

# Business Cycles and Police Hires

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May 11, 2022

Preliminary, please do not cite or circulate.

## Abstract

We show that the quality of police hires varies over the business cycle. Police officers hired when the unemployment rate is high have fewer complaints and disciplinary actions than officers hired when the unemployment rate is low. In addition, those hired during worse economic times are less likely to be fired from their police agency. Effects are larger for younger workers who have weaker outside options in recessions. We also find that more people take entry exams when unemployment rates are high, and a smaller fraction of exam-takers fail the exam in those years. Our findings shed light on how outside options in the labor market affect the quality of police hires, and speak to the policy question of how agencies can attract better officers.

**Keywords:** Police hiring, police outside options, police quality

**JEL Codes:** K42, J33, J45

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# 1 Introduction

State and local governments in the United States spent an estimated \$123 billion on police protection in 2019, with approximately \$73 billion of that total (59%) funding police salaries (US Census Bureau, 2019, 2020). In total, over 1 million people are employed as police officers in the US, making it one of the largest public sector occupations in the country (US Census Bureau, 2020). Although the role of police is to promote public safety, a long history of police violence, racial harassment, and a host of other negative police-civilian interactions have cast doubt on the ability of police to fulfill that role (Pierson et al., 2020; Harrell and Davis, 2020; Hoekstra and Sloan, 2022). Over the last two decades, public confidence in police has fallen from a peak of 64% in 2004 to 51% in 2021 (Brenan, 2021). Some proponents of police reform have proposed reducing the size of police forces, while others have argued for a focus on hiring higher quality officers. The latter approach, however, is stymied by recent increases in officer quit rates and lulls in recruiting, as potential police find outside options more appealing (Shalal and Moore, 2020).

This paper provides novel evidence on how economic conditions shape the quality of officer hires. We examine how the quality of police hires responds to the availability of outside options in the labor market. We leverage a detailed database of all police employment spells in Florida from 1985-2015. These records contain information on officer demographics, employment start date, separation date, and multiple outcomes related to officer quality. We observe all recorded complaints made against an officer, corresponding disciplinary actions, and if they separate from the agency, the reason for separation. We link these records to annual data on economic conditions and assess the relationship between the unemployment rate in an officer’s starting year and that officer’s quality.

We show the quality of new hires does vary in response to economic conditions. Over these three decades in Florida, officers hired when the unemployment rate is higher have subsequently fewer complaints filed against them and fewer disciplinary actions. These officers who enter policing when alternative job opportunities are more scarce are also less likely to be fired and more likely to have a voluntary separation from their police agency. Since economic conditions at career start affect the length of the employment spell, we focus on the officer’s first five years on the force. However, the results are robust to a variety of specifications that relax this restriction. Ultimately, we find that officers hired when the unemployment rate is one percentage point higher, receive 8% fewer complaints and 13% fewer disciplinary actions within the first five years of their start date. They are also 5% less likely to be fired and 5% less likely to be fired for violating agency policy in those first five years. We also find that officers hired during high unemployment periods are more likely to

separate voluntarily from their jobs.

We further assess whether the results are larger for different sub-groups. We do not find significant heterogeneity across officers' race or gender. On the other hand, we find larger effects for young workers, as those starting when the unemployment rate is higher are far less likely to receive a complaint, a disciplinary action, or to be fired. These findings are consistent with firms being less likely to hire young workers during recessions (Forsythe, 2021). Sorting responses to economic conditions by young officers are expected to be stronger, thus explaining the larger estimated impacts on various police quality measures.

While our preferred results follow the existing literature by relying on cross-year variation in the national unemployment rate, we also consider robustness to alternative levels of variation. In particular, we consider unemployment rates across seven sub-state regions designated by the Florida Department of Law Enforcement. This analysis does not account for possible within-state migration responses to economic conditions and relies on sub-state unemployment rates which are only available after 1990. Nonetheless, we still find a positive relationship between the unemployment rate at hire and officer quality in this specification.

In the employment data, we only observe the equilibrium outcome of who is hired, making it difficult to distinguish the role of labor demand from labor supply. If Florida police agencies are more constrained when unemployment rates are high, they may be more selective in their hiring decisions. On the other hand, workers might find policing more appealing when alternative job opportunities are scarce. It is likely that both of these forces are important in this setting. We show that the number of new hires is pro-cyclical in Florida, suggesting that demand for police does rise and fall with the state of the economy at large. However, we also undertake a series of analyses that suggest increases in labor supply improve the overall composition of the applicant pool.

First, we limit our attention to officers hired into the Florida Department of Highway Safety and Motor Vehicles. The Florida Department of Highway Safety and Motor Vehicles is the second largest agency in the state, and it hires approximately 100-300 police officers per year. We show that the number of hires per year at this state-level agency does not vary with the business cycle. Then, we show that our estimates of the relationship between unemployment rate and police quality are similar, albeit noisier, when we focus on this specific agency where labor demand forces are muted.

Second, we draw on a dataset of entry-level exams taken by police applicants in Florida from 1996-2015. These exams are taken after applicants have finished basic recruit training but before they are hired. Applicants who fail the State Officer Certification Exam are not eligible to be hired. However, even applicants who pass the exam may not be hired in that year. We find that the number of people taking the exam in a year is positively correlated

with the unemployment rate. Since number of hires is pro-cyclical, we view this increase in people taking the exam as an increase in labor supply. Finally, we show that the fraction of people who fail their initial exam attempt is lower when the unemployment rate is higher. This provides further evidence that the pool of applicants is substantively different when outside options are scarce.

These results suggest that when markets are weak, the supply of potential police increases and agencies are able to hire better officers as a result. As such, we first contribute to a growing literature on the determinants of police quality. In this context, previous papers have studied how various interventions within an agency affect the performance of officers already on the force (Owens et al., 2018; Ba and Rivera, 2019; Goncalves, 2021). Within that set of papers, a few study the importance of officer pay or other financial motivations (e.g., Foltz and Opoku-Agyemang (2020); Chalfin and Goncalves (2021)). Mas (2006) for example, examines the effect of officer pay, particularly pay relative to a reference point, on officer performance. While these papers offer valuable evidence on how to improve performance of existing police, a separate literature has developed on selection into policing and officer recruitment (Prendergast, 2007; Dharmapala et al., 2016; Ornaghi, 2019; Linos and Riesch, 2020). These studies, however, do not consider the empirical relationship between outside options, officer selection, and labor supply. Our paper is one of the first to examine the role of improving the relative appeal of policing as an occupation, whether that be through financial incentives or other means, in attracting better officers.

Furthermore, our findings contribute to a growing literature on the relationship between economic conditions at career start and subsequent labor market outcomes, including work on the business cycle and subsequent outcomes for MBA graduates and PhD economists (Oyer, 2008; Böhm and Watzinger, 2015). Most closely related to our work is Nagler et al. (2020)’s paper on the relationship between economic conditions and teacher quality. We build on their creative approach to understanding public sector labor supply in a number of ways. First, we document similar patterns for a separate, large public sector occupation: police. The police labor force is approximately one-fourth the size of the primary and secondary education instructional labor force, but has received considerably less attention from economists (US Census Bureau, 2020). Policing also has lower entry costs with respect to training and credentials than teaching, which may make it particularly responsive to economic conditions. Second, we employ data that includes each year of an officer’s employment spell since 1985, allowing us to observe and analyze attrition directly. With this data we can also estimate dynamic impacts on officer quality, rather than the effect on quality at a single point in time. Lastly, we use additional data on entry exams and on the number of officers hired to explore the labor supply and demand mechanisms, respectively. In general, our paper

contributes to a large literature on the impacts of graduating in a recession and subsequent labor market outcomes (Kahn, 2010; Oreopoulos et al., 2012; Altonji et al., 2016; Schwandt and Von Wachter, 2019).

## 2 Data and Methodology

### 2.1 Data

Our empirical analysis relies on administrative data on officer-level outcomes from the Florida Department of Law Enforcement (FDLE) (Goncalves, 2021; Dharmapala et al., 2022). In particular, we use data on all employment spells for police officers in Florida from 1985 through 2015, which include information on the start and end date for each spell, the reason for separation, the employing agency, various outcomes related to police quality and extensive information on officer characteristics. Specifically, we observe the officer’s name, their birth year, gender, and race. Following Grunwald and Rappaport (2019), we restrict our analysis to full-time law-enforcement officers. Moreover, we drop a small number of officers who started their employment at two different agencies at the same time.

Critical to our analysis of police quality, FDLE data includes multiple measures of officer performance. Specifically, we use FDLE administrative data covering misconduct events and disciplinary actions held against officers. Misconduct events included in the FDLE data encompass civilian or internal affairs complaints previously sustained by a local law enforcement agency.<sup>1</sup> The FDLE then opens a ‘complaint’ file and starts a disciplinary investigation. Complaints are evaluated by an FDLE commission and if the commission finds convincing evidence of officer misconduct, it can discipline the officer following existing guidelines (Dharmapala et al., 2022). We follow Ba and Rivera (2019); Grunwald and Rappaport (2019); Dharmapala et al. (2022), among others, and use complaints and disciplines as proxies for officer quality. We note that close to 30% of complaints end up in a disciplinary action in the FDLE data.

We also rely on information in the FDLE data on the reason for officer separations. In particular, we consider whether an officer was fired from their position as a proxy for officer quality, motivated by the idea that police agencies are more likely to fire officers with poor performance. Moreover, since FDLE data includes the specific reason for which an officer was fired, we also analyze whether an officer was fired for directly ‘violating agency policy,’ which may more closely capture events in which an officer was fired due to poor performance

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<sup>1</sup>Local agencies sustain a misconduct event if the purported offense by the officer violates a “good moral character” requirement.

on the job. In our data, among the sample of fired officers, 67% of them were dismissed for violating agency policy. Lastly, we also observe a variable that indicates if an officer who separates from their agency does so voluntarily.

Our main variable for economic conditions at career start comes from annual variation in the national unemployment rate. We follow the literature on the impacts of graduating in a recession (Kahn, 2010; Oreopoulos et al., 2012; Altonji et al., 2016; Schwandt and Von Wachter, 2019) and use the unemployment rate as our preferred measure of business cycle conditions — rather than alternative measures such as GDP growth — as it captures the extent to which potential police officers’ outside options may be limited. We also use alternative measures of economic conditions, encompassing the Florida-wide unemployment rate as well as a binary variable capturing the top tercile of years in terms of unemployment rate. In supplementary analyses, we also leverage within-Florida variation in economic conditions at career start. For this part of the analysis, we use information on county-level unemployment rates (available since 1990), which we aggregate to seven sub-state regions designated by the Florida Department of Law Enforcement.<sup>2</sup> Altogether, we merge the measures capturing economic conditions to each year of employment for all officers included in our sample.

Our sample includes 136,881 unique employment stints, which last an average of 9.9 years. We present summary statistics in Table 1. The first column presents average statistics for our sample. 6.6% of officers receive a complaint against them, and close to one-third of these complaints eventually result in disciplinary action, implying that 2% of the sample is disciplined at some point in their career. On average, 8.5% of officers are fired from their jobs, and two-thirds of them are fired for violating agency policy. The bulk of separations (61%) are due to officers leaving their jobs voluntarily.<sup>3</sup> In the remaining columns, we split the sample by whether the officer was hired in a year above or below the median unemployment rate (5.8%), where the difference in unemployment rates at start across these two groups amounts to 2.3 percentage points. Summary statistics indicate that a smaller share of officers hired in high-unemployment years have complaints against them (6.2% v. 6.9%), are less likely to be fired (8% v. 9%), and are far more likely to eventually separate voluntarily, as 64.3% of officers hired in high-unemployment periods leave their jobs voluntarily compared to just 58.2% of their counterparts hired in low-unemployment periods.

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<sup>2</sup>These regions include Fort Myers, Jacksonville, Miami, Orlando, Pensacola, Tallahassee and Tampa Bay.

<sup>3</sup>The sum of voluntary separations and officers being fired does not add up to 100% as our sample includes officers who eventually retired as well as those who are still employed at the end of our data.

## 2.2 Methodology

We examine the impact of economic conditions at career start on police officer quality by estimating the effect of the unemployment rate at the time of hire on the various officer outcomes described above in the following equation:

$$Y_{iat} = \alpha + \gamma UR_i^S + \beta UR_t + \theta_a + \varepsilon_{iat} \quad (1)$$

where  $Y_{iat}$  represents an outcome of interest for officer  $i$  employed in agency  $a$  in year  $t$ ;  $UR_i^S$  captures the national unemployment rate that prevailed in the year in which the officer was first hired.  $\theta_a$  capture agency fixed effects which absorb differences in outcomes across police agencies in Florida. In equation (1), we control for contemporaneous unemployment ( $UR_t$ ) implying that  $\gamma$  allows us to recover the effect of the initial economic conditions net of all subsequent unemployment rates (Von Wachter, 2020).

To implement equation (1), we need to account for the fact that a sizable share of officers leave their jobs early into their careers, as 58% and 19% of officers remain employed five and twenty years after they are hired, respectively (Figure A1). As such, we could estimate the equation including the officers' entire employment stints — implying that the latter years would only include a few individuals — or focusing early in their careers, yet missing potential longer-term impacts. In our main specification, we take a middle ground approach and focus on officers' outcomes in their first five years since hire, yet we examine robustness to this choice by looking at shorter- and longer-time windows. Since our data on outcomes ends in 2016, we are not able to observe officers hired from 2012-2015 for the full five year period. We show robustness to restricting the range of starting years to 1985-2011.

We further analyze the dynamic impacts of initial economic conditions on officer outcomes in the following equation:

$$Y_{iat} = \alpha + \sum_{s=0}^T \gamma_s UR_i^S + \beta UR_t + \theta_a + v_{iat} \quad (2)$$

where  $\gamma_s$  captures the effect of initial unemployment on officer outcomes at  $s$  years since hire, where  $s$  ranges between zero and five. Equation (2) thus allows us to present novel evidence by tracing out the dynamic effects of unemployment rates at career start on officer quality across their first five years of employment. We note that for us to recover the  $\gamma_s$  coefficients in equation (2), we cannot include year fixed effects in this specification. Nonetheless, we re-estimate a version of equation (1) that includes year fixed effects.

Importantly, we conduct an extensive set of robustness tests, which are highlighted briefly

in the results section. We describe these tests in more detail in their respective table and figure notes in the online appendix.

## 3 Results

### 3.1 Main Results

In Table 2, we present the estimates from equation (1). In the first column, we show that officers hired when the unemployment rate is one percentage point higher receive 0.00073 fewer complaints, or 7.8% of baseline complaints in the first five years of employment.<sup>4</sup> As such, an officer who is hired with above-median unemployment rates is 18 percent less likely to receive a complaint against them compared to a counterpart hired during below-median periods. We find similar impacts on the prevalence of disciplinary actions, as a one percentage point increase in the unemployment rate at career start results in 0.00039 fewer disciplinary actions, or 14.1% of baseline disciplinary actions in the first five years. Rozema and Schanzenbach (2019) have previously shown that officers who receive complaints against them have a far higher likelihood of facing future civil rights litigation. Altogether, the effects of initial economic conditions on police officer quality, as proxied by both the prevalence of complaints and disciplinary actions, are both economically and statistically significant.

In the last two columns of Table 2, we present the estimated impacts on the likelihood of being fired. We find significant impacts of the initial unemployment rate on the likelihood that officers are subsequently fired and that this is due to violating agency policy. In fact, the estimated coefficients for both variables are such that a one percentage point increase in the initial unemployment rate results in a 4.8% decrease in the likelihood of being fired altogether and of being fired for violating agency policy in the first five years of employment.<sup>5</sup>

In Figure 1, we present the dynamic effects of initial unemployment on officer outcomes across the first five years of employment (equation (2)). In the first panel, we present the estimated impacts on the prevalence of complaints. First, we find no significant impacts of initial unemployment rates on complaints in the year of hire, yet the effects become negative and statistically significant by the second year since hire. The coefficients remain negative through the next three years, with varying statistical significance. For disciplines, we similarly fail to find an effect of economic conditions at start in the initial year, yet the effects become negative and significant for the first three subsequent years. As such, we find that the estimated impacts of initial unemployment rates on officer quality emerge as early

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<sup>4</sup>In Table A1, we show the baseline prevalence of complaints and disciplinary actions across both the first five years and the full employment stint for officers in our sample.

<sup>5</sup>We show that the raw data exhibits these patterns in Figure A2.



as the first year since starting the job, indicating the effects are not driven by attrition. In their analysis of business cycles and teacher quality, Nagler et al. (2020) use a time-invariant measure of teacher quality (value-added). Our estimated dynamic effects thus constitute novel evidence in the literature by allowing us to understand how early police quality is revealed in light of starting conditions. In the last two panels, we show that officers hired in high-unemployment periods are more likely to be fired within two years of their career start, and to be fired for violating agency policy in their second year of employment.<sup>6</sup>

In all of the main specifications, we cluster standard errors at the level of the officer’s starting year. However, we consider alternative methods of statistical inference with small clusters. First, we show that the results are fundamentally unchanged by estimating standard errors via a wild cluster bootstrap procedure (Table A2). Second, we construct placebo estimates in two ways: (1) by assigning random starting years to entire starting cohorts and (2) by assigning random starting years to individual officers (Figures A4 and A5). In both cases, our actual estimates are outliers relative to the distribution of placebo estimates.

In Figure A6, we present the robustness of our results to alternative specifications. First, the estimated impacts on complaints, disciplines and the likelihood of being fired are robust to removing contemporaneous unemployment as a control, implying that initial unemployment affects officer quality regardless of subsequent economic conditions. Moreover, all estimates remain significant even upon including linear time trends as well as two leads and two lags for the unemployment rate. Our results are also robust to using the Florida unemployment rate for capturing initial economic conditions, focusing on officers who start their jobs in 1985-2011, and to controlling for worker observables at baseline. Furthermore, we find larger estimated coefficients when focusing on officers’ first two years since hire, which is consistent with the dynamic impacts presented in Figure 1. In the last column, we show similar estimated effects from a specification that includes officer-year observations after they separated from the agency, where we impute the various outcomes to equal zero.

In Table A3, we show that the results of equation (1) are qualitatively similar with the inclusion of year fixed effects, albeit with varying statistical significance. In the specification including all employment years, the coefficients on complaints and disciplines are statistically significant, whereas when we focus on the first five years, we find significant effects on disciplines and on the two fired variables. From a methodological standpoint, both of these specifications have weaknesses. The first permits us to appropriately estimate year fixed effects by including all employment years, but the estimates suffer from attrition bias since officers starting in high unemployment rate years are both more likely to be fired and more

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<sup>6</sup>In Figure A3, we show our results are robust to defining initial unemployment by whether the officer entered the force in a year in the top tercile of unemployment rates (above 6.85%).

likely to voluntarily separate. The second reduces bias from attrition by focusing on the first five years since career start, but in doing so, the year fixed effects are no longer appropriately estimated. For example, in this specification, the fixed effect for 2000 is only identified off of officers hired from 1995-2000. For these reasons, we prefer our main specification in Table 2.

**Labor Market Dynamics.** To further understand the relationship between initial unemployment rates and subsequent labor market dynamics, we estimate equation (2) using voluntary separations as the outcome of interest. Officers hired in high-unemployment years are more likely to voluntarily separate soon after joining the force, with significant effects in their second year since hire (Figure A7). In the second panel of Figure A7, we present the robustness of the estimates to alternative specifications of equation (1).<sup>7</sup> Most interestingly, in the specification that does not control for contemporaneous unemployment, the estimated coefficient becomes insignificant and is close to zero. The difference in the estimates is consistent with officers remaining in the force in response to their outside options: since unemployment rates are correlated over time, officers who enter in high-unemployment periods face high unemployment in subsequent periods, too. As such, officers hired in high-unemployment periods are unlikely to voluntarily separate if outside options remain limited. However, once we account for their outside options — by controlling for contemporaneous unemployment — we find that officers hired in a recession are more likely to subsequently leave voluntarily. Altogether, since higher-quality officers are more likely to have strong outside options in subsequent years, the estimated effect on voluntary separations is consistent with our earlier results.

**Heterogeneous Effects.** In Table 3, we present estimates of equation (1) separately by officers’ age to analyze whether heterogeneous impacts emerge for younger versus older officers. We find significantly larger effects for young officers (hired when younger than 35) than for their older counterparts. The estimated impacts are statistically different across the two age groups across complaints, disciplines, and the two fired outcomes, suggesting that the quality of younger officers exhibits far stronger responses to business cycle conditions.<sup>8</sup> This result is consistent with Forsythe (2021), who shows that during recessions, the hiring rate for young workers falls faster than for older workers. As such, young workers face weaker outside options during slack labor markets, leading to stronger sorting responses into polic-

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<sup>7</sup>The remaining robustness checks show that officers hired in a high unemployment period are more likely to separate voluntarily in their first five years on the job across all specifications. The effect is only insignificant when we control for worker demographic characteristics.

<sup>8</sup>In Table A4, we show this result is robust to defining age at start linearly.

ing than for their older counterparts.<sup>9</sup>

**Within-Florida Variation.** We also assess the robustness of our results by estimating equation (1) but using within-Florida variation in local unemployment rates at career start (Table A7). Specifically, we take advantage of data on county-level unemployment rates — which we aggregate up to seven sub-state regions — to assess the effect of local economic conditions on officer quality. We first present results for the specification that includes officers’ entire employment stints. Across the four outcomes, the estimated coefficients indicate that officers hired with higher local unemployment rates have fewer complaints, disciplines, and lower likelihood of being fired, with significant coefficients for disciplines and for being fired for violating agency policy. When restricting the analysis to the first five years, we also find negative point estimates, and the effects are statistically significant for the likelihood of being fired for violating policy. We do not use local unemployment rates in our main specifications because it requires us to focus on officers hired since 1990, it does not account for potential within-Florida migration flows, and it requires using local unemployment estimates that are inherently noisier than national-level estimates. Nevertheless, the results presented here are largely consistent with the evidence presented in Table 2.

## 3.2 Mechanisms

We have so far shown consistent evidence that the quality of police officers is significantly higher when these officers are hired in high-unemployment periods. This result could emerge through two main channels. First, recessions may lead to large employment losses in related industries in which potential officers may find work. Thus, during economic downturns, high-quality workers may choose to seek employment as police officers in lieu of lower-paying alternative jobs. At the same time, a recession may lead to a reduction in police department budgets, which would reduce the number of officers they could hire. In this case, our findings could arise through police departments selecting the highest-quality officers among the applicant pool. Note that both the labor supply and labor demand channels could be taking place at the same time in our setting.

In Figure A8, we show that the number of hires in police departments in Florida is strongly correlated with the business cycle: the number of officers hired falls significantly during high unemployment years. As such, the labor demand mechanism likely plays an

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<sup>9</sup>Table A5 presents effects by race and gender, respectively, and we do not find statistically significant differences of initial unemployment across outcomes by these characteristics. We also explore whether these demographic characteristics of hirees vary based on the unemployment rate, but we do not find any evidence that suggests that they do (Table A6).

important role in driving our results. Nonetheless, the labor supply responses may also play an important role if employment in police agencies is less responsive to business cycles than the alternative occupations that police officers are coming from. We assess this question by using Current Population Survey data from 1980 until 2019 to identify transitions from other jobs into policing. The majority of new officers come from public administration jobs (32%) and non-employment (21.3%). For private sector transitions, 70% of officers come from one of five industries: professional and business services, retail trade, manufacturing, construction and transportation. Using BLS data on industry-level employment, we find that employment in these five sectors is more responsive to business cycle conditions than local government employment (Table A8), lending credence to the possibility that skilled workers may seek employment as police officers during downturns.

To directly assess the potential importance of the labor supply channel, we carry out two complementary analyses. First, we focus on the relationship between initial economic conditions and subsequent officer outcomes for individuals hired in the Florida Department of Highway Safety and Motor Vehicles, which is the second largest agency in Florida. Importantly the number of hires in this department does not fall during high unemployment periods (Figure A9). We thus re-estimate equation (1) for the officers hired in this department and present the results in Table A9. In this small sample of workers, we still find that officers hired in high unemployment years are significantly less likely to face disciplinary actions. Our estimate on the likelihood of being fired is similar in magnitude to the main results, but it is noisier. This result offers suggestive evidence that part of the effect may arise through the labor supply mechanism posited above.

To provide further evidence of the labor supply mechanism, we would ideally observe how the number of applicants to police departments varies across the business cycle. While we do not have access to such information, we are able to rely on information from a dataset comprised of all entry-level exams taken by police applicants in Florida from 1996-2015. These exams are taken after applicants have finished basic recruit training but before they are hired. Applicants who fail the State Officer Certification Exam are not eligible to be hired. However, even applicants who pass the exam may not be hired in that year. We assess the relationship between the unemployment rate in different years, number of exam-takers (a proxy for labor supply), and the fraction who fail the exam on their initial attempt (a proxy for quality of the applicant pool). Figure 2 plots these results. We first find a strong positive correlation between the unemployment rate and the total number of exam-takers in each year. Second, we find a negative relationship between the unemployment rate and the fraction of people who fail the exam on their initial attempt. Again, this provides further evidence that the pool of applicants is substantively different when outside options are scarce.

Overall, these results indicate that labor demand changes by police departments in recessions likely account for an important share of our main findings. Nonetheless, the evidence from the Department of Highway Safety and Motor Vehicles and from the entry exams suggests that higher-quality officers are more likely to apply when unemployment rates are high.

## 4 Conclusion

In this paper, we examine how economic conditions at career start affect the quality of police hires. Taking advantage of detailed employment spells over three decades in Florida, we show that officers hired during high-unemployment periods are of higher quality than their counterparts hired in strong labor markets, as measured by the number of complaints, disciplines, and the likelihood of being fired. We further show these effects are stronger for younger officers, who face weaker outside options during recessions. Future work should explore whether these features of the police labor market hold true in other states or in other time periods, particularly time periods or places where public confidence in police may be lower than it was in Florida from 1985-2015.

We also present novel evidence of the mechanisms underlying our findings. First, police departments in Florida hire fewer officers during high unemployment years, indicating a strong role for a labor demand channel and agency screening. At the same time, we find qualitatively similar results in a department whose hiring practices do not vary much across the business cycle. Also, we find the number of people taking entry exams increases in high-unemployment years and fraction of those who fail the initial attempt falls. As such, officers' labor supply responses are also an important factor in this context. Altogether, since police officers constitute one of the largest, and most consequential, public sector occupations, further work should examine how police departments' recruitment practices can result in improved police quality, specifically what aspects departments can change to make the occupation more appealing relative to outside options.

## References

- Altonji, J. G., L. B. Kahn, and J. D. Speer (2016). Cashier or consultant? entry labor market conditions, field of study, and career success. *Journal of Labor Economics* 34(S1), S361–S401.
- Ba, B. A. and R. Rivera (2019). The effect of police oversight on crime and allegations of misconduct: Evidence from Chicago. *U of Penn, Inst for Law & Econ Research Paper* (19-42).

- Böhm, M. J. and M. Watzinger (2015). The allocation of talent over the business cycle and its long-term effect on sectoral productivity. *Economica* 82(328), 892–911.
- Brenan, M. (2021, Nov). Americans’ Confidence in Major U.S. Institutions Dips. <https://news.gallup.com/poll/352316/americans-confidence-major-institutions-dips.aspx>.
- Chalfin, A. and F. Goncalves (2021). The professional motivations of police officers.
- Dharmapala, D., N. Garoupa, and R. H. McAdams (2016). Punitive police? agency costs, law enforcement, and criminal procedure. *The Journal of Legal Studies* 45(1), 105–141.
- Dharmapala, D., R. H. McAdams, and J. Rappaport (2022). Collective bargaining rights and police misconduct: Evidence from florida. *The Journal of Law, Economics, and Organization* 38(1), 1–41.
- Foltz, J. D. and K. A. Opoku-Agyemang (2020). Do higher salaries lower petty corruption? a policy experiment on west africa’s highways. *mimeo*.
- Forsythe, E. (2021). Why don’t firms hire young workers during recessions? *University of Illinois*.
- Goncalves, F. (2021). Do police unions increase misconduct? *mimeo*.
- Grunwald, B. and J. Rappaport (2019). The wandering officer. *Yale LJ* 129, 1676.
- Harrell, E. and E. Davis (2020). Contacts between police and the public, 2018–statistical tables. *Bureau of Justice Statics Report, NCJ 255730*.
- Hoekstra, M. and C. Sloan (2022). Does race matter for police use of force? evidence from 911 calls. *American Economic Review* 112(3), 827–60.
- Kahn, L. B. (2010). The long-term labor market consequences of graduating from college in a bad economy. *Labour Economics* 17(2), 303–316.
- Linos, E. and N. Riesch (2020). Thick red tape and the thin blue line: A field study on reducing administrative burden in police recruitment. *Public Administration Review* 80(1), 92–103.
- Mas, A. (2006). Pay, reference points, and police performance. *The Quarterly Journal of Economics* 121(3), 783–821.
- Nagler, M., M. Piopiunik, and M. R. West (2020). Weak markets, strong teachers: Recession at career start and teacher effectiveness. *Journal of Labor Economics* 38(2), 453–500.
- Oreopoulos, P., T. Von Wachter, and A. Heisz (2012). The short-and long-term career effects of graduating in a recession. *American Economic Journal: Applied Economics* 4(1), 1–29.
- Ornaghi, A. (2019). Civil service reforms: Evidence from us police departments. *mimeo*.

- Owens, E., D. Weisburd, K. L. Amendola, and G. P. Alpert (2018). Can you build a better cop? experimental evidence on supervision, training, and policing in the community. *Criminology & Public Policy* 17(1), 41–87.
- Oyer, P. (2008). The making of an investment banker: Stock market shocks, career choice, and lifetime income. *The Journal of Finance* 63(6), 2601–2628.
- Pierson, E., C. Simoiu, J. Overgoor, S. Corbett-Davies, D. Jenson, A. Shoemaker, V. Ramachandran, P. Barghouty, C. Phillips, R. Shroff, et al. (2020). A large-scale analysis of racial disparities in police stops across the united states. *Nature human behaviour* 4(7), 736–745.
- Prendergast, C. (2007). The motivation and bias of bureaucrats. *American Economic Review* 97(1), 180–196.
- Rozema, K. and M. Schanzenbach (2019). Good cop, bad cop: Using civilian allegations to predict police misconduct. *American Economic Journal: Economic Policy* 11(2), 225–68.
- Schwandt, H. and T. Von Wachter (2019). Unlucky cohorts: Estimating the long-term effects of entering the labor market in a recession in large cross-sectional data sets. *Journal of Labor Economics* 37(S1), S161–S198.
- Shalal, A. and A. Moore (2020, Jul). As U.S. police struggle to hire, next-generation cops seek more humane approach.
- US Census Bureau (2019). Annual Survey of State and Local Government Finances.
- US Census Bureau (2020). Annual Survey of Public Employment and Payroll.
- Von Wachter, T. (2020). The persistent effects of initial labor market conditions for young adults and their sources. *Journal of Economic Perspectives* 34(4), 168–94.

# Tables and Figures

**Table 1:** Summary Statistics

	Full Sample	Above Median UN at Start	Below Median UN at Start
Complaints	0.066 (0.248)	0.062 (0.242)	0.069 (0.253)
Disciplinary Actions	0.020 (0.141)	0.021 (0.142)	0.020 (0.140)
Fired	0.085 (0.279)	0.080 (0.271)	0.090 (0.286)
Fired for Violating Agency Policy	0.057 (0.232)	0.054 (0.227)	0.060 (0.238)
Voluntary Separation	0.611 (0.487)	0.643 (0.479)	0.582 (0.493)
Unemployment Rate in Starting Year	6.132 (1.507)	7.348 (1.245)	5.008 (0.556)
Observations	136,881	65,728	71,153

Notes: This table produces summary statistics for the sample of full time police officers beginning an employment spell from 1985-2015. Column 1 shows statistics for all officers, column 2 limits to officers who start in a year with an above median unemployment rate (UN), and column 3 limits to officers who start in a year with a below median unemployment rate. Officers may appear more than once in the data if they have multiple employment spells. The rows are defined as follows: fraction to receive any complaint during their spell, fraction to receive any disciplinary action during the spell. fraction fired during their spell, fraction fired for violating agency policy during their spell, fraction who separate voluntarily, and the mean unemployment rate in the starting year.



**Table 2:** Effect of Starting Year Unemployment Rate on Officer Quality

	Complaints	Disciplinary Actions	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00073*** (0.00025)	-0.00039*** (0.00012)	-0.00072*** (0.00025)	-0.00044*** (0.00016)
Constant	0.0106*** (0.0015)	0.0030*** (0.0006)	0.0176*** (0.0023)	0.0096*** (0.0016)
Observations	484,629	484,629	484,629	484,629
$R^2$	0.0028	0.0007	0.0044	0.0034

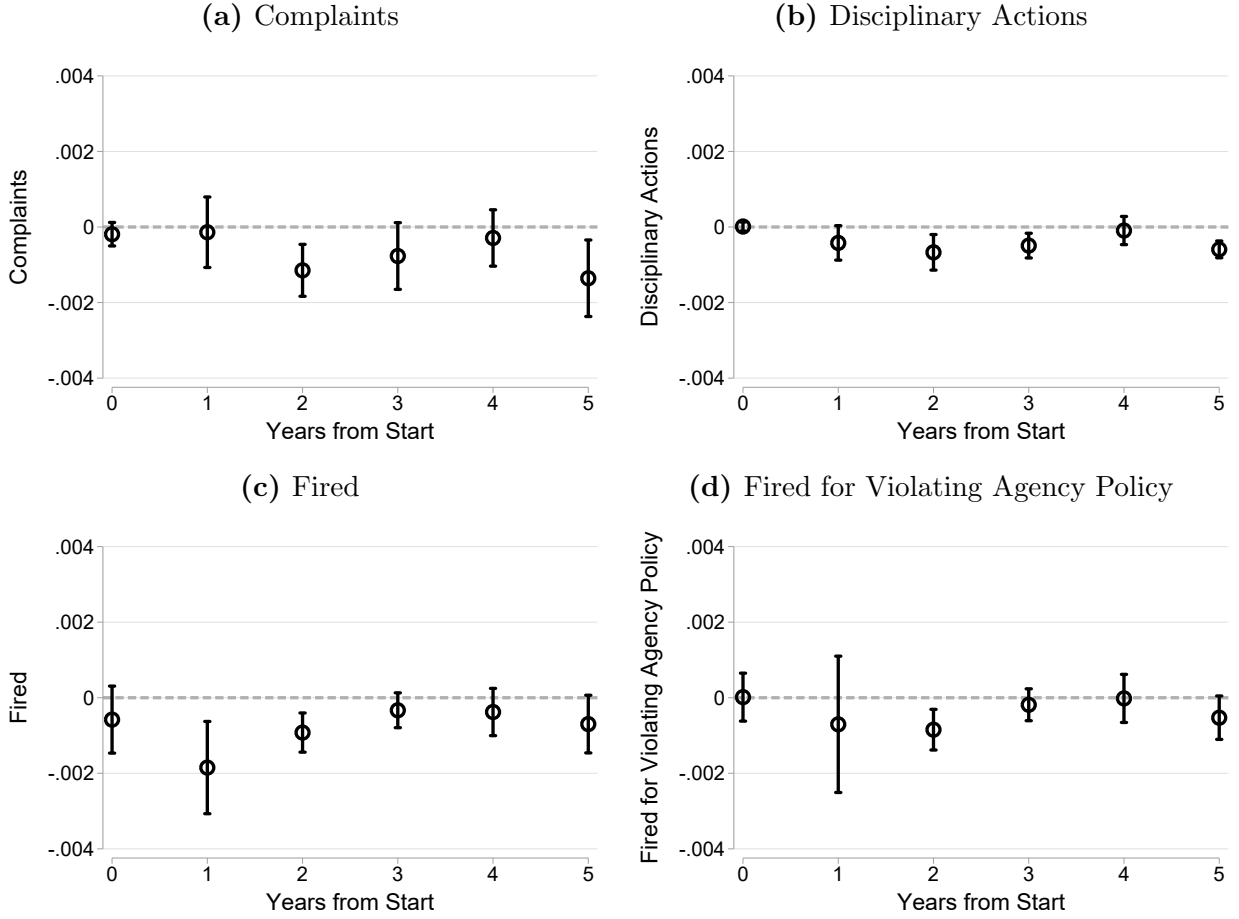
Notes: This table displays results estimated from equation (1). Standard errors clustered at the level of officer's starting year in parentheses. Each observation corresponds to an officer-by-year employment record. Column 1 estimates the relationship between the unemployment rate in the officer's starting year and the number of complaints on their file from years 0-5 since the starting year. Column 2 estimates the relationship between starting year unemployment rate and disciplinary actions. Column 3 estimates the relationship between starting year unemployment rate and likelihood of being fired. Column 4 estimates the relationship between starting year unemployment rate and likelihood of being fired for violating agency policy. All columns limit the sample to years 0-5 from each officer's starting year. All specifications include a control for current year unemployment rate and agency fixed effects. Table A1 reports the overall mean of each of these outcomes within the first five years of an officer's career. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 3:** Effect of Starting Year Unemployment on Officer Quality by Age

	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00032 (0.00030)	-0.00022*** (0.00008)	-0.00004 (0.00029)	-0.00009 (0.00017)
Young	0.01001*** (0.00252)	0.00474*** (0.00115)	0.01994*** (0.00326)	0.01229*** (0.00238)
Young $\times$ UR Start	-0.00091** (0.00043)	-0.00039** (0.00019)	-0.00157*** (0.00050)	-0.00087** (0.00036)
Constant	0.00588*** (0.00173)	0.00079 (0.00052)	0.00848** (0.00314)	0.00402*** (0.00130)
Current UN	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years
$R^2$	0.0033	0.0012	0.0063	0.0048
Observations	484626	484626	484626	484626

Notes: This table displays results estimated from equation (1) but including a binary variable equal to one if the officer is below 35 upon starting (i.e., young) and equal to zero if not and an interaction between that variable and the starting year unemployment rate. Standard errors clustered at the level of officer's starting year in parentheses. Each observation corresponds to an officer-by-year employment record. Columns 1-4 are estimated on the same outcomes described in the notes for Table 2. All columns limit the sample to years 0-5 from each officer's starting year. All specifications include a control for current year unemployment rate and agency fixed effects. Table A1 reports the overall mean of each of these outcomes within the first five years of an officer's career. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

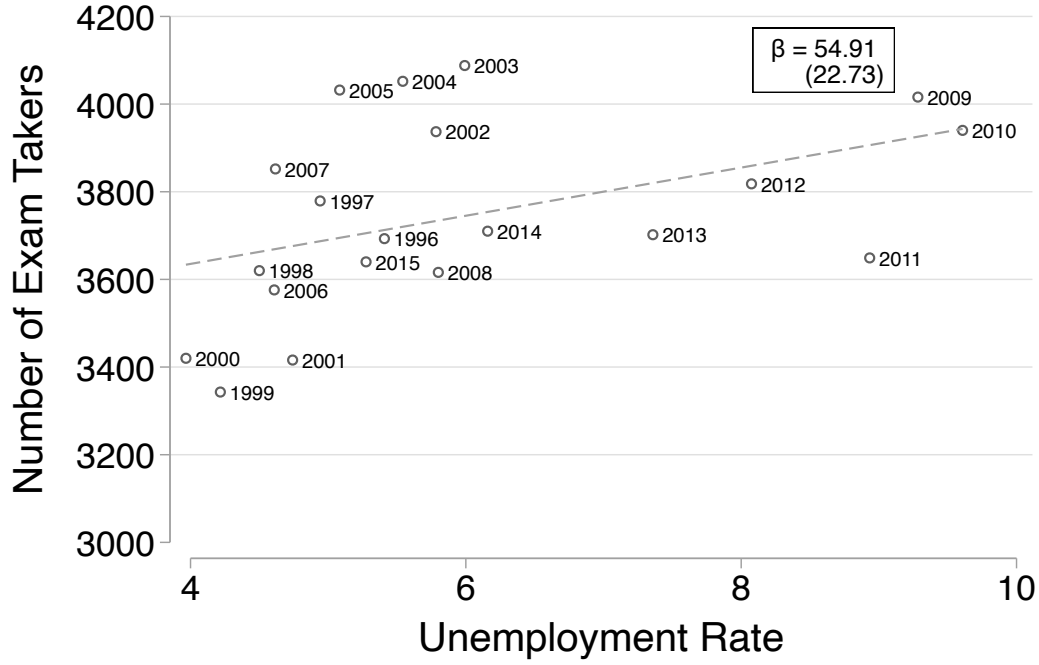
**Figure 1: Starting Year Unemployment and Officer Quality, By Year**



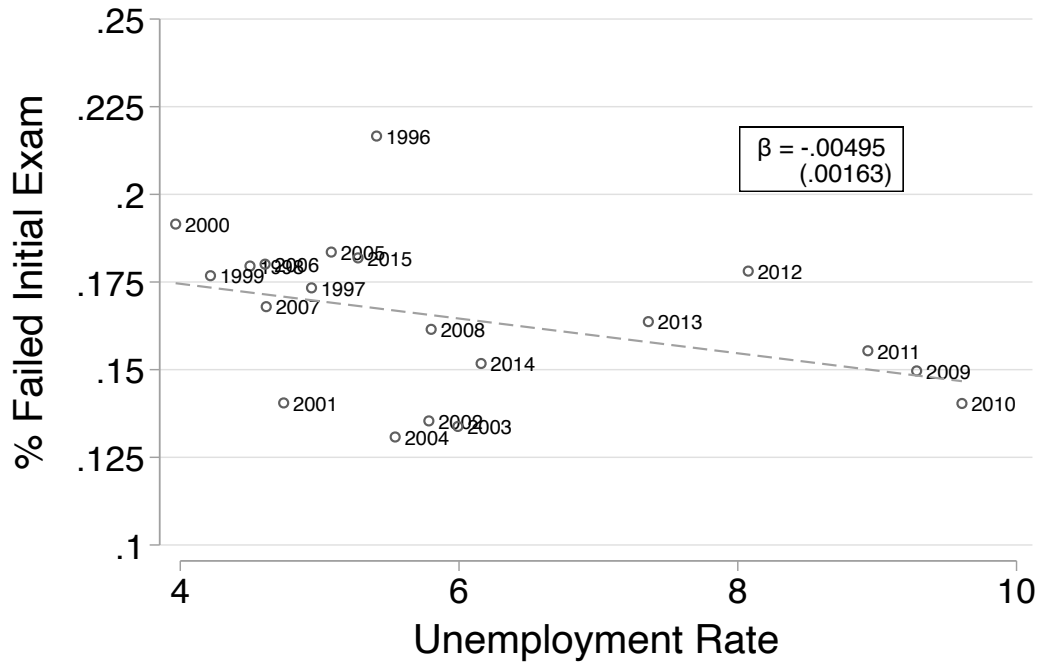
Notes: This figure displays coefficients estimated from equation (2). With each coefficient, we plot the 90 percent confidence interval, based on standard errors clustered at the level of officer's starting year. Panel (a) displays estimates of the effect of starting year unemployment rate on complaints in the year the officer starts, the year after, 2 years after, 3 years after, 4 years after, and 5 years after. Panel (b) displays the same time path of estimates for disciplinary actions. Panel (c) shows estimates for the likelihood that the officer is fired and panel (d) shows estimates for the likelihood that they are fired for violating agency policy.

**Figure 2:** Florida Law Enforcement Entry Exams

(a) Number of People Taking Exam



(b) Fraction of People Failing Initial Exam



Notes: This figure uses data from Florida police entry exams, taken after the applicant completes basic recruit training. These data are available from 1996-2015. Panel (a) plots the relationship between the number of applicants who take the exam in a given year and the unemployment rate in that year. Panel (b) plots the relationship between the fraction who fail their initial attempt in a given year and the unemployment rate in that year. Both figures also display the linear fit, the slope coefficient, and the standard error (clustered at the level of the officer's starting year).

## Appendix A. Additional Tables and Figures

**Table A1:** Summary Statistics

	Within 5 Years of Hiring	All Years
Complaints	0.009 (0.100)	0.009 (0.096)
Disciplinary Actions	0.003 (0.053)	0.002 (0.049)
Fired	0.015 (0.121)	0.011 (0.103)
Fired for Violating Agency Policy	0.009 (0.096)	0.007 (0.084)
Voluntary Separation	0.083 (0.275)	0.064 (0.244)
Unemployment Rate in Starting Year	5.934 (1.370)	5.825 (1.205)
Unemployment Rate in Current Year	6.021 (1.475)	6.114 (1.582)
Observations	484,629	950,825

Notes: This table produces summary statistics based on each year of employment for the sample of full time police officers beginning an employment spell from 1985-2015. Column 1 limits to the first 0-5 years of an officer's employment spell while column 2 includes all years. The rows are defined as follows: number of complaints per year, number of disciplinary actions per year, likelihood of being fired in a given year, likelihood of being fired for violating agency policy in a given year, likelihood of separating voluntarily in a given year, the starting year unemployment rate for officers in the sample, and the current year unemployment rate.

**Table A2:** Effect of Starting Year Unemployment on Officer Quality,  
Wild Cluster Bootstrap

	Complaints	Disciplinary Actions	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00073*** (0.00025)	-0.00039*** (0.00012)	-0.00072*** (0.00025)	-0.00044*** (0.00016)
Constant	0.0106*** (0.0015)	0.0030*** (0.0006)	0.0176*** (0.0023)	0.0096*** (0.0016)
Wild Cluster Bootstrap CI	[-0.0013,-0.0002]	[-0.0006,-0.0001]	[-0.0012,-0.0002]	[-0.0008,-0.0001]
Wild Cluster Bootstrap P-Value	0.0170	0.0030	0.0010	0.0060
Observations	484,629	484,629	484,629	484,629
$R^2$	0.0028	0.0007	0.0044	0.0034

Notes: See notes for Table 2. This table reproduces those main results, but adds the 95 percent confidence interval and the p-value derived from a wild cluster bootstrap procedure. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

**Table A3:** Effect of Starting Year Unemployment on Officer Quality, Time Fixed Effects

Panel A: All Years				
	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00032* (0.00016)	-0.00014*** (0.00005)	-0.00024 (0.00037)	-0.00030 (0.00020)
Constant	0.01046*** (0.00091)	0.00311*** (0.00027)	0.01207*** (0.00204)	0.00884*** (0.00114)
Year FE	Yes	Yes	Yes	Yes
Years Since Hire	All Years	All Years	All Years	All Years
$R^2$	0.0028	0.0011	0.0046	0.0035
Observations	950822	950822	950822	950822

Panel B: Five Year Window				
	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00017 (0.00033)	-0.00015* (0.00008)	-0.00072** (0.00032)	-0.00058** (0.00023)
Constant	0.01032*** (0.00197)	0.00368*** (0.00043)	0.01909*** (0.00182)	0.01266*** (0.00138)
Year FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years
$R^2$	0.0035	0.0011	0.0047	0.0039
Observations	484626	484626	484626	484626

Notes: See notes for Table 2. Panel A estimates equation (1) but includes year fixed effects and extends the sample to all years of an officer's employment spell. Panel B also estimates equation (1) with year fixed effects, but it limits the sample to the first five years of an officer's employment spell. Standard errors are clustered at the officer's starting year level in parentheses. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

**Table A4:** Effect of Starting Year Unemployment on Officer Quality by Age (Linear)

	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00245*** (0.00089)	-0.00119** (0.00045)	-0.00397*** (0.00093)	-0.00217*** (0.00070)
Age at Start	-0.00056*** (0.00012)	-0.00027*** (0.00006)	-0.00118*** (0.00014)	-0.00070*** (0.00011)
Age $\times$ UR Start	0.00005** (0.00002)	0.00002** (0.00001)	0.00009*** (0.00002)	0.00005*** (0.00002)
Constant	0.03117*** (0.00519)	0.01283*** (0.00252)	0.06116*** (0.00551)	0.03571*** (0.00517)
Current UN	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years
$R^2$	0.0035	0.0013	0.0071	0.0053
Observations	484610	484610	484610	484610

Notes: See notes for Table 3. Instead of using a binary term to capture officer age, the results in this table are based on a model that uses a linear term in age. Standard errors are clustered at the officer's starting year level in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



**Table A5:** Effect of Starting Year Unemployment on Officer Quality by Race and Gender

Panel A: Heterogeneity by Race				
	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00069** (0.00031)	-0.00042 (0.00025)	-0.00076** (0.00031)	-0.00016 (0.00028)
White	-0.00385*** (0.00120)	-0.00193 (0.00129)	-0.00894*** (0.00197)	-0.00150 (0.00176)
White $\times$ UR Start	-0.00006 (0.00017)	0.00005 (0.00020)	0.00005 (0.00031)	-0.00039 (0.00028)
Constant	0.01363*** (0.00210)	0.00449*** (0.00131)	0.02465*** (0.00256)	0.01087*** (0.00238)
Current UN	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years
$R^2$	0.0030	0.0008	0.0051	0.0037
Observations	484626	484626	484626	484626

Panel B: Heterogeneity by Gender				
	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00069** (0.00026)	-0.00021* (0.00011)	-0.00069 (0.00045)	-0.00022 (0.00030)
Male	0.00344* (0.00197)	0.00294*** (0.00077)	-0.00079 (0.00305)	0.00322 (0.00208)
Male $\times$ UR Start	-0.00004 (0.00033)	-0.00021 (0.00012)	-0.00004 (0.00044)	-0.00026 (0.00033)
Constant	0.00764*** (0.00178)	0.00047 (0.00064)	0.01828*** (0.00323)	0.00681*** (0.00204)
Current UN	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years	$\leq 5$ Years
$R^2$	0.0029	0.0008	0.0044	0.0035
Observations	484626	484626	484626	484626

Notes: See notes for Table 3. Instead of exploring heterogeneity in effects by officer age, this table explores heterogeneity by other officer demographics. Panel A tests for heterogeneity in effect size by race and Panel B tests for heterogeneity in effect size by gender. Standard errors are clustered at the officer's starting year level in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A6:** Effect of Starting Year Unemployment Rate on Hired Officer Demographics

	White (1)	Black (2)	Hispanic (3)	Male (4)	Age (5)	White (6)	Black (7)	Hispanic (8)	Male (9)	Age (10)
Unemployment Rate in Starting Year	0.00024 (0.00588)	-0.00028 (0.00110)	-0.00073 (0.00433)	0.00023 (0.00117)	0.16878 (0.15109)	-0.00224 (0.00564)	-0.00010 (0.00101)	0.00162 (0.00428)	0.00003 (0.00118)	0.10618 (0.12425)
Constant	0.74638*** (0.03556)	0.10310*** (0.00644)	0.13572*** (0.02609)	0.85671*** (0.00739)	30.57691*** (0.91119)	0.76111*** (0.03418)	0.10201*** (0.00581)	0.12175*** (0.02559)	0.85792*** (0.00734)	30.94878*** (0.74172)
Agency FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
$R^2$	0.0000	0.0000	0.0000	0.0000	0.0006	0.1966	0.0706	0.1863	0.0123	0.1313
Observations	110726	110726	110726	110726	110576	110726	110726	110726	110726	110576

Notes: This table estimates the relationship between unemployment rate in a given year and the demographic characteristics of officers hired in that year. Columns 1-3 and 6-8 test whether economic conditions influence the race or ethnicity of new hires. Columns 4 and 9 test whether economic conditions affect the sex of new hires. Finally, columns 5 and 10 test whether economics conditions impact the age of new hires. Columns 1-5 exclude agency fixed effects and columns 6-10 include them. Standard errors are clustered at the year level in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A7:** Effect of Starting Year Unemployment on Officer Quality,  
Within-Florida Variation

Panel A: All Years

	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00014** (0.00007)	-0.00007*** (0.00002)	-0.00013 (0.00012)	-0.00016** (0.00007)
Constant	0.01089*** (0.00221)	0.00275** (0.00107)	0.00918*** (0.00266)	0.00317* (0.00167)
Current UN	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Years Since Hire	All Years	All Years	All Years	All Years
$R^2$	0.0029	0.0010	0.0051	0.0036
Observations	722122	722122	722122	722122

Panel B: Five-Year Window

	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00008 (0.00017)	-0.00006 (0.00005)	-0.00028* (0.00016)	-0.00032** (0.00012)
Constant	0.01295*** (0.00230)	0.00401*** (0.00114)	0.01243*** (0.00292)	0.00237 (0.00213)
Current UN	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Years Since Hire	≤ 5 Years	≤ 5 Years	≤ 5 Years	≤ 5 Years
$R^2$	0.0035	0.0011	0.0050	0.0039
Observations	398621	398621	398621	398621

Notes: In this table, we take advantage of data on county-level unemployment rates — which we aggregate up to seven sub-state regions — to assess the effect of local economic conditions on officer quality. We estimate the following specification leveraging within-state variation in unemployment rates at career start on officer quality:

$$Y_{iat} = \alpha + \gamma UR_{ir}^S + \beta UR_{rt} + \lambda_t + \theta_a + \varepsilon_{iat} \quad (\text{A1})$$

where  $UR_{ir}^S$  captures the unemployment rate in region  $r$  faced by officer  $i$  at career start;  $\lambda_t$  captures year fixed effects and we still control for contemporaneous unemployment and agency fixed effects. This analysis does not incorporate potential within-state migration responses to local economic conditions. Moreover, local unemployment rates are only available starting in 1990. Panel A estimates this for all years of an officer's employment spell, and Panel B limits the analysis to the first five years of a officer's employment spell. See Table 2 notes for a description of the outcome variables. Standard errors are clustered at the starting year by region level in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A8: Business Cycle and Industry-Level Employment**

	Private (1)	Construction (2)	Manufacturing (3)	Retail Trade (4)	Transportation (5)	Professional (6)	Local Govt. (7)
Unemployment Rate	-0.021*** (0.003)	-0.053*** (0.008)	-0.039*** (0.003)	-0.017*** (0.003)	-0.030*** (0.003)	-0.028*** (0.007)	-0.001 (0.004)
Constant	11.344*** (0.021)	8.718*** (0.054)	10.286*** (0.025)	9.463*** (0.021)	8.077*** (0.024)	9.062*** (0.049)	8.340*** (0.029)
$R^2$	0.959	0.757	0.968	0.873	0.975	0.948	0.890
Observations	35	35	35	35	35	35	35

Notes: In this table, we take advantage of Bureau of Labor Statistics data on industry-level annual employment outcomes to assess the cyclicity of employment across different sectors in the following specification:

$$E_{st} = \alpha + \gamma UR_t + t + \varepsilon_{st} \quad (A2)$$

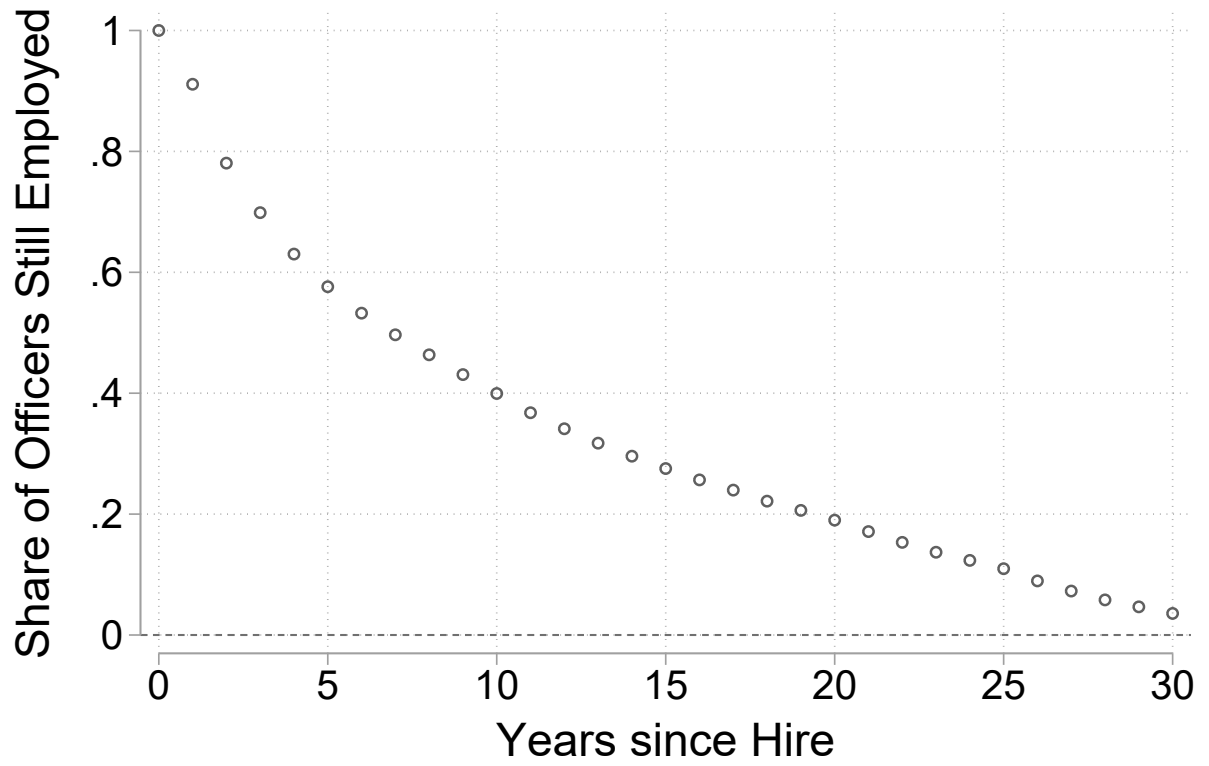
where  $E_t$  represents the natural logarithm of total employment in industry  $s$  in year  $t$ ,  $UR_t$  denotes the national unemployment rate in year  $t$  and  $t$  represents a linear time trend. We focus on the years 1985-2019 to match the time period considered in the paper. The outcome variable in the first column encompasses total private sector non-farm employment. The second through sixth columns consider employment in the construction, manufacturing, retail trade, transportation and professional and business services sectors, respectively. The last column focuses on local government employment excluding education, which serves as a proxy for police employment since disaggregated data on total police employment is not directly available. Robust standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A9: Effect of Starting Year Unemployment Rate on Officer Quality, Department of Highway Patrol**

	Complaints (1)	Disciplinary Actions (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00003 (0.00101)	-0.00053** (0.00023)	-0.00113 (0.00077)	-0.00013 (0.00028)
Constant	-0.0086* (0.0045)	0.0002 (0.0016)	0.0168* (0.0089)	-0.0002 (0.0027)
Observations	17,147	17,147	17,147	17,147
$R^2$	0.0017	0.0006	0.0001	0.0004

Notes: See Table 2 notes for a description of the outcome variables. Panel A estimates equation (1) restricting the sample to officers employed in the Florida Department of Highway Safety and Motor Vehicles. We limit to this agency because as a state-wide agency its hiring is not as responsive to business cycle conditions (Figure A9). Standard errors are clustered at the officer's starting year level in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Figure A1:** Employment Rates by Years since Hire



Notes: This figure plots the share of officers still employed in each year since their initial hire. The share remaining employed just five years after hire is less than 60%. The share remaining employed 20 years after hire is approximately 20%.

**Figure A2: Starting Year Unemployment Rate and Officer Quality, Residualized**

(a) Line Plot of Comovement

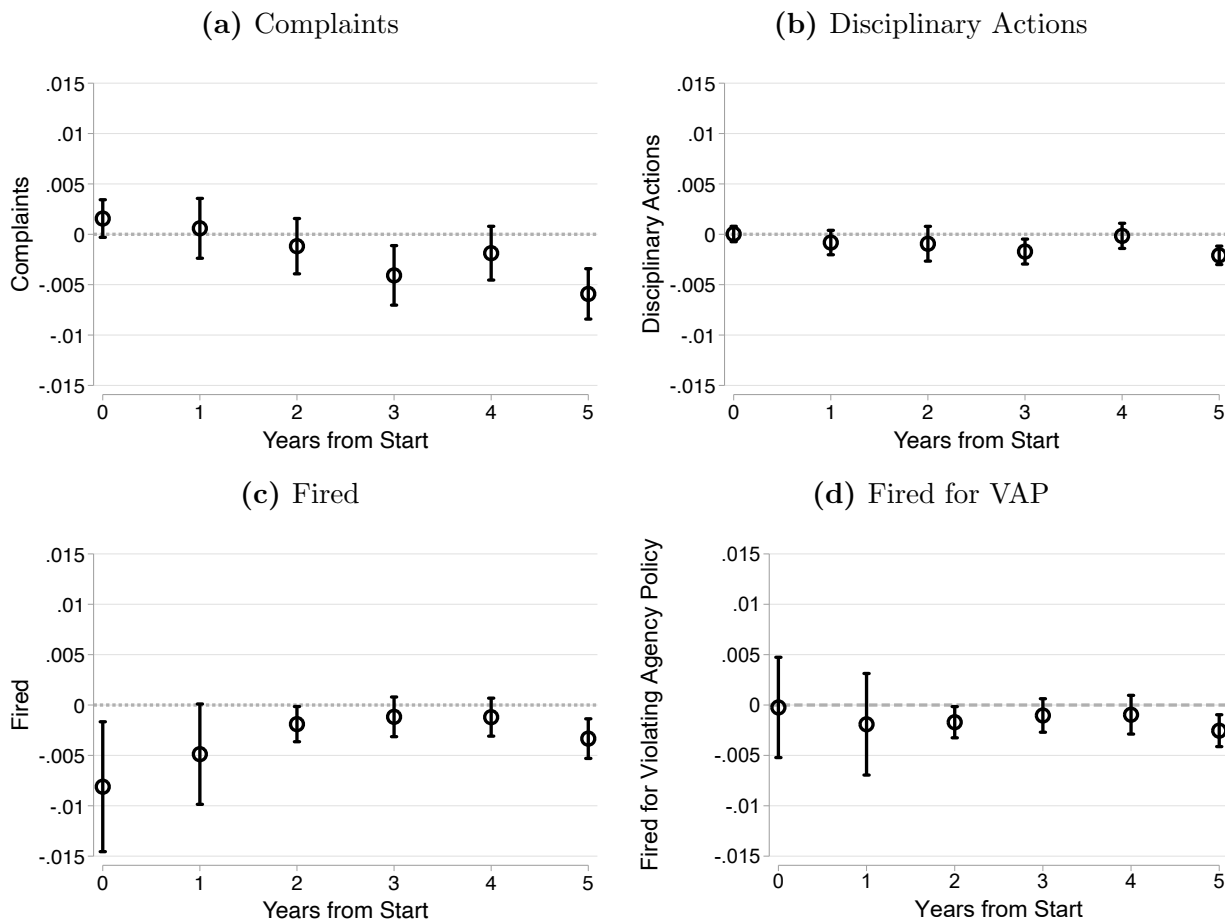


(b) Linear Fit of Starting Year UN and Officer Quality



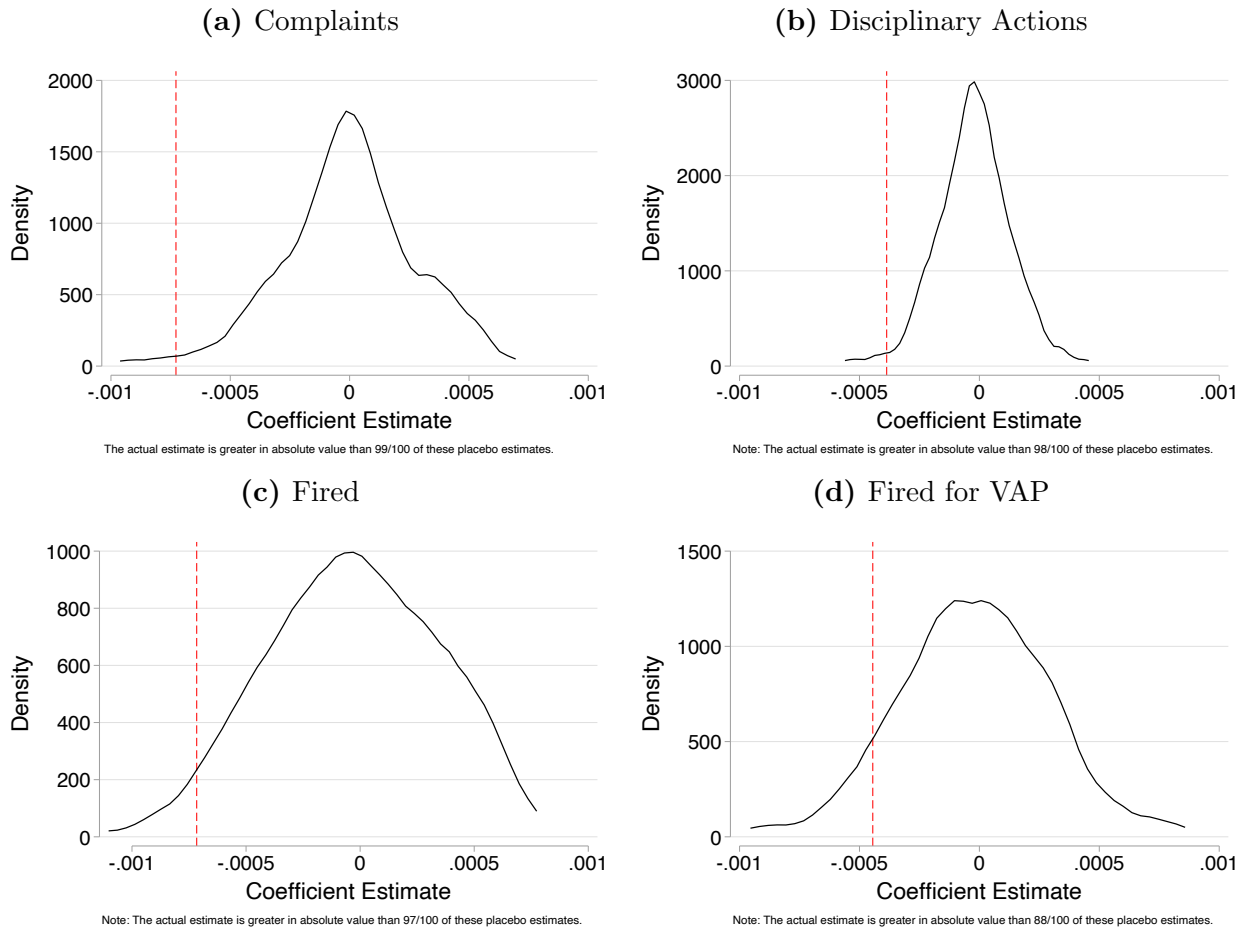
Notes: Panel (a) and panel (b) plot the relationship between a summary measure of officer quality and unemployment rate, after residualizing both using current year unemployment and agency fixed effects. Panel (a) shows how these two variable move with each other over time. Panel (b) plots the two against each other and overlays a linear fit.

**Figure A3:** Effect of Starting Year Unemployment Rate (Top Tercile) on Officer Outcomes



Notes: In this figure, we re-estimate equation (1), replacing the linear term in starting year unemployment rate with a binary indicator for the officer's starting year unemployment being in the top tercile ( $>6.85\%$ ). With each coefficient, we plot the 90 percent confidence interval, based on standard errors clustered at the level of officer's starting year. See Table 2 notes for a description of the outcome variables.

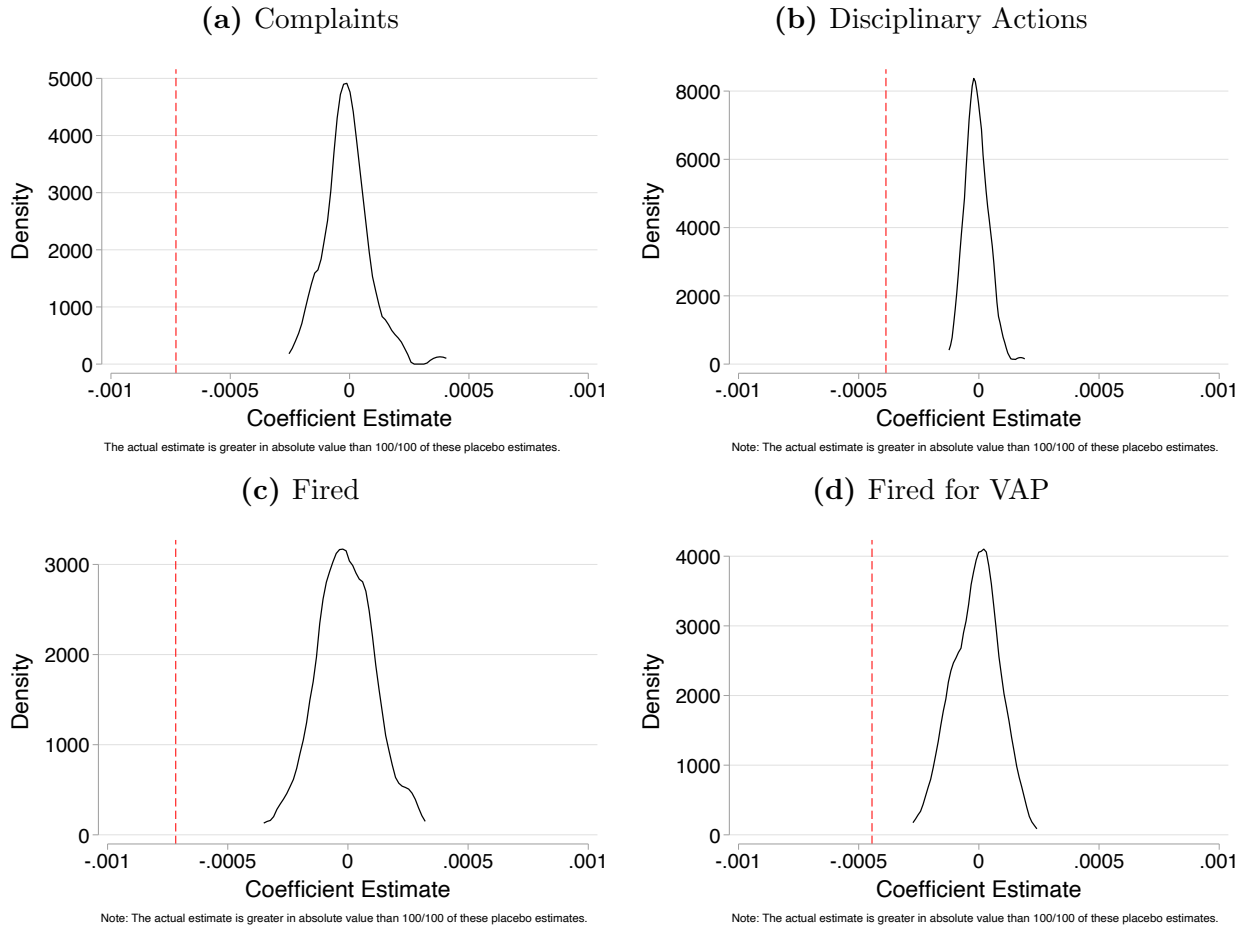
**Figure A4:** Placebo Estimates from Randomizing Starting Year for each Cohort



Notes: We randomly assign starting years to entire starting cohorts of police and re-estimate our main results over 100 replications. In this figure, we plot those placebo estimates for our four main outcomes. The actual estimate in each case is marked by the dashed red line. See Table 2 notes for a description of the outcome variables.

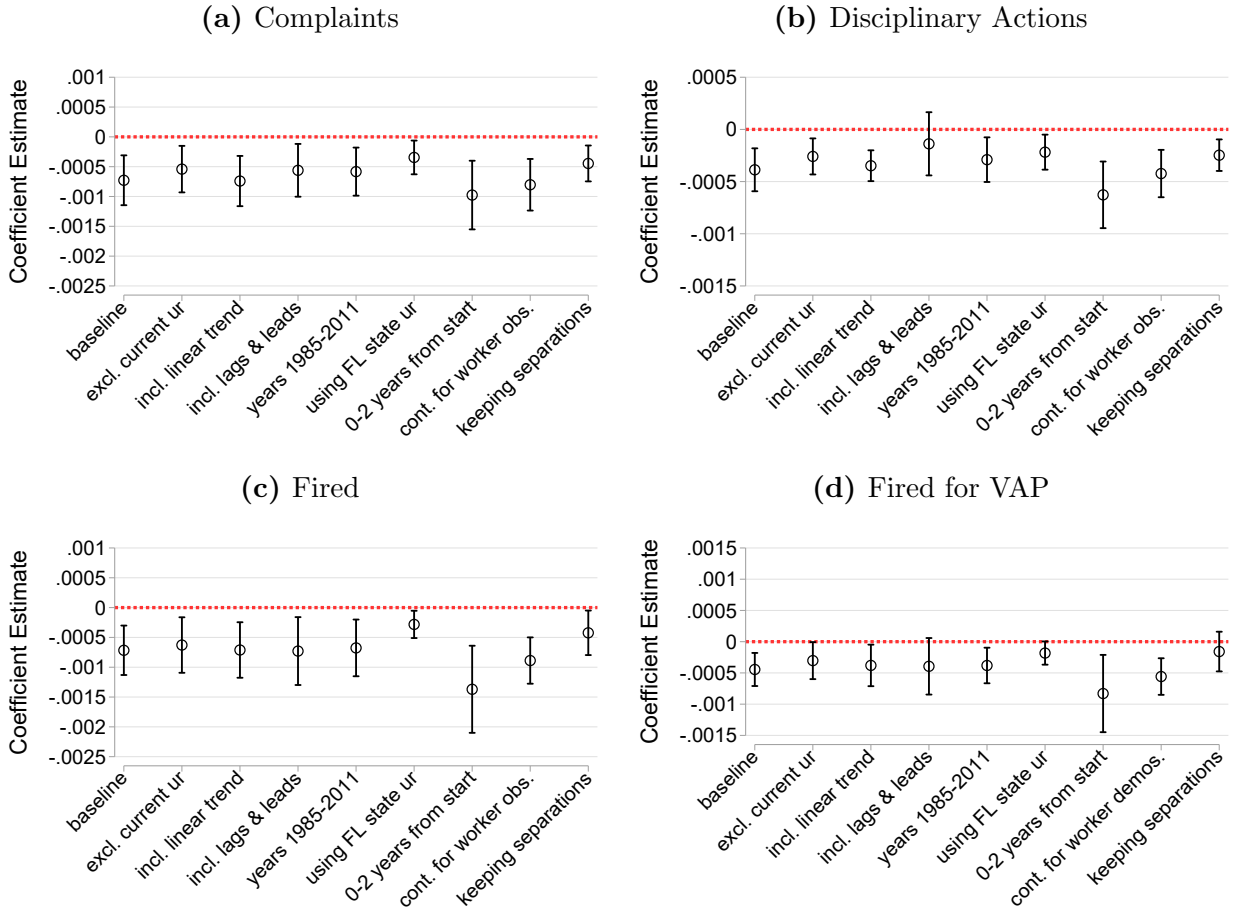


**Figure A5:** Placebo Estimates from Randomizing Starting Year for each Individual



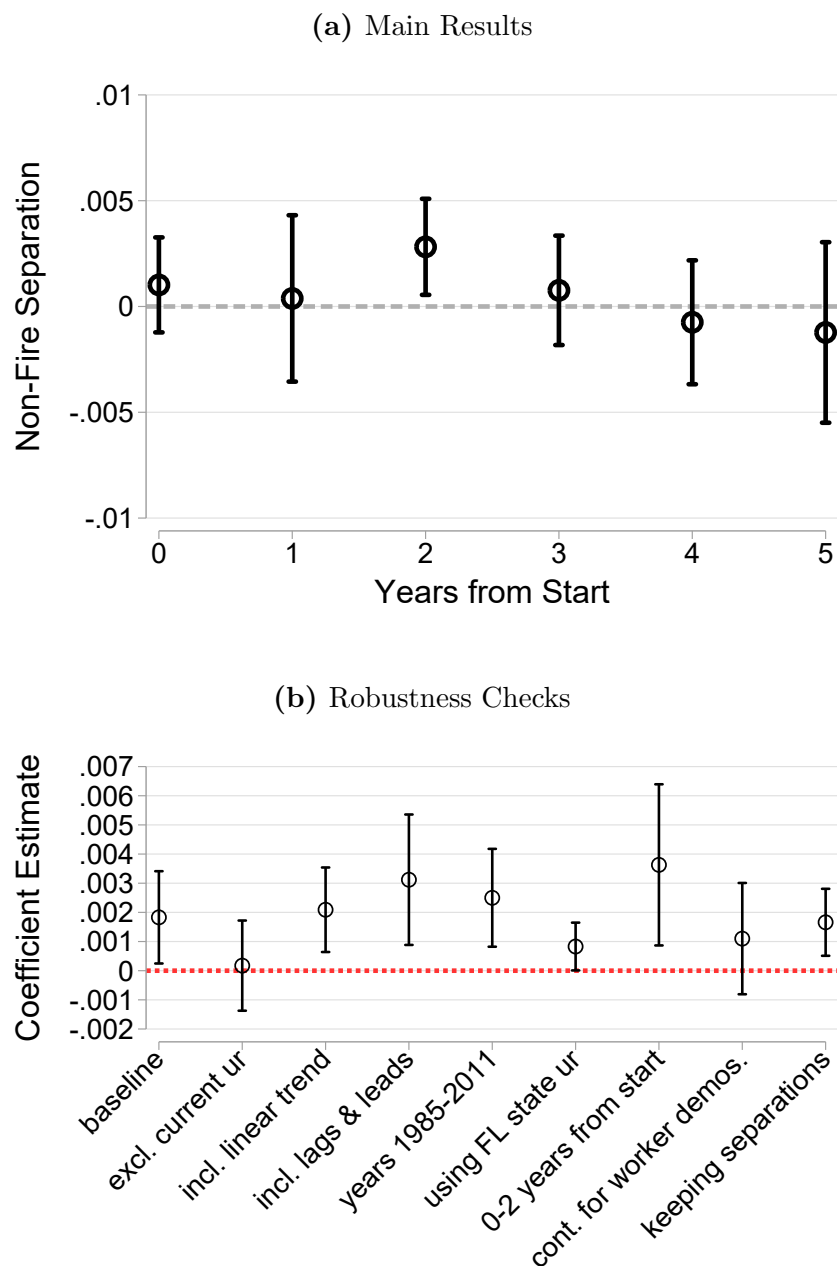
Notes: We randomly assign starting years to individual officer and re-estimate our main results over 100 replications. In this figure, we plot those placebo estimates for our four main outcomes. The actual estimate in each case is marked by the dashed red line. See Table 2 notes for a description of the outcome variables.

**Figure A6:** Effect of Starting Year Unemployment Rate on Officer Outcomes, Robustness Tests



Notes: This figure shows an array of robustness tests that we conducted for our main results. In the following order, it shows: our baseline estimate from Table 2, excluding the current year unemployment rate, including a linear time trends, including leads and lags of the starting year unemployment rate, restricting to years 1985-2011, using the Florida-specific unemployment rate, restricting to the first 0-2 years of an officer's career, controlling for worker observable characteristics, and finally, restructuring the data to keep officers who separate and code their outcomes as zero. With each coefficient, we plot the 90 percent confidence interval, based on standard errors clustered at the level of officer's starting year. See Table 2 notes for a description of the outcome variables.

**Figure A7:** Effect of Starting Year Unemployment Rate on Officer Separations



Notes: Panel (a) estimates equation (2) with voluntary separation as the dependent variable. Panel (b) shows our standard set of robustness checks for this outcome. In both panels, with each coefficient, we plot the 90 percent confidence interval, based on standard errors clustered at the level of officer's starting year.

**Figure A8:** Relationship between # of New Hires and Starting Year Unemployment Rate



Notes: This figure plots the number of full-time police hires per year in Florida and the unemployment rate in each year. This figure suggests that Florida police agencies exhibit a labor demand response to economic conditions.

**Figure A9:** Relationship between # of New Hires and Starting Year Unemployment Rate, Department of Highway Patrol



Notes: This figure plots the number of full-time police hires per year in the Florida Department of Highway Safety and Motor Vehicles and the unemployment rate in each year. This figure suggests that the Florida Department of Highway Safety and Motor Vehicles either do not exhibit a labor demand response to economic conditions or exhibit a labor demand response that is far more muted than other agencies in Florida.