu} z + \frac{\underline{w}}{r+\lambda} + a_1 z^{b_1} + a_2 z^{b_2}, z \in [\underline{w}, \overline{w}]. \tag{A.56}$$

The parameters will be solved below using information from both cases of $V_g(0, z)$.

A.2.2.3 Value function below the regulatory threshold before triggering restriction

In this case, the HJB equation of the pre-trigger value function is

$$(r+\lambda)V = z + V'\mu z + V''\frac{1}{2}\sigma^2 z^2 + \lambda\Omega z \tag{A.57}$$

The solution takes the form of $V = Az + B + a_3 z^{b_3} + a_4 z^{b_4}$.

Therefore, we first solve the nonlinear part az^b by plugging $V = az^b$ into the reduced equation

$$(r+\lambda)V = V'\mu z + V''\frac{1}{2}\sigma^2 z^2. \tag{A.58}$$

We get:

$$(r+\lambda) = b\mu + b(b-1)\frac{1}{2}\sigma^2 \tag{A.59}$$

We only keep the positive root to make sure V is finite when z approaches zero:

$$b_3 = b_1 = \frac{-\left(\mu - \frac{1}{2}\sigma^2\right) + \sqrt{\left(\mu - \frac{1}{2}\sigma^2\right)^2 + 2\sigma^2(r+\lambda)}}{\sigma^2} > 1 \tag{A.60}$$

Second, we plug the particular solution $V = Az + B$ into the full differential equation:

$$(r+\lambda)(Az+B) = z + A\mu z + \lambda\Omega(1-\tau)z \tag{A.61}$$

We get:

$$\begin{gathered} A = \frac{1+\lambda\Omega(1-\tau)}{r+\lambda-\mu}, \\ B = 0. \end{gathered} \tag{A.62}$$

Therefore, the value function is

$$V\left(0, z_t\right) = \frac{1+\lambda\Omega}{r+\lambda-\mu} z + a_3 z^{b_1}, z \in [0, \underline{w}]. \tag{A.63}$$

A.2.2.4 Solve the parameters

Then we use four boundary conditions to solve the four remaining parameters: a_1,a_2, a_3 and $\overline{w}$. The value matching condition at $\underline{w}$ is that

$$\lim_{z\to\underline{w}^+} V(0,z) = \lim_{z\to\underline{w}^-} V(0,z), \tag{A.64}$$

which implies

$$\frac{1+\lambda\Omega}{r+\lambda-\mu}\underline{w} + a_3\underline{w}^{b_1} = \frac{\lambda\Omega}{r+\lambda-\mu}\underline{w} + \frac{\underline{w}}{r+\lambda} + a_1\underline{w}^{b_1} + a_2\underline{w}^{b_2}, \tag{A.65}$$

The smooth pasting condition at $\underline{w}$ is that

$$\lim_{z\to\underline{w}^+} V'(0,z) = \lim_{z\to\underline{w}^-} V'(0,z), \tag{A.66}$$

which implies

$$\frac{1+\lambda\Omega}{r+\lambda-\mu}+b_1a_3\underline{w}^{b_1-1}=\frac{\lambda\Omega}{r+\lambda-\mu}+b_1a_1\underline{w}^{b_1-1}+b_2a_2\underline{w}^{b_2-1}, \tag{A.67}$$

Combining equations (A.65) and (A.66), we get

$$a_2=\frac{\frac{1-b_1}{r+\lambda-\mu}+\frac{b_1}{r+\lambda}}{b_2-b_1}\underline{w}^{1-b_2}, \tag{A.68}$$

and thus

$$a_3=\left(\frac{-1}{r+\lambda-\mu}+\frac{1}{r+\lambda}+\frac{\frac{1-b_1}{r+\lambda-\mu}+\frac{b_1}{r+\lambda}}{b_2-b_1}\right)\underline{w}^{1-b_1}+a_1, \tag{A.69}$$

The value matching condition at $\overline{w}$ is that

$$\lim_{z\to\overline{w}^+}V(0,z)=\lim_{z\to\overline{w}^-}V(0,z), \tag{A.70}$$

which implies

$$\frac{\lambda\Omega}{r+\lambda-\mu}\overline{w}+\frac{\underline{w}}{r+\lambda}+a_1\overline{w}^{b_1}+a_2\overline{w}^{b_2}=\frac{1+\lambda\Omega(1-\tau)}{r+\lambda-\mu}\overline{w}. \tag{A.71}$$

The smooth pasting condition at $\overline{w}$ is that

$$\lim_{z\to\overline{w}^+}V'(0,z)=\lim_{z\to\overline{w}^-}V'(0,z), \tag{A.72}$$

which implies

$$\frac{\lambda\Omega}{r+\lambda-\mu}+b_1a_1\overline{w}^{b_1-1}+b_2a_2\overline{w}^{b_2-1}=\frac{1+\lambda\Omega(1-\tau)}{r+\lambda-\mu} \tag{A.73}$$

Combining equations (A.71) and (A.73), we get

$$(b_2-b_1)a_2\overline{w}^{b_2}=(1-b_1)\frac{1-\lambda\Omega\tau}{r+\lambda-\mu}\overline{w}+\frac{\underline{w}}{r+\lambda}b_1 \tag{A.74}$$

Plug in a_2, we get

$$F\left(\frac{\overline{w}}{\underline{w}}\right) = \left(\frac{1-b_1}{r+\lambda-\mu} + \frac{b_1}{r+\lambda}\right)\left(\frac{\overline{w}}{\underline{w}}\right)^{b_2} + (b_1-1)\frac{1-\lambda\Omega\tau}{r+\lambda-\mu}\frac{\overline{w}}{\underline{w}} - \frac{b_1}{r+\lambda} = 0 \quad \text{(A.75)}$$

Recall that we have $b_1 > 1$ and $b_2 < 0$. If we further assume that $1 - \lambda\Omega\tau > 0$, then we get

$$F(1) = (b_1 - 1)\frac{-\lambda\Omega\tau}{r+\lambda-\mu} < 0 \quad \text{(A.76)}$$

$$\lim_{w\to+\infty} F(w) = +\infty \quad \text{(A.77)}$$

By the continuity of $F(w)$ and the intermediate value theorem, there exists a valid $\overline{w}$ that is higher than $\underline{w}$. The intuition of the assumption $1 - \lambda\Omega\tau > 0$ is that the expected wage loss due to triggering the wage limit should not be too large in order to prevent the agent from waiting forever.

After solving $\overline{w}$ from (A.75), we can plug $\overline{w}$ into (A.71) and get a_1.

In summary, the pre-trigger value function is

$$V_g(0,z) = \begin{cases} \frac{\lambda\theta+r-\mu}{(r+\lambda-\mu)(r-\mu)}z + a_3 z^{b_1}, & z \in [0, \underline{w}] \\ \frac{\lambda\theta}{(r+\lambda-\mu)(r-\mu)}z + \frac{w}{r+\lambda} + a_1 z^{b_1} + a_2 z^{b_2}, & z \in [\underline{w}, \overline{w}] \\ \frac{(1-\tau)\lambda\theta+r-\mu}{(r+\lambda-\mu)(r-\mu)}z & z \in [\overline{w}, +\infty] \end{cases},$$

where

$$a_1 = \frac{r-\mu-\tau\lambda\theta}{(r+\lambda-\mu)\,(r-\mu)}\overline{w}^{1-b_1} - \frac{\underline{w}}{r+\lambda}\overline{w}^{-b_1} - a_2\overline{w}^{b_2-b_1}, \tag{A.78}$$

$$a_2 = \frac{\frac{1-b_1}{r+\lambda-\mu}+\frac{b_1}{r+\lambda}}{b_2-b_1}\underline{w}^{1-b_2}, \tag{A.79}$$

$$a_3 = a_1 + \left(\frac{-1}{r+\lambda-\mu}+\frac{1}{r+\lambda}+\frac{\frac{1-b_1}{r+\lambda-\mu}+\frac{b_1}{r+\lambda}}{b_2-b_1}\right)\underline{w}^{1-b_1}, \tag{A.80}$$

$$b_1 = \frac{-\left(\mu-\frac{1}{2}\sigma^2\right)+\sqrt{\left(\mu-\frac{1}{2}\sigma^2\right)^2+2\sigma^2(r+\lambda)}}{\sigma^2} > 1, \tag{A.81}$$

$$b_2 = \frac{-\left(\mu-\frac{1}{2}\sigma^2\right)-\sqrt{\left(\mu-\frac{1}{2}\sigma^2\right)^2+2\sigma^2(r+\lambda)}}{\sigma^2} < 0, \tag{A.82}$$

$$\overline{w} \text{ solves } \left(\frac{1-b_1}{r+\lambda-\mu}+\frac{b_1}{r+\lambda}\right)\left(\frac{\overline{w}}{\underline{w}}\right)^{b_2} + (b_1-1)\frac{r-\mu-\tau\lambda\theta}{(r+\lambda-\mu)\,(r-\mu)}\frac{\overline{w}}{\underline{w}} - \frac{b_1}{r+\lambda} = 0. \tag{A.83}$$

A.2.3 Proof of proposition 1

We will show that the following strategy is optimal:

$$w(0,z) = \begin{cases} z, & z \notin [\underline{w},\overline{w}] \\ \underline{w}, & z \in [\underline{w},\overline{w}] \end{cases}, \tag{A.84}$$

and

$$w(1,z) = z. \tag{A.85}$$

First, in the post-trigger state, people would always choose the highest possible wage as there is no cost related to that.

Next, we prove by contradiction that the above strategy is optimal in the pre-trigger state.

Case 1: Assume that $w(0,z)$ is strictly dominated by the optimal strategy $w'(0,z)$ and $w'(0,z)$ is different from $w(0,z)$ in $z \in (0,\underline{w})$.

Consider the third strategy $w''(0,z)$ that replicates $w'(0,z)$ outside of $z \in (0,\underline{w}]$ but chooses the same as $w(0,z)$ in $z \in (0,\underline{w}]$. As the flow payoff within $z \in (0,\underline{w}]$ is capped by $wdt = zdt$, and the third strategy $w''(0,z)$ provides the same flow payoff as $w'(0,z)$ outside of $z \in (0, \underline{w}]$ for any realization of the shock path, we get that $w'(0,z)$ is dominated by $w''(0,z)$ and is not the optimal strategy.

Case 2: Assume that $w(0,z)$ is strictly dominated by the optimal strategy $w'(0,z)$ and $w'(0,z)$ is different from $w(0,z)$ in $z \in [\underline{w}, \overline{w}]$.

Assume that $w'(0,z)$ is different from $w(0,z)$ at $z_0 \in [\underline{w}, \overline{w}]$. It can only be that $w'(0,z_0) > \underline{w}$, and this leads to a value of $V_g(1, z_0)$ for strategy $w'(0,z)$. However, in the dynamic programming above, switching to $V_g(1, z_0)$ is always an option for $w(0,z)$, and thus the payoff from $w'(0,z)$ can't be strictly higher than that of $w(0,z)$.

Case 3: Assume that $w(0,z)$ is strictly dominated by the optimal strategy $w'(0,z)$ and $w'(0,z)$ is different from $w(0,z)$ in $z \in (\overline{w}, +\infty)$.

Assume that $w'(0,z)$ is different from $w(0,z)$ at $z_1 \in (\overline{w}, +\infty)$. It can only be that $w'(0,z_1) = \underline{w}$. Consider the third strategy $w''(0,z)$ that replicates $w'(0,z)$ outside of z_1, which gives a value of $V_g(1, z_1)$. By the dynamic programming above, $V_g(1, z_1)$ is the highest value that can be obtained starting from z_1 and the no trigger status. Therefore, $w'(0,z)$ is dominated by $w''(0,z)$ and is not optimal.

In summary, if a strategy is the optimal strategy, then it should not be different from $w(0,z)$. In other words, $w(0,z)$ is the optimal strategy.

A.2.4 Labor supply

Following Chetty (2012), we consider a representative agent with a quasi-linear utility:

$$u(C, L_g, L_p) = C - \alpha_g^{-1/\epsilon} \frac{L_g^{1+1/\epsilon}}{1+1/\epsilon} - \alpha_p^{-1/\epsilon} \frac{L_p^{1+1/\epsilon}}{1+1/\epsilon}$$

where C is the life-time consumption, L_g and L_p are labor supply to the public and private sector, and ϵ is the elasticity of labor supply. α represents other shocks to labor supply, such as preference shocks. The representative agent chooses consumption and labor supply to maximize utility, subject to the budget constraint:

$$C \leq W + V_g L_g + V_p L_p,$$

where W is the non-labor income, and V_p and V_g are the expected lifetime wages at the entry level in the private and public sectors, respectively. We assume that the post-employment restrictions have not been triggered yet, so $V_p = \frac{1}{r-\mu}\theta z$ according to Equation (1) and V_g is defined by Equation (5). Based on those assumptions, we obtain the labor supply expression in Equation (13).

Figure A.1: **Distribution of federal salaries**

Many federal employees cluster at the top of their pay grade, awaiting promotion to the next pay grade. On the left, we plot the raw distribution of basic pay in our sample within ±\$50,000 of the threshold specified in Section 207. The two marked regions represent the top pay available in pay grades GS-14 and GS-15. On the right, we plot the raw distribution in 2007 of basic pay for GS employees within ±\$50,000 of the threshold, marked with the top pay available in GS-7 through GS-15.

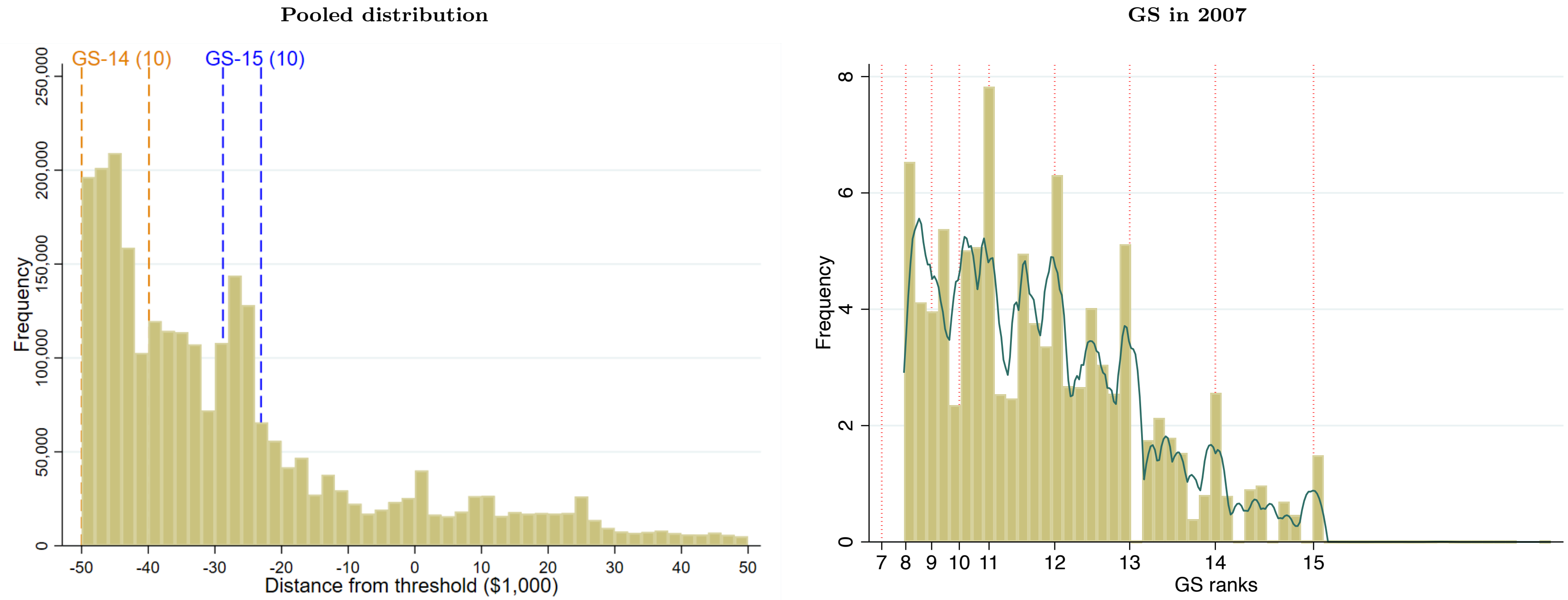

Figure A.2: **Distribution of statistical significance**

We estimate bunching behavior in 151 federal agencies, according to the procedure described in Section 4.1. We then compute the t-statistics of the estimated bunching range (Δw) and plot the distribution below. In the paper, bunching is considered statistically significant if the t-statistics is greater or equal to 1.96 (red line), using standard 5% confidence intervals.

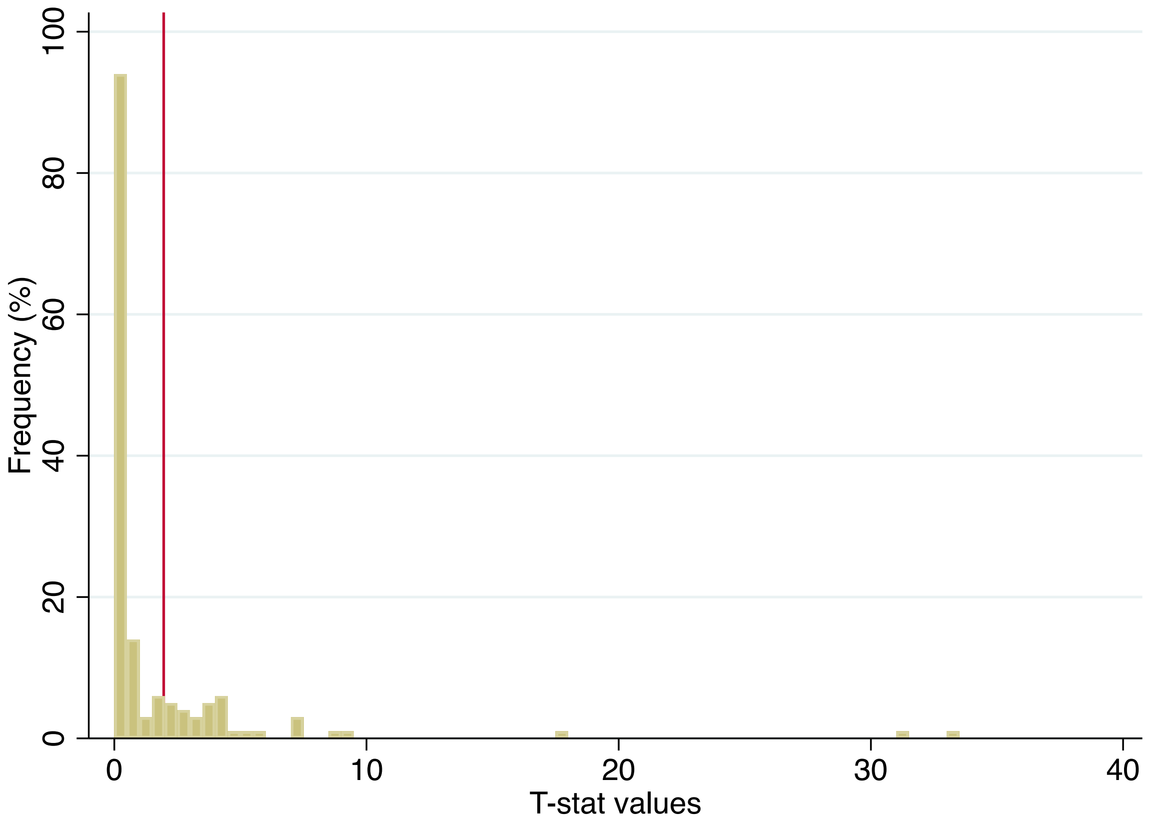

Table A.1: **Difference of Means: employee types - robustness**

Panel A. These are difference of means tests between employees that bunch below the post-employment restriction threshold and those who do not. *Bunched* refers to employees who were within $[-\$5,000, -\$0)$ of the threshold at least once. *Never Bunched, Crossed* are employees who were never within $[-\$5,000, -\$0)$ of the threshold but they were above the threshold at least once. The first two columns present the means for the two groups while the third column has the point estimate and standard error (in parentheses) for a t-test comparing the means of the two groups.

	Bunched	Never Bunched Crossed	Diff of Means
Tenure (years)	22.48	16.40	6.09***
			(0.10)
Number of promotions	1.27	0.92	0.35***
			(0.01)
Number of relocations	0.50	0.39	0.11***
			(0.01)
Base Pay ($)	136814.85	148024.94	-11210.09***
			(167.49)
Adjusted Pay ($)	148411.26	158745.99	-10334.72***
			(188.62)
Base Pay Raise (%)	17.60	9.13	8.47*
			(3.36)
Adjusted Pay Raise (%)	17.89	10.55	7.33*
			(3.37)
Years with Bonus	3.47	1.83	1.63***
			(0.03)
Bonus ($) | Bonus>0	3022.02	3343.82	-321.80***
			(53.11)
Bonus (%) | Bonus>0	2.35	2.60	-0.25***
			(0.04)
Observations	24431	40584	65015

Panel B. These are difference of means tests between employees that bunch below the post-employment restriction threshold and those who do not. *Bunched* refers to employees who were within $[-\$5,000, -\$0)$ of the threshold at least once. *Never Bunched, Never Crossed* are employees who were never within $[-\$5,000, -\$0)$ of the threshold and were never above the threshold. The first two columns present the means for the two groups while the third column has the point estimate and standard error (in parentheses) for a t-test comparing the means of the two groups.

	Bunched	Never Bunched Never Crossed	Diff of Means
Tenure (years)	22.48	22.43	0.05
			(0.08)
Number of promotions	1.27	1.00	0.27***
			(0.01)
Number of relocations	0.50	0.39	0.11***
			(0.01)
Base Pay ($)	136814.85	104036.89	32777.97***
			(117.72)
Adjusted Pay ($)	148411.26	119106.95	29304.31***
			(147.07)
Base Pay Raise (%)	17.60	8.98	8.62*
			(3.47)
Adjusted Pay Raise (%)	17.89	9.57	8.32*
			(3.48)
Years with Bonus	3.47	3.39	0.07**
			(0.02)
Bonus ($) | Bonus>0	3022.02	1672.69	1349.34***
			(36.63)
Bonus (%) | Bonus>0	2.35	1.77	0.58***
			(0.03)
Observations	24431	255008	279439

Table A.2: **Descriptive statistics: wage differentials**

These are summary statistics for the sample that is used to construct the public-private wage gap measures. The sample includes 110 federal agencies between 2004-2021, and the unit of observation is agency×year (for example, the SEC in 2012). The sample of agencies are those that can be matched to the industry lobbying data from OpenSecrets.

Statistic:	N	Mean	SD	P25	P50	P75
Total Lobbying Expenditure	2151	6592220	12073888	174916	1321830	5814141
No. of lobbying industries (SIC2)	2151	25.58	21.52	7.00	20.00	39.00
% Share of top lobbying industry (SIC2)	2118	46.06	25.27	25.63	39.71	62.94
Average employee pay	1836	84807	20002	72184	85645	96049
Average employee pay (adj)	1836	96972	25512	82046	100275	112087
Average private sector pay	1945	74797	15065	65176	73767	81187
Wage Gap (Private - Public)	1836	-10450	20980	-23546	-13346	1283
Wage Gap (Private/Public)	1835	0.92	0.27	0.74	0.85	1.02
Adj. Wage Gap (Private - Public)	1836	-22649	25741	-39325	-28075	-10047
Adj. Wage Gap (Private/Public)	1835	0.89	0.78	0.64	0.73	0.88

Table A.3: **Characteristics of federal agencies**

The table below lists 50 characteristics of federal agencies, based on data shared by Selin (2015) and Selin and Lewis (2018). We include all 50 variables in our estimation of Equation (11); those results were reported above in Table 7 and Table 8.

Variable	**Description**
ActingService	If the agency head position is vacant, then the President may designate an acting head or a specific official will serve as acting head (coded 1); or the statute is silent (coded 0).
Adjudication	Equals 1 if the agency has power to adjudicate.
AdvisoryCommissions	Equals 1 if a statute establishes a committee, or authorizes the agency to establish a committee.
ALJs	Equals 1 if the agency employes administrative law judges.
Bureau	Equals 1 if the agency is a component of a larger agency (e.g., Consumer Financial Protection Bureau is a component of the Federal Reserve).
Cabinet	Equals 1 if the agency is an executive department or a component of it (e.g., Federal Aviation Administration within the Department of Transportation).
CFO	Equals 1 if the agency appoints its own Chief Financial Officer or has a CFO appointed by the President; 0 if the agency is not mandated to have a CFO.
ChairRemoval	If MultiMember=1, and max(PASHead,PresSelects)=1, and OutsideChair=0, then ChairRemoval captures if the head has specific term (1); can be removed for cause (coded 2); or serves at the pleasure of the president (coded 3).
CIO	Equals 1 if the agency is mandated to have a Chief Information Officer.
CodeRef	Equals 1 if the agency is referenced in the U.S. Code (most agencies are, but a counterexample is the Employment Standards Administration within the Department of Labor).
ConflictofInterest	Equals 1 if the agency's statute explicitly prohibits conflict of interest on the employees.
CongressCommittees	Number of congressional committees the agency is overseen by.

Variable	Description
CongressInput	Equals 1 if there is congressional input in the nomination process, aside from confirmation (e.g., the Election Assistance Commission).
CongressReports	Number of reports the agency must submit to Congress.
ContinuationReplacement	If FixedTerms=1, this variable equals 1 if the person whose term has expired will continue to serve until a successor was appointed.
ElectedHead	If MultiMember=1, then ElectedHead equals 1 if the head is chosen from the commissioners/directors.
EOP	Equals 1 if the agency belongs to the Executive Office of the President (e.g., Office of Management and Budget).
Expertise	Equals 1 if the leadership (agency head and commissioners) requires specific expertise and/or minimal job experience.
ExpertiseLL	Equals 1 if expertise and/or experience is required from lower-level employees (not the agency head and its commissioners).
FixedTerms	Equals 1 if statute specifies fixed terms for leadership.
FixedTermsLL	Equals 1 if statute specifies fixed terms for non-leadership (lower-level employees).
ForCause	Equals 1 if leadership (head/commission/board) may only be removed for cause, e.g., neglect of duty of inefficiency.
IG	The agency is not mandated to have an Inspector General (coded 0); has an audit office (coded 1); has an iG appointed internally (coded 2); has an IG appointed by the President (coded 3).
IndepDecisions	Weighted average of characteristics which pertain to the decision-making process. Based on the methodology in Selin (2015).
IndepFunding	Equals 0 if the agency is not authorized to raise funds on its own, and 1.
IndepLitigating	Equals 1 if the agency is authorized to represent itself in legal proceedings (rather than going through the Attorney General).
IndepPersonnel	Title 5 of the U.S. Code governs pay and allowances for federal employees, except for certain agencies. This variable equals 1 if there are any exemptions available for this agency, and 0 otherwise.

Variable	Description
IndepPolitical	Weighted average of characteristics which pertain to insulation from politica interference. Based on the methodology in Selin (2015).
Multimember	Equals 1 if the agency is governed by a multi-member commission or board of directors (e.g., Chemical Safety and Hazard Investigation Board).
NoOmbBudgetRev	Equals 1 if the agency's annual budget is not subject to OMB review, and 0 if it is subject.
NoOmbCommRev	Equals 1 if the agency's communications with Congress is exempt from OMB review, and 0 if it is subject to OMB review.
NoOmbRuleRev	Equals 1 if the agency is exempt from submitting regulatory actions to OIRA.
NumberMembers	If MultiMember=1, then NumberMembers is the number of commissioners or directors.
OutsideApproval	Equals 1 if the agency must seek approval before embraking on some activities.
OutsideHead	Equals 1 if the agency head must serve in a position in a different agency.
ParentagySelectsHead	If Bureau=1, then this variable equals 1 if the head of the larger organization appoints the head of the agency.
PartyBalancing	If MultiMember=1, then this variable equals 1 if the statute limits the number of board/commission members who serve from the same party.
PASHead	Equals 1 if the President appoints the agency head with advise and consent of the Senate.
PresidentSelectsChair	Equals 1 if the President appoints the agency head.
QuorumNumber	If QuorumRules=1, then QuorumNumber is the number which constitutes a quorom.
QuorumRules	If MultiMember=1, then QuorumRules=1 if there is a required minimum of commissioners or directors to constitute a quorom.
Rulemaking	Equals 1 if the agency is authorized to promulgate rules.
ServePresident	Equals 1 if the statute specifies that officials serve at the pleasure of the President. If ForCause=1, this variable equals 0.
ServePresidentChair	Equals 1 if the head serves at the pleasure of the president.
SignificantRule	Equals 1 if the agency has promulgated an economically significant rule (since 1996).
StaggeredTerms	If MultiMember=1, then this variable equals 1 if the statute fixes the terms of the initial members of the commission/board so that nomination in future years will be staggered.

Variable	Description
StatMandate	If coderef=1: Equals 1 if a federal statute mandates the establishment of the agency (e.g., the Securities and Exchange Commission). If CodeRef=0 then StatMandate=0.
StatPermit	If statmandate=0: Equals 1 if a federal statute permits, but does not mandate, the establishment of the agency (e.g., the Occupational Safety and Health Administration). If StatMandate=1 then StatPermit=0.
Sunshine	Equals 1 if the agency is subject to the Sunshine Act.
TermLength	If FixedTerms=1, this variable equals the number years in the fixed terms.

Table A.4: **Model Calibration: Agency-specific Parameters**

This table provides the agency-specific parameters for model calibration. The sample includes 35 revolving agencies for which agent-level salary data are available. We report the wage growth (μ), exit rate (λ), restriction (τ), and wage premium (θ). NASA is for National Aeronautics and Space Administration, NOAA is for National Oceanic and Atmospheric Administration. See Section 7.

Agency	μ	λ	τ	θ
Broadcasting Board of Governors	0.9%	10.5%	3.0%	2.0
Commodity Futures Trading Commission	2.0%	13.7%	2.9%	1.1
Consumer Product Safety Commission	1.3%	12.8%	2.8%	0.6
Defense Nuclear Facilities Safety Board	1.2%	12.8%	2.9%	1.4
Department of Agriculture	1.5%	12.6%	2.9%	0.8
Food Safety and Inspection Service	1.2%	16.8%	2.7%	2.7
Department of Commerce	1.3%	48.4%	2.5%	0.2
Bureau of Economic Analysis	2.9%	12.0%	2.9%	2.9
NOAA	1.7%	11.1%	2.9%	2.0
Technology Administration	1.7%	13.5%	2.8%	4.7
U.S. Census Bureau	1.1%	30.6%	2.6%	0.7
Institute of Education Sciences	0.8%	11.8%	2.9%	1.0
Health Resources and Services Adm	1.7%	14.1%	2.8%	1.8
National Institutes of Health	1.2%	12.8%	2.9%	1.7
Assistant Secretary for Community Planning	1.8%	14.8%	2.8%	0.6
Department of Interior	1.8%	13.4%	2.9%	0.6
Bureau of Land Management	1.7%	21.5%	2.6%	2.0
Bureau of Reclamation	1.4%	13.3%	2.8%	0.7
National Park Service	1.3%	30.6%	2.6%	0.1
Office of Justice Programs	1.9%	11.2%	2.9%	0.4
Bureau of Labor Statistics	1.6%	11.2%	2.9%	3.7
Mine Safety and Health Administration	1.7%	11.0%	3.0%	0.4
Department of Transportation	1.6%	15.4%	2.8%	0.8
Federal Transit Administration	1.5%	12.8%	2.9%	1.1
Surface Transportation Board	0.8%	12.2%	2.9%	0.8
Bureau of Engraving and Printing	0.7%	11.3%	2.9%	0.8
Farm Credit Administration	1.7%	9.3%	2.8%	4.6
Federal Retirement Thrift Investment Board	1.8%	14.9%	2.8%	0.5
Federal Maritime Commission	1.3%	11.8%	2.9%	1.0
Maritime Administration	1.3%	13.5%	2.8%	1.1
NASA	1.1%	9.7%	3.0%	0.5
Overseas Private Investment Corporation	1.3%	19.2%	2.7%	0.7
Railroad Retirement Board	1.3%	9.8%	3.1%	1.1
Securities and Exchange Commission	1.8%	11.6%	2.9%	5.2
Small Business Administration	1.4%	36.6%	2.5%	0.3

Table A.5: **Response to revolving door incentives: full results**

This is the full list of revolving agencies, extending the partial list in Table 2.

Agency	**Bunching range (Δw)**	**s.e.**	**Strategic agents (α)**	**s.e.**	**Obs.**
Small Business Administration	$5,000	(1,310)	39.1%	(0.288)	93,930
Federal Retirement Thrift Investment Board	$5,000	(1,290)	69.9%	(0.243)	3,044
Federal Transit Administration	$9,000	(2,030)	10.1%	(0.202)	9,833
Overseas Private Investment Corporation	$8,000	(2,300)	32.2%	(0.314)	4,517
Farm Credit Administration	$26,000	(1,480)	5.9%	(0.349)	5,137
Securities and Exchange Commission	$40,000	(5,600)	23.9%	(0.418)	73,625
Federal Maritime Commission	$7,000	(2,190)	58.1%	(0.352)	2,169
Surface Transportation Board	$6,000	(1,550)	62.3%	(0.269)	2,064
Commodity Futures Trading Commission	$10,000	(2,310)	0.0%	(0.339)	11,324
Department of Commerce	$6,000	(1,780)	41.6%	(0.236)	355,937
National Institutes of Health	$13,000	(1,830)	5.5%	(0.400)	335,812
National Aeronautics and Space Administration	$3,000	(550)	45.5%	(0.228)	325,061
U.S. Census Bureau	$12,000	(2,890)	10.9%	(0.212)	285,048
National Oceanic and Atmospheric Administration	$15,000	(4,000)	79.4%	(0.213)	217,948
Bureau of Land Management	$25,000	(790)	30.7%	(0.127)	199,330
Food Safety and Inspection Service	$26,000	(770)	5.6%	(0.163)	173,090
Department of Agriculture	$6,000	(2,450)	30.2%	(0.229)	161,177
Bureau of Reclamation	$6,000	(1,250)	51.6%	(0.230)	97,743
Department of Interior	$5,000	(2,290)	30.9%	(0.295)	62,231
Technology Administration	$40,000	(4,630)	80.7%	(0.244)	59,024
Bureau of Labor Statistics	$27,000	(2,980)	13.1%	(0.257)	43,139
National Park Service	$2,000	(1,010)	10.9%	(0.145)	415,965
Mine Safety and Health Administration	$3,000	(1,110)	68.8%	(0.145)	38,684

Agency	**Bunching range (Δw)**	**s.e.**	**Strategic agents (α)**	**s.e.**	**Obs.**
Bureau of Engraving and Printing	\$5,000	(2,040)	78.0%	(0.137)	34,607
Health Resources and Services Adm	\$16,000	(2,180)	74.5%	(0.246)	32,268
Broadcasting Board of Governors	\$13,000	(2,960)	14.2%	(0.198)	29,008
Department of Transportation	\$8,000	(1,860)	26.2%	(0.368)	25,786
Railroad Retirement Board	\$7,000	(1,910)	70.0%	(0.184)	16,860
Maritime Administration	\$9,000	(1,550)	4.5%	(0.402)	14,179
Office of Justice Programs	\$3,000	(1,110)	40.7%	(0.168)	11,560
Consumer Product Safety Commission	\$5,000	(2,320)	42.8%	(0.296)	8,966
Bureau of Economic Analysis	\$26,000	(5,800)	82.4%	(0.132)	8,814
Assistant Secretary for Community Planning	\$6,000	(2,390)	13.5%	(0.198)	4,766
Institute of Education Sciences	\$7,000	(2,840)	71.0%	(0.266)	3,265
Defense Nuclear Facilities Safety Board	\$11,000	(4,260)	62.6%	(0.435)	1,807
Mean (all revolvers)	\$11,275		31.2%		3,167,718