Business Cycles and Police Hires*

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Abstract

We show that the quality of police hires varies over the business cycle. Officers hired when the unemployment rate is high have fewer complaints, disciplines, and are less likely to be fired than officers hired when the unemployment rate is low. Effects are larger for younger workers who have weaker outside options in recessions. We find that the size and quality of the applicant pool increases in high unemployment years–more people take entry exams and a larger fraction pass the exam. Our findings shed light on how outside options affect police hires and speak to policy questions about police recruitment.

Keywords: Police hiring, police quality, public sector labor markets, outside options
JEL Codes: J24, J33, J45, K42

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1 Introduction

The public-sector workforce is the backbone of a well-functioning state. Despite the critical importance of this input in the production of effective government, the best approach to recruitment and selection of public-sector employees remains unclear. While offering financial incentives may attract higher-skilled applicants, it might crowd out applicants with an intrinsic desire to work in government (Benabou and Tirole, 2003; Delfgaauw and Dur, 2008; Barfort et al., 2019). This tension between extrinsic and intrinsic motivations raises an important question: should government agencies use financial incentives to attract workers?

In this paper, we study the power of financial incentives in the context of police recruitment and selection in the United States. Specifically, we examine how the quality of police hires responds to the availability of outside options in the labor market. We add new evidence on how these factors shape policing. Studying these issues in the context of policing is both substantively important and policy relevant. First, 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). 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). Second, 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 (Shalal and Moore, 2020).

Furthermore, the nature of policing differs in two core ways from other public-sector occupations. First, the intrinsic motivation of police may be associated with negative rather than positive outcomes. If the intrinsic motivations of police are biased against the interest of suspects (Prendergast, 2007) or driven by a taste for harsh punishment (Dharmapala et al., 2016), then crowding out those applicants might improve police treatment of civilians. Second, police training and police culture might transform new recruits in a way that negates gains made on the recruitment margin (Adger et al., 2022). It is an open question whether it is possible to improve policing via recruitment at all, and if so, whether it can be accomplished with financial incentives.

This paper provides the first evidence on these questions by studying how economic

conditions, and hence financial incentives, shape the quality of officer hires. To do this, 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 agency-sustained 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 at career start. 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. Officers who enter policing when alternative job opportunities are more scarce are also less likely to be fired. Since a significant share of officers leave their jobs early into their careers, we focus on the officer's first five years on the force. In our main specification, which controls for agency fixed effects and contemporaneous economic conditions, 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. Furthermore, the effect of initial unemployment across the four outcomes emerges as early as the second year since hire, indicating our results are not driven by attrition.

We show that our results are robust to including agency-by-year fixed effects, thus accounting for the possibility that the nature of policing may vary over time. Although our main specification focuses on the first five years of an officer's career, our results are also robust to relaxing this restriction and including all years of the employment spell. We also show that our results are robust to including linear trends, controlling for various leads and lags of initial unemployment, removing the contemporaneous unemployment rate as a control, and controlling for officers' characteristics. We find similar results when using unemployment rates across seven sub-state regions as our measure of economic conditions at career start. Moreover, we find larger impacts for younger officers across the four quality measures — this group may exhibit stronger sorting responses to economic conditions, since firms are less likely to hire young workers during recessions (Forsythe, 2022).[1]

From these results alone, we do not know if the changing quality of hires is due to changes in the pool of applicants or changes in agency hiring decisions. To overcome this empirical challenge, we take advantage of additional data on entry exams and on the number of officers hired each year. This allows us to assess the relative importance of labor supply and labor

[1]We do not find heterogeneous impacts of initial unemployment across officers' race or gender.

demand mechanisms in driving our results.[2] It is likely both of these forces are important in this setting. 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.

Why do we expect the applicant pool might change in response to economic conditions? First, prior work has documented that the labor supply of teachers and nurses changes across the business cycle. Compared to these public sector occupations, policing has relatively low entry costs. In Florida, individuals can enter policing after completing a training program that is typically only 20-30 weeks long. Second, since public sector employment is less pro-cyclical than in the private sector (Kopelman and Rosen, 2016), more high-skilled individuals may apply to become officers in recessions due to higher expected earnings relative to other jobs. In our setting, we show that starting salaries in policing in Florida do not vary across the cycle, in contrast to the pro-cyclicality of starting wages in the private sector.

To assess the importance of the labor supply channel, 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, and applicants who fail the exam are not eligible to be hired. We find that the number of people taking the exam in a year is positively correlated with the unemployment rate. We further show that the fraction of people who pass their initial exam attempt is higher when the unemployment rate is higher. We show that passing the exam on the first try is associated with improved measures of officer quality, indicating the pool of applicants is stronger when outside options are scarce.

At the same time, if Florida police agencies are more constrained when unemployment rates are high, they may be more selective in their hiring decisions. To assess the role of the labor demand channel, we take advantage of additional data on the number of officers hired each year. 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. Since these results indicate a role for both labor demand and labor supply in our setting, we conduct a bounding exercise to estimate the potential importance of the labor demand channel. Under reasonable assumptions about the ability of agencies to screen out lower quality workers, we find that labor supply responses account for an important share of the overall effect.[3]

[2]We also assess the possibility that the nature of policing may change during recessions. We do not find significant changes in the types of agencies that officers joined across the cycle or in their job training participation. Our results are also robust to directly controlling for current and starting year crime rates.

[3]In reaction to the changes in labor supply and demand, agencies may engage in more selective hiring during recessions. Using information from a survey of law enforcement agencies across the country, we show that when the unemployment rate is higher, agencies adopt more screening mechanisms for potential hires.

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 (e.g., Owens et al. (2018); Goncalves (2021); Rivera and Ba (2022)). Within that set of papers, a few study the importance of officer pay or other financial motivations (e.g., Mas (2006); Foltz and Opoku-Agyemang (2020); Chalfin and Goncalves (2021)). 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 (McCrary, 2007; Prendergast, 2007; Dharmapala et al., 2016; Ornaghi, 2019; Linos and Riesch, 2020; Cox et al., 2022). 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. Importantly, our findings suggest that agencies attract higher quality applicants when policing is more appealing than outside options. As a result, better officers are hired and those improvements persist even in the face of existing police culture and training. In general, recruitment, selection, and retention of public sector workers are critical policy levers, and our paper informs how government agencies can hire and retain good workers. Therefore, we build on an existing literature about the effect of financial or career incentives on the recruitment and performance of public-sector employees (Propper and Van Reenen, 2010; Ferraz and Finan, 2011; Dal Bó et al., 2013; Nagler et al., 2020; Bertrand et al., 2020).

Furthermore, our findings contribute to a literature on the cyclicality of labor market flows, and how this differs by worker skill and across the public and private sectors (Krueger, 1988; Kopelman and Rosen, 2016; Mueller, 2017). We also connect to a related literature that explores how the quality of new teachers and nurses responds to outside options in the labor market (Propper and Van Reenen, 2010; Britton and Propper, 2016; Nagler et al., 2020; Deneault, 2023).[4] 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 police, a separate, large public sector occupation. Policing 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

[4]Our paper also contributes to a growing literature on the relationship between economic conditions at career start and subsequent labor market outcomes (Oyer, 2008; Kahn, 2010; Oreopoulos et al., 2012; Böhm and Watzinger, 2015; Altonji et al., 2016; Schwandt and Von Wachter, 2019)

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 rich data on entry exams and on the number of officers hired to explore the labor supply and demand mechanisms, respectively.

2 Data, Institutional Context and Methodology

2.1 Data Sources

Our empirical analysis relies on administrative data 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, and various outcomes related to police quality. We also observe the officer's name, 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.

Importantly, 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.[5] 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 Grunwald and Rappaport (2019); Dharmapala et al. (2022); Rivera and Ba (2022), among others, and use complaints and disciplines as proxies for officer quality. Close to 30% of complaints result in a disciplinary action in the FDLE data.

We also rely on information in the FDLE data on the reason for officer separations. 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 on the job. In

[5]Local agencies sustain a misconduct event if the purported offense by the officer violates a "good moral character" requirement.

our data, among the sample of fired officers, 67% of them were dismissed for violating agency policy. These outcomes capture officers at increasingly worse parts of the quality distribution, allowing us to observe effects for a range of police misconduct. At the other end, we also observe whether officers separate from their agency voluntarily, a potential indication that they are able to find better outside options once economic conditions improve.

Our main variable for economic conditions at career start comes from annual variation in the national unemployment rate.[6] We follow the literature on the impacts of graduating in a recession and use the unemployment rate as our preferred measure of business cycle conditions as it captures the extent to which potential police officers' outside options may be limited. We also use alternative measures of economic conditions, such as the Florida-wide unemployment rate. In supplementary analyses, we use information on county-level unemployment rates (available since 1990) aggregated to seven sub-state regions designated by the FDLE. Altogether, we merge the measures capturing economic conditions to each year of employment for all officers included in our sample.

2.2 Institutional Background

Becoming a police officer in Florida involves multiple steps. First, candidates must meet a number of minimum requirements, including being at least 19 years old, having a high school degree or GED, and passing a background check. Moreover, they must pass an exam evaluating basic competencies and a physical examination. Upon meeting these requirements, candidates must complete the Basic Recruitment Training Program, which prepares them for becoming an officer through academic courses and physical preparation, amounting to a total of 770 hours. After the training course (or if they have served as out-of-state officers), applicants must pass the State Officer Certification Exam (SOCE), which evaluates their preparation to become police officers. Upon passing the exam, candidates apply to a police agency, and hiring is done at the discretion of the agency. In the FDLE data, 59% of applicants were hired within one year after passing the SOCE.

We use the FDLE data to assess the characteristics of new police officers in Florida. New hires are on average 29 years old, and close to 20% of officers are older than 35 at their career start. The vast majority of new officers in Florida are male (86%) and white (76%), see Table A1. To understand officers' occupational trajectories, we take advantage of the longitudinal component of the Current Population Survey in 1980-2019. We identify all individuals who transitioned into or out of policing and examine their occupational transitions. A substantial

[6] We use the unemployment rate faced by an officer at the start of each employment stint, except when the previous stint resulted in a transfer within agency. For those officers, we use the unemployment rate at the start of their careers. Results are robust to alternative definitions.

share of officers are previously employed in other public and private protective service occupations (16% and 10%, respectively), but the majority come from non-employment (15%) or from more distinct occupational categories like administrative support (10%), management (8%), business (6%), or sales (5%), see the second panel of Table A1. Likewise, individuals transition to a similar set of occupations after their employment as police. This evidence indicates that officers move across a variety of occupations, suggesting they may adjust their labor supply in response to economic conditions.

We turn back to the FDLE data to describe long-term employment outcomes for a group of young officers hired in 1985-1989 (Figure 1). First, a sizable share of officers leave their jobs early into their careers, with 61% remaining employed after five years and 25% after twenty-five years. The majority of officers who leave within ten years do so voluntarily, with smaller shares being fired for violating agency policies or fired for other reasons. Figure A1 further shows that despite a small increase in retention rates for more recent entry cohorts, around 60% of officers remain employed in FDLE five years after being hired.

Summary Statistics. Our sample includes 103,971 unique employment stints, which last an average of 9 years. We present summary statistics in Table 1. The first column presents average statistics for our sample. 7% of officers receive a complaint against them, and close to 30% of these complaints eventually result in disciplinary action. On average, 9.4% of officers are fired from their jobs, and two-thirds of them are fired for violating agency policy. A sizable share of officers (54%) leave their jobs voluntarily. 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 2.1 percentage points. A smaller share of officers hired in high-unemployment years have complaints against them (6.1% vs. 7.7%), are less likely to be fired (8.6% vs. 10%), and are less likely to be fired for violating agency policy (5.7% vs. 6.7%). The raw data shows that officers hired in high unemployment years are less likely to have received complaints against them or fired than those hired in low unemployment periods (Figure A2).

2.3 Empirical Strategy

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:

$$Y_{iat} = \alpha + \gamma\, UR_i^S + \beta\, UR_t + \theta_a + \varepsilon_{iat} \tag{1}$$

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. θ_a capture agency fixed effects which account for differences in outcomes across police agencies in Florida. In equation (1), we control for contemporaneous unemployment (UR_t) implying that γ allows us to recover the effect of the initial economic conditions net of all subsequent unemployment rates (Von Wachter, 2020). This accounts, for example, for the possibility that officers may adjust their policing behavior due to facing weak concurrent outside options. We additionally estimate a specification that accounts for potential changes in the policing environment by including agency-by-year fixed effects (θ_{at}) in equation (1).

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 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 alternative time windows.

We conduct an extensive set of robustness tests along other dimensions as well. First, we re-estimate equation (1) without including the contemporaneous unemployment rate, which allows us to recover the total impact of initial conditions on police quality. In addition, we assess the robustness of the results to the inclusion of time trends and to multiple leads and lags of the unemployment rate. We estimate the results using the Florida-wide unemployment rate, restricting our sample to stints starting in 2011 (to observe outcomes fully through the end of our data) and analyzing outcomes through the first two years of employment. We also estimate a specification in which we control for officer characteristics at career start and a specification in which we control for officers' experience. We also estimate a version of equation (1) that controls for current and starting year crime rates. These results and others are described in more detail in Section 3 and in their respective table and figure notes.

We further analyze the dynamic impacts of initial economic conditions on officer outcomes by estimating equation (1) separately for each year s since the officer was hired, where s ranges between zero and five. This specification 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.

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 0.00077 fewer complaints, or 8.5% of baseline complaints in the first five years of employment.[7] As such, an officer who is hired during a period with an above-median unemployment rate is 20 percent less likely to receive an agency-sustained complaint against them compared to a counterpart hired during below-median periods. This is similar in magnitude to civilian complaint reductions caused by increased police oversight (Jordan and Kim, 2022; Rivera and Ba, 2022), procedural justice training (Wood et al., 2020), and the introduction of body-worn cameras (Kim, 2022). 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 13% of baseline disciplinary actions in the first five years. 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 4.9% decrease in the likelihood of being fired altogether and of being fired for violating agency policy in the first five years of employment.

In Figure 2, we present the dynamic effects of initial unemployment on officer outcomes across the first five years of employment. 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 as the second year since starting the job, indicating the effects are not driven by attrition. In their analysis

[7] In Table A2, 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.

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 less 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.[8]

In this context, we note that the policing literature has previously highlighted the difficulty of assessing officer quality (Rim et al., 2020; Hoekstra and Sloan, 2022). We do not aim to determine what are the best measures of overall officer quality, yet we posit that the outcomes we study are negative aspects of officer quality. For instance, a common concern with using complaints as a measure of quality is that officers who are more proactive on the job may receive more complaints. If that were the case, then complaints could reflect good policing performance. On the other hand, Rozema and Schanzenbach (2019) have shown that officers who receive complaints against them have a far higher likelihood of facing future civil rights litigation. Moreover, the complaints we study are agency-sustained complaints, not civilian complaints and complaints with disciplinary actions are further sustained by FDLE. In Section 4, we further show that officers who passed the entry exam on the first try are less likely to have received complaints and disciplinary actions. Lastly, in our data, complaints and disciplinary actions are positively correlated with the likelihood an officer is fired altogether and fired for violating agency policy, indicating that lower-quality officers are more likely to have received complaints and disciplines.

Addressing Differences in the Nature of Policing. We examine the robustness of our results to account for the fact that the nature of policing may vary across agencies and over time. We first estimate a modified version of equation (1) that includes agency-by-year fixed effects, implying we compare outcomes for officers working in the same agency in the same year but who were hired at different points in the cycle. We present the estimated results in the first panel of Table 3, finding that officers in high unemployment years are less likely to have received disciplines against them, to have been fired, and to have been fired for violating agency policy. We remark that since this specification focuses on the first five years since career start, we are effectively comparing outcomes *only* for officers working in the same agency who were hired in the past five years.

In this context, we re-estimate this specification using all employment years, and we find

[8]Our results show that officers hired in a recession are less likely to have been fired early in their careers. These officers are at the bottom of the quality distribution, suggesting that had they remained employed, they would have likely incurred additional complaints and disciplines.

significant effects of initial unemployment on the prevalence of complaints, disciplines and the likelihood of being fired for violating agency policy. Nonetheless, these estimates suffer from attrition bias, as a sizable share of officers leave policing early into their career. We thus estimate an additional specification in which we first residualize each outcome of interest from agency-year fixed effects, controlling for differences in the prevalence of each outcome for *all* officers employed in a particular agency in that year. We then use the residualized variable as our outcome of interest in equation (1). We present the results in the third panel of Table 3, where we find that officers hired in high unemployment years are less likely to have received complaints and disciplines, as well as being less likely to be fired and fired for violating agency policy. Altogether, these results indicate that our main results are robust to controlling for differences in the policing environment in a number of ways.

We also assess the robustness of our results by estimating a modified version of equation (1) that uses variation in initial local unemployment rates across seven sub-state regions and controls for agency-by-year fixed effects (Table A3). We find that officers who started with higher local unemployment rates have fewer complaints, disciplines, and a lower likelihood of being fired/fired for violating agency policy, with significant effects on the last three outcomes.[9] 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, these results are consistent with the evidence presented in Table 2.

Agency-Level Public Safety Outcomes. We further examine how agencies' employment composition affects their ability to promote public safety. In particular, we analyze whether agencies with a larger share of officers hired in high-unemployment years attain better outcomes. We capture agencies' annual outcomes using Uniform Crime Report (UCR) data on agency-level crime rates and clearance rates between 1985-2015. We study how these outcomes vary depending on the composition of officers in an agency, including average race, age, gender and unemployment rate at career start of all officers employed in the agency in that year. We control for agency size, contemporaneous unemployment, as well as agency and year fixed effects. We find that agencies with a larger share of officers hired in high unemployment years have lower crime rates and higher clearance rates (Table A4).

[9] In the second panel of Table A3, we re-estimate this specification using all employment years and find significant effects across all four outcomes.

3.2 Robustness Checks

We test the robustness of our main results to alternative specifications in Figure 3. 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 upon including linear time trends. The effects on complaints and both firing outcomes remain similar even when conditioning on various leads and lags of the initial unemployment rate. Our results are also robust to using the Florida unemployment rate for capturing initial economic conditions, to focusing on officers who start their jobs in 1985-2011, to controlling for worker observables at baseline, and to controlling for current and starting year crime rates. We also include a specification in which we control for officer's experience–despite introducing this endogenous control, we find similar results. 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 2. 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.[10]

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 A6). 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 estimates are outliers relative to the distribution of placebo estimates.

3.3 Labor Market Dynamics

In Table 4, 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.[11] This is consistent with Forsythe (2022), who shows that during recessions, the hiring rate for young workers falls

[10] Our results are also robust to measuring economic conditions at start using monthly unemployment rates, and to using lagged measures of initial monthly unemployment (Table A5). Moreover, our main estimates are robust to dropping any given entry cohort from the sample (Figure A3).

[11] This result is robust to defining age at start linearly and for officers under 30 at start (Table A7).

faster than for older workers. As such, young workers face weaker outside options during slack labor markets, leading to stronger sorting responses into policing than for their older counterparts.[12] We also explore whether the demographic characteristics of hirees vary based on the unemployment rate, but do not find any evidence to this end (Table A9).

To provide further evidence on initial unemployment rates and subsequent labor market dynamics, we estimate equation (1) and find that 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 A6). Interestingly, when we do not control for contemporaneous unemployment in this analysis, the estimated coefficient becomes insignificant and is close to zero. The difference in the estimates is consistent with officers remaining on the force in response to their outside options. Since unemployment rates are correlated over time, officers hired in recessions are unlikely to voluntarily separate when 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.

4 Mechanisms

We have so far shown consistent evidence that the quality of police officers is significantly higher for officers hired in high-unemployment periods. This result could emerge through different 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. A third possibility is that the nature of policing could vary in a downturn vis-à-vis an expansion, and that starting under different conditions may have a path-dependent effect on quality. In fact, these mechanisms could be taking place at the same time in our setting.

Labor Supply. As noted above, labor supply responses may contribute to our results if the relative attractiveness of policing increases during economic downturns. To this end, we use

[12]Table A8 presents effects by race and gender, respectively. We do not find statistically significant differences across outcomes by these characteristics.

Florida Criminal Justice Agency Profile (CJAP) data in 2011-2019 to examine how posted entry salaries in police agencies and sheriff's offices vary across the business cycle. In Table A10, we show that starting salaries across police agencies do not vary across the business cycle, which stands in contrast with extensive evidence showing that wages of private sector hires are strongly procyclical (Bils, 1985; Martins et al., 2012; Carneiro et al., 2012; Gertler et al., 2020). As such, these results suggest that becoming a police officer becomes relatively more attractive during high unemployment periods.[13]

To assess the potential importance of the labor supply channel, we rely on information from a dataset comprised of all entry-level State Officer Certification Exams taken by police applicants in Florida from 1996-2015. As discussed in Section 2, these exams are taken after applicants have finished basic recruit training, and passing the SOCE exam is a requirement to be eligible to be hired by a police agency. In this context, we assess the relationship between the unemployment rate in different years and the number of exam-takers, which we consider a proxy for labor supply. We present the results in the first panel of Figure 4. We find a positive correlation between the unemployment rate and the total number of exam-takers in each year.

We further examine the relationship between the unemployment rate and the fraction who pass the exam on their initial attempt, which we consider a proxy for quality of the applicant pool. Panel (b) in Figure 4 show a positive relationship between the unemployment rate and the fraction of people who pass the exam on their initial attempt, as a one percentage point increase in the unemployment rate is associated with a 0.5 percentage point increase in the SOCE pass rate.[14] To further assess the link between passing on the first try and officer quality, we analyze the relationship between passing on the first try and our four outcomes of interest. We present the results in Table A13, which shows that officers who passed on the first try receive 0.005 fewer complaints than those who failed the exam, such that officers who passed the exam receive 33% fewer complaints in their first five years of employment than their peers who failed their first exam. Furthermore, officers who passed the exam receive 0.0017 fewer disciplines, which also amounts to a one-third reduction relative to their peers who did not pass on the first try. We also find significant differences in the likelihood of being fired and of being fired for violating agency policy. Altogether,

[13]Employment in industries that new officers tend to come from — professional and business services, retail trade, manufacturing, construction and transportation — is more responsive to business cycle conditions than local government employment (Table A11).

[14]Applicants who fail the SOCE exam are allowed to re-take the exam up to three times, and 66% of applicants who failed the test on their first try eventually pass the SOCE exam in our data. Among a sample of candidates who eventually pass the test, having passed the SOCE on the first try substantially increases the likelihood of being hired within one year of passing, from 48% to 60%. This further suggests that officers who pass the exam on the first try have qualities that agencies value.

since passing on the first try is associated with improved measures of officer performance, these results indicate the pool of applicants is substantively better when outside options are scarce.[15,16]

Labor Demand. To assess the role of labor demand, in the third panel of Figure 4, 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. While we do not observe information on agencies' job postings or vacancies to directly measure police agencies' labor demand, this result suggests that changes in labor demand by police departments likely plays an important role in driving our results.

Since we find evidence for changes in labor demand and supply in this setting, we carry out a bounding exercise to assess the extent to which our main results can be explained by the demand channel. Using the estimate from panel (c) in Figure 4, we estimate the counterfactual hiring reduction that would have occurred in each year if the agencies in that year had faced an unemployment rate of 9.6%, the highest rate in our sample. Then, we impose that hiring reduction in the data by removing officers from the sample. We make various assumptions about how effective agencies are at screening officers at the time of hire. First, we assume that agencies are able to identify 100% of officers that would go on to have at least one complaint in the next five years. We drop those officers first and the remainder of the hiring reduction is done at random. We repeat this exercise assuming agencies can identify 80%, 60%, 40%, 20%, or 0% of these lower-quality officers prior to hiring them (Figure 5).[17] For all four outcomes, if agencies could identify 100% of lower-quality officers, then labor demand would fully explain the main effect. On the other hand, if agencies cannot identify any lower-quality officers, then labor demand explains 0% of the main effect. Prior work on employee screening suggests the reality is somewhere in between (Oyer et al., 2011). Assuming agencies can identify 40% of lower-quality officers, about 75% of the effect on complaints, 40% of the effect on disciplines, 10% of the effect on firing, and 30% of the effect on firings for

[15] The demographic characteristics of exam-takers also change in high unemployment years (Table A14).

[16] We also re-estimate our main specification for statewide agencies, where labor demand forces are muted (Figure A7), and find significant effects on disciplines, the likelihood of being fired and of being fired for violating agency policy (Table A15).

[17] The intuition for this exercise is as follows: consider a year in which 200 fewer officers would have been hired if the agencies had faced an unemployment rate of 9.6%. Moreover, suppose that among all officers hired that year, 100 go on to have at least one complaint in their first five years. Under 80% screening effectiveness, we assume that agencies can identify 80 of these 100 "lower quality" officers. We drop those 80 officers from the sample, then drop the remaining 120 officers (for a total reduction of 200) at random from all other officers hired in that year. We then re-estimate equation (1) for the remaining officers and compare to the estimates from Table 2. The difference in the estimated coefficients informs the importance of the labor demand channel.

violating agency policy could be explained by labor demand. As such, this exercise suggests that under reasonable assumptions for agencies' screening effectiveness, labor supply likely plays an important role in driving our results.

Changing Job Characteristics. As noted above, the characteristics of the job may also change during recessions and starting under certain conditions may have path-dependent effects on performance. For example, the nature of policing could vary during high unemployment periods. Officers hired at different points in the business cycle may need to engage in more or less 'proactive' policing practices. First, since crime increases during high-unemployment periods (Raphael and Winter-Ebmer, 2001; Machin and Meghir, 2004), officers starting in those periods may need to engage in aggressive practices more often, resulting in more complaints. Yet our main estimates show the opposite pattern. Moreover, our results are robust to directly controlling for current and starting year crime rates (Figure 3). Finally, officers entering in high-unemployment periods also receive fewer complaints across categories that are not directly related to the policing environment, such as drug-related misconduct events (Table A16).

At the same time, job training opportunities experienced by new officers may differ across the business cycle (Arellano-Bover, 2020). We test this using data on participation in job training courses, and we do not find a relationship between the initial unemployment rate and the likelihood of job training participation (Table A17). This suggests the quality differences we observe are not necessarily driven by differential learning opportunities across the cycle. We further show that new hires do not enter different agencies across the cycle, where we characterize agencies by the complaints, disciplines and dismissal rates for incumbent officers (Table A18).

The combination of the labor supply and labor demand channels we have documented so far suggest that police agencies can engage in more selective hiring in high unemployment periods. In this context, we study how agencies respond to such changes in labor supply and demand by using data from the Law Enforcement Management and Administrative Statistics' (LEMAS) 2003, 2007 and 2016 surveys. We assess the relationship between state-level unemployment rates and the use of various screening mechanisms, including credit checks and aptitude exams, among others. We find that police agencies adopt more screening practices during high unemployment periods, but do not change their education or training requirements for new recruits across the cycle, nor do they engage in differential spending on salaries, operations or equipment (Table A19). Our results show that agencies may engage in upskilling through an increased use of screening mechanisms for new recruits, fitting in

with previous evidence documenting upskilling during recessions (Hershbein and Kahn, 2018; Modestino et al., 2020)

Overall, these results indicate that both the labor supply and labor demand channels are important drivers of our main findings. First, evidence from entry exams suggests that higher-quality officers are more likely to apply when unemployment rates are high. Moreover, agencies hire less during recessions, and as a result, can be more selective in who they hire.

5 Conclusion

In this paper, we examine how economic conditions at career start affect the quality of police hires. Taking advantage of detailed data on 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, the number of people taking entry exams increases in high-unemployment years and the fraction of those who pass the initial attempt increases. Since passing the exam on the first try is associated with improved officer quality, the pool of applicants improves during high unemployment periods, indicating an important role for labor supply responses. While the number of hires is procyclical in Florida, indicating a role for a labor demand channel and agency screening, the evidence on labor supply and on the ability of agencies to effectively screen applicants suggests agencies could improve quality by engaging in countercyclical hiring. Further work should examine how agency recruitment practices can result in improved police quality, analyzing the specific aspects that agencies can change to make the occupation more appealing relative to outside options.

In general, the size of policing in the United States and the active policy debate about police reform and police funding underscores the need to understand whether financial incentives can improve policing. We make headway on this general question by leveraging variation in economic conditions and the relative appeal of outside options. While prior work offers important evidence on other public-sector occupations, policing is distinct in several ways. First, unlike teaching, policing requires relatively little formal training. Second, typical concerns about financial incentives crowding out intrinsically motivated applicants depend on

positive selection into policing. Finally, if there are fundamental issues with police culture or police training, it is possible that improving recruitment fails to change on-the-job behavior. Our findings suggest that agencies attract higher quality applicants when policing is more appealing than outside options. As a result, better officers are hired and those improvements persist even in the face of existing police culture and training.

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Tables and Figures

Table 1: Summary Statistics

	Full Sample	Above Median UN at Start	Below Median UN at Start
Complaints	0.070	0.061	0.077
	(0.256)	(0.240)	(0.267)
Disciplinary Actions	0.020	0.018	0.022
	(0.141)	(0.133)	(0.147)
Fired	0.094	0.086	0.100
	(0.292)	(0.281)	(0.301)
Fired for Violating Agency Policy	0.063	0.057	0.067
	(0.243)	(0.232)	(0.250)
Voluntary Separation	0.540	0.539	0.542
	(0.498)	(0.499)	(0.498)
Unemployment Rate in Starting Year	5.936	7.116	5.041
	(1.332)	(1.145)	(0.521)
Observations	103,971	44,833	59,138

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	-0.00077***	-0.00039***	-0.00073**	-0.00044**
	(0.00027)	(0.00013)	(0.00027)	(0.00017)
Constant	0.0109***	0.0031***	0.0181***	0.0097***
	(0.0015)	(0.0006)	(0.0025)	(0.0016)
Observations	468,924	468,924	468,924	468,924
R^2	0.0028	0.0007	0.0043	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 A2 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, Alternative Specifications

Panel A: Agency-by-Year Fixed Effects, Five Year Window

	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00034	-0.00020**	-0.00097***	-0.00069**
	(0.00038)	(0.00009)	(0.00030)	(0.00026)
Constant	0.01140***	0.00396***	0.02075***	0.01347***
	(0.00230)	(0.00051)	(0.00171)	(0.00156)
Agency-Year FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq$ 5 Years	$\leq$ 5 Years	$\leq$ 5 Years	$\leq$ 5 Years
R^2	0.0149	0.0039	0.0139	0.0140
Observations	468361	468361	468361	468361

Panel B: Agency-by-Year Fixed Effects, All Years

	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00037**	-0.00017***	-0.00037	-0.00036*
	(0.00017)	(0.00005)	(0.00036)	(0.00020)
Constant	0.01077***	0.00329***	0.01289***	0.00923***
	(0.00098)	(0.00026)	(0.00200)	(0.00113)
Agency-Year FE	Yes	Yes	Yes	Yes
Years Since Hire	All Years	All Years	All Years	All Years
R^2	0.0119	0.0057	0.0158	0.0133
Observations	941108	941108	941108	941108

Panel C: Residualized Outcomes, Five Year Window

	Complaints (1)	Disciplines (2)	Fired (3)	Fired for VAP (4)
Unemployment Rate in Starting Year	-0.00034*	-0.00023***	-0.00064***	-0.00046***
	(0.00019)	(0.00006)	(0.00022)	(0.00015)
Constant	0.00148	0.00131***	0.00765***	0.00354***
	(0.00128)	(0.00037)	(0.00197)	(0.00122)
Agency FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq$ 5 Years	$\leq$ 5 Years	$\leq$ 5 Years	$\leq$ 5 Years
R^2	0.0006	0.0005	0.0011	0.0007
Observations	468703	468703	468703	468703

Notes: In the first two panels of this table, we present the results from a modified version of equation (1) that includes agency-by-year fixed effects in:

$$Y_{iat} = \alpha + \gamma\, UR_i^S + \theta_{at} + \varepsilon_{iat} \tag{2}$$

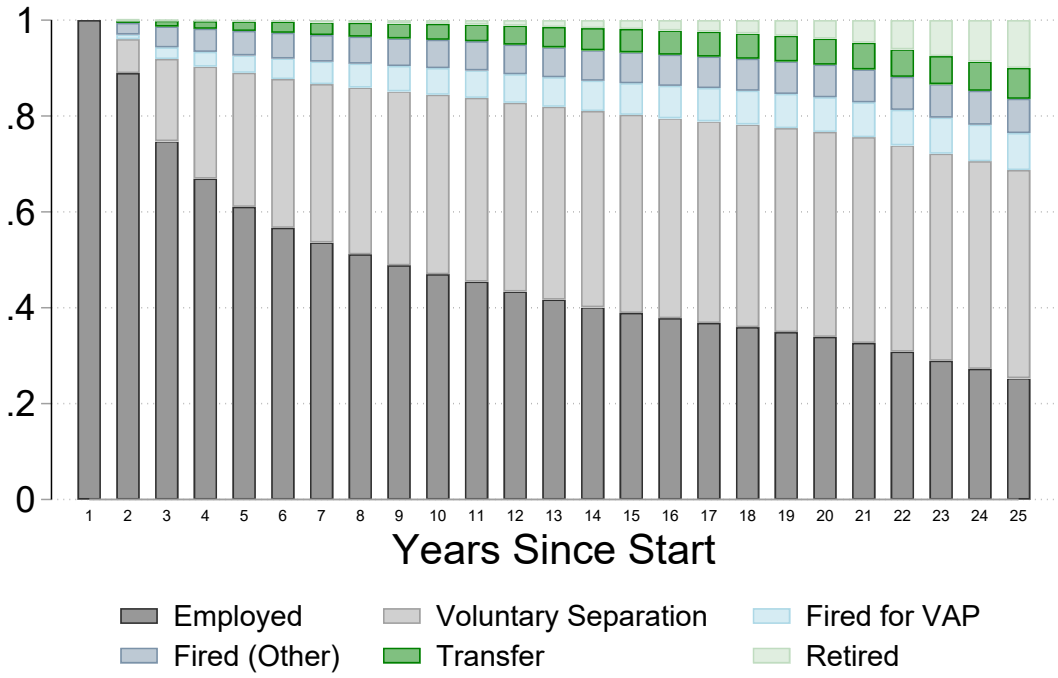
where θ_{at} captures agency-by-year fixed effects. Panel A estimates equation (2) restricting the sample to the first five years of an officer's employment spell, whereas Panel B includes all years of employment. Panel C presents the results from a modified version of equation (1), which uses residualized outcomes as the outcome variable of interest. We residualize the four outcome variables from agency-by-year characteristics in a preliminary step by estimating the following regression: $Y_{iat} = \alpha + \phi_{at} + v_{iat}$, and we then use the residualized outcome from this equation ($\widehat{Y_{iat}}$) as the outcome variable in equation (1). See Table 2 notes for a description of the outcome variables. Standard errors are clustered at the officer's starting year level in parentheses in all three specifications. * p<0.1, ** p<0.05, *** p<0.01.

Table 4: Effect of Starting Year Unemployment Rate on Officer Quality by Age

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00041	-0.00024***	-0.00002	-0.00006
	(0.00028)	(0.00009)	(0.00034)	(0.00017)
Young	0.00939***	0.00450***	0.02040***	0.01280***
	(0.00213)	(0.00118)	(0.00350)	(0.00246)
Young × UR Start	-0.00080**	-0.00035*	-0.00163***	-0.00094**
	(0.00036)	(0.00019)	(0.00052)	(0.00035)
Constant	0.00651***	0.00108*	0.00868**	0.00392***
	(0.00159)	(0.00055)	(0.00340)	(0.00135)
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	0.0034	0.0012	0.0063	0.0048
Observations	468921	468921	468921	468921

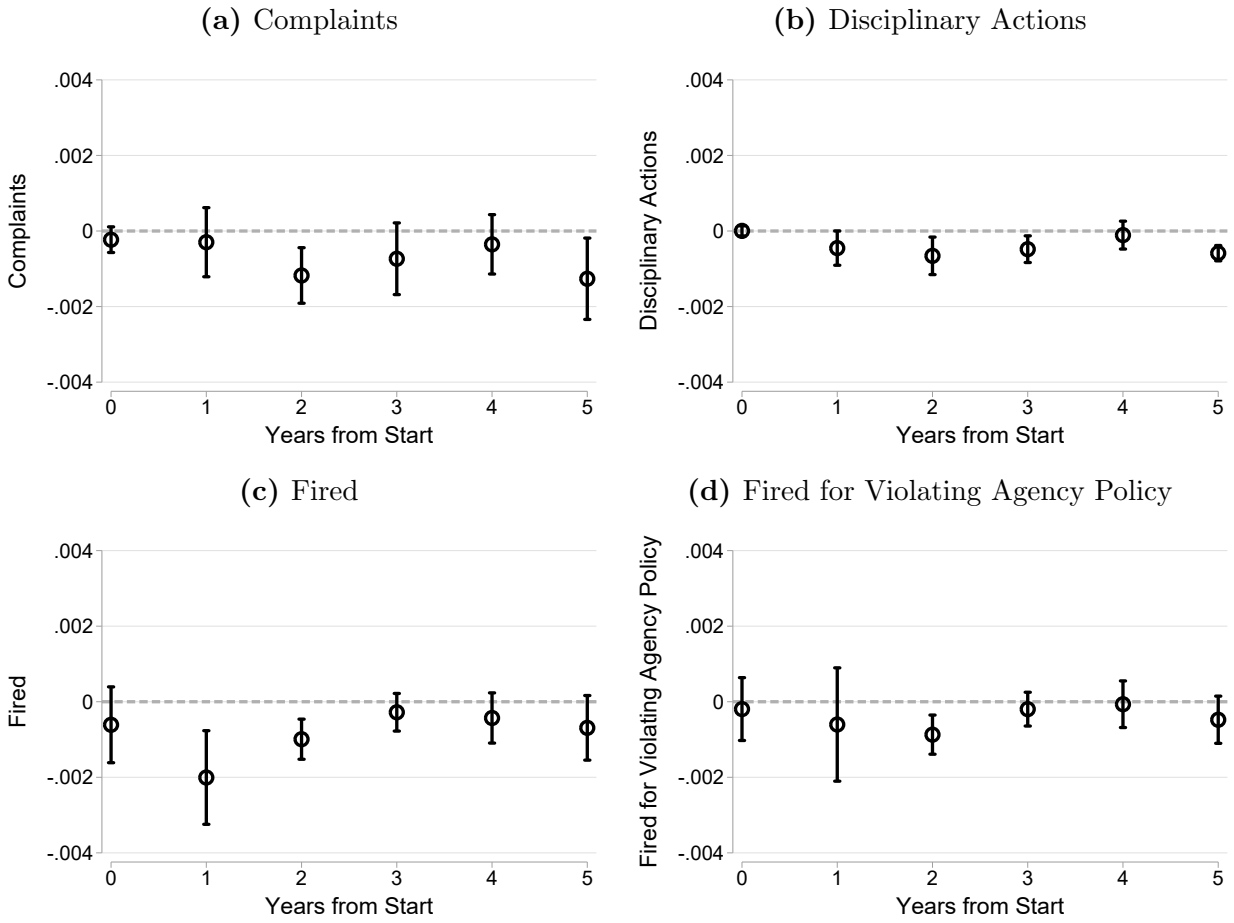
Notes: This table displays results estimated from equation (1) but including a binary variable equal to one if the officer is below 35 upon starting (i.e., young) and equal to zero if not and an interaction between that variable and the starting year unemployment rate. Standard errors clustered at the 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 A2 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: Employment Outcomes by Years since Hire



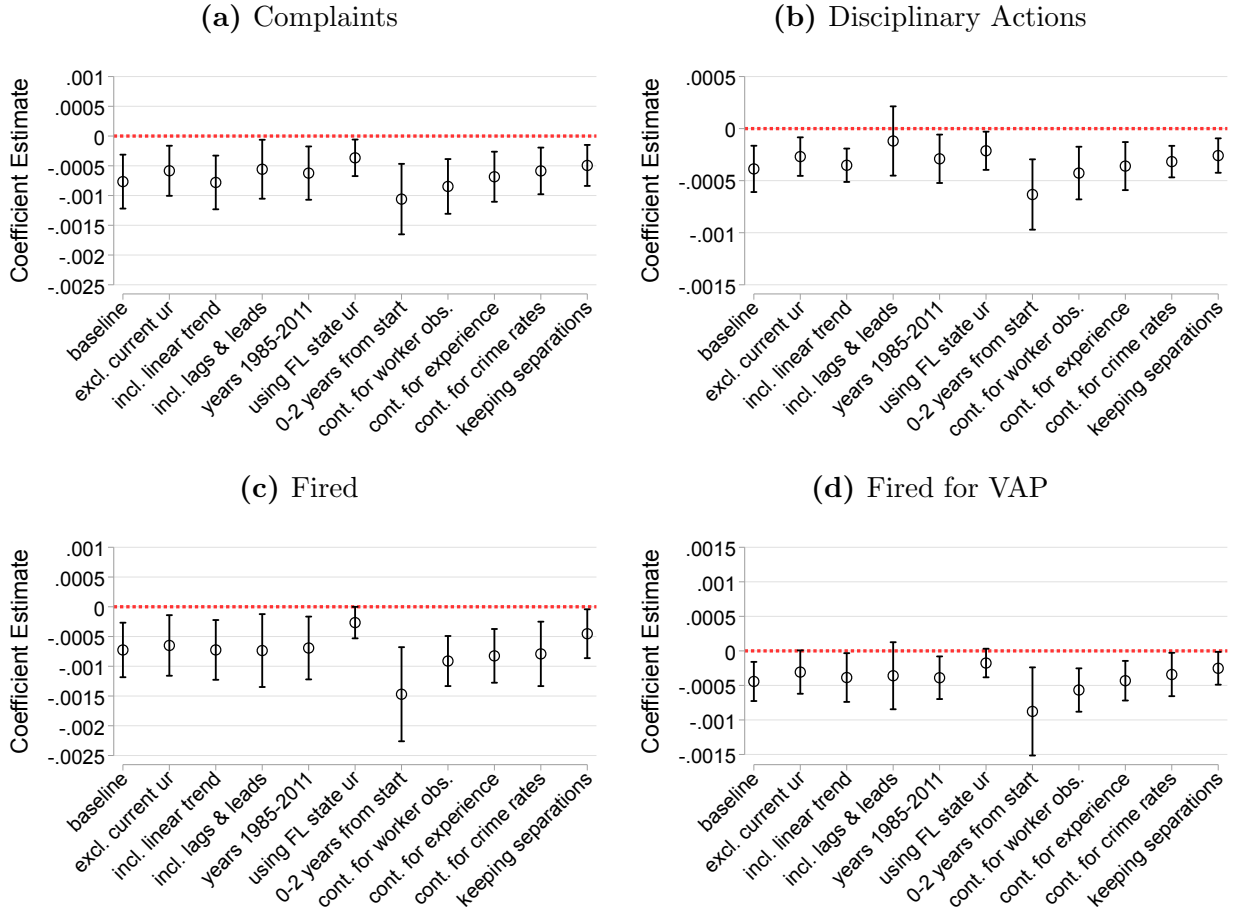
Notes: This figure presents employment outcomes for a cohort of officers younger than 35 at hire who started between 1985 and 1989. We show the share of workers who remained employed 25 years after starting, as well as the proportion who separated voluntarily, were fired for violating agency policies, fired for other reasons, transferred to other agencies or eventually retired.

Figure 2: Starting Year Unemployment Rate and Officer Quality, By Year



Notes: This figure displays coefficients estimated from equation (1) estimated separately for each year since start. 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.

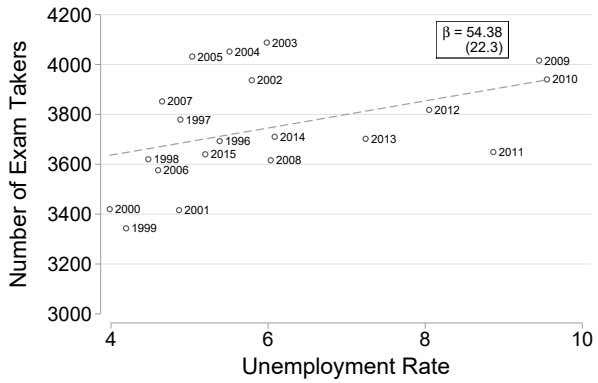
Figure 3: Effect of Starting Year Unemployment Rate on Officer Outcomes, Robustness Tests



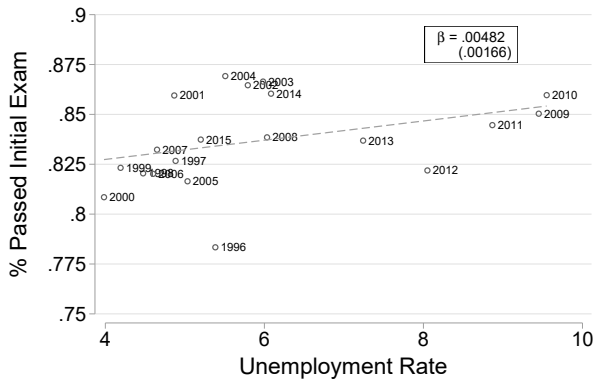
Notes: This figure shows an array of robustness tests that we conducted for our main results. In the following order, it shows: our baseline estimate from Table 2, excluding the current year unemployment rate, including a linear time trends, including leads and lags of the starting year unemployment 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, controlling for their experience as officers, controlling for national current and starting year crime rates (results are robust to using Florida crime rates) 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 4: Florida Law Enforcement: Hires and Entry Exams

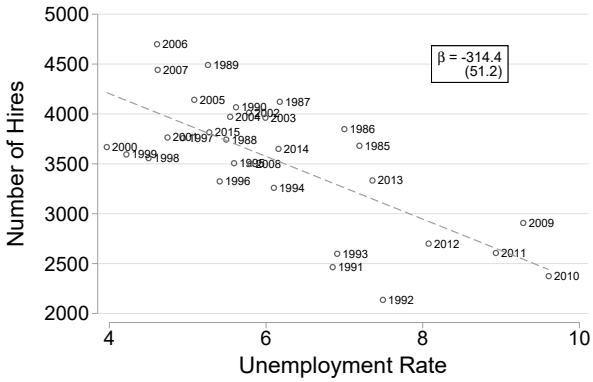
(a) Number of People Taking Exam



(b) Fraction of People Passing Initial Exam

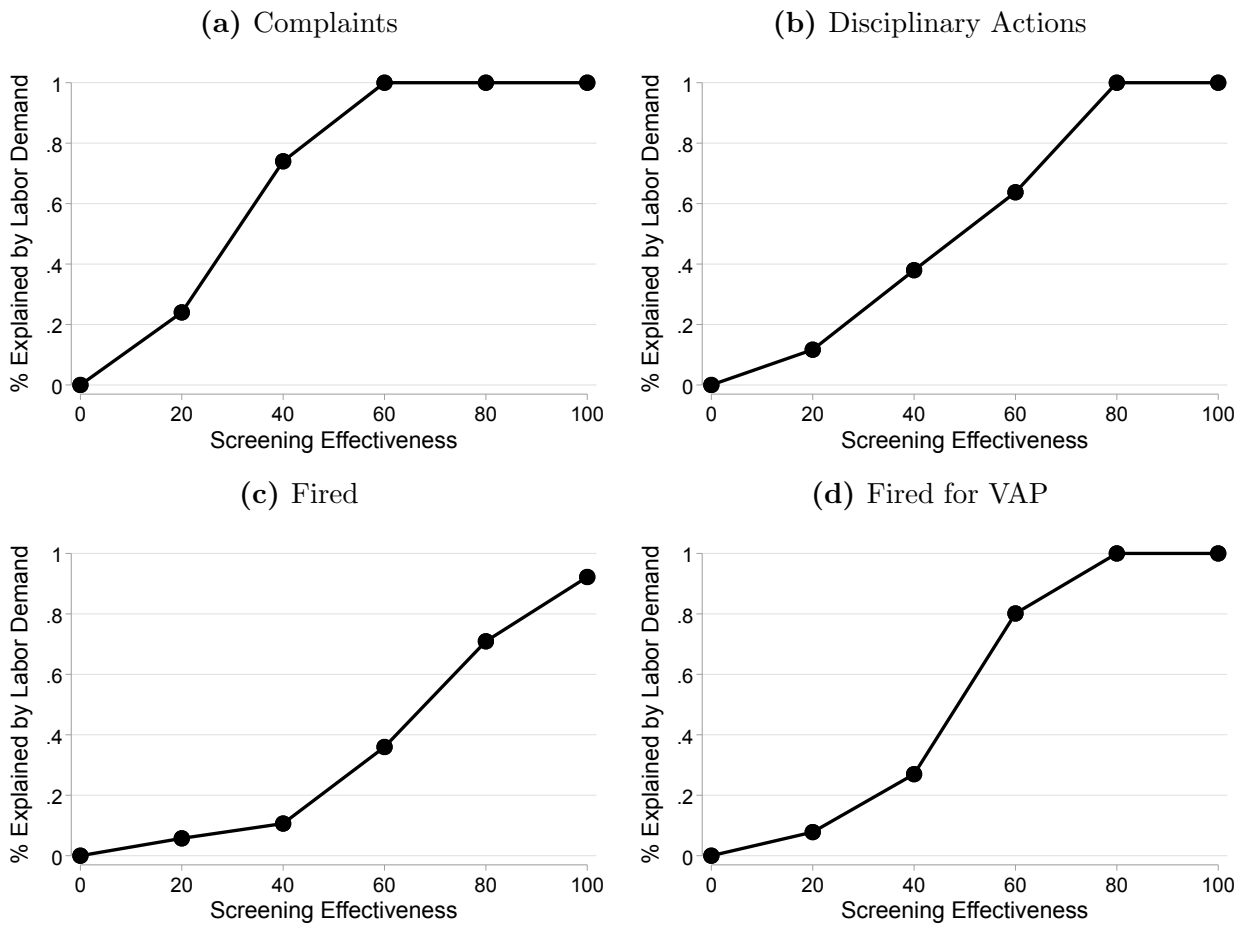


(c) Number of Hires



Notes: The first and second panels use 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 pass their initial attempt in a given year and the unemployment rate in that year. Panel (c) plots the number of full-time police hires per year in Florida and the unemployment rate in each year, suggesting that Florida police agencies exhibit a labor demand response to economic conditions. All panels also display the linear fit, the slope coefficient, and the standard error (clustered at the level of the officer's starting year). Table A12 presents the regression estimates for the test-score results and documents robustness to controlling for population and a linear time trend.

Figure 5: Bounding the Effect of Labor Demand on Police Quality Measures



Notes: This figure plots estimates of the percentage of the main effect explained by the labor demand channel under different assumptions about how effective agencies are at screening applicants. First, we use our estimate of the decrease in hiring caused by a one percentage point increase in the unemployment rate to determine the hiring reduction that would occur if each year had the highest unemployment rate in the sample. Next, we identify all hires who have at least one complaint over their first five years on the force. Then, we drop hires from the sample under different assumptions about how effective agencies are at screening applicants. First, we assume that agency screening is 100% effective. In other words, we assume that agencies can identify 100% of applicants who would go on to have at least one complaint. We drop from that set of officers first and drop the remainder of the hiring reduction at random. Then, we assume that agency screening is 80% effective–that agencies can identify 80% of the 'lower-quality' applicants. We drop from that set of officers first and drop the remainder of the hiring reduction at random. We repeat this exercise for 60%, 40%, 20%, and 0%. Finally, we estimate our main specifications dropping the hires implied by these various assumptions. We take the coefficient estimate from those regressions and divide by the coefficient from our main specifications to determine the percent of the main effect potentially explained by labor demand effects. For example, if the new estimate on complaints is -0.000308, we calculate the share of the main effect explained by labor demand as $\frac{-0.000308+0.00077}{0.00077} = 60\%$. If the percent explained is above 100, we round it down to 100. This exercise assumes that agencies only misclassify applicants in one direction, mistakenly identifying lower-quality officers as higher-quality. On the other hand, if agencies also misclassify some higher-quality officers as lower-quality and exclude them from the hiring pool in high unemployment years, then labor demand would explain a smaller share of the main effects found in this paper.

- SUPPLEMENTARY APPENDIX -
For Online Publication

A Additional Tables and Figures

Table A1: Officer Characteristics at Hire

Panel A. Characteristics of Hired Officers in Florida

	(1)
Age	29.126
Male	0.861
White	0.756
Black	0.100
Hispanic	0.123
Sample Size	100887

Panel B. Occupational Transitions of Police Officers, Current Population Survey

	New Officers	Old Officers
	Previous Occ.	Next Occ.
	(1)	(2)
Public Protective Service	0.159	0.158
Not Employed	0.154	0.145
Private Protective Service	0.098	0.125
Office, Administrative Support	0.106	0.106
Management	0.075	0.078
Business, Financial Operations	0.059	0.069
Sales and Related	0.048	0.041
Transportation and Material Moving	0.037	0.035
Community, Social Service	0.028	0.030
Construction and Extraction	0.034	0.029
Other	0.202	0.184
Sample Size	8672	6424

Notes: The first panel of Table A1 presents the age, race and gender of police officers in the FDLE data when they are first hired. The second panel takes advantage of the longitudinal component of the Current Population Survey between 1980 and 2009 to identify individuals who transition into and out of policing. We define a transition into policing as an individual who started working as a 'Police Officers and Detectives' and had not previously worked in that occupation or as a 'First-Line Supervisor of Police and Detectives.' We follow the same definition for capturing transitions out of policing. In the CPS data, we identify 8,672 individuals who become police officers at some point in the survey, and 6,424 individuals who transition out of policing. The second panel exhibits the ten most common two-digit occupations from which these individuals were previously employed in (column 1) and subsequently employed in (column 2), including those who have an unemployment spell. We split protective service occupations into public and private protective service, where the latter category includes 'Private Detectives and Investigators,' 'Security Guards,' and 'Gaming Surveillance Officers.'

Table A2: Summary Statistics

	Within 5 Years of Hiring	All Years
Complaints	0.009	0.009
	(0.100)	(0.096)
Disciplinary Actions	0.003	0.002
	(0.053)	(0.049)
Fired	0.015	0.011
	(0.122)	(0.103)
Fired for Violating Agency Policy	0.009	0.007
	(0.096)	(0.084)
Voluntary Separation	0.083	0.063
	(0.276)	(0.244)
Unemployment Rate in Starting Year	5.929	5.828
	(1.355)	(1.187)
Unemployment Rate in Current Year	6.019	6.116
	(1.471)	(1.582)
Observations	468,924	941,593

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 A3: Effect of Starting Year Unemployment on Officer Quality, Within-Florida Unemployment Rates

Panel A: Five-Year Window

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00017	-0.00010*	-0.00048***	-0.00044***
	(0.00018)	(0.00005)	(0.00016)	(0.00014)
Constant	0.01072***	0.00315***	0.01811***	0.01158***
	(0.00105)	(0.00030)	(0.00092)	(0.00081)
Agency-Year FE	Yes	Yes	Yes	Yes
Years Since Hire	$\leq$ 5 Years	$\leq$ 5 Years	$\leq$ 5 Years	$\leq$ 5 Years
R^2	0.0163	0.0050	0.0148	0.0155
Observations	382952	382952	382952	382952

Panel B: All Years

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00017**	-0.00009***	-0.00025*	-0.00022***
	(0.00007)	(0.00003)	(0.00012)	(0.00007)
Constant	0.00992***	0.00270***	0.01273***	0.00851***
	(0.00043)	(0.00015)	(0.00068)	(0.00045)
Agency-Year FE	Yes	Yes	Yes	Yes
Years Since Hire	All Years	All Years	All Years	All Years
R^2	0.0132	0.0061	0.0173	0.0144
Observations	706564	706564	706564	706564

Notes: In this table, we take advantage of data on county-level unemployment rates — which we aggregate up to seven sub-state regions, including Fort Myers, Jacksonville, Miami, Orlando, Pensacola, Tallahassee and Tampa Bay — 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:

$$Y_{iat} = \alpha + \gamma\, UR^{S}_{ir} + \theta_{at} + \varepsilon_{iat} \tag{A1}$$

where UR^{S}_{ir} captures the unemployment rate in region r faced by officer i at career start; θ_{at} captures agency-by-year 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 equation (A1) restricting the analysis to the first five years of a officer's employment spell, whereas Panel B includes all years of an 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 A4: Agency-Level Employment Composition and Crime Related Outcomes

Panel A: Agency-Level Crime Rates

	(Log) Crimes			
	(1)	(2)	(3)	(4)
Agency's Mean UR in Starting Year	-0.0662**	-0.0427*	-0.0432*	-0.0627**
	(0.0272)	(0.0252)	(0.0254)	(0.0248)
County Unemployment			0.0095	0.0145**
			(0.0061)	(0.0061)
Year FE	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Agency Characteristics	Yes	Yes	Yes	Yes
Population	No	Yes	Yes	Yes
Local Unemployment	No	No	Yes	Yes
Linear Trend	No	No	No	Yes
R^2	0.9724	0.9740	0.9740	0.9807
Observations	7006	7006	7006	7006

Panel B: Agency-Level Crime Clearance Rates

	Agency Crime Clearance Rates			
	(1)	(2)	(3)	(4)
Agency's Mean UR in Starting Year	0.0360*	0.0329*	0.0326*	0.0368*
	(0.0199)	(0.0181)	(0.0180)	(0.0193)
County Unemployment			0.0064	0.0084*
			(0.0044)	(0.0050)
Year FE	Yes	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes	Yes
Agency Characteristics	Yes	Yes	Yes	Yes
Population	No	Yes	Yes	Yes
Local Unemployment	No	No	Yes	Yes
Linear Trend	No	No	No	Yes
R^2	0.1491	0.1497	0.1498	0.1786
Observations	6850	6850	6850	6850

Notes: This table presents evidence on the relationship between agencies' employment composition and their crime and clearance rates. We match agency-level annual outcomes from the Unified Crime Report (UCR) in 1985-2015, covering information on the number of crimes committed in the area assigned to each agency and the number of cases cleared. We relate these outcomes to agency-level characteristics in the following specification:

$$Y_{at} = \alpha + \gamma UR^S_{at} + X_{at} + X_{ct} + \lambda_t + \theta_a + e_{at} \tag{A2}$$

where Y_{at} captures one of the crime-related outcomes described above. UR^S_{at} represents the average unemployment rate at career start among all officers employed in agency a in year t. X_{at} captures agency-level characteristics, including the agencies' race, gender and age composition as well as the number of officers employed in a particular year. X_{ct} includes county-level time-varying characteristics, including county-level unemployment and its population. Panel A uses log crimes as the outcome variable of interest. Panel B uses the annual agency-level crime clearance rate as the outcome of interest, defined as the number of clearances divided by the number of crimes in that year. In each panel, the first column, controls for agency and year fixed effects, as well as for average agency-characteristics. Subsequent columns add population, local unemployment and a linear trend as controls. Standard errors are clustered at the agency level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table A5: Effect of Starting Year Unemployment on Officer Quality, Monthly Unemployment

Panel A. Concurrent Unemployment at Start

	Complaints	Disciplinary Actions	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Month	-0.00004**	-0.00002**	-0.00007***	-0.00004***
	(0.00002)	(0.00001)	(0.00002)	(0.00001)
Constant	0.0006***	0.0001***	0.0017***	0.0010***
	(0.0001)	(0.0000)	(0.0003)	(0.0001)
Observations	4508353	4508353	4508353	4508353
R^2	0.0003	0.0001	0.0005	0.0004

Panel B. Lagged Unemployment at Start (6- and 12-Months)

	Complaints	Disciplinary Actions	Fired	Fired for VAP	Complaints	Disciplinary Actions	Fired	Fired for VAP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged UN Rate	-0.00006**	-0.00002***	-0.00007**	-0.00004**	-0.00007***	-0.00002***	-0.00006**	-0.00003*
	(0.00002)	(0.00001)	(0.00002)	(0.00001)	(0.00002)	(0.00001)	(0.00003)	(0.00002)
Constant	0.0007***	0.0002***	0.0017***	0.0010***	0.0008***	0.0002***	0.0017***	0.0010***
	(0.0001)	(0.0000)	(0.0003)	(0.0001)	(0.0001)	(0.0000)	(0.0003)	(0.0001)
UR Start Lag	6 Months				12 Months			
Observations	4508353	4508353	4508353	4508353	4508353	4508353	4508353	4508353
R^2	0.0003	0.0001	0.0005	0.0004	0.0003	0.0001	0.0005	0.0004

Notes: Table A5 presents results from equation (1) using monthly unemployment rates and month-level outcomes for each officer. The first panel presents estimates of the relationship between the unemployment rate in the officer's starting month and the prevalence of the four quality measures considered in the paper (see notes for Table 2). The second panel examines the relationship between lagged unemployment rates at start and month-level outcomes. The first four columns present evidence using a six-month lag in the initial unemployment rate. The last four columns present evidence using a twelve-month lag in the initial unemployment rate. 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 on Officer Quality, Wild Cluster Bootstrap

	Complaints	Disciplinary Actions	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00077***	-0.00039***	-0.00073**	-0.00044**
	(0.00027)	(0.00013)	(0.00027)	(0.00017)
Constant	0.0109***	0.0031***	0.0181***	0.0097***
	(0.0015)	(0.0006)	(0.0025)	(0.0016)
Wild Cluster Bootstrap 95% CI	[-0.0013,-0.0002]	[-0.0007,-0.0001]	[-0.0013,-0.0002]	[-0.0008,-0.0001]
Wild Cluster Bootstrap P-Value	0.015	0.004	0.004	0.007
Observations	468,924	468,924	468,924	468,924
R^2	0.0028	0.0007	0.0043	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 A7: Effect of Starting Year Unemployment on Officer Quality by Age

Panel A: Linear Age Interaction

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00229***	-0.00117**	-0.00413***	-0.00233***
	(0.00082)	(0.00047)	(0.00099)	(0.00073)
Age at Start	-0.00053***	-0.00027***	-0.00123***	-0.00075***
	(0.00011)	(0.00006)	(0.00016)	(0.00011)
Age × UR Start	0.00004**	0.00002**	0.00009***	0.00005***
	(0.00002)	(0.00001)	(0.00002)	(0.00002)
Constant	0.03036***	0.01299***	0.06345***	0.03753***
	(0.00491)	(0.00267)	(0.00609)	(0.00545)
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	467447	467447	467447	467447

Panel B: Young (Age 30) Interaction

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00064**	-0.00033***	-0.00040	-0.00031**
	(0.00025)	(0.00009)	(0.00025)	(0.00014)
Young	0.00888***	0.00489***	0.02514***	0.01490***
	(0.00263)	(0.00153)	(0.00381)	(0.00308)
Young × UR Start	-0.00072*	-0.00038	-0.00197***	-0.00105**
	(0.00042)	(0.00023)	(0.00056)	(0.00043)
Constant	0.00880***	0.00201***	0.01224***	0.00640***
	(0.00153)	(0.00048)	(0.00267)	(0.00126)
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	0.0068	0.0051
Observations	468921	468921	468921	468921

Notes: See notes for Table 4. In Panel A, 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. In Panel B, we include a binary variable that equals one if the officer is below 30 upon starting (i.e. young) and equal to zero if not, and an interaction between that variable and the unemployment rate. Standard errors are clustered at the officer's starting year level in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Table A8: Effect of Starting Year Unemployment on Officer Quality by Race and Gender

Panel A: Heterogeneity by Race

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00071**	-0.00040	-0.00080**	-0.00017
	(0.00032)	(0.00025)	(0.00033)	(0.00030)
White	-0.00375***	-0.00182	-0.00923***	-0.00159
	(0.00128)	(0.00125)	(0.00209)	(0.00192)
White × UR Start	-0.00008	0.00002	0.00009	-0.00038
	(0.00019)	(0.00019)	(0.00034)	(0.00031)
Constant	0.01387***	0.00456***	0.02530***	0.01110***
	(0.00212)	(0.00130)	(0.00268)	(0.00252)
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	0.0031	0.0008	0.0051	0.0037
Observations	468921	468921	468921	468921

Panel B: Heterogeneity by Gender

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00068**	-0.00019	-0.00079*	-0.00026
	(0.00027)	(0.00011)	(0.00046)	(0.00031)
Male	0.00385*	0.00309***	-0.00150	0.00297
	(0.00195)	(0.00080)	(0.00306)	(0.00217)
Male × UR Start	-0.00011	-0.00023*	0.00008	-0.00022
	(0.00033)	(0.00013)	(0.00044)	(0.00034)
Constant	0.00761***	0.00050	0.01935***	0.00719***
	(0.00180)	(0.00067)	(0.00324)	(0.00208)
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	0.0043	0.0034
Observations	468921	468921	468921	468921

Notes: See notes for Table 4. 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 A9: Effect of Starting Year Unemployment Rate on Hired Officer Demographics

	White	Black	Hispanic	Male	Age	White	Black	Hispanic	Male	Age
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment Rate in Starting Year	0.00065	-0.00062	-0.00067	0.00020	-0.17782	-0.00232	-0.00006	0.00174	-0.00016	-0.20931*
	(0.00642)	(0.00126)	(0.00473)	(0.00124)	(0.10704)	(0.00606)	(0.00109)	(0.00461)	(0.00126)	(0.12114)
Constant	0.73779***	0.10717***	0.13901***	0.85535***	36.11348***	0.75538***	0.10384***	0.12473***	0.85746***	36.30045***
	(0.03814)	(0.00733)	(0.02794)	(0.00767)	(0.67098)	(0.03640)	(0.00624)	(0.02727)	(0.00783)	(0.75175)
Agency FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
R^2	0.0000	0.0000	0.0000	0.0000	0.0006	0.1975	0.0694	0.1880	0.0122	0.0900
Observations	103971	103971	103971	103971	103664	103971	103971	103971	103971	103664

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 economic 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 A10: Unemployment Rate and Starting Salaries in Policing

	Log Starting Wages		
	(1)	(2)	(3)
County-Level Unemployment	0.0036	0.0064	0.0008
	(0.0040)	(0.0054)	(0.0048)
Constant	10.7041***	10.7281***	10.6818***
	(0.0241)	(0.0323)	(0.0296)
Agencies	All	Police Dept.	Sheriff's Office
Year FE	Yes	Yes	Yes
Agency FE	Yes	Yes	Yes
R^2	0.8787	0.8202	0.9461
Observations	2741	2155	586

Notes: we use Florida Criminal Justice Agency Profile (CJAP) data in 2011-2019 to examine how posted entry salaries in police agencies and sheriff's offices vary across the business cycle. We estimate the following specification: $W_{at}^S = \alpha + \beta UR_{ct} + \lambda_t + \theta_a + v_{at}$, where W_{at}^S denotes either a police agency or sheriff's office posted entry salary in a given year over the period 2011-2019. We cluster standard errors at the county-year level, presented in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Table A11: Business Cycle and Industry-Level Employment

	Private	Construction	Manufacturing	Retail Trade	Transportation	Professional	Local Govt.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Unemployment Rate	-0.021***	-0.053***	-0.039***	-0.017***	-0.030***	-0.028***	-0.001
	(0.003)	(0.008)	(0.003)	(0.003)	(0.003)	(0.007)	(0.004)
Constant	11.344***	8.718***	10.286***	9.463***	8.077***	9.062***	8.340***
	(0.021)	(0.054)	(0.025)	(0.021)	(0.024)	(0.049)	(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 use Bureau of Labor Statistics data on industry-level annual employment outcomes to assess the cyclicality of employment across different sectors in the following specification: $E_{st} = \alpha + \gamma\, UR_t + t + \varepsilon_{st}$ 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 A12: Unemployment Rate and Test-Taking Outcomes

	Number of Test-Takers	Share of Passed Exams	Number of Passed Exams
	(1)	(2)	(3)
Unemployment Rate	74.7766***	0.0039*	77.5760***
	(20.4729)	(0.0021)	(21.3456)
Constant	-1710.2731	0.5075**	-2685.0714
	(2077.3611)	(0.2382)	(2106.9923)
FL Population	Yes	Yes	Yes
Linear Time Trend	Yes	Yes	Yes
R^2	0.2703	0.0960	0.3129
Observations	20	20	20

Notes: This table uses data from Florida police entry exams, taken after the applicant completes basic recruit training. These data are available from 1996-2015. The first column examines the number of annual test-takers as the outcome of interest. The second column presents evidence on the share of passed exams. The last column analyzed the total number of passed exams in each year. All specifications include the Florida population as a control variable and a linear time trend as a control. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Table A13: Passing the SOCE Exam on the First Try and Subsequent Outcomes

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Pass Exam on First Try	-0.00515***	-0.00160***	-0.00922***	-0.00405***
	(0.00097)	(0.00036)	(0.00152)	(0.00075)
Constant	0.01112***	0.00282***	0.02237***	0.01052***
	(0.00207)	(0.00066)	(0.00284)	(0.00155)
Baseline for Officers who Fail First Exam	0.0145	0.0039	0.0240	0.0129
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	0.0026	0.0008	0.0055	0.0037
Observations	253742	253742	253742	253742

Notes: This table uses data from Florida police entry exams, taken after the applicant completes basic recruit training and examines the relationship between passing the SOCE exam on the first try and the likelihood that officers received complaints, disciplines, were fired or fired for violating agency policy. We restrict the sample to officers hired in 1996-2015, to match data availability for the test score data. We estimate a version of equation (1) that includes whether the officer passed the SOCE exam on the first try as the main explanatory variable. Results are robust to also including the initial unemployment rate as a control. We include the basline prevalence of the four outcomes for officers who did not pass the SOCE exam on their first try. Standard errors are clustered at the officer's starting year level in parentheses in all three specifications. * p<0.1, ** p<0.05, *** p<0.01.

Table A14: Unemployment Rate and Test-Taker Demographics

	White	Black	Hispanic	Male	Under 35
	(1)	(2)	(3)	(4)	(5)
Unemployment Rate	0.0112***	-0.0047***	-0.0062***	0.0041***	-0.0077***
	(0.0018)	(0.0010)	(0.0013)	(0.0013)	(0.0020)
Constant	0.8879***	0.1029	0.1525	0.9958***	1.6936***
	(0.1665)	(0.1132)	(0.0991)	(0.1109)	(0.2123)
Baseline Share	0.6841	0.1179	0.1671	0.8328	0.7504
FL Population	Yes	Yes	Yes	Yes	Yes
Linear Time Trend	Yes	Yes	Yes	Yes	Yes
R^2	0.9126	0.3372	0.9557	0.4496	0.5432
Observations	20	20	20	20	20

Notes: This table uses data from Florida police entry exams, taken after the applicant completes basic recruit training. These data are available from 1996-2015. The first three columns examine how the proportion of applicants who are White, Black and Hispanic, respectively varies with the unemployment rate in the year of the test. The fourth column examines the relationship between the unemployment rate and the proportion of male applicants. The last column presents corresponding evidence on the share of young test-takers (under 35 years old). All specifications include the Florida population as a control variable and a linear time trend as a control. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Table A15: Effect of Starting Year Unemployment Rate on Officer Quality, Statewide Agencies

	Complaints	Disciplinary Actions	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00002	-0.00033*	-0.00065*	-0.00038*
	(0.00053)	(0.00017)	(0.00038)	(0.00019)
Constant	-0.0019	0.0006	0.0123***	0.0038**
	(0.0030)	(0.0009)	(0.0040)	(0.0015)
Observations	45,401	45,401	45,401	45,401
R^2	0.0027	-0.0004	0.0027	0.0002

Notes: See Table 2 notes for a description of the outcome variables. This table estimates equation (1) restricting the sample to officers employed in the statewide agencies. Statewide agencies include state attorney's offices, courts of appeal, Department of Agriculture, Department Of Business Professional Regulation, Department Of Financial Services, Department Of Highway Safety And Motor Vehicles, Department Of Lottery, Department Of Environmental Protection, Fish And Wildlife Conservation Commission, the Office Of Inspector General, Department Of Management Services, and the Department of Financial Services. Hiring in these agencies is not as responsive to business cycle conditions (Figure A7). We still find that officers hired in high unemployment years are significantly less likely to face disciplinary actions, to be fired and to be fired for violating agency policy. Standard errors are clustered at the officer's starting year level in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Table A16: Effect of Starting Year Unemployment on Officer Complaint Types

	All Complaints	Violent	Drug-Related	Other
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00077***	-0.00026***	-0.00004**	-0.00045**
	(0.00027)	(0.00008)	(0.00002)	(0.00021)
Constant	0.01089***	0.00344***	0.00056***	0.00689***
	(0.00154)	(0.00057)	(0.00014)	(0.00114)
Baseline Prevalence	0.0094	0.0025	0.0004	0.0065
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	0.0028	0.0009	0.0001	0.0023
Observations	468921	468921	468921	468921

Notes: This table estimates the equation (1) using different complaint types as the outcome variable. The first column replicates the result presented in the first column of Table 2. The second column analyzes the prevalence of violent complaints, which are due to arson, assault, homicide, kidnapping, robbery and/or sex offenses. The third column examines drug-related complaints, which include those due to selling, possessing, smuggling, trafficking, or distributing drugs such as hallucinogens, heroin, cocaine, and marijuana, among others. Lastly, the 'Other' complaints comprise misconduct events due to bribery, burglary, commercialized sexual offenses, damage property, family offenses, forgery, fraud, invasion of privacy, larceny, obscenity, obstructing the judiciary, Congress, legislature or the police, violating public peace, sexual assault, smuggling, stealing property, traffic offenses, and weapon offenses. Standard errors are clustered at the officer's starting year level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table A17: Effect of Starting Year Unemployment on Job Training Participation

	Training Courses		Hours Trained	
	Advanced	Specialized	Advanced	Specialized
	(1)	(2)	(3)	(4)
Unemployment Rate	-0.0012	-0.0023	-0.0845	-0.0062
	(0.0031)	(0.0026)	(0.1436)	(0.0497)
Constant	0.3682***	0.0295	16.5538***	0.2983
	(0.0366)	(0.0232)	(1.6536)	(0.3755)
Observations	468921	468921	468921	468921

Notes: This table displays results estimated from equation (1) on officers' job training participation. The first two columns present the number of courses that officers participated in and passed in each year. The last two columns show the number of hours of job training participation in each year, where the number of hours are given by the minimum number of hours required for each course. Advanced courses include 117 different courses, including courses in radar speed measurement, interviews and interrogations, narcotics and dangerous drugs investigation, line supervision, stress management techniques, and advanced report writing and review, among others. Specialized courses include breath test operator courses, general instructor refresher course, laser speed measuring device courses and defensive tactics and firearms instruction, among others. Standard errors clustered at the level of officer's starting year in parentheses. Each observation corresponds to an officer-by-year employment record. * p<0.1, ** p<0.05, *** p<0.01

Table A18: Effect of Starting Year Unemployment on Agency Characteristics

	Complaints	Disciplines	Fired	Fired for VAP
	(1)	(2)	(3)	(4)
Unemployment Rate in Starting Year	-0.00007	-0.00001	-0.00003	-0.00003
	(0.00005)	(0.00001)	(0.00009)	(0.00005)
Constant	0.00152***	0.00049***	0.00253***	0.00192***
	(0.00030)	(0.00008)	(0.00052)	(0.00029)
R^2	0.0002	0.0000	0.0000	0.0000
Observations	106134	106134	106134	106134

Notes: This table displays the relationship between new officers' unemployment rate at hire and the average characteristics of the agency they entered, where agencies are represented by their (residualized) incumbent officers' complaints, disciplines, proportion fired and proportion fired for violating agency policy across the four columns. The residualized characteristics are computed as follows. First, for each agency-year in our data, we first compute the average values of each of these characteristics only for incumbent officers. We then residualize these averages by regressing each characteristic against a sub-state region fixed effect and incumbent-officer-level characteristics, including their age, race and gender. We then relate the residualized characteristics to the national-level unemployment rate for new officers. Standard errors are clustered at the level of the officer's starting year in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Table A19: Relationship between Unemployment Rate and Recruit Screening, LEMAS

Panel A. Agency Screening Policies

	Credit Check	Personality Test	Polygraph	Psych. Eval.	Written Test	Problem Solving Test	Diversity Assessment	Physical Test	Sum of Screens
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unemployment Rate	0.03300***	0.00798	-0.00469	0.01606*	0.01303	0.02373**	0.01600*	0.02512***	0.12478**
	(0.01078)	(0.01930)	(0.00917)	(0.00884)	(0.01499)	(0.01037)	(0.00818)	(0.00745)	(0.05353)
Constant	0.4604***	0.2830**	0.4133***	0.6562***	0.4911***	0.1700***	0.0461	0.4560***	3.0017***
	(0.0636)	(0.1117)	(0.0525)	(0.0529)	(0.0871)	(0.0593)	(0.0493)	(0.0447)	(0.3096)
Observations	8,441	8,452	8,427	8,449	8,454	8,440	8,452	8,460	8,518
R^2	0.1369	0.1679	0.2958	0.1887	0.0912	0.0397	0.0276	0.1683	0.1753

Panel B. Agency Requirements and Spending

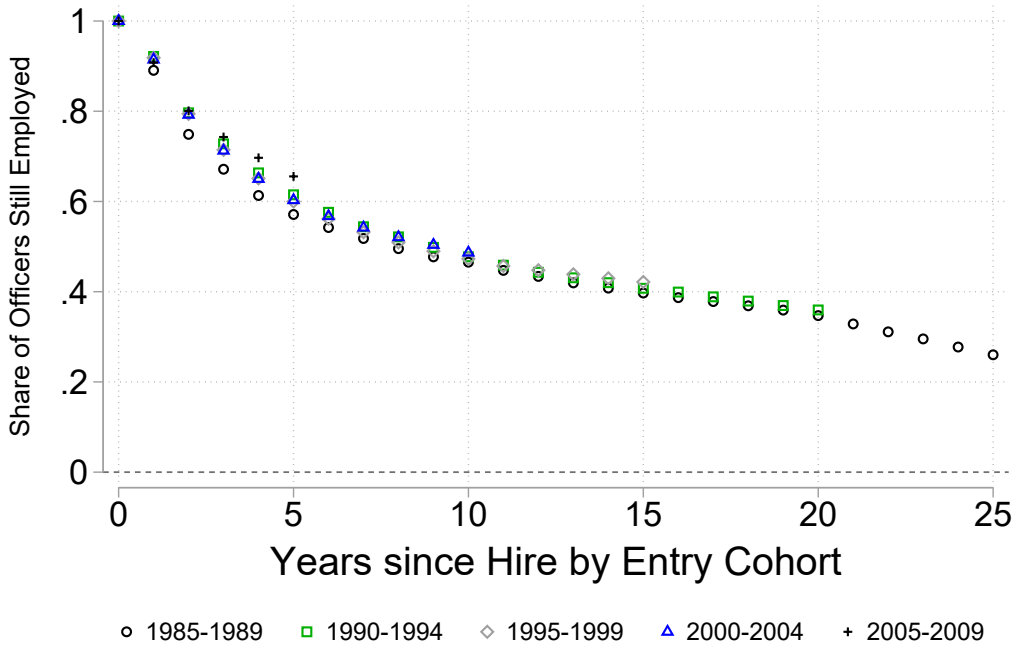
	Education Requirements		Training Requirements		(Log) Agency Spending		
	Some College	BA	Class	Field	Salaries	Operations	Equipment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Unemployment Rate	0.0053	0.0005	-9.5863	4.5573	-0.0032	0.0270	0.0045
	(0.0071)	(0.0011)	(6.7777)	(4.2092)	(0.0229)	(0.0315)	(0.0290)
Constant	0.1266***	0.0090	487.4624***	182.1689***	13.2369***	11.3279***	10.7631***
	(0.0381)	(0.0057)	(37.4108)	(23.3900)	(0.1197)	(0.1822)	(0.1606)
Observations	23337	23337	19940	19933	8867	8549	7816

Notes: In this table, we use data on new recruit screening from the Law Enforcement Management and Administrative Statistics (LEMAS) survey. In particular, we estimate the relationship between state unemployment rates and the use of these screening techniques by agencies, controlling for state and year fixed effects. We estimate the following equation:

$$Screening_{st} = \alpha + \gamma\, UR_{st} + Y_t + Z_s + \varepsilon_{st} \tag{A3}$$

The first panel focuses on the eight screening mechanisms in LEMAS that are used by over 20% of agencies and under 80% of agencies. This information is consistently reported in the 2003, 2007, and 2016 survey waves. In column (9), we find that when the unemployment rate is higher, agencies adopt more of these screening mechanisms. The second panel presents evidence for agencies' educational requirements (first two columns), job training requirements (columns 3-4) and their log spending on different items (columns 5-7). In the second panel, we use LEMAS survey waves that include information on each relevant item. The education requirement information is included in the 1990, 1993, 1997, 2000, 2003, 2007, 2013 and 2016 waves. Job training requirements are available in 1990, 1993, 1997, 2000, 2003, 2007 and 2016. Expenditure on various categories is available in 1990, 1993 and 1997. Standard errors are clustered at the state level in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Figure A1: Proportion Employed by Years since Hire

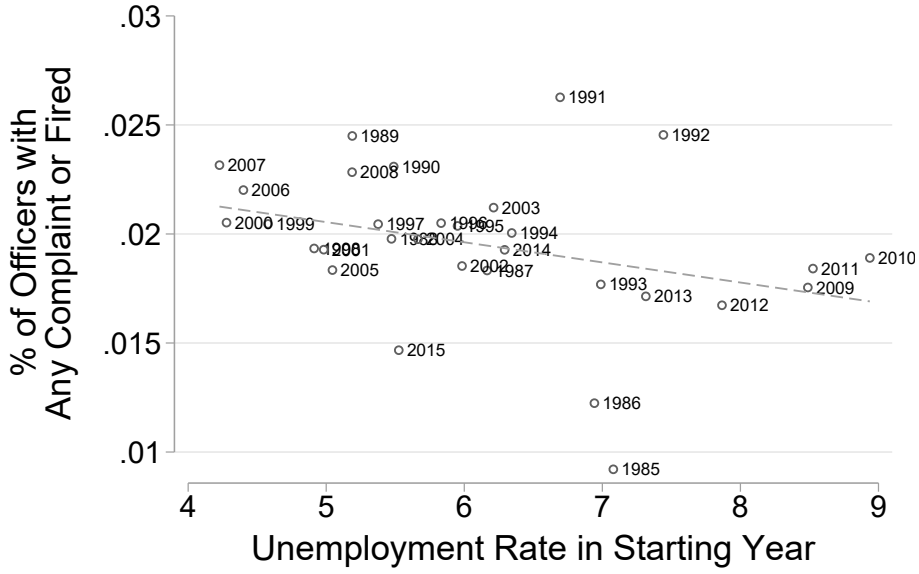


Notes: This figure shows the share of officers who remained employed in each year since their initial hire. We present evidence for five different cohorts of entrants, encompassing those who entered in 1985-1989, 1990-1994, 1995-1999, 2000-2004 and 2005-2009.

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

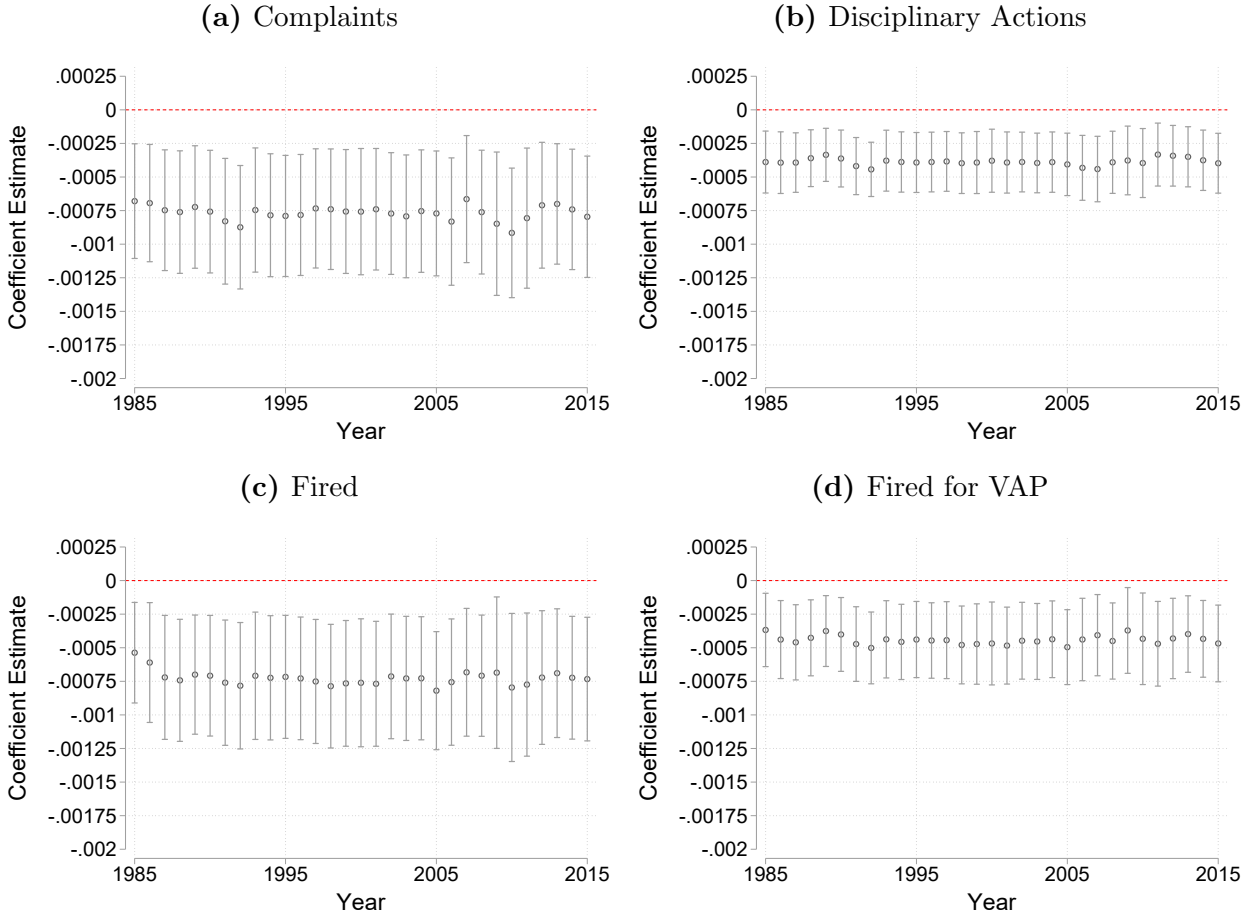
(a) Line Plot of Comovement

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



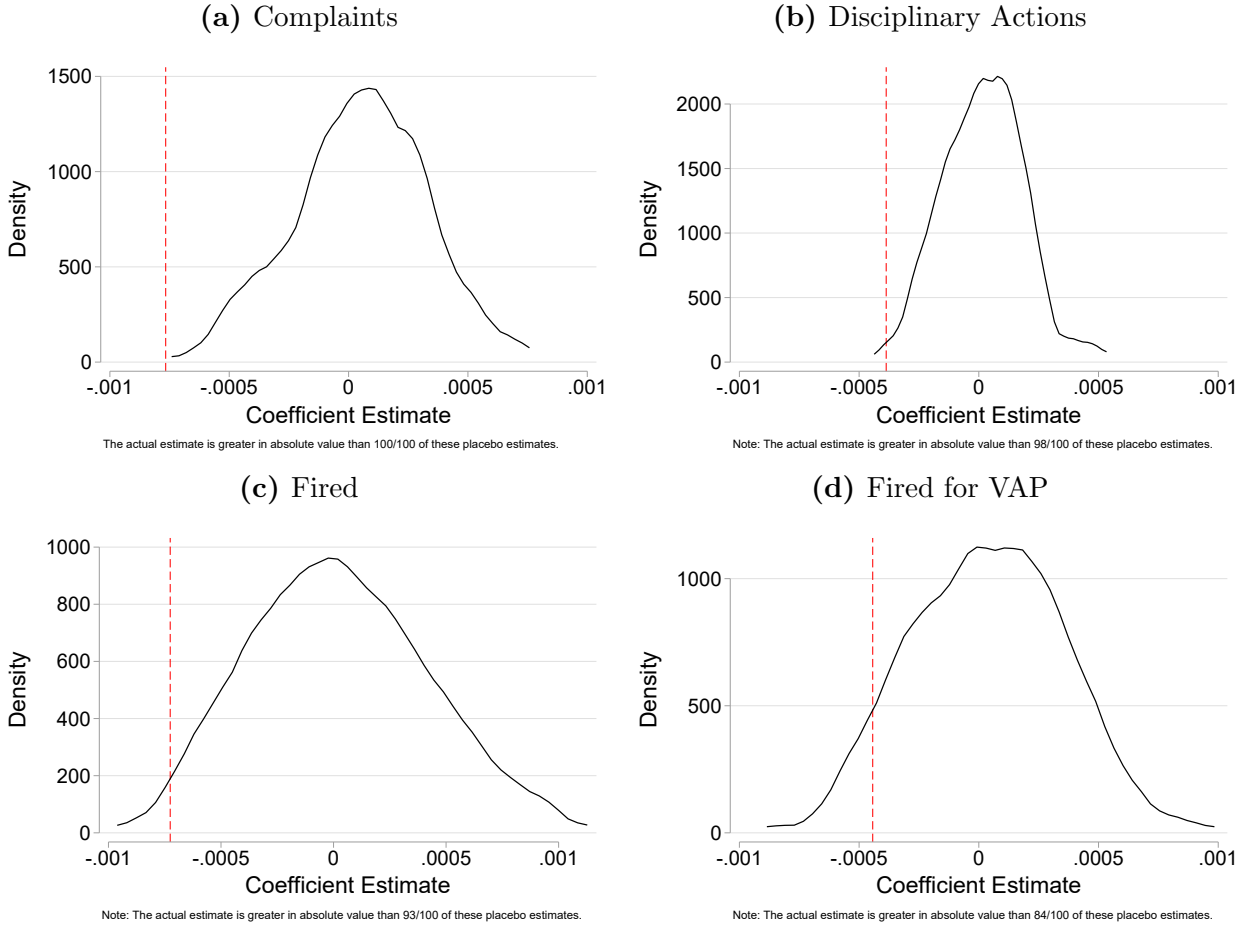
Notes: Panel (a) and panel (b) plot the relationship between a summary measure of officer quality and unemployment rate, after residualizing both using current year unemployment and agency fixed effects. Panel (a) shows how these two variable move with each other over time. Panel (b) plots the two against each other and overlays a linear fit. At the starting year level, unemployment rate in starting year explains 11.6% of the residual variation in likelihood an officer receives a complaint or is fired in their first five years.

Figure A3: Effect of Starting Year Unemployment Rate on Officer Outcomes, Dropping One Entry Cohort



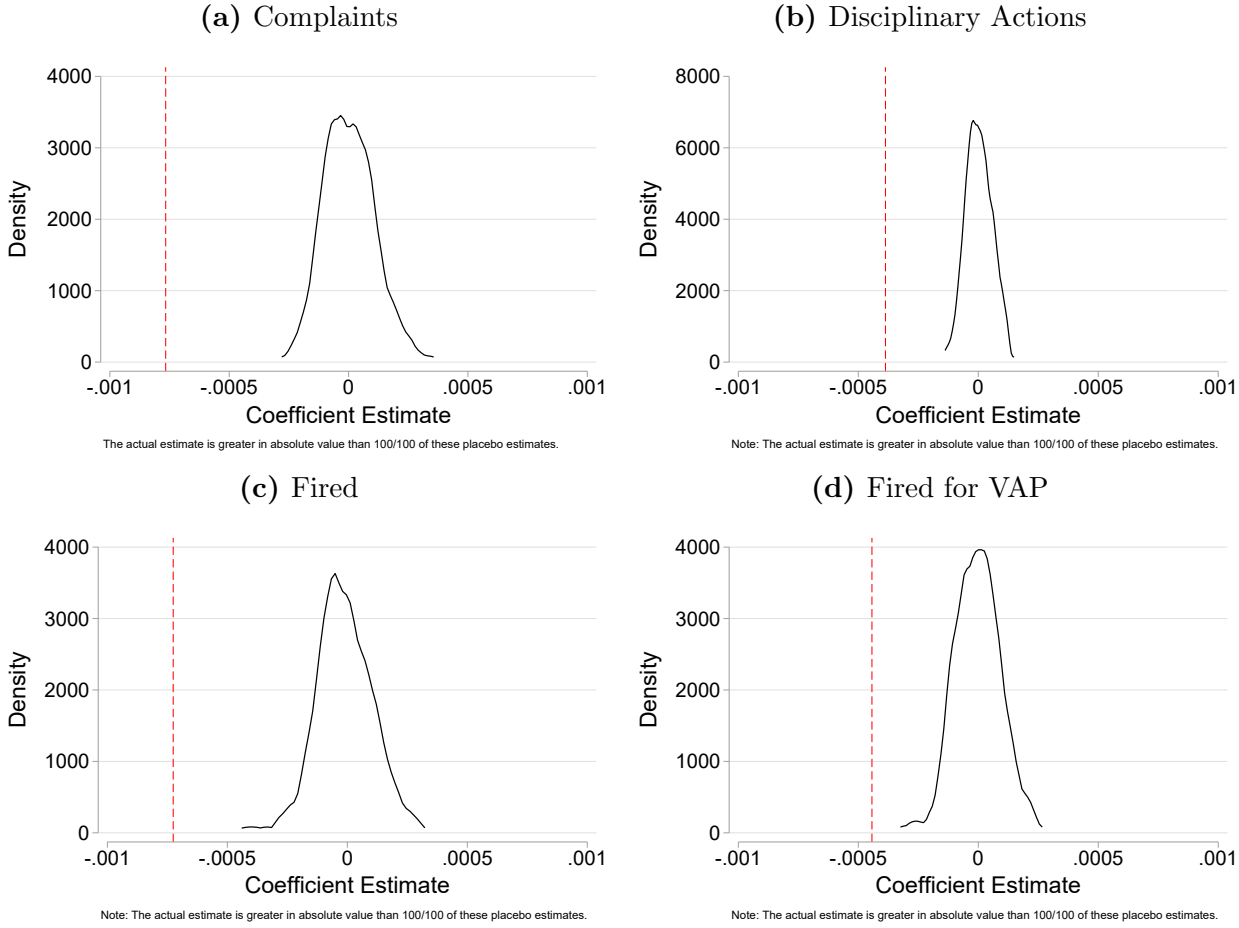
Notes: This figure shows the robustness of our main estimates to dropping a specific entry cohort. The years presented in the X-axis denote the specific cohort dropped in each robustness test. See Table 2 notes for a description of the outcome variables.

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.

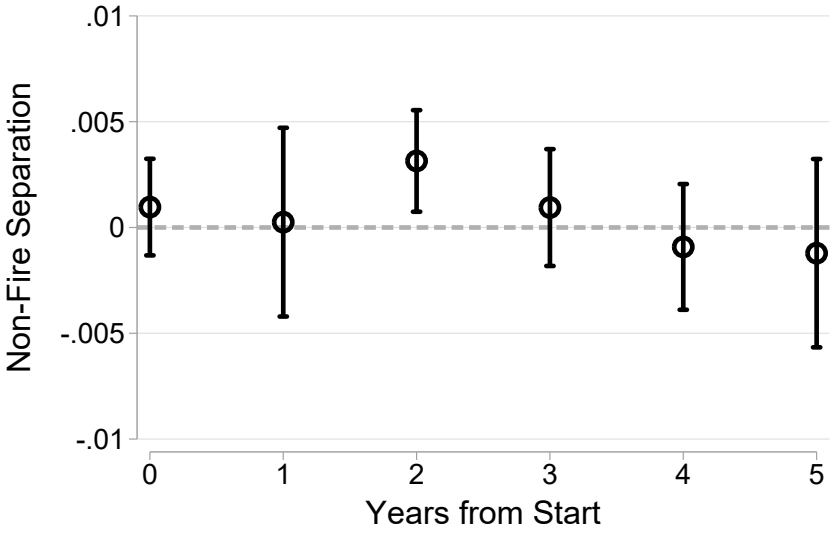
Figure A5: Placebo Estimates from Randomizing Starting Year for each Individual



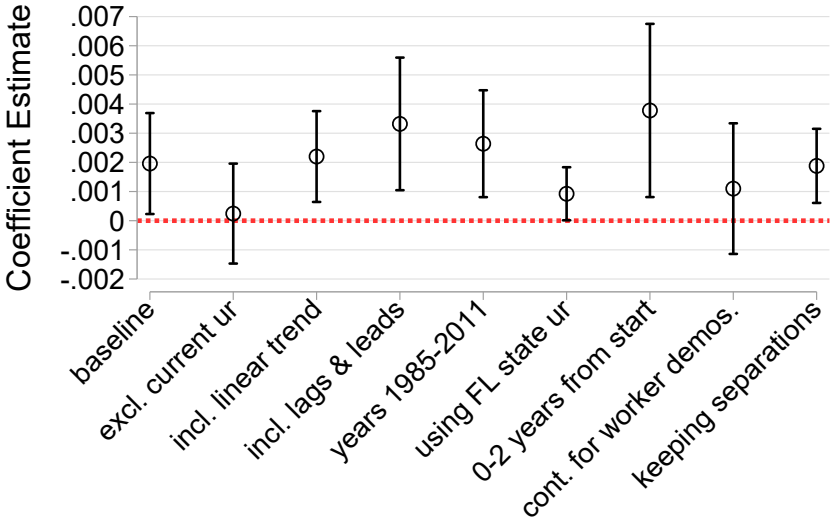
Notes: We randomly assign starting years to individual officers and re-estimate our main results over 100 replications. In this figure, we plot those placebo estimates for our four main outcomes. The actual estimate in each case is marked by the dashed red line. See Table 2 notes for a description of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

Figure A6: Effect of Starting Year Unemployment Rate on Officer Separations

(a) Main Results

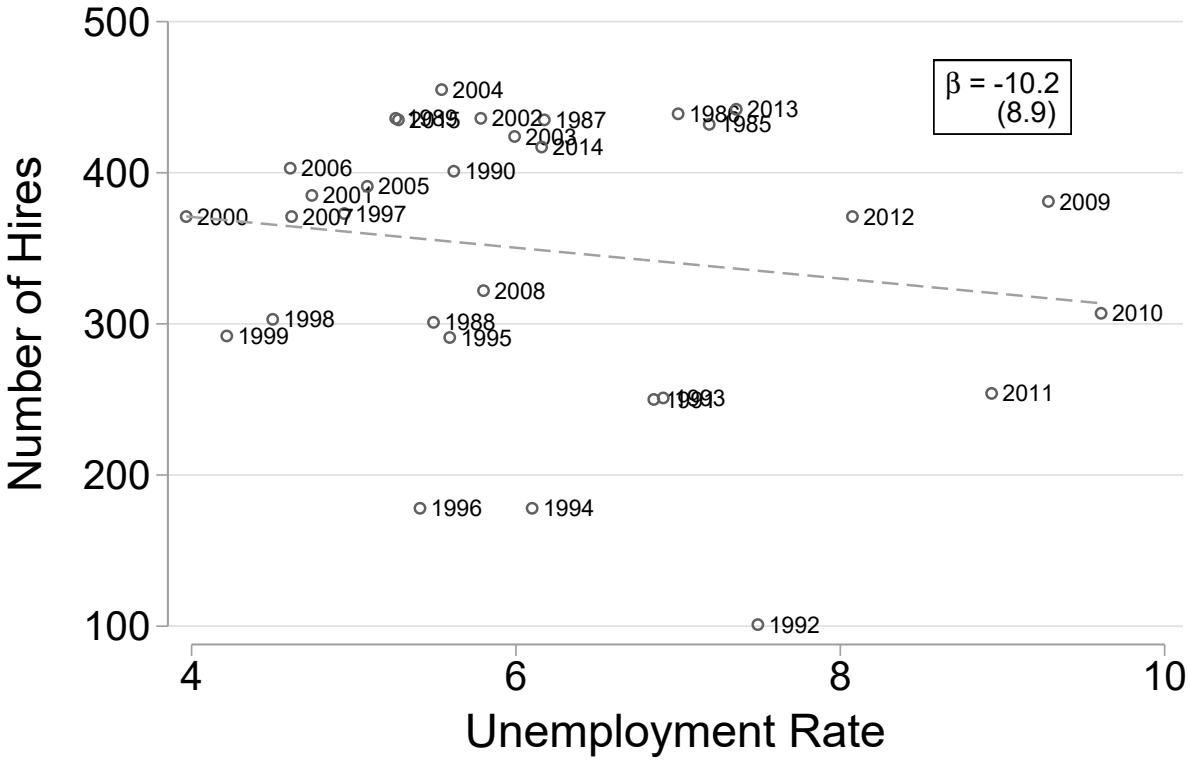


(b) Robustness Checks



Notes: Panel (a) estimates equation (1) with voluntary separation as the dependent variable separately for each year since start. 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 A7: Relationship between # of New Hires and Starting Year Unemployment Rate, Statewide Agencies



Notes: This figure plots the number of full-time police hires per year in the statewide agencies in Florida and the unemployment rate in each year. Statewide agencies include state attorney's offices, courts of appeal, Department of Agriculture, Department Of Business Professional Regulation, Department Of Financial Services, Department Of Highway Safety And Motor Vehicles, Department Of Lottery, Department Of Environmental Protection, Fish And Wildlife Conservation Commission, the Office Of Inspector General, Department Of Management Services, and the Department of Financial Services. This figure shows a largely muted labor demand response in statewide agencies to economic conditions relative to other agencies in the state.