Promotions in Law Enforcement: Financial Outcomes and Household Labor Supply Responses

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Abstract

Public-sector jobs have regulated pay structures that commonly tie wage growth to promotions. This paper leverages novel data and quasi-experimental variation in promotions to examine how credit utilization and household labor supply respond to increases in earnings. We exploit the sharp discontinuity from an exam-based policy implemented to allocate promotions among early-career police officers in Colombia, allowing us to compare the outcomes of nearly identical individuals before and after they receive a 25 percent pay raise. Four years after promotion, officers accumulate debt for about 160 percent of their annual pay increase. This response is driven by mortgages and personal loans, two types of installment credit. As a result, promoted officers only use one-third of the raise to repay their debt quarterly. Using household data, we show a significant reduction in wives' employment after their police husbands are promoted. This effect is more pronounced among couples with school-age children, but cannot be explained by changes in fertility decisions. Our findings suggest that households rely on credit instruments to adjust their time and consumption allocation in response to a pay increase.

Keywords: pay raise, promotions, debt, labor supply

JEL codes: J45, M51, D12, D14, G51

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I. Introduction

Public-sector workers comprise a significant share of the overall employment in most countries, typically performing jobs that feature a stable and regulated pay structure (World Bank, 2021). Wage growth among these workers often hinges on promotions based on tenure, educational attainment, and internal evaluations. While promotion policies are essential for attracting, retaining, and incentivizing qualified personnel in the public sector (Dal Bó, Finan and Rossi, 2013; Cameron, de Figueiredo and Lewis, 2016; Deserrano, Kastrau and León, 2024), these policies can also offer an ideal setting to study the response of various worker and household outcomes to pay progression.

This paper investigates how earnings increases influence public-sector workers' financial and household labor supply decisions, shedding light on the important role that public employment has on economic development and individual well-being. To answer this question, we assemble novel micro-level data and leverage variation from an exam-based policy that allow us to compare nearly identical individuals before and after they receive a 25 percent pay increase. In Colombia, early-career police officers are promoted to higher-paying ranks based on their performance in an external exam evaluating general skills and police-specific knowledge.[1] Bureaucratic regulations delaying the timing of promotions allow us to determine police officers' responses to the announcement and realization of a pay raise.

To estimate the responses of credit outcomes we employ an event-study specification that compares promoted workers with others who competed for a promotion but remain in their current positions for a time. We exploit the quasi-random allocation of promotions by restricting our sample to otherwise identical individuals whose scores are just above and below the promotion cutoff. This approach resembles a difference-in-differences design with treatment adoption occurring over time and treatment assignment jumping discontinuously at an arbitrary value.

Using comprehensive data on all formal loans extended by banks and lending institutions in the country, we document four key findings. First, four years after promotion, police officers accumulate debt for about 160 percent of their annual earnings increase, which amounts to almost 1,900 USD. This debt response is primarily driven by increases in installment credit, with mortgages and personal loans accounting respectively for 44 and 52 percent of the total debt. Second, debt starts to accumulate only after officers have received the raise, as we observe negligible effects during the months when earnings have not yet increased but officers are aware of the upcoming raise. Third, we estimate differential borrowing behaviors between officers with low

[1] Police departments in various countries, including Argentina and the Dominican Republic, implement similar promotion policies. Promotions among public school teachers in Colombia are also determined based on external evaluations (Busso et al., 2024).

and high debt levels prior to promotion, supporting the idea that binding credit constraints may explain the observed average effects. Fourth, officers use about one-third of their monthly wage increase to repay their financial obligations, as the accumulated debt is held in installment credit.

To examine household labor supply responses, we utilize population census data that includes cross-sectional employment information for all adult relatives of police officers. Regression discontinuity estimates show that officers' spouses are 13 percentage points (or 25 percent) less likely to be employed, suggesting a cross-wage elasticity of approximately 1. This effect is stronger for spouses with school-age children, for whom employment declines by 18 percentage points (or 35 percent). We rule out potential mechanisms, including changes in fertility decisions, job relocation, health deterioration, or school enrollment, as explanations for this employment response. Additional estimates show a decrease of 11 percentage points (or 26 percent) in the employment of older relatives within households, and an increase in home production involvement of 6.7 percentage points (or 25 percent) among all adult relatives of police officers. These significant labor supply responses are observed only among officers who have received their pay raises, as we find no effects among those merely informed of their upcoming promotion to a higher-paying rank.

The richness of our data and the unique setting we study, allow us to examine whether public-sector workers rely on various credit instruments to smooth consumption after being notified of an impending wage increase, as the neoclassical consumption theory predicts. Our empirical results reject this prediction and lead us to conclude that binding credit constraints may explain the lack of borrowing and the delayed decrease in household labor supply. Overall, our results indicate that an increase in the income-to-debt ratio—which likely relaxes credit constraints—allows households to rely on credit to adjust their time and consumption allocation following a pay raise.

Our paper contributes to the literature on debt and consumption responses to income and earnings shocks. This is a long-standing literature in economics that began with the formulation of the life cycle theory of consumption and the permanent income hypotheses. Both models assume that individuals are forward-looking and, therefore, consumption and borrowing should only respond to unexpected shocks (Jappelli and Pistaferri, 2010). Yet, evidence has shown that consumers also respond to anticipated shocks if liquidity constraints are binding and in the presence of precautionary savings.[2] We contribute to this literature by studying the debt and labor

[2]Some recent papers estimating the effect of consumption to anticipated income shocks include Souleles (1999), Shapiro and Slemrod (2003), Hsieh (2003), Stephens (2003, 2006, 2008), Johnson, Parker and Souleles (2006), Agarwal, Liu and Souleles (2007), Stephens and Unayama (2011), Parker et al. (2013), and Baugh et al. (2021). For a review of the literature, see Fuchs-Schündeln and Hassan (2016) and Jappelli and Pistaferri (2010).

supply responses to one of the most common personnel policies used to incentivize workers: promotions. To the best of our knowledge, this is the first paper to investigate the response to promotion-based earnings increases.

Two closely related papers on this literature are Aaronson, Agarwal and French (2012) and Agarwal and Qian (2014). The first paper investigates the response of household debt and spending to minimum wage hikes, showing that households with low earnings—likely minimum-wage households—increase their debt exposure primarily by taking out auto loans. In contrast, we find that vehicle debt remains unaffected after promotion, but overall debt increases due to a higher likelihood of promoted workers holding a mortgage. Significant responses in durables spending have been documented in studies examining sizable changes in disposable income, with larger effects observed among more liquidity-constrained individuals.[3] However, none of these studies find increases in home purchases, which are typically financed through mortgage debt.

The second paper is part of a small body of literature examining debt and consumption responses to unanticipated income shocks.[4] Similar to this study, our setting allows us to decompose the debt response into effects following the shock announcement (in our context, after exam scores are released and workers are notified of their upcoming promotion) and after the realization of the shock (or, after workers are promoted and receive a pay raise). An important difference with our paper lies in the response they observed in credit card usage after the income shock was announced but before it actually occurred. While we do not find an accumulation of credit card debt, the authors of that study document that most of the spending response during this period occurs through credit cards. The list of papers in this literature is relatively short due to the difficulty of identifying truly exogenous shocks that affect individual or household income (Jappelli and Pistaferri, 2010). Although individuals in our context likely anticipate being promoted, focusing on those with exam scores near the promotion cutoff allows us to reasonably assume that they have similar expectations about promotion probabilities, thereby treating promotion timing among these individuals as exogenous. We provide evidence supporting this assumption by comparing the characteristics of marginally promoted police officers.

Pay and career progression can affect the bargaining power of individuals within households, impacting family decisions that involve multiple members (Browning, Chiappori and Weiss, 2014). The household labor supply literature has documented how shocks to an individual's employment can influence their family's labor supply. Most of this literature focuses on the so-called 'added-worker' effect, which refers to

[3]Work documenting effects on durables include: Souleles (1999), Parker (1999), Parker et al. (2013), Adams, Einav and Levin (2009), and Leininger, Levy and Schanzenbach (2010).

[4]Papers studying the impact of unexpected income changes include: Wolpin (1982), Paxson (1993), Gruber (1997), Jappelli and Pistaferri (2014), Agarwal and Qian (2014), and Parker (2017).

the increase in labor supply among married women when their husbands become unemployed (e.g. Melvin Stephens, 2002; Blundell, Pistaferri and Saporta-Eksten, 2016, 2018; Autor et al., 2019; Halla, Schmieder and Weber, 2020). We contribute to this literature by examining the labor supply response of wives whose husbands experience a quasi-random wage increase, rather than a job displacement, social insurance shock, or death.[5] Early studies in this literature argued that, in a life-cycle model, the added-worker effect is only significant in the presence of credit constraints (Lundberg, 1985). More recently, some papers have analyzed family labor supply as an insurance mechanism to smooth consumption (Blundell, Pistaferri and Saporta-Eksten, 2016, 2018). Our paper contributes to this literature by showing that after credit constraints are relaxed, families are able to reallocate their time by reducing their labor.

Finally, promotions can also impact workers' personal lives. Folke and Rickne (2020) provides evidence that females double their likelihood of getting a divorce after being promoted, while divorce rates among male workers remain unaffected. Uckat (2023) shows that women's intrahousehold bargaining power increases with career advancement. We do not find evidence that the marital status or household roles of promoted officers change post-promotion, which aligns with the literature, given that our sample is predominantly male.

The rest of the paper is organized as follows. Section II describes our institutional setting, focusing on the exam-based promotion policy regulating career progression among police officers in Colombia. Section III provides a description of the information sources we use and the main outcome variables. In Section IV, we estimate the debt response of promoted workers, outlining first the empirical strategy and our identifying assumptions. We present evidence on the validity of these assumptions and then describe our findings regarding financial decisions. In Section V, we study the impact of promotions on workers' employment status, health outcomes, and household labor supply. Section VI concludes.

II. Setting and Institutional Background

This section provides background information on the police profession in Colombia. We describe officers' duties, employment conditions, and the changes they experience after being promoted to higher-paying ranks. We present details on the exam-based policy used to allocate promotions among early-career officers, focusing on institutional details that are relevant to our empirical analysis and conclusions.

[5]Papers using an structural approach to estimate wives' cross-wage elasticity include: Blundell, Pistaferri and Saporta-Eksten (2016, 2018). Papers drawing quasi-experimental variation from job displacement include: Halla, Schmieder and Weber (2020), Kohara (2010), Hardoy and Schøne (2014), and Melvin Stephens (2002). Finally, papers exploiting variation through social insurance benefits include: Autor et al. (2019), Fadlon and Nielsen (2021), and Cullen and Gruber (2000).

II.1. The Police Occupation in Colombia

Law enforcement in Colombia is overseen by the National Police, a centralized public organization attached to the Ministry of Defense. The police employ approximately 148,000 officers, whose jobs and responsibilities are subject to a strict hierarchical structure. Two independent career paths are available within the force: the *executive track*, where officers are trained for managerial and planning roles, and the *base track*, where most jobs are operational. In the chain of command, officers in the base track are subordinate to those in the executive track, regardless of their rank or years of service. Nearly 95 percent of the police personnel are part of the base track, and hold one of the following ranks in ascending order: *(i)* patrol officer, *(ii)* deputy inspector, *(iii)* inspector, *(iv)* chief inspector, *(v)* deputy commissioner, and *(vi)* commissioner. In this paper, we focus on patrol officers, the entry-level position of the base level, and their transition to deputy inspectors. Together, these two ranks account for 79 percent of the police staff.

Personnel Selection.—Each year, the police make a public call to fill vacancies created by retirements, separations, or staff expansion plans. The selection process for incoming patrol officers is rigorous and competitive. Candidates must meet several requirements, including holding a high school diploma, scoring at least 40 points on the high school exit exam,[6] being under 27 years of age,[7] and having no criminal record. The applicant screening process includes medical exams, psychological evaluations, physical fitness tests, family background checks, and security clearance assessments. The result of this process is a psycho-physical score, which the admissions committee uses to select candidates. Only 7 to 13 percent of the applicants, from a pool that has ranged from 35,000 to 88,000 in recent years, are offered admission (Hernández, Cortés and Sanabria, 2022).

Admitted applicants enroll in a one-year training program offered at the 13 campuses of the Police Academy nationwide. The program consists of 3,500 hours of instruction, covering police tactical skills, firearms training, law enforcement and legal framework, and other related competencies. In a typical cohort, 90 percent of the students are men around 22 years old, and 84 percent come from low-income families. Over 95 percent of students graduate on time and receive a vocational degree in police services.

Job Allocation.—After graduation, students receive the rank of patrol officer and are assigned to one of 53 police departments nationwide. Officers' job locations are determined at the central level based on the annual security and service plan, which

[6] High school seniors in Colombia take an exam evaluating their knowledge in different subjects a few months before graduation. 40 points is roughly the bottom 25th percentile of exam scores.

[7] The age requirement varies based on education level. Candidates with a bachelor's degree are eligible for admission if they are under 30, while those with a graduate degree can apply up to the age of 35.

assesses the ratio of officers with different ranks across departments and the specific security needs of each region. Except for the top students in each cohort, personnel preferences are not taken into account in this initial allocation. However, after two years of service in a specific unit or department, officers may submit a list of preferred locations to be transferred. Relocation decisions are again made at the central level and may be issued even if an officer does not intend to transfer.

Officers can perform various activities within the force, as established in Decree 1800 of 2000. Jobs are classified into two categories: operational and administrative. Operational roles focus on preventing and reducing crime, while administrative roles support police services through resource coordination. Within the operational category, roles can be further divided into street patrolling, investigations and operations, and remote area surveillance. Approximately 73 percent of police staff and 82 percent of all patrol officers have operational positions (Rodriguez, 2021).

Street patrolling units are concentrated in urban areas and cities. These units have the highest day-to-day interaction with citizens, as their activities include running background checks, frisking individuals, confiscating illegal items, responding to citizen calls, and arresting suspects. Patrol units consist of at least six officers who work in pairs and conduct surveillance in eight-hour shifts. Each pair is assigned a motorcycle, typically ridden by the officer with the lowest rank or the fewest years of service. Outcomes are reported to the officer in charge of the unit, who meets with patrol officers between shifts to gather information and provide instructions to the next team. Surveillance in remote areas serves a similar purpose to street patrolling, and officers in these units perform related tasks. Almost 35 percent of patrol officers are assigned to street patrolling and 17 percent to surveillance in remote areas.

Officers in operations and investigation units undertake more specialized tasks, such as conducting criminal investigations, performing undercover or intelligence operations, supporting bodyguard details for public figures, monitoring roadways, and assisting units focused on extortion, kidnapping, and drug-related offenses. Approximately 30 percent of all patrol officers are assigned to these units. The remaining 18 percent of patrol officers perform administrative tasks.

Employment Conditions.—Police jobs are among the occupations with the highest risk levels, as established in Decree 768 of 2022. Yet, several benefits can make a career in law enforcement appealing. First, the entry-level salary or base-rank officers corresponds to the 75th percentile of the earnings distribution of graduates from short-cycle programs. Moreover, patrol officers' salaries remain 20 percent higher than the median earnings of these graduates even five years after college completion. Police wages typically increase above the inflation rate, and with few exceptions, all officers holding the same rank receive the same base salary. Therefore, promotions to higher

ranks are the main source of wage variation in an officer's career.[8]

Second, police jobs are highly stable, as evidenced by the low turnover rates across cohorts of incoming base-rank officers. Internal data shows that the highest separation rate occurs within the first five years, reaching 17 percent; however, only 6 percent of officers leave voluntarily. An additional 19 percent leave the force over the following fifteen years, while voluntary separations increase by another 6 percent. Most of the remaining officers retire after 25 years of service when they become eligible for a pension (Cortés, López and Sanabria, 2023). This means that a considerable number of officers retire with a pension between the ages of 46 and 50 (Hernández, Cortés and Sanabria, 2022), which is 12 to 16 years earlier than formal workers in other sectors.[9]

Finally, the government implements an assisted housing program, known as *Caja Honor*, to help officers purchase their first home. Participation is mandatory for officers without real estate. Consequently, about 80 percent of the police personnel save at least 7 percent of their monthly salary through this program, which provides a generous subsidy to those who save for fourteen years. Officers can choose to use their savings earlier to buy a property, although no subsidy is granted if they exercise this option. In particular, after two years in the program, officers can obtain a leasehold mortgage, which allows them to use a property for a specified number of years before purchasing it at an agreed-upon price. They can also access their savings after eight years to secure a mortgage from any bank or lending institution in the country. This program has been in place since 1995 to improve the living conditions of patrol officers and increase their low rates of homeownership.[10]

II.2. Career Progression and Exam-based Promotion Policy

Career Progression.—The police career follows a hierarchical structure with a linear progression, meaning officers must hold each rank in sequence to advance to the highest position in the command chain. Eligibility and procedures to promote officers to higher ranks are established in Decrees 1791 and 1800 of 2000. Under this regulation, patrol officers are promoted to deputy inspectors through a competitive process involving a written evaluation. We referred to this evaluation as the *promotion exam*. Patrol officers are eligible to take the exam if they: *(i)* have at least 8 years of service,

[8] Officers in a limited number of geographic areas receive higher wages due to either their remote location or security conditions. The police also offer monetary incentives for acts of heroism or exceptional performance, but such incentives do not affect officers' wages.

[9] In Colombia, as established by Law 100 of 1993, the retirement age is 62 for men and 57 for women. In contrast, police employment regulations do not specify a retirement age but rather a required number of years in service, which has been set at 25 years since 2004.

[10] By 2021, only 16 percent of patrol officers owned a home or were paying off a mortgage. This figure is unsurprising and likely lower if we focus on recently hired officers, as most come from low-income families.

(ii) have no sanctions within the last 3 years, and *(iii)* are in good physical and mental condition, as certified by the most recent psychophysical assessment.[11] The exam is administered once a year, and there is no limit on the number of attempts before achieving promotion. Additional details on the exam are provided below.

Promotions above the rank of deputy inspector are determined by a career committee based on experience and performance evaluations filed every year by an officer's superior. To be eligible for a promotion, officers must hold a rank for at least five years.[12] Each year, the career committee allocates promotions among eligible officers based on the average of their most recent evaluations. A minimum of 31 years of service is required to attain the highest rank within the police base-level career.

Three main factors change when an officer is promoted to higher ranks. First, officers' base salary increases considerably. For patrol officers promoted to deputy inspector, their salary increases by 25 percent (or approximately 100 USD). Second, the likelihood of performing administrative duties, rather than operational ones, increases over the course of an officer's career. However, this transition can take time, as administrative roles are limited within the force. For patrol officers, the day-to-day activities do not change drastically after promotion.[13] Third, the likelihood of an officer being transferred to a different police department increases after promotion, as job locations within the force are assigned to maintain a balanced ratio of ranks across and within departments.

Exam-based Promotions.—Since 2006, the Colombian police has implemented an exam-based policy to identify and promote qualified patrol (entry-level) officers to the next hierarchical rank. To ensure a fair and transparent promotion process, the exam is designed, proctored, and graded by the National Testing Agency, known as ICFES.[14] As mentioned above, officers with at least eight years of service and no recent sanctions are eligible to take the exam.[15] The promotion exam is administered once a year on a single day, typically on a Sunday in September.

The exam is divided into two sections. In the first (morning) section of the exam, officers take various tests designed to measure *general* cognitive and non-cognitive skills. This section lasts four and a half hours, during which 125 questions must be answered. Four test are administered: *(i)* a quantitative reasoning test evaluating officers'

[11] To remain on active duty, police officers must visit a doctor and a dentist once a year for a general evaluation of their physical and mental health.

[12] Promotion to any rank requires a minimum of five years, except for the position of deputy commissioner, which requires seven years.

[13] The most significant change in responsibilities and job characteristics for base-rank officers occurs during their transition from inspector to chief inspector.

[14] ICFES (in Spanish, *Instituto Colombiano para la Evaluación de la Educación*) is a public organization with extensive experience in developing standardized exams for different purposes, including evaluating the quality of education and screening applicants for public-sector jobs.

[15] Internal police records show that over 85 percent of eligible officers take the exam each year.

basic understanding of mathematical concepts, *(ii)* a critical reading test assessing their ability to read, analyze, and draw conclusions from written material, *(iii)* a civic competencies test examining their ability to analyze and judge situations within the ethical and legal frameworks of the Colombian Constitution, and *(iv)* a personality test that inquires about context-based behavior, self-assessment, and achievement orientation. In the second (afternoon) section, officers complete a *police-specific* test assessing their knowledge of law enforcement regulations. In total, officers are given seven hours and thirty minutes to answer 225 questions.

Officers' overall scores on the exam determine whether they continue in the annual promotion process.[16] In particular, officers with scores above a certain threshold proceed to a second stage, where they must complete a six-month training course. This course is a mere requirement, as all officers complete their training; therefore, performance on the exam is the main determinant of promotion outcomes. The promotion threshold is announced along with the exam scores to all participants and is defined based on budget restrictions. Typically, the police and the testing agency release the exam scores two or three months after the exam date. From 2016 to 2019, the promotion exam was administered between June and October, and exam scores had already been announced before the end of December.[17] Officers with scores above the promotion cutoff begin their training in January of the following year and are promoted to deputy inspectors before the end of September.[18] We leverage the timing of this highly structured promotion process in our empirical analysis.

III. Data and Descriptive Statistics

To study how a pay raise may impact financial outcomes and household labor supply decisions, we construct novel data on promotions using individual-level records from various administrative sources. Our universe of analysis corresponds to patrol officers who took the promotion exam between 2016 and 2019. *Exam records* were obtained from the National Testing Agency (ICFES).[19] This data includes overall exam scores for over 54,000 officers, who can be uniquely identified using their social security numbers (or cédula de ciudadanía). Using this unique identifier, we can determine if an officer retakes the promotion exam over time and link other administrative data. Figure 1 presents the number of police officers taking the promotion exam every year.

Exam records do not include an indicator to identify whether an officer was pro-

[16] Overall scores are computed as a weighted average of five tests. See more details in Appendix A.
[17] For additional details on exam and score announcement dates, see Appendix Table A.2.
[18] As established in Decree 1791 of 2000, the promotion ceremony for base-rank officers can only be held in March or September of any given year.
[19] Records were downloaded in PDF format in September 2023 from https://www.icfes.gov.co/en/policía-nacional. The information is no longer available online.

moted or scored above the promotion cutoff. However, this information can be easily determined by leveraging the longitudinal nature of the data and the institutional context. Figure 2a displays overall exam scores for officers who took the promotion exam in 2016 and 2017. The visual truncation in this two-dimensional distribution corresponds to the promotion cutoff. The truncation arises from the fact that promoted officers do not retake the exam in subsequent years, while those with scores below the cutoff do. As Figure 2b shows, over 95 percent of officers who score below the cutoff retake the promotion exam, but the retake probability sharply declines to zero, as none of the officers who score above the cutoff retake the exam.[20]

We merge officer's exam scores with longitudinal data on credit use and debt. The Financial Superintendence of Colombia (SFC) collects this data through *Format 341*, where all financial and lending institutions quarterly report information on individuals with outstanding credit. The data covers the universe of all formal loans from 2004 to 2023 and provides an end-of-quarter snapshot with details by credit type (credit cards, personal loans, mortgages, vehicle loans, and small business loans) such as principal amount, payments made towards principal and interest, minimum payment due, days in delinquency, interest rate, risk level, collateral valuation, and loan maturities. Using social security numbers, we merge the credit history of over 99 percent of the individuals in our sample.

Detailed information about police officers and their households is obtained from the most recent *Population and Housing Census*, which is conducted almost every ten years to gather data on all residents in the country. This cross-sectional data was collected between April and September of 2018 and allows us to observe sociodemographic characteristics such as gender, age, education level, city of residence, and marital status. The census also includes data on employment status and health-related outcomes, which we use in our empirical analysis. We observe this information not only for the 98 percent of the police officers we were able to link but also for their household members. This allows us to study the short-term response of police officers and their families to a promotion-based pay raise.

We obtained *Police Academy records* between 2007 and 2014 from the Ministry of Education.[21] This data includes the year-semester when individuals enrolled in the police training program, which allows us to identify first-time exam takers as part of our robustness analysis. Additional background information is also observed in this data, such as officers' percentile scores on the high school exit exam, mothers' education, and socioeconomic stratum. We observe this information for 64 percent of police officers in our sample, indicating that 36 percent of our sample comprises

[20] Appendix Figure A.5 shows that the pattern observed in 2016-2017 is also present in future years.

[21] The National Police reports records of every student who enrolls to become a patrol officer through the Ministry of Education's System for Prevention and Analysis of College Dropout, known as SPADIES.

officers who became eligible to take the promotion exam before 2015.[22]

Descriptive Statistics.—Table 1 presents summary statistics for all police officers in our sample. These statistics are computed using the population census and should be interpreted with caution, as they may reflect outcomes rather than initial characteristics. Almost 93 percent of the officers are male, with an average age of 31 years at the time they take the promotion exam. Most come from low-income households, and less than half were born in one of Colombia's main cities. About 66 percent are married, 27 percent are single, and the remaining 7 percent are divorced or widowed. Approximately 73 percent of these officers are heads of their households and live with about three relatives. Finally, 45 percent have a family member under 17 years of age, 55 percent live with a relative between 18 and 40 years old, and 22 percent live with a relative over 41.

IV. Credit Utilization and Debt Responses

In this section, we use longitudinal banking data to investigate how a pay raise affects workers' financial decisions. We describe our empirical design and assess the validity of its identifying assumptions before presenting our main results. We then conduct various robustness checks and explore potential mechanisms explaining the observed effects.

IV.1. Empirical Strategy

To study the dynamic response of financial outcomes to the announcement and realization of a pay raise, we exploit variation from the police's exam-based promotion policy and the timing of promotions among early-career officers. We employ an event-study specification that compares individuals promoted to higher-paying positions with others who competed for a promotion but remained in their current positions. We leverage quasi-experimental variation in the allocation of promotions by restricting our sample to nearly identical individuals whose scores are just above and below the promotion cutoff. This approach resembles a difference-in-differences design with treatment adoption occurring over time and treatment assignment jumping discontinuously at an arbitrary value.

Let $P_i = 1(s_i \geq c)$ be an indicator equal to 1 if individual i obtains an exam score s_i above cutoff c and is therefore promoted to a higher-paying position. Define β_k as the causal effect on outcome Y_{it} measured k quarters after individual i took the promotion

[22] As mentioned in Section II.2, officers become eligible to take the promotion exam after eight years of service. Therefore, officers who enrolled in the police training program in 2008 were first eligible to participate in the promotion process in 2016.

exam. Note that β_k represents the difference in outcomes between individuals who receive a pay raise after promotion and the counterfactual scenario in which their labor earnings remain unchanged. Our outcomes of interest include indicators for whether police officers hold different types of outstanding loans, as well as measures of their accumulated debt and quarterly debt payments.

We estimate the causal effect of a pay raise on outcome Y_{it} using the following event-study specification:

$$Y_{it} = \alpha + \sum_{k \neq -1} \beta_k P_{it-k} + \mu_i + \lambda_t + X_{it}'\gamma + \varepsilon_{it}, \tag{1}$$

where $P_{it-k} = 1(s_i \geq c) \times 1(T_i = t - k)$ indicates if i obtained a score above the promotion cutoff in the exam taken k quarters ago. T_i records the second quarter of the year in which individual i took the promotion exam.[23] We control for aggregate factors that might affect all officers at the same time, as well as potential seasonal variation in credit utilization and debt, by including year-quarter fixed effects, λ_t. To account for heterogeneity in time-invariant factors across officers, such as preferences or financial literacy, we include individual fixed effects, μ_i. X_{it} is a set of time-varying controls, including age-square and linear trends for individuals taking the promotion exam in different years. β_k is the parameter of interest and measures the marginal response of scoring above the promotion cutoff if $k \in \{0, ..., 19\}$.[24] For $k \in \{-9, ..., -2\}$, β_k captures pre-exam trends between officers who are promoted and those who are not. β_{-1} is normalized to zero, implying that differences in outcomes between promoted and non-promoted officers are relative to the observed gap in the first quarter of the exam year. ε_{it} represents a stochastic error term. We cluster standard errors at the individual level, allowing errors to be arbitrarily correlated over time for each officer.

For identification, we assume $\mathbb{E}[\varepsilon_{it}|P_{iz}(s_i)] = 0$. This assumption implies that, in the absence of treatment (promotion), the outcomes of promoted officers would have followed similar trends to those of non-promoted individuals. While the counterfactual parallel trends cannot be directly observed, we can still test the validity of our assumption by comparing officers' outcomes before they take the promotion exam. Moreover, since P_{iz} depends on performance in the exam, our identification assumption is more likely to hold for officers with scores s_i marginally close to the promotion cutoff c. For these officers, treatment allocation can be considered as good as random. We provide evidence supporting the exogeneity of treatment allocation by showing that officers'

[23] In some years, the promotion exam was administered in the third and fourth quarters. However, by the end of each year, exam scores have already been announced, and the promotion ceremony takes place only in the third quarter of the following year. To treat coherently all exam cohorts, T_i records the second quarter of the year.

[24] We consider effects only within five years, given the time horizon of our data and because officers can be eligible for additional promotions beyond this time window.

characteristics do not significantly differ around c, and that exam scores are unlikely to be manipulated. Therefore, we relax our parallel trends assumption by restricting the sample to officers with scores closer to the cutoff.[25]

Our empirical design leverages variation in the timing of promotions among early-career officers. This source of variation can be illustrated by the rates of promotion of exam takers. Figure 3a displays the promotion rates for all officers who took the exam in a given year, while Figure 3b restricts the sample to officers closer to the cutoff. As expected, the promotion rates for officers near the cutoff are higher than those for the full sample of exam takers. This indicates that, when we restrict the sample to officers marginally close to the cutoff, the identification of our parameters of interest will rely more on 'not-yet-treated' individuals rather than on 'never-treated.'

Recent literature on empirical designs that leverage variation in treatment timing across groups emphasizes that potential bias may arise when treatment effects are heterogeneous or when treatment timing is correlated with treatment effects (Goodman-Bacon, 2021; Sun and Abraham, 2021; de Chaisemartin and D'Haultfoeuille, 2020; Borusyak, Jaravel and Spiess, 2024). We conduct several robustness checks to address these concerns. First, we restrict our sample to police officers who take the promotion exam for the first time. Since eligible officers may retake the exam until they score above the promotion cutoff, the sample of exam takers from 2016 to 2019 includes individuals who may have participated in multiple promotion processes. By restricting the sample to first-time exam takers, we mitigate potential biases that arise from differential exposure to the promotion process or familiarity with the exam format.

Second, we estimate our event-study specification separately by exam cohort, defined as all officers who took the exam in a specific year. By examining outcomes within cohorts, we assess whether the estimated effects remain consistent across different promotion years, reducing concerns about cohort-specific that might affect our pooled results. Finally, we estimate our main specification using recently developed methods that account for heterogeneous and dynamic effects in contexts where individuals may adopt treatment at different times. These methods improve upon traditional two-way fixed effects estimators by reducing potential biases associated with staggered treatment timing and variation in treatment effects across cohorts (Sun and Abraham, 2021; Borusyak, Jaravel and Spiess, 2024; Dube et al., 2023).

To summarize the dynamic effects on credit outcomes and distinguish between the response after taking the promotion exam, the response to a pay raise announcement,

[25] Athey and Imbens (2022) and Callaway and Sant'Anna (2021) demonstrate that, under random treatment timing, the standard two-way fixed effects estimator remains unbiased. Consequently, we address concerns raised in the literature on difference-in-differences with staggered treatment adoption by restricting our sample to individuals with scores arbitrarily close to the promotion cutoff.

and the response once the raise takes effect, we estimate the following equation:

$$Y_{it} = \alpha + \beta_{exam}\left(P_i \times 1_{post-exam}\right) + \beta_{notice}\left(P_i \times 1_{raise-notice}\right) + \beta_{raise}\left(P_i \times 1_{post-raise}\right) + \mu_i + \lambda_t + X_{it}'\gamma + \varepsilon_{it}, \tag{2}$$

where $1_{post-exam} = 1(0 \leq t - T_i < 3)$ is an indicator equal to 1 for the quarters following the promotion exam, but when scores have not yet been released. This period spans the second semester of the exam year and extends through the end of that year. $1_{raise-notice} = 1(3 \leq t - T_i < 6)$ is an indicator equal to 1 for the periods in which scores have been announced, officers know whether they will obtain a pay raise, but the raise is not yet reflected in their monthly earnings. This period begins in January of the year following the exam and continues until the end of September. Finally, $1_{post-raise} = 1(t - T_i \geq 7)$ is an indicator for the quarters after officers received a pay raise. β_{exam} captures any anticipated response after taking the exam, β_{notice} captures the response when individuals expect a earnings shock, and β_{raise} captures the effect after the shock is realized. We are able to identify these different responses due to the bureaucratic regulations in the promotion process of early-career officers in Colombia. Specifically, officers must complete a six-month training course before assuming a higher-paying position, and the promotion ceremony, after which pay raises take effect, must be held by the end of the third quarter of the year following the promotion exam (see Section II.2 for additional details).

IV.2. Validity of the Research Design

Our empirical design identifies the effect of a pay raise on financial outcomes by leveraging two sources of variation: *(i)* the sharp discontinuity in promotion allocation from an exam-based policy, and *(ii)* the timing of promotions among police officers. Given that our preferred estimates condition on officers whose scores are marginally close to the promotion cutoff, we first validate that treatment allocation is as good as random for this group of individuals. We provide evidence suggesting that exam scores cannot be "manipulated" to validate that treatment allocation is exogenous (Imbens and Lemieux, 2008; Lee, 2008). Then, we discuss the validity of the identification assumption underlying our event-study specification.

Density Smoothness.—Manipulation of scores can lead to bunching or discontinuities in the density of the running variable. Therefore, a first validity check is to show that the density of scores is smooth around the promotion cutoff, where manipulation incentives are higher than anywhere else in the distribution. To assess potential manipulation, we run the test proposed by Cattaneo, Jansson and Ma (2020), which

employs a non-parametric estimator to measure discontinuities in the density of a continuous variable. Under the null hypothesis of this test, scores are not manipulated. As shown in Figure 4, we cannot reject the null hypothesis for any of the exams administered between 2016 and 2019. In other words, there is no evidence of manipulation.[26]

Covariate Balance.—Manipulation of scores can affect the balance of pre-determined characteristics around the cutoff. A second validity check is to show that individuals who pass the promotion exam by a thin margin have nearly identical characteristics to individuals who barely fail the exam. Figure 5 displays regression discontinuity coefficients for individuals within 4.4 points of the promotion cutoff. This value represents the average bandwidth from separate regressions, where the tuning parameter is chosen by minimizing the mean squared errors. These results show no significant differences for a broad set of covariates, including age at exam, gender, highest education level, socioeconomic stratum (or SES Index), and scores from the high school exit exam. Importantly, we do not observe any differences in the likelihood of taking the exam in the previous year. Furthermore, conditional on having taken the exam one year ago, there is no difference in the average performance of officers near the cutoff.[27]

Different reasons make manipulation of scores unlikely in our context. First, to ensure fairness and transparency of the promotion process, the police hire a third party to design, proctor, and grade the exam. We found no reports or complaints of fraudulent disclosure of exam questions between 2016 and 2023.[28] Second, the promotion cutoff is determined based on overall exam scores, which are computed as a weighted average of the scores five tests. Given that test weights have changed over time, it is challenging for exam takers to focus on a specific test. Additionally, the police-specific test has undergone significant changes, as it emphasizes knowledge of police regulations, which are frequently revised. Finally, the promotion cutoff is unknown to all exam takers before the scores are announced. This is because the cutoff is determined jointly with the Ministry of Finance and the Ministry of Defense during a meeting held shortly before the scores are released.

Parallel Trends.—The evidence above suggests that treatment assignment is quasi-random for individuals with scores near the promotion cutoff. Focusing on a group where treatment allocation is exogenous reduces concerns about the potential correlation between treatment effects and treatment timing, which violates the parallel trends assumption (Athey and Imbens, 2022; Callaway and Sant'Anna, 2021). We test the validity of the parallel trends assumption by analyzing estimates for the period preced-

[26] Visual evidence on the continuity in the density of scores is presented in Appendix Figure A.6.

[27] Visual evidence on the continuity of covariates is presented in Appendix Figure A.7.

[28] The confidentiality of exam questions is one of the main reasons the National Police hires an external testing firm. The firm could face legal and financial consequences if questions or answers are disclosed prior to the exam date.

ing the promotion exam. As we show in the following section, the evidence indicates that this assumption holds not only for officers marginally close to the promotion cutoff but also for the entire sample of exam takers.

IV.3. Credit Response: Extensive and Intensive Margins

We examine two dimensions of how credit outcomes respond to a pay raise. First, we analyze the extensive margin response or the changes in the likelihood that individuals take out loans over time. Second, we study the intensive margin response by documenting the trends of debt levels before and after individuals receive a raise.

Extensive Margin Response.—Our banking data include loans of five types: credit cards, personal loans, mortgages, vehicle loans, and small business loans. Using this information, we define an indicator for whether an individual holds a loan of any of these types. We then estimate equation 1 over a period spanning nine quarters before and nineteen quarters after the promotion exam. We present estimates for both, the full sample of exam takers and a subsample of individuals with scores within 4.4 points of the promotion cutoff. We refer to the latter group as the 'RD-restricted' sample.[29] Figure 6a displays the results of this analysis.

Four observations are worth highlighting from these results. First, estimates for the quarters preceding the exam date show that officers scoring above and below the promotion cutoff exhibit similar trends. This observation applies to both samples considered and supports the validity of the parallel trends assumption. Second, officers scoring above the promotion cutoff are more likely to have outstanding loans only after receiving the pay raise. We observe precise zero estimates for all quarters preceding the promotion date, even during quarters when exam scores have been announced and officers are aware they will obtain a pay raise. Third, almost five years after taking the exam, promoted officers are 3 to 5 percentage points (or 3.4 to 5.6 percent) more likely to hold an outstanding loan. Fourth, although estimates from both samples show similar patterns, results for officers near the promotion cutoff yield smaller effects. This difference could suggest a potential upward bias in the full-sample results; however, it may also reflect that control group individuals with scores closer to the cutoff are more likely to be promoted in the future. The latter observation is consistent with the observed pattern, where the response is initially steeper but stabilizes over time.[30]

Intensive Margin Response.—We now explore effects on debt accumulation, defined as the sum of the principal from all outstanding loans in a given quarter. To facilitate

[29] See Section IV.2 for details on the selection of a 4.4-point bandwidth.

[30] Loosely speaking, the control group is 'catching up' at a faster rate when we estimate our model with officers closer to the promotion cutoff.

interpretation, we adjust for inflation and express debt in 2016 US dollars.[31] Results are presented in Figure 6b. Consistent with previous findings, estimates for the quarters before the exam date suggest that debt trends for promoted individuals are similar to those for non-promoted individuals. This provides additional evidence of the validity of parallel trends. Our estimates indicate that debt increases after officers receive a pay raise, rather than in response to the announcement of a future promotion. Specifically, five years after taking the exam, promoted officers' debt has increased by 1,905 USD, which represents 160 percent of their annual earnings increase. A back-of-the-envelope calculation indicates that the elasticity of debt to a change in wages is approximately 1. Once again, we observe that full-sample estimates are larger than those from the RD-restricted sample, but both exhibit a pattern where the response is steeper in the short run and gradually plateaus.

Responses by Credit Type.—Our previous results aggregate across financial obligations that differ significantly in duration, repayment schedules, interest rates, and collateral requirements. To better understand the extensive and intensive margin responses, we extend the analysis by estimating separate effects for each loan type. Figure 7 presents the results of this exercise for credit cards, personal loans, and mortgages.[32] We underscore two observations from these results.

First, officers who receive a pay raise are not more likely to hold credit cards, and their credit card debt does not change over time either. This finding contrasts with the evidence presented by Agarwal and Qian (2014), who show that individuals increase their credit card spending during months when they are aware of a future positive income shock that was previously unanticipated. Our results suggest that individuals may not smooth their consumption through credit card use or other forms of credit after they are able to anticipate a pay raise.

Second, personal loans and mortgages explain most of the aggregate effects that we documented above. On the extensive margin, our results suggest that promoted officers are 2.8 percentage points (or 3.4 percent) more likely to hold a personal loan and 3.9 percentage points (or 60 percent) more likely to hold a mortgage.[33] On the intensive margin, our estimates show that five years after the exam date, officers who receive a pay raise accumulate an additional 1,000 USD in personal loan debt and 830 USD in mortgage debt. This represents 96 percent of the total debt response.

The effect on mortgages is particularly notable given *(i)* that the population under study is relatively young (around 32 years old) and comes from poor socioeconomic

[31] We use an exchange rate of 3,050.98 COP per 1 USD, which corresponds to the average rate in 2016.

[32] Results for vehicle loans and small business loans are displayed in Appendix Figure B.1.

[33] Our data distinguish between low-cost and regular-cost house mortgages. Extensive margin responses for each mortgage type are presented in Appendix Figure B.2. An important distinction between these two types of properties is not only their prices but also their down payments. Regular-cost houses require a down payment of 30 percent of the house value, while low-cost houses require only 10 percent. We observe very similar responses for both mortgage types.

backgrounds, and *(ii)* the effect size, with a 1 percent wage increase causing a 2.4 percent rise in the likelihood of holding a mortgage. This effect is roughly comparable to the impact of a 1 percentage point decline in mortgage interest rates, as documented in the literature (DeFusco and Paciorek, 2017).

Our findings are summarized in Table 2, where we present static difference-in-differences estimates from equation 2. These results use the sample of police officers with scores near the promotion cutoff, for whom the pay raise announcement is likely exogenous. Column 1 displays aggregate estimates for any type of loan, while Columns 2 to 6 present results by loan type. Estimates for credit cards, personal loan, and mortgages, align with our event-study analysis. Negligible effects are found for vehicle loans and small business loans. This contrasts with evidence from Aaronson, Agarwal and French (2012), which suggests that low-income households exposed minimum wage hikes primarily increase their debt through auto loans.

Taken together, the results here show that debt exposure increases after individuals are affected by a positive and earnings shock, but it does not respond to the shock announcement. This debt increase is partially explained by a decision to invest in a highly illiquid asset, and perhaps the most expensive good owned by individuals, a house. We arrive at this conclusion due to the crucial role that mortgages play in enabling households to purchase a home (Agarwal, Qian and Tan, 2020).

IV.4. Debt Repayment Behavior

The documented increase in debt is primarily attributed to mortgages and personal loans, which indicates that our findings are better characterized as a response of installment debt. With this in mind, we turn to studying officers' debt repayment behavior, focusing particularly on the amortization response, the relationship between quarterly payments and the increase in earnings following a promotion, and the differences between payments and installments.

Figure 8a presents the debt repayment response over time. We aggregate payments toward principal and interest across all outstanding loans in a given quarter. To facilitate interpretation, we adjust for inflation and express payments in 2016 US dollars. This evidence suggests that five years from the promotion exam, officers' quarterly payments increased by approximately 90 USD, which represents 30 percent of the quarterly pay raise they receive upon assuming a higher-paying rank. This indicates that officers are likely to fully amortize their additional debt within five or six years. In Figure 8b, we examine whether officers' quarterly payments differ from the minimum amount due in a quarter.[34] The estimates in this figure show that, after five

[34]Our data does not record installment amounts, but it does record the 'expected' payment (or minimum due) for each loan in a given quarter.

years, promoted officers are able to repay approximately 28 USD above the minimum due in a quarter, although these results are somewhat noisier.

In Figure 9 we present estimates by type of loan. As expected, personal loan and mortgage payments account for most of the repayment response. However, we also observe a significant increase in credit card payments. Specifically, by the end of our period of analysis, promoted officers are paying approximately 28 USD more on their credit cards. Remarkably, this amount matches the increase in payments above the minimum due. Moreover, given that credit card debt did not increase (see Figure 7), this result suggests that officers who obtained a pay raise may have increased their spending using credit cards.

Table 3 presents static difference-in-difference estimates summarizing our findings. These results indicate that credit card, personal loan, and mortgage payments account for most of the repayment behavior among promoted officers. The table also shows that promoted officers can repay their debt faster, as quarterly payments exceed the minimum amounts required by lending institutions. Moreover, officers prioritize repaying their credit card and personal loan debts, as payments above the minimum due are concentrated in these two credit types. Null effects are again observed for vehicle and small business loans.

IV.5. Robustness of the Credit Response

The econometric literature on difference-in-differences settings with staggered treatment adoption suggests that standard two-way fixed-effects estimates may be biased (Goodman-Bacon, 2021; Sun and Abraham, 2021; de Chaisemartin and D'Haultfoeuille, 2020; Athey and Imbens, 2022; Borusyak, Jaravel and Spiess, 2024). The primary source of bias identified in the literature arises from heterogeneous effects across groups of individuals who adopt treatment in different periods. We conduct several empirical checks to assess the robustness of our findings (see results in Appendix B).

First, we restrict our sample to officers who became eligible to take the promotion exam between 2016 and 2019. By estimating our event-study specification on this sample of first-time exam takers, we mitigate potential biases steaming from differential exposure to the promotion process or familiarity with the exam format. Our results may be biased due to this differential exposure, as we pooled officers who have taken the promotion exam across multiple years with those who recently became eligible to take it for the first time. The results from this sample of first-time takers show credit responses that exhibit similar patterns to those in Figures 6 and 8. However, effect sizes are larger for first-time takers. Specifically, our extensive margin estimates indicate that officers are approximately 7.5 percentage points more likely to hold a loan after five years. On the intensive margin, we find that debt increased by about 2,500

USD, while quarterly debt payments rose to 130 USD. A potential reason why we observe larger effects among first-time takers is the fact that this group is younger and, therefore, more likely to hold debt.

Second, we estimate credit responses by exam cohort, defined as the group of police officers who took the promotion exam in a specific year. This analysis aims to address concerns about cohort-specific shocks that may bias our estimates. Similar credit responses are observed, although there is some variation across cohorts. In particular, earlier cohorts exhibit stronger credit responses. One potential reason for this pattern is the varying exposure to the COVID-19 pandemic across cohorts. Although police officers were classified as essential workers and did not face massive layoffs, the greater exposure to the pandemic among later cohorts may have limited their ability to secure loans. To summarize these results, we stack cohorts and run a slightly different event-study specification. The results are remarkably similar to our main estimates.

Finally, we consider alternative estimation methods that address heterogeneous treatment effects. Specifically, we employ the estimators proposed by Sun and Abraham (2021), Borusyak, Jaravel and Spiess (2024), and Dube et al. (2023). Not only the pattern of the credit response is similar but also the effect sizes that we obtain from the standard two-way fixed effects approach.

IV.6. Mechanisms Behind the Credit Response

We now examine possible reasons underlying the observed credit responses. First, we consider if credit characteristics, such as interest rates or loan maturities, change for police officers who receive a pay raise. We also examine if banks might adjust their assessment of these officers as clients. Finally, we evaluate if credit constraints might explain our results.

Credit Conditions.—Our data include the effective annual interest rate (EAR) and the time to maturity for all loans. Using this information, we estimate our event study specification to determine how loan characteristics change over time. Figure 10 presents the results of this analysis, which should be interpreted with caution, as it conditions on individuals holding loans. While we do not observe any changes in the interest rates for credit cards and mortgages, we do find a steady decline in the interest rates of personal loans. Specifically, five years after the exam, promoted officers secure personal loans with interest rates that are approximately 0.8 to 1.2 percentage points lower. It is important to note that this decline begins after officers receive their pay raises, rather than after taking the exam or when the exam scores are announced.

Various factors can contribute to lower personal loan interest rates, including loan maturity, principal amount, loan purpose (such as home improvements or debt consolidation), and the individual's credit score or income-to-debt ratio. The results on

loan maturity presented in Figure 10 suggest that this factor is unlikely to account for the interest rate response. Although our data does not include credit scores, it does record the probability of default determined by lending institutions' internal risk systems.[35] Appendix Figure B.3 presents the event-study estimates using individuals' default probability as outcome. We do not observe significant changes for personal loans, but we do observe a somewhat imprecise decline in the probability of default on credit cards.

These estimates suggest that one potential reason officers increase their debt exposure is their ability to secure more favorable credit conditions, as evidenced by lower interest rates. Although the decline in interest rates could be attributed to various factors, our analysis suggests it may be related to either the loan purpose or the income-to-debt ratio. While we do not observe the specific purpose of each loan, we are inclined to conclude that the primary reason for the decrease in interest rates is the increase in earnings officers experience after promotion. We reach to this conclusion based on the rapid decline in interest rates observed shortly after officers receive their pay raise.

Credit Constraints.—In a neoclassical consumption model with complete credit and insurance markets, individuals should respond to an unanticipated and positive earnings shock by dissaving or borrowing to increase their consumption (Jappelli and Pistaferri, 2010). The credit response we observe challenges the predictions of this theory, especially if we focus on officers with scores near the promotion cutoff, for whom the pay raise is assigned quasi-randomly.[36]

A potential explanation for our results is the presence of binding credit constraints. To examine if that is the case, we use officers' credit history prior to the promotion exam to categorize individuals into low, medium, and high debt groups.[37] Then, we run our event-study specification dividing the treatment group into these three debt categories. Figure 11 presents the results of this empirical analysis.[38] These estimates indicate that high-debt officers behave as if they were credit constrained, this is, their probability of holding an outstanding credit does not change over time. However, we observe that their accumulated debt decreases initially, but after promotion, it returns to the same trend as that of unpromoted officers. Conversely, we find that low-debt officers, who are likely not constrained, can take on additional loans and significantly

[35] Risk assessment systems vary across lending institutions, and their models are considered highly confidential.

[36] The credit response we document cannot be explained even if the pay raise was anticipated. In that scenario, the neoclassical theory predicts that consumption, and consequently borrowing, should not respond to an expected shock.

[37] Categories are determined based on quartiles of the debt distribution. Specifically, low debt corresponds to the bottom quartile, while high debt corresponds to the top quartile

[38] To reduce endogeneity, we omit the quarters preceding the promotion exam that we used to classify individuals into debt groups.

increase their debt exposure. These effects suggest that credit constraints may indeed account for our earlier findings.

V. Household Decisions and Labor Supply Response

In this section, we use population census data to investigate how a pay raise affects various worker and household outcomes. This cross-sectional data allows us to examine effects on both workers and their family members. We study impacts on household labor supply decisions, city of residence, family size, and marital status. We begin describing our empirical strategy and stating the identifying assumptions. We then present the results from our regression analysis and the conclusions we draw from it.

V.1. Empirical Strategy

To estimate the effects of a pay raise, we exploit the sharp discontinuity in the allocation of promotions among early-career officers who must take a promotion exam. The intuition behind this approach is that promotions are quasi-randomly allocated among officers with exam scores marginally close to the cutoff. This design identifies the causal effect of being promoted to a higher-paying position as long as other determinants of outcomes are continuous around the cutoff. The following equation is a parametric representation of our regression specification:

$$Y_{j(i)} = \alpha + \beta P_i + \delta Z_i + \eta(Z_i \times P_i) + X'_{j(i)}\gamma + u_{j(i)}, \tag{3}$$

where $Y_{j(i)}$ denotes the outcome of individual j, who is a relative of officer i. Depending on the outcome, i and j may refer to the same individual. Moreover, unless otherwise is stated, assume $i = j$. $P_i = 1(s_i \geq c)$ is an indicator variable equal to 1 if i's exam score s_i is above cutoff c and, therefore, i is promoted to a higher-paying position. The (running) variable Z_i measures the distance of scores to the promotion cutoff and is defined as $Z_i = s_i - c$.[39] $X_{j(i)}$ is a set of covariates and $u_{j(i)}$ is a stochastic error term. The parameter of interest, β, is estimated as a function of the cutoff, as we show in the following expression:

$$\beta(c) = \lim_{s \downarrow c} E[Y_{j(i)}|P_i = 1, s_i = s, X_{j(i)}] - \lim_{s \uparrow c} E[Y_{j(i)}|P_i = 0, s_i = s, X_{j(i)}].$$

[39] Whenever there is more than one police officer within a household and i is different from j, Z_i and P_i are defined as functions of the maximum score among officers. Specifically, $Z_i = \tilde{s}_i - c$ and $P_i = 1(\tilde{s}_i \geq c)$, where $\tilde{s}_i = \max\{s_i, s_{i'}\}$ for all $i \neq i'$ within the household. That way, individual j will be "treated" if any of the officers in the household are promoted. It is worth mentioning that less than 1 percent of the households in our sample have more than one police officer among their members.

Under regular smoothness assumptions around the cutoff, this estimator recovers the causal effect on outcome $Y_{j(i)}$. In Section IV.2, we provided evidence of the validity of this empirical design. As suggested by Imbens and Lemieux (2008), we estimate equation (3) using local polynomial regressions of different order and determine the bandwidth by minimizing the mean of square errors (MSE). We present bias-corrected estimates based on the methodology developed by Calonico, Cattaneo and Titiunik (2014), and compute robust standard errors following Calonico, Cattaneo and Farrell (2020).

Given the timing of promotions among early-career officers and the period when the census data was collected, we focus on individuals who took the promotion exam in 2016. This is because officers taking the exam in year t and scoring above the promotion cutoff, will not assume their new positions before September of year $t+1$ (for additional details about the timing of promotions see Section II). The census data, on the other hand, was collected between April and September of 2018. This implies that the census provides post-treatment information for the 2016 exam cohort and pre-treatment information for cohorts after 2017. We leverage this feature of our data and estimate placebo effects using exam cohorts after 2017.

V.2. Household Labor Supply Response

Worker's Response.—Promotions can improve workers' job satisfaction and perception of employment stability, reducing their incentives to separate from current employers (Pergamit and Veum, 1999; Francesconi, 2001). Conversely, promotions may signal workers' high ability, which can potentially increase turnover rates if other employers extend job offers to promoted workers (Bernhardt and Scoones, 1993; Waldman, 2013). The census data allows us to observe the employment status of police officers. Using this information, we investigate how promotions influence officers' labor supply, which offers indirect evidence on the effect of promotions on employment attachment.

Our data allows us to determine whether an individual is employed,[40] engaged in home production activities, seeking a job, or involved in other activities.[41] Table 4 presents regression discontinuity estimates using indicators for each employment category. Results in columns (1) to (4) of Panel A corresponds to officers who took the promotion exam in 2016, for whom we observe post-promotion information. These estimates indicate that officers' employment status does not change after promotion.

[40] Following the census definition, we classify an individual as employed if during the week of reference, they *(i)* worked at least one hour as a paid employee, *(ii)* worked without pay for at least one hour, or *(iii)* were temporarily absent from a paid job or business.

[41] Other employment activities include: *(i)* studying, *(ii)* being retired or living off a pension or rent, *(iii)* being permanently incapacitated, and *(iv)* other.

However, the question of whether individuals continue to be employed by the police remains open. To approach an answer, we call the attention to some police personnel statistics. First, over 97 percent of individuals who scored below but close to the promotion cutoff retake the exam. Second, only about one percent of police officers leave the force in a given year.[42] This suggests that failing to pass the promotion exam might have little to no effect on separations.[43]

Possible explanations for our findings include the high stability and benefits of public sector jobs, the number of employers demanding labor within a specific occupation, and the extent to which the promotion allocation procedure is salient to the labor market. Police officers likely receive considerable benefits compared to workers in similar jobs, such as individuals in private security. On the other hand, officers' skills can be highly specialized, and the demand for police-specific abilities could be limited. Finally, potential employers may not consider an exam-based promotion policy as a helpful signal to identify high-ability workers.

Our results align with evidence from other public-sector workers, such as teachers in Chile, who receive a salary bonus based on their performance in a competitive process involving a written exam. Berlinski and Ramos (2020) find that teachers who obtain this monetary incentive are equally likely to continue working at a public school.

Response of Workers' Relatives.—Workers' career success can affect the bargaining power of individuals within their families, influencing household labor supply decisions (Uckat, 2023; Halla, Schmieder and Weber, 2020). The census data allows us to observe the employment status of all adult relatives residing with police officers.[44] We leverage this information to study how a worker's promotion can affect the labor supply decision of his family members.

Figure 12 shows sharp changes in the employment status of the relatives of police officers with scores near the promotion cutoff. Point estimates measuring these discontinuities are presented in Table 4, columns (5) to (8) of Panel A.[45] We observe a significant decline of approximately 11 percentage points (or 22 percent) in the likelihood that relatives of promoted officers are employed. Moreover, there is a significant increase of 6.7 percentage points (or 25 percent) in the likelihood that relatives engage in home production activities. No significant effects are found for the likelihood of seeking jobs or performing other activities. These results suggest that family labor supply is elastic and that cross-wage elasticities can be negative. Although we do not

[42] See Section II and Appendix Figure A.2.

[43] The placebo estimates in Panel B, which corresponds to officers who took the exam from 2017 to 2019, also supports this claim.

[44] Individuals legally become adults at age 18 in Colombia. Although we observe employment information for all household members over the age of 10, we restrict our analysis to adults, as this population faces fewer restrictions to participate in the labor force.

[45] These results use the sample of adult relatives of police officers, therefore $j \neq i$ in equation 3.

have access to intensive margin data (i.e., work hours), a sharp and persistent decline in labor supply can be expected if some family members opt out of the labor force to spend more time on home production.

We now focus on the labor supply decision of adults with a specific relationship to police officers. Figure 13 presents estimates for spouses and other relatives. These results suggest that our previous findings are primarily driven by a 13 percentage point (or 25 percent) decline in the likelihood that police officers' spouses are employed. Since most spouses are women, these results primarily reflect a sharp decline in the employment of wives.[46] In addition to spouses, we consider relatives over 35 and those under 35.[47] While we observe an 11 percentage point (or 26 percent) decline in the likelihood of employment for family members over 35, there is no observed effect for younger relatives.

V.3. Mechanisms Behind the Labor Supply Response

We explore various mechanisms explaining our results. First, we consider how the presence of children affects the employment status of promoted officers' spouses. We then examine whether officers' spouses are more likely to have children, experience health-related issues, or enroll in an education program following their partners' promotions. Finally, we analyze if officers' job relocation can affect the employment status of spouses.

The presence of children could explain the observed decline in employment among promoted officers' spouses. To investigate this possibility, we run regressions on two separate samples: (i) spouses with children under sixteen and (ii) spouses without children or with children over sixteen. Figure 14a presents the results of this analysis, showing that spouses with children experience an employment decline of approximately 18 percentage points (or 35 percent). In contrast, the effect is negligible for spouses without children, although these estimates are relatively imprecise due to the smaller sample size. This suggests that the spouses of promoted workers may adjust their employment situation to allocate more time to their children.

In Table 5, we investigate if alternative factors can explain the observed decline in employment. Columns (1) and (2) show that the spouses of promoted workers are equally likely to have children under sixteen and equally likely to have children under the age of two. This indicates that there are no imbalances regarding the presence of children and that promotions do not influence the decision to have more children. In columns (3) and (4), we assess whether promoted officers' spouses have any health conditions or have experienced any sickness or injury that might affect their employ-

[46] Nearly 97 percent of police officers' spouses are women of approximately 29 years of age.
[47] We made this decision based on the bimodal shape of the age distribution of police officers' relatives.

ment. We do not observe significant impacts on these factors. Finally, in column (5), we evaluate whether the spouses of promoted officers are more likely to be enrolled in an education program, but we find no significant impact on this outcome.

Given the potential impact of relocation on employment opportunities, we investigate whether a change in city of residence explains the labor supply response among the spouses of promoted officers. In Section V.4, we show that police officers are significantly more likely to move from the city where they lived before their promotion. In Figure 14b, we show estimates for spouses who relocate and those who do not relocate. These findings should be interpreted with caution, as we are conditioning on an outcome. We observe negative effects on employment rates for both spouses who relocate and those who stay in their pre-promotion cities. While these estimates are imprecise, it is notable that relocating spouses experience a less significant decline in employment, although they are more likely to be seeking for a job.

Based on the previous evidence, we conclude that the effects shown in Table 4 are primarily driven by spouses with children and older relatives in the households of police officers. We rule out alternative explanations, as our analysis indicates that promotions do not significantly influence fertility decisions and that relocation does not account for the observed effects on employment.

V.4. Household Decisions and Additional Effects

City of Residence.—Job relocation can be part of promotion offers extended by employers (Petriglieri, 2018). In Colombia, early-career officers are subject to transfers to different police divisions every two years as part of a 'rotation' plan. As mentioned in section II, transfer decisions are made by the central level of the police organization and can be motivated by both voluntary requests and staffing needs in specific units. Officers participating in the annual promotion process are informed during the exam registration period that they may be transferred to maintain a balanced distribution of ranks within and across police departments. Although we do not observe transfer decisions or job location over time, we can still examine how promotions influence officers' city of residence.

The census collects retrospective information on place of residence. Using this data, we estimate whether promoted officers are more likely to relocate from their pre-promotion city and assess how certain city characteristics may shift as a result. Table 6 presents the results of this empirical analysis. Column (1) shows that promoted officers are 9 percentage points (or 90 percent) more likely to reside in a different city post-promotion. To investigate whether their job location may have also changed, we examine broader geographic areas: police departments.[48] Column (2) indicates that

[48]Colombia has approximately 1,120 cities or municipalities, which are grouped into 53 police depart-

officers are 9.6 percentage points (or 123 percent) more likely to relocate to a city outside their pre-promotion police department. This evidence suggests that officers are more likely to be transferred once they are promoted.

In columns (3) to (7), we investigate how city characteristics change with relocation. We examine whether promoted officers are more likely to move to a major city, their birthplace, a city with a higher crime rate, a city with a higher unemployment rate, and a city with a greater number of banks per capita.[49] These results indicate that officers are not more likely to relocate to a major city, their city of origin, or a city with a higher crime rate. However, they are more likely to move to cities with lower unemployment rates and a higher number of banks per capita. This suggests that officers' preferences may play an important role in their relocation decisions, possibly indicating a desire for better economic opportunities and financial stability.

Family Decisions.—Promotions can affect workers' decision-making roles within their households as well as other family outcomes (Uckat, 2023; Halla, Schmieder and Weber, 2020). We study whether promotions can affect police officers' household roles, marital status, and family size. Table 7 presents the results of this exercise. In Column (1), we use an indicator equal to one if officers are classified as household heads.[50] We don't find evidence that promoted officers are more likely to be heads, suggesting that promotions may not affect decision-making roles within households.

Columns (2) to (4) present estimates of the effect of promotions on marital status. We do not find evidence that promoted officers are more likely to be married or single, although we find a negative and weakly significant effect on the likelihood of being divorced. This estimate suggests that police officers are 4.2 percentage points (or 52 percent) less likely to be divorced after promotion. Furthermore, the evidence in columns (5) and (6) suggests that family size does not change after promotions, as we find null estimates on the number of household members and an indicator for whether there are children under two years of age within the household.

Previous research has shown that men's family relationships are typically unaffected by promotions, while women's household outcomes tend to be more responsive (Folke and Rickne, 2020). Our findings align with this evidence, as our sample primarily consists of men. Consequently, we lack sufficient statistical power to estimate separate effects for men and women.

Worker Health.—We conclude our analysis by examining the potential impact of promotions to higher-paying positions on workers' health outcomes. This question is

ments. For additional details, see Appendix Figure A.4.

[49] Crime rates, unemployment levels, and the number of banks are measured in 2017, prior to officers' promotions. We classify cities according to deciles for each measure. We use these classifications to compare city characteristics over time.

[50] The household head is defined as the person recognized by other family members as having the primary decision-making role. In cases where there is uncertainty about who the head is, this definition is provided to household members when completing the census questionnaire.

inherently empirical, as individuals with higher income or occupational status tend to exhibit better health and well-being outcomes (Lindqvist, Östling and Cesarini, 2020; Lindahl, 2005; Johnson, Sorlie and Backlund, 1999). On the other hand, promotions may increase responsibility, accountability, and work hours, which can negatively impact workers' health and job satisfaction (Johnston and Lee, 2013). The census data allows us to observe two health-related outcomes. First, individuals report whether they have any physical or mental conditions that impair daily activities, such as walking, talking, listening, or eating. Second, respondents indicate whether they experienced any sickness, accident, or health or dental issue that required a specialist visit in the month prior to the survey. Columns (7) and (8) of Table 7 present regression discontinuity estimates using these health indicators as outcomes.

The results show a negative association, suggesting that marginally promoted officers exhibit better health outcomes compared to otherwise similar workers who were not promoted. However, these effects are not statistically different from zero. This is consistent with evidence by Boyce and Oswald (2012) and Johnston and Lee (2013), who report that promotions have a minimal impact on physical health outcomes but can negatively affect mental health in the medium run. While our estimates rely on weaker identification assumptions, they are specific to the police occupation. Additionally, our health outcomes are self-reported, and we do not have data on psychological well-being or mental health.

VI. Conclusion

This paper uses novel micro-level data on promotions to study how credit utilization, debt, and household labor supply respond to a pay raise. To address endogeneity concerns, we leverage the quasi-random allocation of promotions among early-career police officers in Colombia. This variation arises from an exam-based policy that allows us to compare the outcomes of nearly identical individuals before and after they receive a 25 percent increase in their monthly salary. Bureaucratic regulations affecting the timing of promotions allow us to distinguish between the impact of a raise announcement and the actual effect of receiving the raise.

We find that, four years after promotion, police officers accumulate an additional debt of approximately 1,905 USD (or 160 percent of their annual earnings increase) and are 3 percentage points (or 3.4 percent) more likely to have outstanding loans. These credit responses are primarily driven by the decision to take out mortgages and personal loans. Specifically, mortgages account for 44 percent of the total debt, and officers are 3.9 percentage points (or 60 percent) more likely to hold this type of credit. Personal loans, on the other hand, explain 52 percent of the debt response, while of-

ficers' likelihood of having such loans only increases by about 2.8 percentage points (or 3.4 percent). Significant credit responses are documented only after promoted officers receive their raises, as we observe negligible effects during the nine months following the pay increase announcement. This behavior may indicate that officers are credit-constrained. We explore this possibility by estimating heterogeneous responses among individuals with low and high debt prior to promotion. The differential effects estimated for these groups suggest that our average response may indeed be explained by binding constraints.

Using household data, we analyze the labor supply responses among relatives of promoted police officers. We find that officers' spouses are 13 percentage points (or 25 percent) less likely to be employed, indicating a cross-wage elasticity of approximately 1. This effect is stronger for spouses with school-age children, among whom employment declines by 18 percentage points (or 35 percent). We rule out potential mechanisms, including changes in fertility decisions, job relocation, health deterioration, or school enrollment, as explanations for this employment response. Additionally, our estimates show a decrease of 11 percentage points (or 26 percent) in employment of older relatives within households. Overall, the adult relatives of promoted officers increase their involvement in home production by 6.7 percentage points (or 25 percent).

We contribute to the existing literature by providing credible evidence that the announcement of a pay raise does not lead to an increase in debt, suggesting that borrowing constraints may limit consumption smoothing through credit instruments. This conclusion is supported by the strong credit response we observe once the earnings shock is realized, and individuals' earnings-to-debt ratio increases. Notably, this response is primarily characterized by changes in installment credit, such as mortgages and personal loans, and only one-third of the earnings shock is required to cover these obligations each month. This may help explain the significant decline in employment rates among individuals' spouses, indicating that households rely on credit to reallocate their time and consumption (e.g., housing) following a pay raise.

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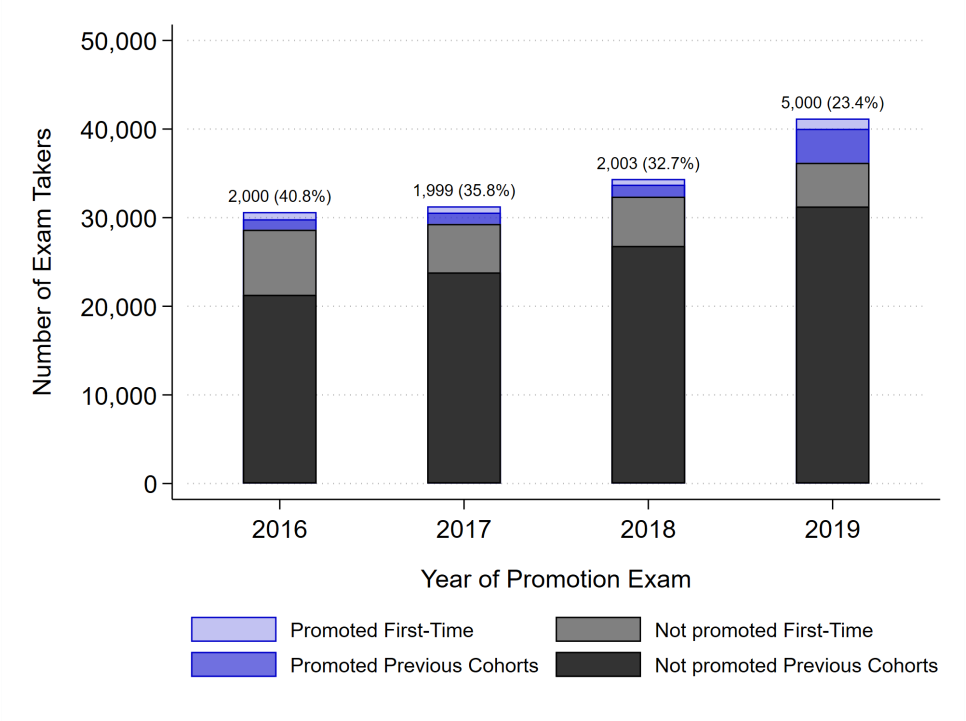
Figures and Tables

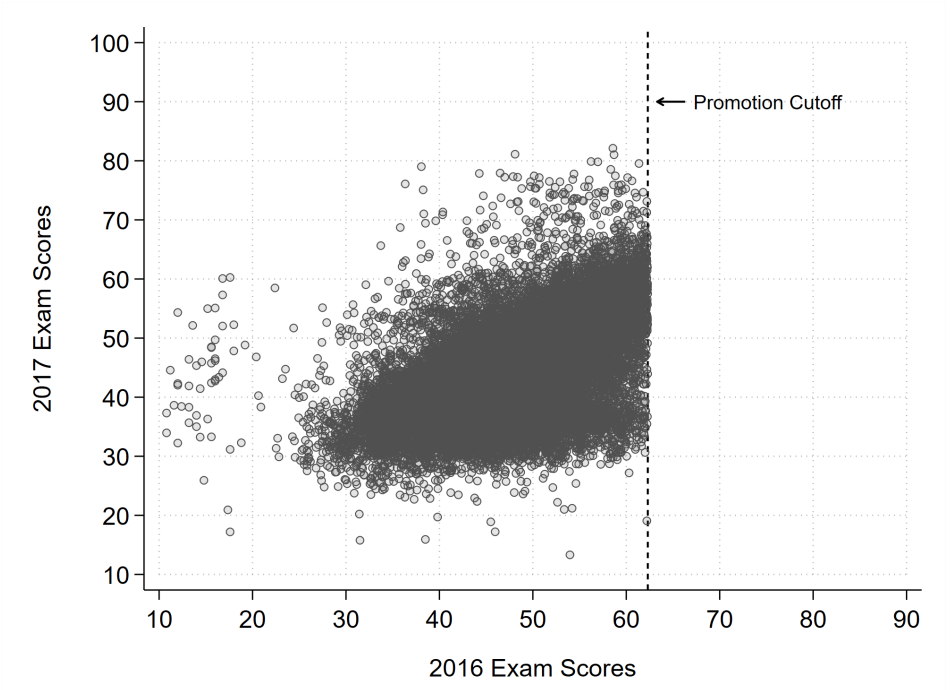
Figure 1: Police Officers by Promotion Exam, 2016-2019



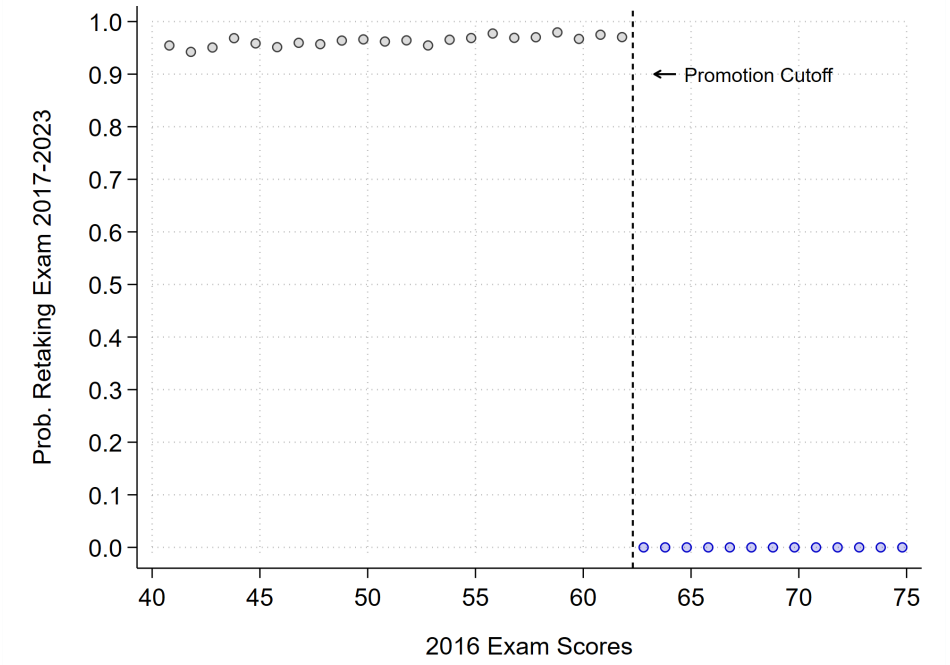
Notes. Each bar represents the number of patrol officers taking the promotion exam between 2016 and 2019. The light blue area at the top of each bar represents the number of officers who became eligible to take the exam for the first time, scored above the promotion cutoff, and will be promoted to a higher-paying rank. The dark blue area corresponds to officers who became eligible in previous years and are not being promoted. The light gray area represents officers who became eligible to take the exam and are being promoted, while the dark gray area represents officers who were eligible in previous years but are not being promoted. The label at the top of each bar shows the number of officers being promoted in each cycle, with the percentage of first-time takers in parentheses.

Figure 2: Exam-based Promotion Policy: Promotion Cutoff and Exam Retake Rates

(a) Scatter Plot of Exam Scores Over Time



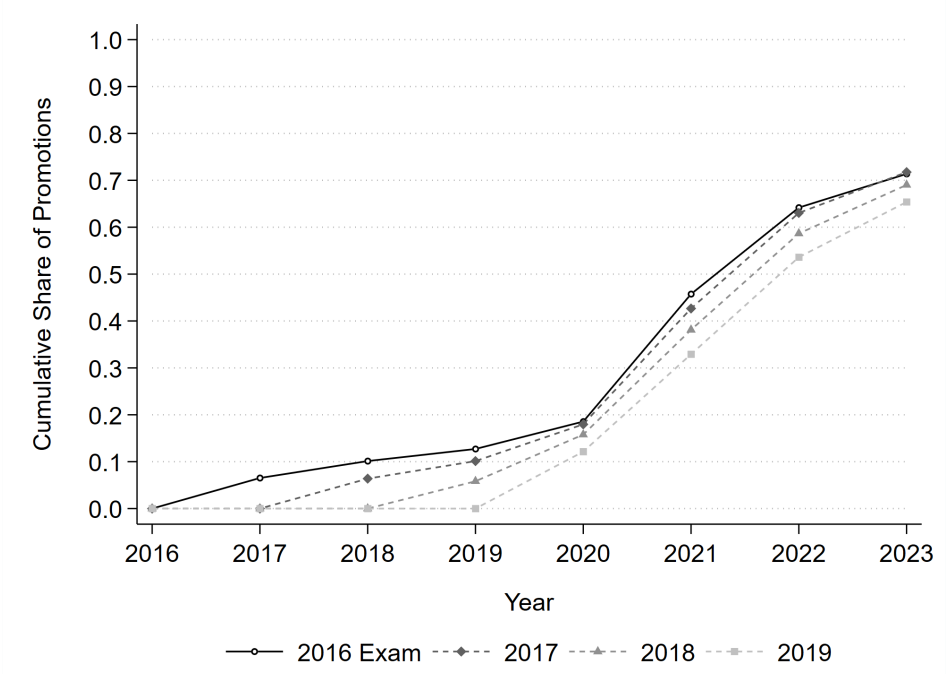
(b) Probability of Retaking the Exam as a Function of Scores



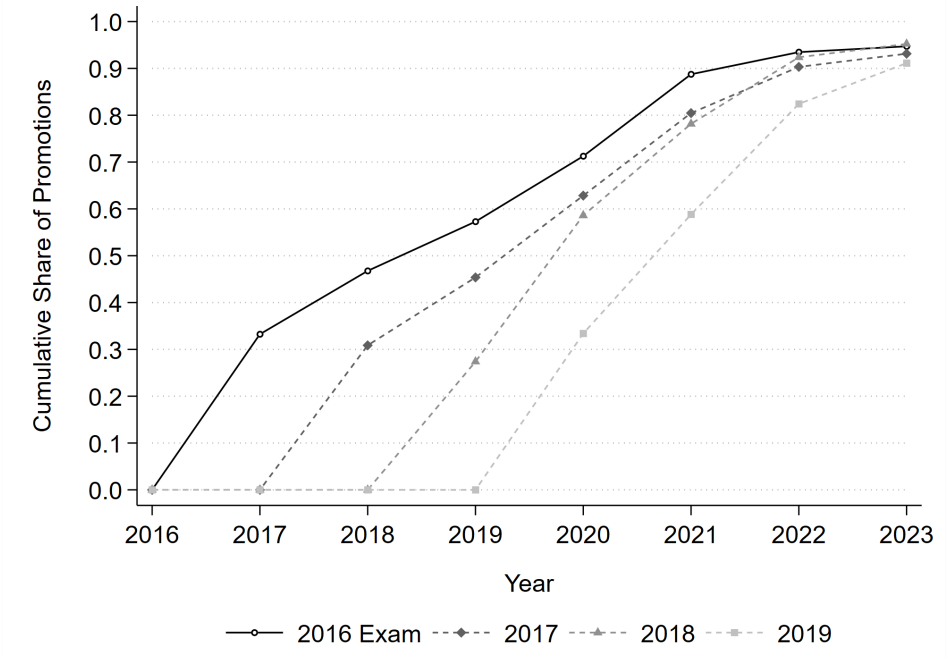
Notes. Panel (a) represents the bivariate distribution of scores among officers who took the promotion exam in the 2016 and 2017 cycles. Panel (b) shows the probability that patrol officers who participated in the 2016 process will retake the exam in any year between 2017 and 2023.

Figure 3: Promotion Rates by Year of Exam

(a) All Exam Takers



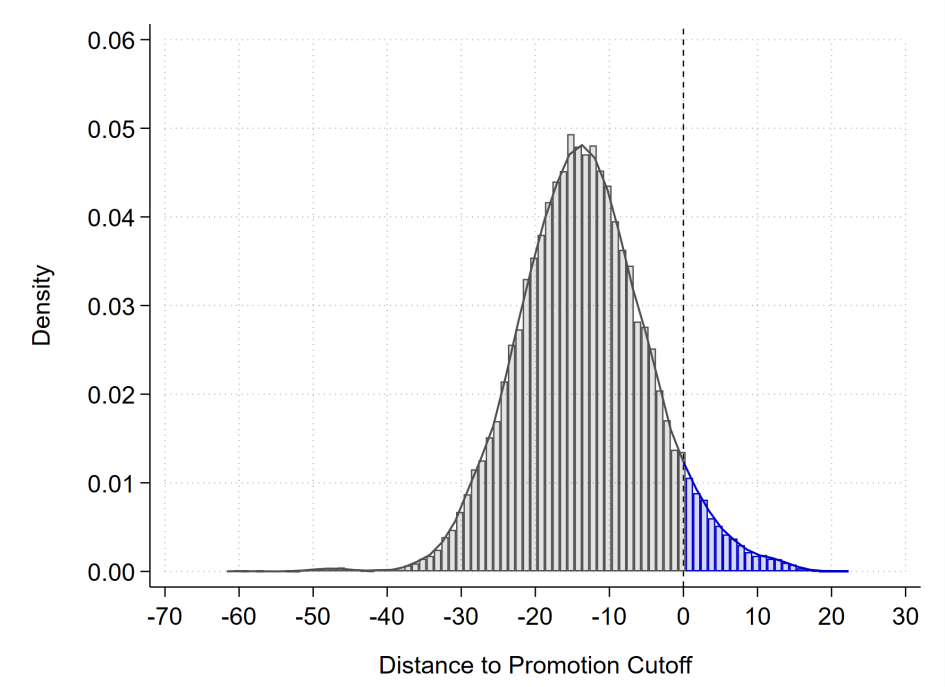
(b) Exam Takers Near Promotion Cutoff



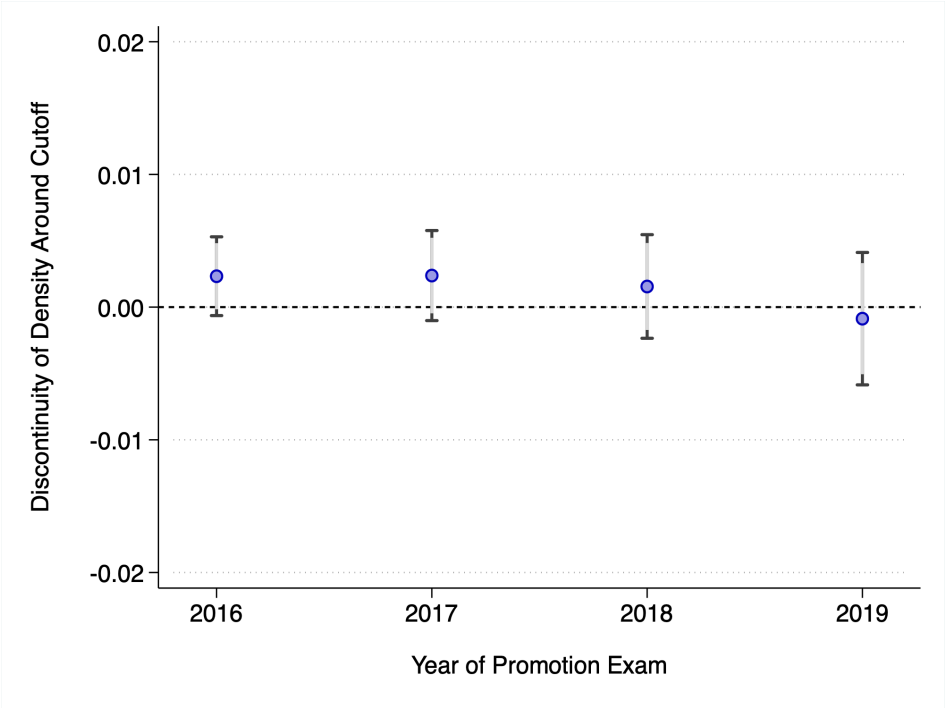
Notes. Lines in Panel (a) represent the share of officers promoted by year t among those who took the promotion exam in a specific year from 2016 to 2019. Lines in Panel (b) represent the share of officers promoted by year t among those who took the promotion exam in a specific year and scores within 4.4 points from the promotion cutoff.

Figure 4: Density Smoothness Around the Promotion Cutoff

(a) Running Variable Density

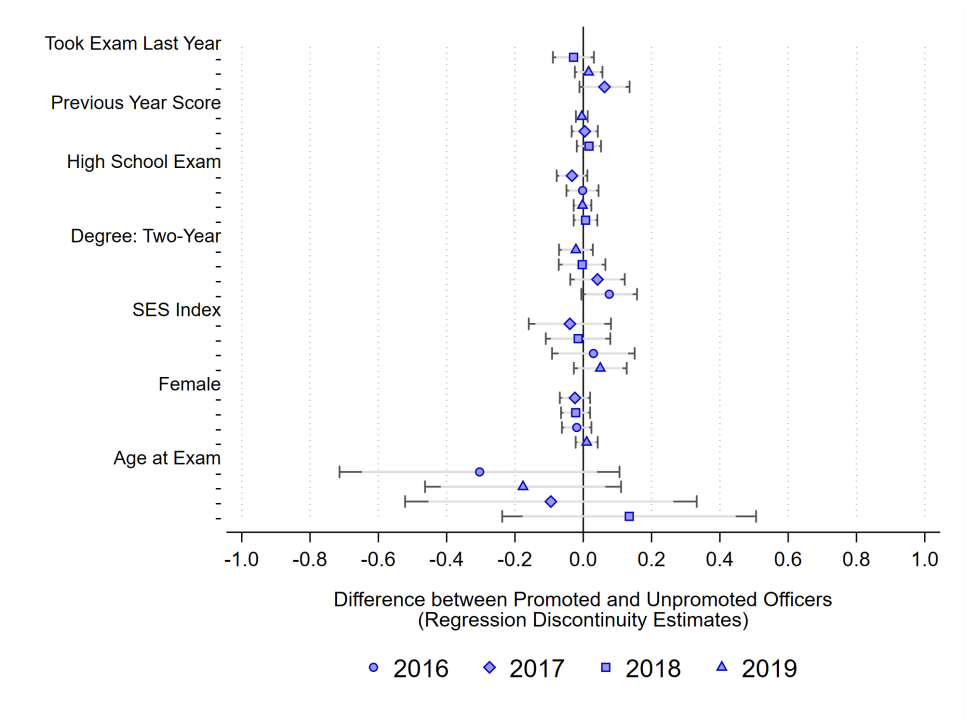


(b) Manipulation Test



Notes. Panel (a) presents the estimated density of scores in the 2016 promotion exam. Scores are recentered by subtracting the promotion cutoff. Panel (b) displays the estimated discontinuity in the density of scores based on the manipulation test proposed by Cattaneo, Jansson and Ma (2020). Under the null hypothesis of this test there is no manipulation (or discontinuity in the density) of scores. Point estimates for each promotion process between 2016 and 2019 are displayed in this figure. Corresponding 90 and 95 percent confidence intervals are displayed around each coefficient.

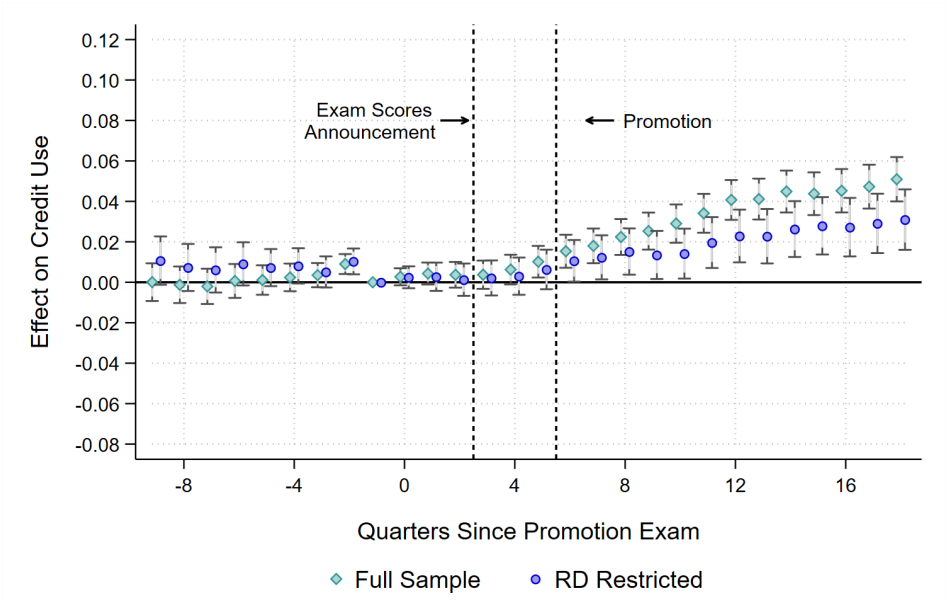
Figure 5: Covariate Balance Around the Promotion Cutoff



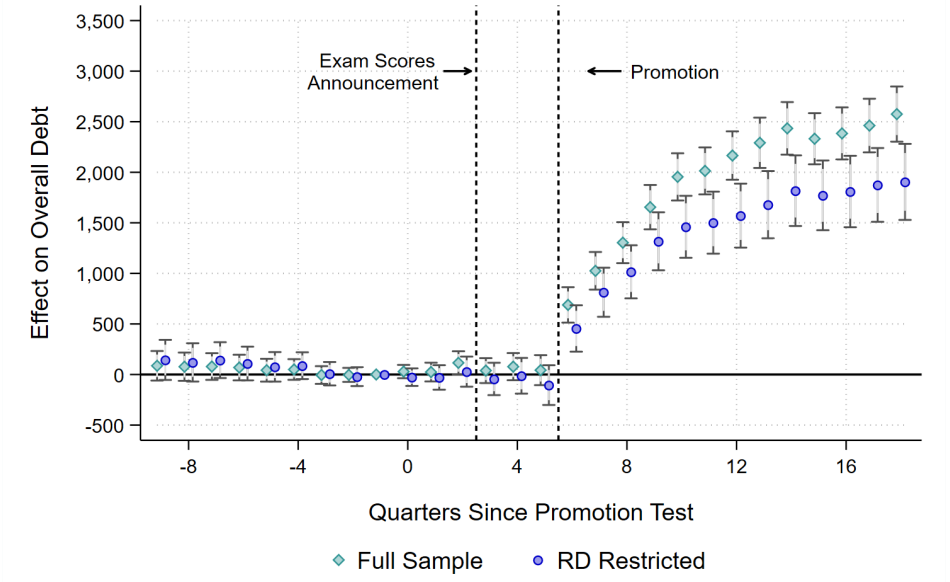
Notes. Plotted estimates represent regression discontinuity coefficients using pre-determined covariates as outcome variables. The running variable is the distance of scores to the promotion cutoff. Estimates across regressions are obtained from linear local regressions with an Epanechnikov kernel and a fixed bandwidth of 4.4 points. This value represents the average bandwidth from separate regressions where the tuning parameter is chosen by minimizing the mean squared errors. Corresponding 90 and 95 percent bias-corrected confidence intervals are displayed around each coefficient. Intervals are computed following the estimator proposed by Calonico, Cattaneo and Titiunik (2014).

Figure 6: Credit Utilization and Debt Responses to a Promotion-based Pay Raise

(a) Extensive Margin: Credit Use



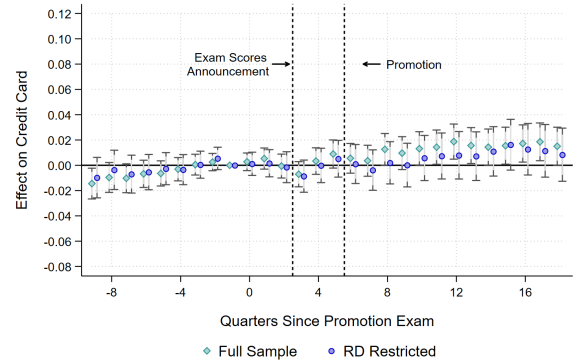
(b) Intensive Margin: Debt



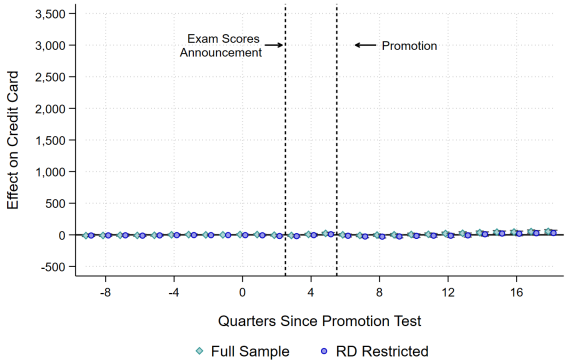
Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. In Panel (a), the outcome variable is an indicator equal to 1 if the individual has any outstanding loans in a given year-quarter. In Panel (b), the outcome variable is accumulated debt, defined as the sum of principal amounts across outstanding loans in a given year-quarter. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Individuals can hold five types of credit, including credit cards, personal loans, mortgages, vehicle loans, and small business credit. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Figure 7: Credit Utilization and Debt Responses to a Promotion-based Pay Raise, by Loan Type

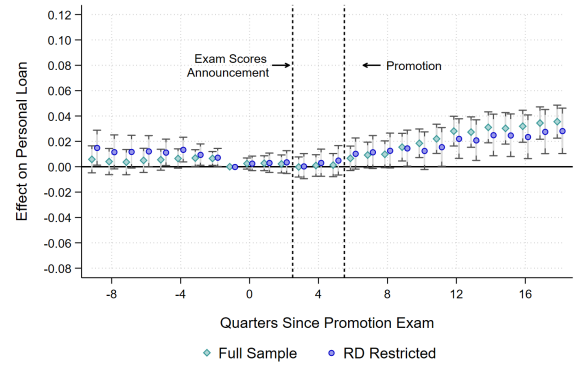
(a) Extensive Margin: Credit Card



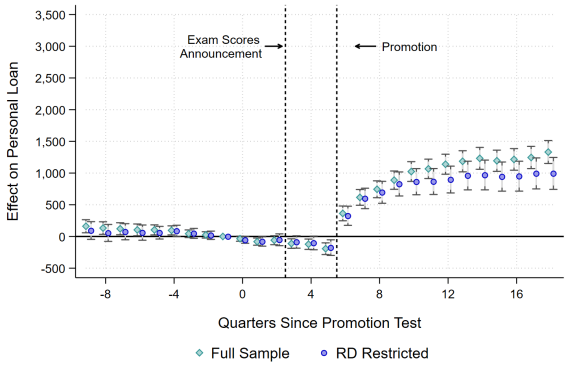
(d) Intensive Margin: Credit Card



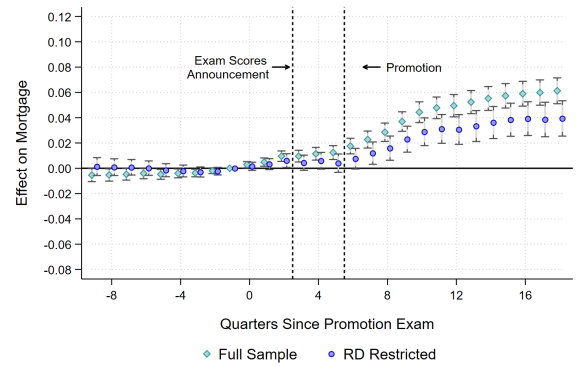
(b) Extensive Margin: Personal Loans



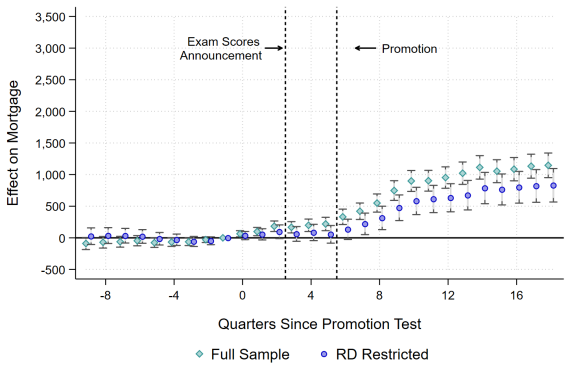
(e) Intensive Margin: Personal Loans



(c) Extensive Margin: Mortgage



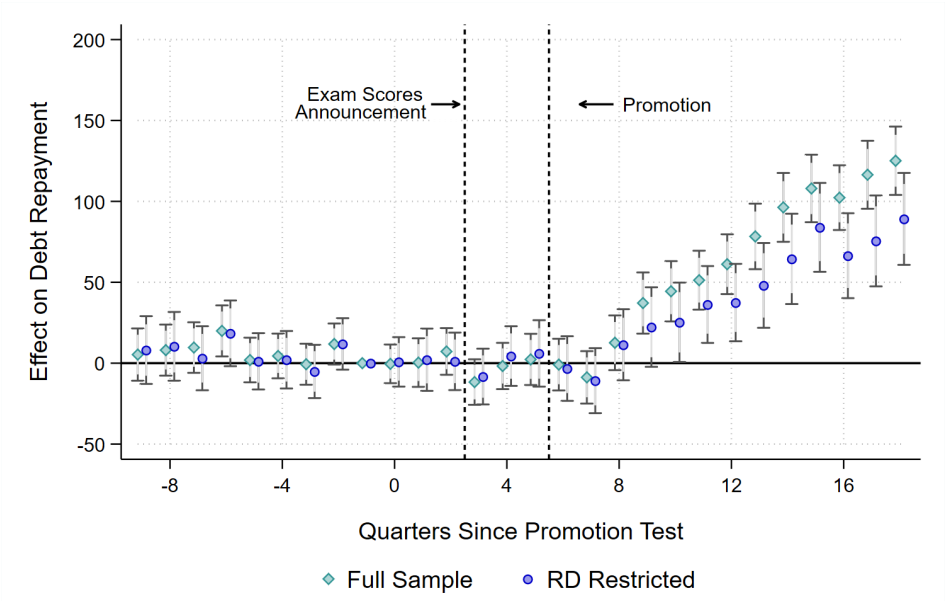
(f) Intensive Margin: Mortgage



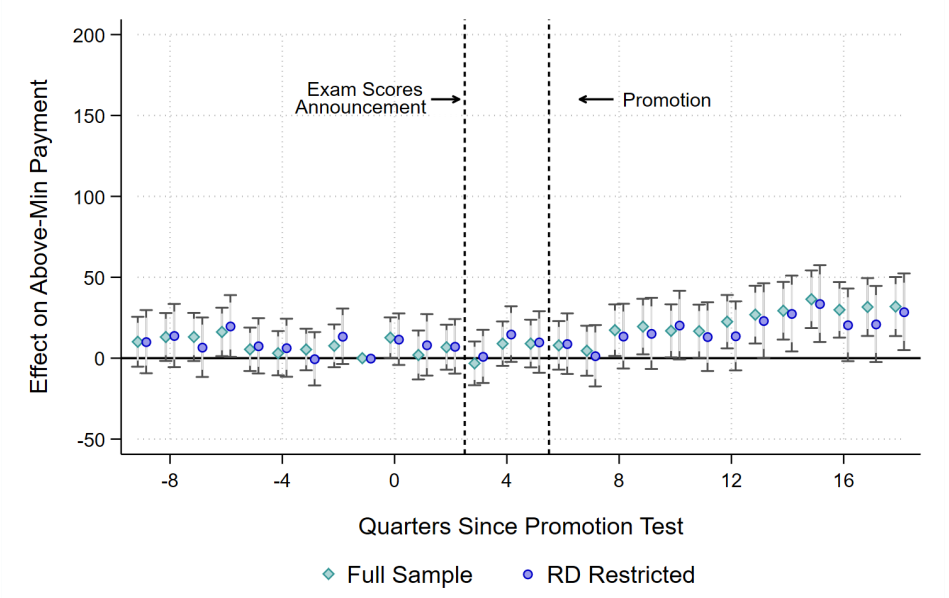
Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. The outcome variables in panels (a), (b), and (c) indicate whether the individual is a credit card holder, has an outstanding personal loan, or holds a mortgage in a given year-quarter. In panels (d), (e), and (f), the outcome variables correspond to the outstanding credit card debt, personal loan debt, and mortgage debt. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Figure 8: Debt Repayment Responses to a Promotion-based Pay Raise

(a) Quarterly Payments (Principal + Interest)



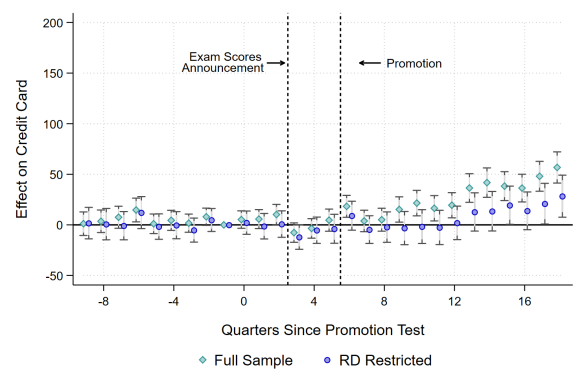
(b) Above-Minimum Payments (Payments - Minimum Due)



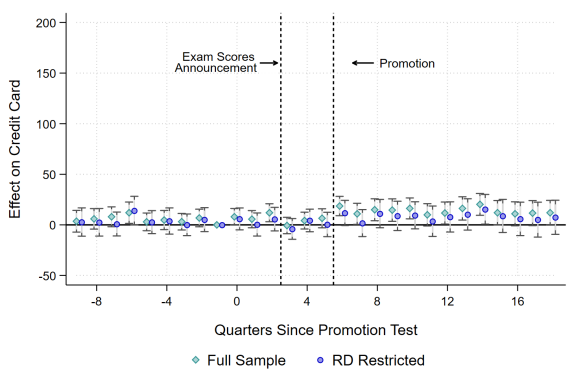
Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. In Panel (a), the outcome variable is the sum of all payments made towards principal and interest for any outstanding credit in a given year-quarter. In Panel (b), the outcome variable is the sum of all payments made minus the minimum due across all outstanding loans in a given year-quarter. We express payments in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Individuals can hold five types of credit, including credit cards, personal loans, mortgages, vehicle loans, and small business credit. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Figure 9: Debt Repayment Responses to a Promotion-based Pay Raise, by Loan Type

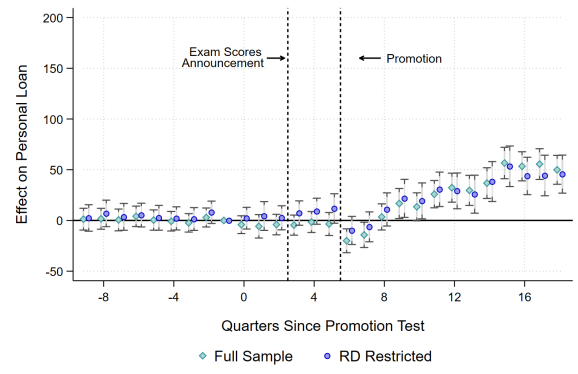
(a) Payment: Credit Card



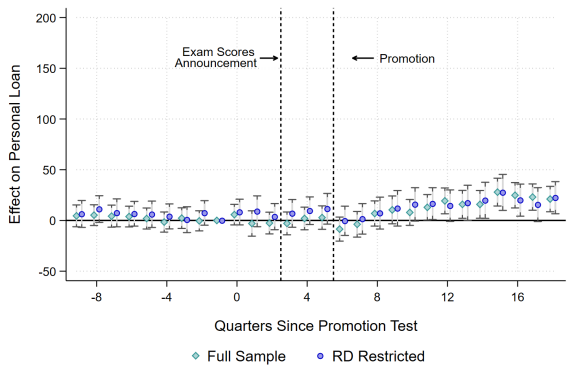
(d) Above-Minimum: Credit Card



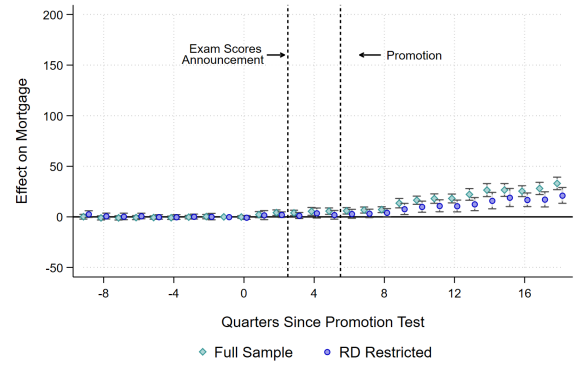
(b) Payment: Personal Loans



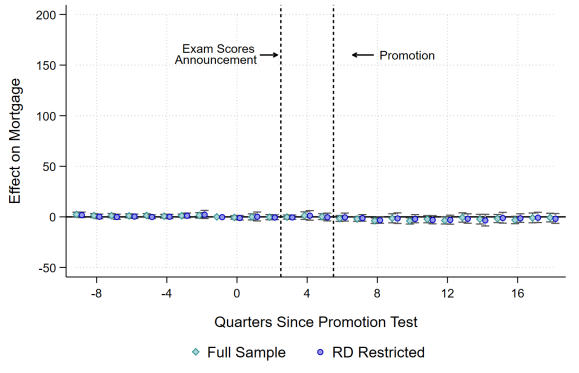
(e) Above-Minimum: Personal Loans



(c) Payment: Mortgage



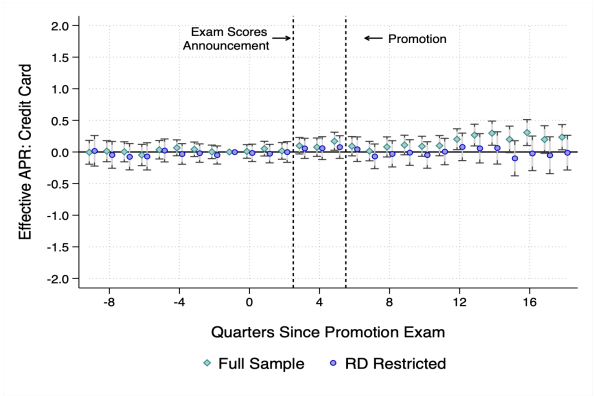
(f) Above-Minimum: Mortgage



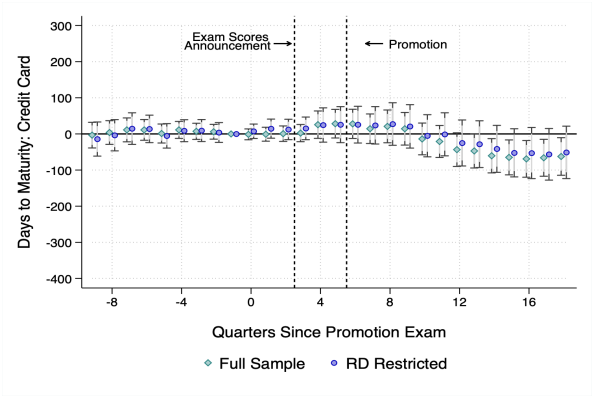
Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. The outcome variables in panels (a), (b), and (c) are credit card payments, personal loan payments, and mortgage payments made towards principal and interest in a given year-quarter. In panels (d), (e), and (f), the outcome variables correspond to the payments made on top of the minimum due for credit cards, personal loans, and mortgage in a given year-quarter. We express payments in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Figure 10: Credit Response Mechanisms: Interest Rates and Loan Maturity

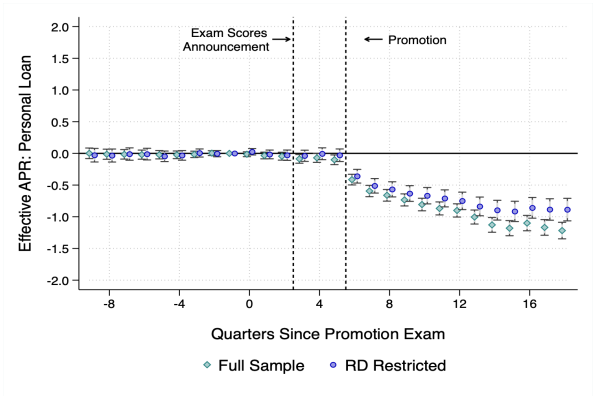
(a) Interest Rate: Credit Card



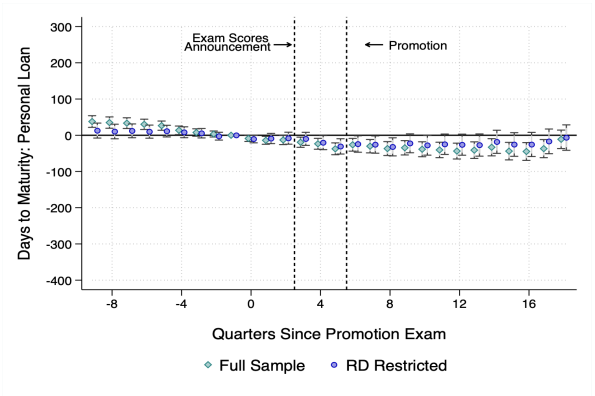
(d) Time to Maturity: Credit Card



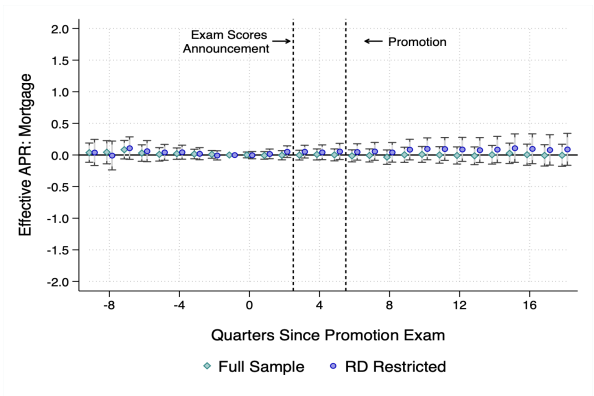
(b) Interest Rate: Personal Loans



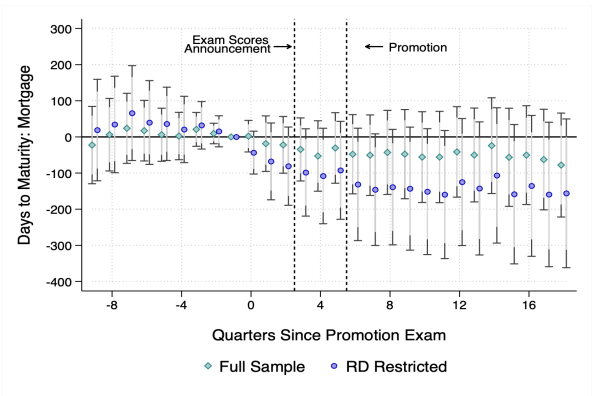
(e) Time to Maturity: Personal Loans



(c) Interest Rate: Mortgage



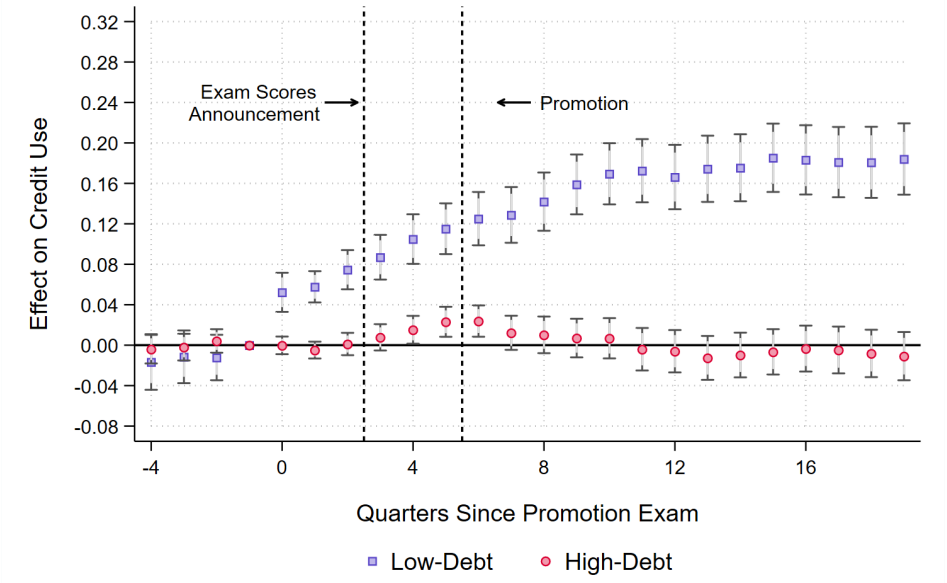
(f) Time to Maturity: Mortgage



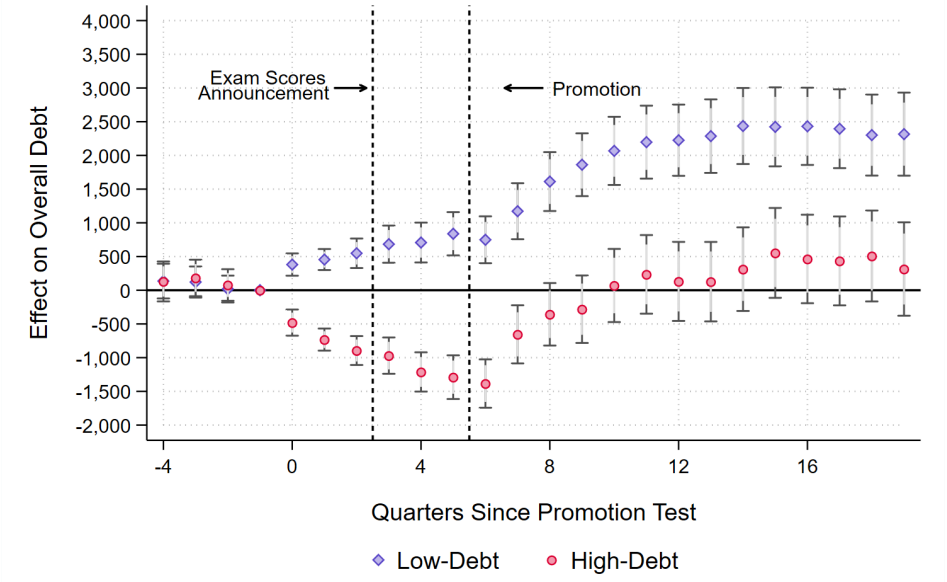
Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. The outcome variables in panels (a), (b), and (c) correspond to the average effective annual interest rates for any credit cards, personal loans, and mortgages in a given year-quarter. In panels (b), (d), and (f), the outcome variables are the days to maturity of credit cards, personal loans, and mortgages in a given year-quarter. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Figure 11: Credit Response Mechanisms: Estimates by Pre-Exam Debt Level

(a) Extensive Margin: Credit Use



(b) Intensive Margin: Debt

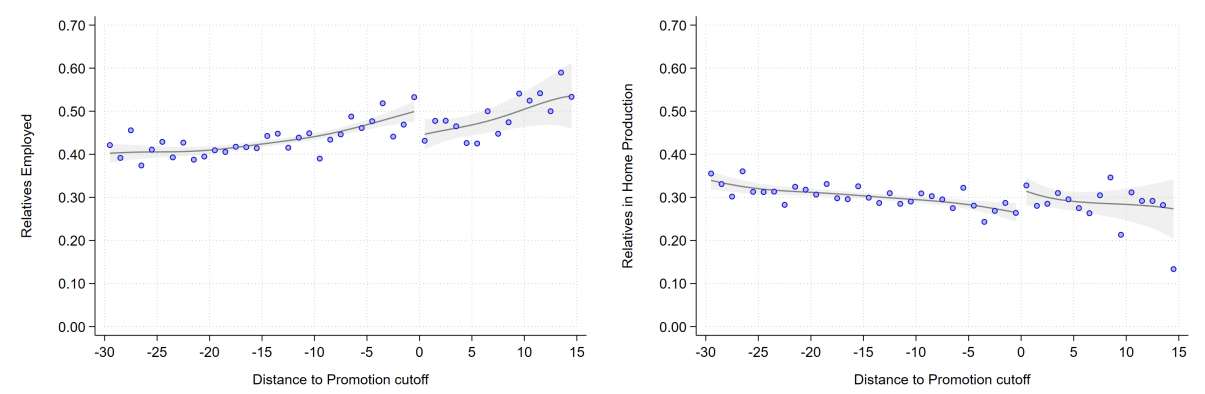


Notes. Ordinary Least Squares estimates of the dynamic effects from equation $Y_{it} = \alpha + \sum_{k\neq -1} \beta_k^I P_{it-k}^I + \sum_{k\neq -1} \beta_k^{II-III} P_{it-k}^{II-III} + \sum_{k\neq -1} \beta_k^{IV} P_{it-k}^{IV} + \mu_i + \lambda_t + X_{it}'\gamma + \varepsilon_{it}$. P_{it-k}^j indicates the quarters relative to the exam date for promoted officers classified in debt group $j \in \{I, II-III, IV\}$. Debt groups are defined based on quartiles using pre-exam information. Group I represents the bottom quartile (low-debt), and group IV represents the top quartile (high-debt). In Panel (a), the outcome variable is an indicator equal to 1 if the individual has any outstanding loans in a given year-quarter. In Panel (b), the outcome variable is accumulated debt, defined as the sum of principal amounts across outstanding loans in a given year-quarter. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Individuals can hold five types of credit, including credit cards, personal loans, mortgages, vehicle loans, and small business credit. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Figure 12: Household Labor Supply Response to a Promotion-based Pay Raise

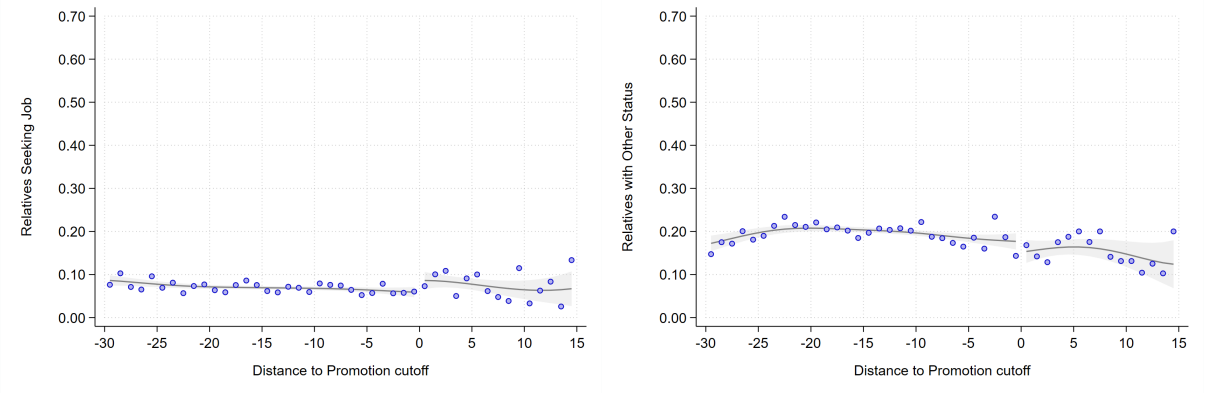
(a) Employment Status: Employed

(b) Employment Status: Home Production



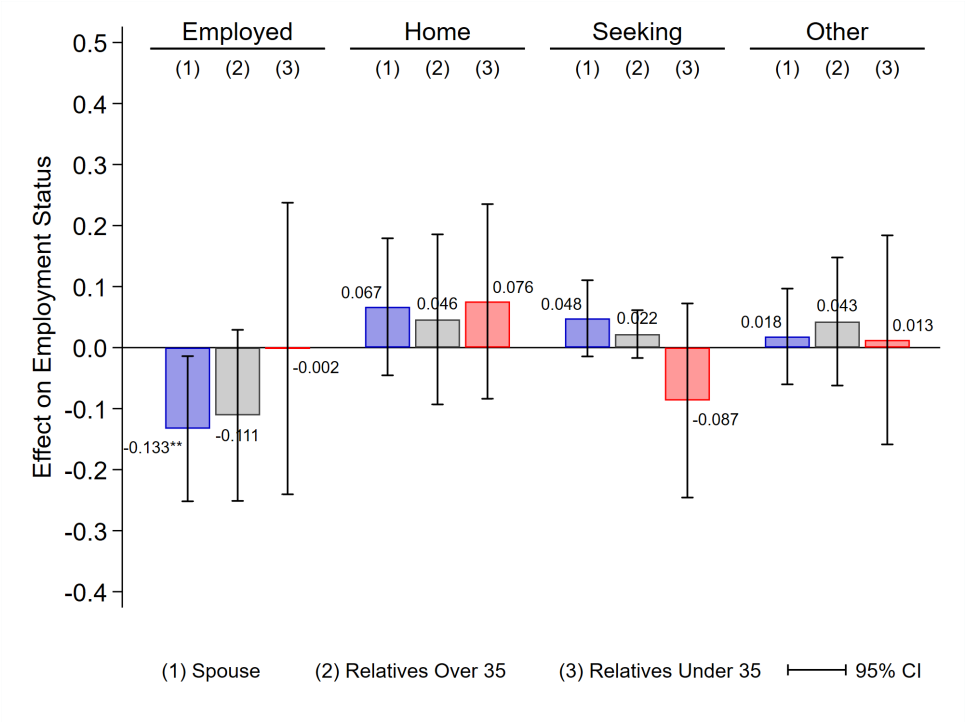
(c) Employment Status: Seeking Job

(d) Employment Status: Other



Notes. Likelihood of a promoted worker's spouse to be employed as a function of the running variable (i.e., the distance of scores to the promotion cutoff). Only police officers taking the promotion exam in 2016 are considered to compute estimates. Across panels, plotted dots represent local averages within equidistant bins of the running variable. A width of 0.5 is used to compute local averages. Solid lines represent linear local regressions using a bandwidth equal to 5 and an Epanechnikov kernel. 95 percent confidence intervals are displayed around each local regression on both sides of the cutoff.

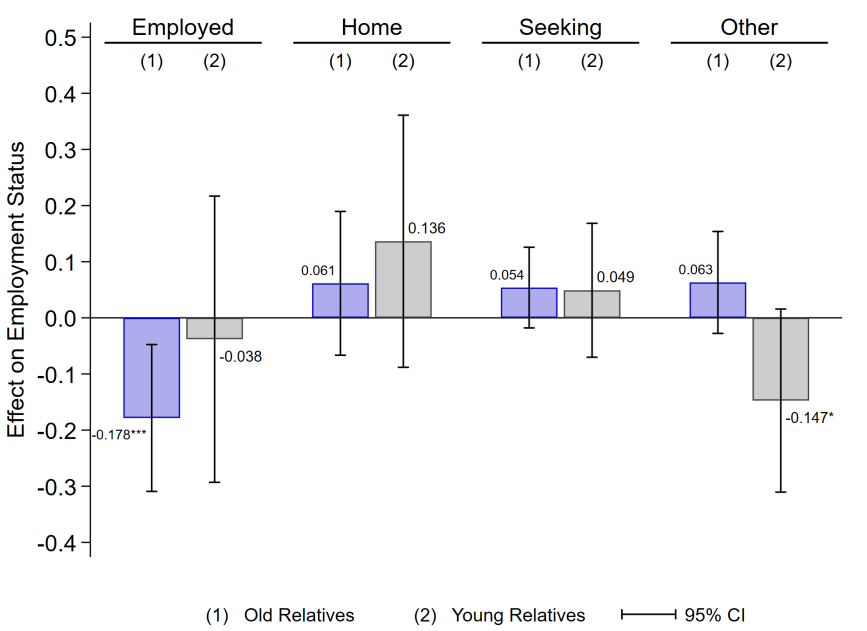
Figure 13: Labor Supply Responses by Type of Relationship with Promoted Workers



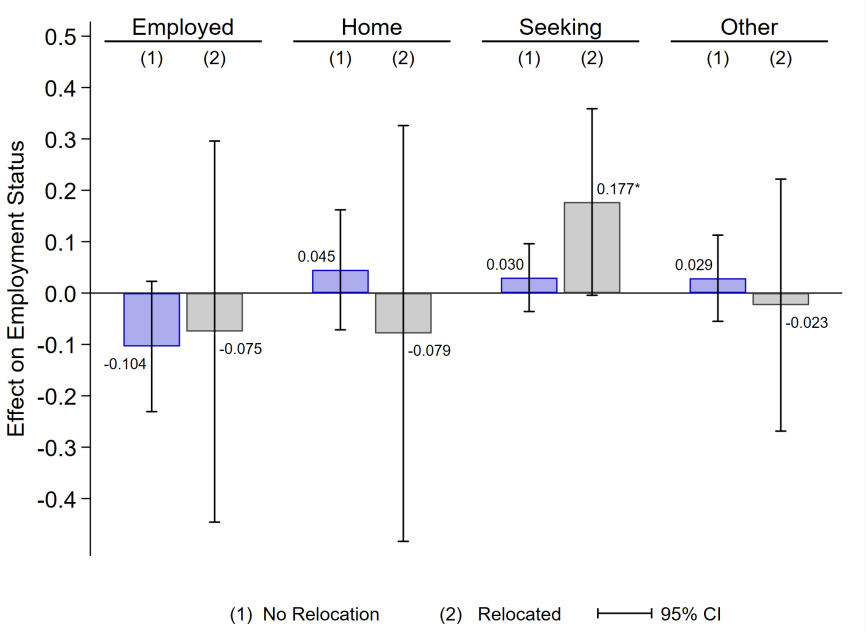
Notes. Estimates in this figure are regression discontinuity coefficients of the effect on the employment status of police officers' relatives. Following the census definition, we classify an individual as employed if during the week of reference, they *(i)* worked at least one hour as a paid employee, *(ii)* worked without pay for at least one hour, or *(iii)* were temporarily absent from a paid job or business. Other employment activities include: *(i)* studying, *(ii)* being retired or living off a pension or rent, *(iii)* being permanently incapacitated, and *(iv)* other. Panel (a) presents estimates for all spouses, as well as for spouses with children under 16 years of age and those with no children or whose children are over 16. Panel (b) displays estimates for other household members (excluding spouses), distinguishing between those under and over 35 years of age. The running variable is the distance of officers' scores to the promotion cutoff. Estimates use linear local regressions, an Epanechnikov kernel, and MSE-optimal bandwidths. 95 percent bias-corrected confidence intervals are displayed around coefficients. Intervals are computed following the estimator proposed by Calonico, Cattaneo and Titiunik (2014). * $p<0.10$, ** $p<0.05$, ***

Figure 14: Spouses' Labor Supply Response: Children Presence and Job Relocation

(a) Employment Status by Presence of Children



(b) Employment Status by Job Relocation



Notes. Estimates in this figure are regression discontinuity coefficients of the effect on the employment status of police officers' relatives. Following the census definition, we classify an individual as employed if during the week of reference, they *(i)* worked at least one hour as a paid employee, *(ii)* worked without pay for at least one hour, or *(iii)* were temporarily absent from a paid job or business. Other employment activities include: *(i)* studying, *(ii)* being retired or living off a pension or rent, *(iii)* being permanently incapacitated, and *(iv)* other. Panel (a) presents estimates for all spouses, as well as for spouses with children under 16 years of age and those with no children or whose children are over 16. Panel (b) displays estimates for other household members (excluding spouses), distinguishing between those under and over 35 years of age. The running variable is the distance of officers' scores to the promotion cutoff. Estimates use linear local regressions, an Epanechnikov kernel, and MSE-optimal bandwidths. 95 percent bias-corrected confidence intervals are displayed around coefficients. Intervals are computed following the estimator proposed by Calonico, Cattaneo and Titiunik (2014). * $p<0.10$, ** $p<0.05$, ***

Table 1: Summary Statistics by Promotion Status, 2016-2019

	Full Sample		Promoted		Unpromoted	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
	(1)	(2)	(3)	(4)	(5)	(6)
Individual Characteristics :						
Female	0.07	0.26	0.13	0.34	0.06	0.24
Age at Exam	31.46	2.60	29.46	2.33	31.72	2.61
SES Index	2.21	0.77	2.33	0.74	2.18	0.77
Born in Main City	0.48	0.50	0.48	0.50	0.48	0.50
Completed Education :						
2-Year College	0.46	0.50	0.51	0.50	0.45	0.50
3-Year College	0.06	0.23	0.08	0.27	0.05	0.22
Bachelor's Degree	0.07	0.26	0.15	0.35	0.05	0.22
Marital Status :						
Married	0.66	0.47	0.62	0.49	0.67	0.47
Divorced	0.06	0.25	0.06	0.24	0.07	0.25
Single	0.27	0.44	0.31	0.46	0.25	0.44
Household Characteristics :						
Household Head	0.73	0.44	0.72	0.45	0.74	0.44
Family Size	2.73	1.56	2.77	1.52	2.72	1.57
Relative Under 17	0.45	0.50	0.46	0.50	0.44	0.50
Relative 18–40	0.55	0.50	0.56	0.50	0.55	0.50
Relative Over 41	0.22	0.41	0.23	0.42	0.22	0.41
Observations	54,303		11,002		43,301	

Notes. Summary statistics pooling officers who took the promotion exam between 2016 and 2019. Households in Colombia are classified into six socioeconomic status (SES) categories, where 1 corresponds to the poorest and 6 to the richest. The main factors determining a household's SES category are the physical condition of the living place, access to essential utilities, and other neighborhood characteristics. We classify officers as low SES if they belong to any of the two poorer categories. Standard deviations are displayed in parentheses.

Table 2: Credit Utilization and Debt Responses to a Promotion-based Pay Raise

	Dependent Variable : Outstanding Credit or Debt					
	Any Type	by Credit Type :				
		Credit Card	Personal	Mortgage	Vehicle	Small Business
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A : Extensive Margin						
$P_i \times 1_{post-exam}$	–0.004	0.005	–0.007*	0.003	–0.005***	–0.001
	[0.003]	[0.005]	[0.004]	[0.003]	[0.002]	[0.001]
$P_i \times 1_{raise-notice}$	–0.002	0.004	–0.007	0.003	–0.004*	–0.001
	[0.004]	[0.006]	[0.005]	[0.003]	[0.002]	[0.001]
$P_i \times 1_{post-raise}$	0.015***	0.011*	0.009	0.026***	0.004	–0.002**
	[0.005]	[0.006]	[0.005]	[0.004]	[0.003]	[0.001]
R-squared	0.396	0.501	0.414	0.516	0.345	0.454
Mean Outcome	0.887	0.473	0.827	0.066	0.028	0.005
Panel B : Intensive Margin						
$P_i \times 1_{post-exam}$	–112.75	–3.81	–101.27**	23.51	–30.03***	–1.17
	[69.74]	[6.80]	[46.37]	[49.50]	[11.19]	[2.28]
$P_i \times 1_{raise-notice}$	–174.31**	0.56	–177.84***	29.88	–22.89	–4.00
	[85.28]	[8.31]	[56.36]	[60.24]	[14.21]	[3.01]
$P_i \times 1_{post-raise}$	1,321.19***	5.32	789.91***	517.29***	20.22	–11.55***
	[109.20]	[10.22]	[76.33]	[73.96]	[17.62]	[3.08]
R-squared	0.49	0.44	0.50	0.45	0.28	0.38
Mean Outcome	7396	346.5	5863	1045	129.2	11.66
Observations	646,080	646,080	646,080	646,080	646,080	646,080
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Ordinary least squares estimates of equation 2. In Panel A, the outcome variables indicate whether the individual holds a specific type of credit in a given year-quarter. In Panel B, the outcome variables are the accumulated debt in a specific credit type in a given year-quarter. All types of credit are used to define the outcomes in column 1. Debt is expressed in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. P_i is an indicator that equals 1 if an officer scored above the promotion cutoff in the most recent exam she took. $1_{post-exam}$ is an indicator equal to 1 for the quarters after taking the exam, but before scores are released. $1_{raise-notice}$ is an indicator equal to 1 for the quarters in which scores have been announced, officers are aware they will receive a pay raise, but the raise is not yet reflected in their monthly earnings. $1_{post-raise}$ is an indicator equal to 1 for the quarters after officers have assumed a higher-paying rank and begun receiving the pay raise. All regressions control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Standard errors are displayed in square brackets and are clustered at the individual level. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 3: Debt Repayment Responses to a Promotion-based Pay Raise

	Dependent Variable : Debt Repayment					
	Any Type	by Credit Type :				
		Credit Card	Personal	Mortgage	Vehicle	Small Business
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A : Quarterly Payments						
$P_i \times 1_{post-exam}$	–5.20	–1.72	0.39	–0.00	–2.20**	–0.69***
	[5.12]	[3.64]	[3.42]	[1.14]	[0.92]	[0.26]
$P_i \times 1_{raise-notice}$	–5.90	–8.54**	5.75	1.44	–3.01***	–0.70**
	[5.55]	[4.00]	[3.57]	[1.46]	[1.06]	[0.28]
$P_i \times 1_{post-raise}$	39.75***	8.26*	25.38***	11.44***	0.36	–0.74***
	[6.56]	[4.70]	[3.99]	[1.88]	[1.27]	[0.28]
R-squared	0.36	0.28	0.29	0.29	0.18	0.09
Mean Outcome	311.1	123.8	165	17.89	11.39	0.340
Panel B : Above-Min Payments						
$P_i \times 1_{post-exam}$	–0.13	0.53	0.76	–1.24	0.72	–0.50**
	[4.19]	[2.79]	[3.07]	[0.91]	[0.73]	[0.25]
$P_i \times 1_{raise-notice}$	0.33	–2.26	3.08	–0.54	1.17	–0.59***
	[4.36]	[3.00]	[3.07]	[1.14]	[0.87]	[0.23]
$P_i \times 1_{post-raise}$	9.06*	5.97*	7.29***	–2.23**	1.44	–0.13
	[4.63]	[3.38]	[2.61]	[0.98]	[1.67]	[0.22]
R-squared	0.12	0.11	0.12	0.14	0.18	0.06
Mean Outcome	–56.58	37.12	–85.93	–4	–0.140	–0.330
Observations	646,080	646,080	646,080	646,080	646,080	646,080
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Ordinary least squares estimates of equation 2. In Panel A, the outcome variables are the sum of payments made (toward principal and interest) for a specific credit type in a given year-quarter. In Panel B, the outcome variables are the sum of payments made minus the minimum due for a specific credit type in a given year-quarter. All types of credit are used to define the outcomes in column 1. Payments are expressed in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. P_i is an indicator that equals 1 if an officer scored above the promotion cutoff in the most recent exam she took. $1_{post-exam}$ is an indicator equal to 1 for the quarters after taking the exam, but before scores are released. $1_{raise-notice}$ is an indicator equal to 1 for the quarters in which scores have been announced, officers are aware they will receive a pay raise, but the raise is not yet reflected in their monthly earnings. $1_{post-raise}$ is an indicator equal to 1 for the quarters after officers have assumed a higher-paying rank and begun receiving the pay raise. All regressions control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Standard errors are displayed in square brackets and are clustered at the individual level. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 4: Household Labor Supply Response to a Promotion-based Pay Raise

	Dependent Variable : Employment Status							
	Worker				Workers' Relatives			
	Employed	Home	Seeking	Other	Employed	Home	Seeking	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A : 2016 Exam								
P_i	0.015	–0.010	0.001	–0.006	–0.106**	0.067*	0.019	0.020
	[0.034]	[0.007]	[0.005]	[0.033]	[0.042]	[0.039]	[0.021]	[0.031]
Observations	29,740	29,740	29,740	29,740	28,522	28,522	28,522	28,522
Bandwidth	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	1,159	1,159	1,159	1,159	1,171	1,171	1,171	1,171
Control Obs.	2,354	2,354	2,354	2,354	2,407	2,407	2,407	2,407
Mean Control	0.810	0.011	0.003	0.176	0.484	0.264	0.066	0.187
Panel B : Placebo (2017–2019)								
P_i	–0.010	0.000	0.002*	0.008	0.025	–0.020	–0.015	0.010
	[0.015]	[0.004]	[0.001]	[0.015]	[0.019]	[0.017]	[0.009]	[0.015]
Observations	104,936	104,936	104,936	104,936	99,510	99,510	99,510	99,510
Bandwidth	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	6,005	6,005	6,005	6,005	5,948	5,948	5,948	5,948
Control Obs.	13,436	13,436	13,436	13,436	13,272	13,272	13,272	13,272
Mean Control	0.783	0.014	0.001	0.202	0.451	0.282	0.071	0.196

Notes. Regression discontinuity estimates following equation (3). Worker-level information is used in columns (1) to (4), so $j = i$ in equation (3). The outcomes in these columns are indicators equal to one if any adult in a worker's household is employed, engaged in home production, seeking employment, or reporting another status. We impute zero for any worker without adults within her household. In columns (5) to (7), we use individual-level information of all adults within a worker's household. Therefore, $j \neq i$ in equation (3). The outcome in these columns is the employment status of the individual (or worker's relative). An individual is 'employed' if, during the week of reference, she *(i)* worked at least one hour as a paid employee, *(ii)* worked without pay for at least one hour, or *(iii)* were temporarily absent from a paid job or business. The 'other' category includes: *(i)* studying, *(ii)* being retired or living off a pension or rent, *(iii)* being permanently incapacitated, and *(iv)* other. The running variable is the distance of officers' scores to the promotion cutoff. All estimates are computed using linear local regressions, an Epanechnikov kernel, and MSE-optimal bandwidths. Robust biased-corrected standard errors are displayed in square brackets, following Calonico, Cattaneo and Titiunik (2014). Standard errors in Panel B are additionally clustered at the individual level. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 5: Alternative Mechanisms on the Labor Supply of Promoted Workers' Spouses

	Dependent Variable :				
	Has Any Children	Children Under 2yo	Health Condition	Visit Doctor	Enrolled in School
	(1)	(2)	(3)	(4)	(5)
Panel A : 2016 Exam					
P_i	–0.044	–0.003	0.014	–0.003	0.012
	[0.041]	[0.037]	[0.014]	[0.031]	[0.046]
Observations	15,368	15,368	15,368	15,368	15,368
Bandwidth	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	578	578	578	578	578
Control Obs.	1,253	1,253	1,253	1,253	1,253
Mean Control	0.876	0.109	0.017	0.075	0.189
Panel B : Placebo (2017–2019)					
P_i	0.004	–0.007	0.004	–0.002	–0.013
	[0.021]	[0.018]	[0.006]	[0.014]	[0.021]
Observations	49,624	49,624	49,624	49,624	49,624
Bandwidth	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	2,683	2,683	2,683	2,683	2,683
Control Obs.	6,346	6,346	6,346	6,346	6,346
Mean Control	0.845	0.128	0.015	0.072	0.192

Notes. Regression discontinuity estimates following equation (3). The outcome in column (1) is an indicator equal to one if the worker's spouse has any children under 16 years old. In column (2), the outcome indicates if the worker's spouse has any children under 2 years old. In column (3), the outcome is an indicator equal to one if the spouse reports any physical or mental condition that impairs daily activities such as walking, talking, listening, or eating. In column (4), the outcome is an indicator equal to one if the spouse reports having any sickness, accident, or health and dental issue that required a specialist visit the month before the survey. In column (5), the outcome indicates whether the spouse is enrolled in any education program by the survey date. The running variable is the distance of officers' scores to the promotion cutoff. All estimates are computed using linear local regressions, an Epanechnikov kernel, and MSE-optimal bandwidths. Robust biased-corrected standard errors are displayed in square brackets, following Calonico, Cattaneo and Titiunik (2014). Standard errors in Panel B are additionally clustered at the individual level. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 6: Effect of a Job Promotion on City of Residence

	Dependent Variable : Move from Pre-Promotion City to						
	Another City	City Out of Department	Main City	City of Origin	City with More:		
					Crime	Unemployment	Banks
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A : 2016 Exam							
P_i	0.090***	0.096***	0.034	–0.006	0.032	–0.086***	0.054***
	[0.031]	[0.030]	[0.024]	[0.017]	[0.020]	[0.022]	[0.020]
Observations	29,740	29,740	29,740	29,740	29,740	29,740	29,740
Bandwidth	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	1,159	1,159	1,159	1,159	1,159	1,159	1,159
Control Obs.	2,354	2,354	2,354	2,354	2,354	2,354	2,354
Mean Control	0.101	0.078	0.053	0.024	0.039	0.034	0.032
Panel B : Placebo (2017–2019)							
P_i	0.010	0.008	0.008	0.003	0.006	–0.002	–0.004
	[0.011]	[0.010]	[0.008]	[0.006]	[0.007]	[0.007]	[0.007]
Observations	104,936	104,936	104,936	104,936	104,936	104,936	104,936
Bandwidth	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	6,005	6,005	6,005	6,005	6,005	6,005	6,005
Control Obs.	13,436	13,436	13,436	13,436	13,436	13,436	13,436
Mean Control	0.100	0.075	0.049	0.024	0.039	0.034	0.038

Notes. Regression discontinuity estimates following equation (3). The outcome in column (1) is an indicator equal to one if the city of residence of an individual changed from 2017 to 2018. In column (2), the outcome is an indicator equal to one if the police geographic division where an individual resided in 2017 differs from the division where she lived in 2018. In column (3), the outcome indicates if the individual moved in 2017-2018 and now lives in one of the main cities in the country. In column (4), the outcome indicates if the individual moved in 2017-2018 and now lives in her city of birth. In columns (5) to (7), outcomes are indicators for whether the city where individuals reside in 2018 has a higher homicide rate, unemployment rate, and presence of financial institutions. City characteristics are computed based on information for 2017. The running variable is the distance of officers' scores to the promotion cutoff. All estimates are computed using linear local regressions, an Epanechnikov kernel, and MSE-optimal bandwidths. Robust biased-corrected standard errors are displayed in square brackets, following Calonico, Cattaneo and Titiunik (2014). Standard errors in Panel B are additionally clustered at the individual level. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 7: Effect of a Job Promotion on Within-Household Role, Marital Status, and Family Size

	Dependent Variable :							
	Head of Family	Marital Status :			Family Size	Children Under 2yo	Health Condition	Visit Doctor
		Married	Single	Divorced				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A : 2016 Exam								
P_i	0.018	0.045	–0.003	–0.042*	–0.103	0.034	–0.016	–0.024
	[0.037]	[0.041]	[0.037]	[0.024]	[0.127]	[0.026]	[0.015]	[0.017]
Observations	29,740	29,740	29,740	29,740	29,740	29,740	29,740	29,740
Bandwidth	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	1,159	1,159	1,159	1,159	1,159	1,159	1,159	1,159
Control Obs.	2,354	2,354	2,354	2,354	2,354	2,354	2,354	2,354
Mean Control	0.749	0.684	0.232	0.080	2.911	0.109	0.025	0.061
Panel B : Placebo (2017–2019)								
P_i	–0.010	–0.021	0.014	0.010	–0.028	–0.004	–0.009**	–0.006
	[0.017]	[0.018]	[0.017]	[0.009]	[0.059]	[0.012]	[0.005]	[0.008]
Observations	104,936	104,936	104,936	104,936	104,936	104,936	104,936	104,936
Bandwidth	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Treatment Obs.	6,005	6,005	6,005	6,005	6,005	6,005	6,005	6,005
Control Obs.	13,436	13,436	13,436	13,436	13,436	13,436	13,436	13,436
Mean Control	0.741	0.647	0.283	0.063	2.799	0.122	0.021	0.053

Notes. Regression discontinuity estimates following equation (3). The outcome in column (1) is an indicator equal to one if the individual is recorded as the head of the household in the census. In columns (2) to (5), outcomes are mutually exclusive indicators depending on the individual's marital status. The outcome in column (6) is the number of members within the household. In column (7), the outcome indicates whether there are children younger than two years old in the household. In column (5), the outcome is an indicator equal to one if the individual reports any physical or mental condition that impairs daily activities such as walking, talking, listening, or eating. In column (6), the outcome is an indicator equal to one if the individual reports having any sickness, accident, or health and dental issue that required a specialist visit the month before the survey. The running variable is the distance of officers' scores to the promotion cutoff. All estimates are computed using linear local regressions, an Epanechnikov kernel, and MSE-optimal bandwidths. Robust biased-corrected standard errors are displayed in square brackets, following Calonico, Cattaneo and Titiunik (2014). Standard errors in Panel B are additionally clustered at the individual level. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

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A. Additional Institutional Details

A.1. Police Job and Career in Colombia

As mentioned in Section II, the Colombian police operate with a strict hierarchical structure, dividing officers into two independent career paths: the *executive track* and *base track*. Within each track, officers in lower ranks are subordinate to those in higher ranks. Additionally, base-rank officers are subordinate to executive-rank officers. As shown in Appendix Table A.1, the police employ over 148,000 officers, 95 percent of whom are in the base ranks and 66 percent work as patrol officers.

Appendix Table A.1: Police Staff Counts by Level and Rank, 2017

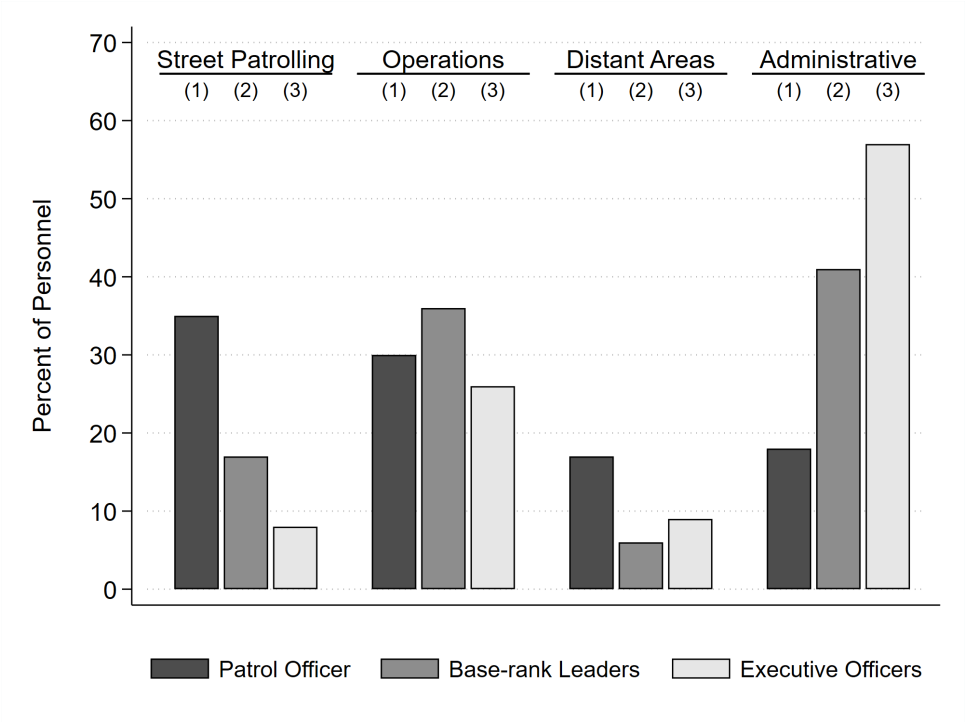
Executive Level Ranks		Base Level Ranks	
Rank	Staff Counts	Rank	Staff Counts
General (*Highest Rank*)	1	Commissioner (*Highest Rank*)	239
Major General	8	Deputy Commissioner	727
Brigadier General	20	Chief Inspector	3,537
Colonel	220	Inspector	19,595
Lieutenant Colonel	510	Deputy Inspector	18,910
Major	1,009	Patrol Officer (*Entry Level*)	98,146
Captain	1,532		
Lieutenant	1,967		
Second lieutenant (*Entry Level*)	1,904		
Total	7,142	Total	141,154

Notes. This table presents the number of police officers at each level and rank, as reported by the National Police on April 15, 2017.

To enforce the law and maintain order nationwide, the police perform a wide range of actions. While police officers can hold administrative roles, about 73 percent of the staff is involved in operational duties. Operational positions are categorized into street patrolling, investigations and operations, and surveillance of remote areas (Rodriguez, 2021). As shown in Appendix Figure A.1, nearly 60 percent of executive-rank officers occupy administrative jobs. In contrast, only 18 percent of patrol officers hold administrative positions, although that percentage increases to 41 percent as base-rank officers progress in their careers.

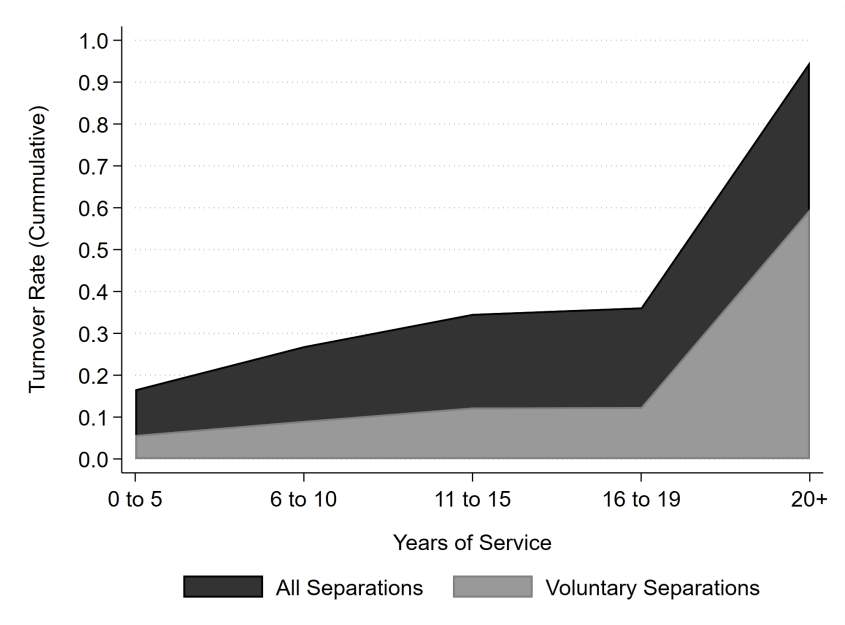
Police employment are highly stable. Appendix Figure A.2 shows that 16 percent of base-rank officers leave the police within the first five years of their careers, and an additional 19 percent leave over the next fifteen years. However, considering only voluntary separations, the figure drops to 6 percent in the first five years, with another 7 percent leaving before year 20. On average, 2 percent of the officers separate in any given year, with only 0.65 percent leaving by choice.

Appendix Figure A.1: Distribution of Officers by Rank and Role



Notes. Bars represent the percentage of officers with different roles within each rank (i.e., values add up to 100 percent within each rank). Base-rank leaders correspond to all officers in the base rank, excluding patrol officers. The source of the information for this figure is Rodriguez (2021).

Appendix Figure A.2: Turnover Rates Among Base-rank Police Officers



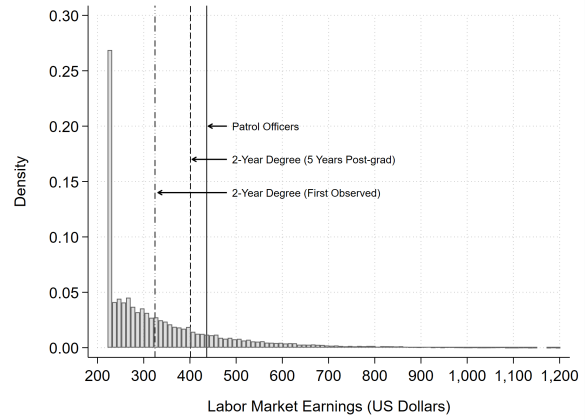
Notes. The areas in this figure represent the cumulative percentage of officers who separate from the National Police over time. These turnover rates are calculated using cohorts of base-rank officers who began their service between 1994 and 2000. The source of the information for this figure is Cortes, Lopez, and Sanabria (2021).

Officers' salaries can be relatively high compared to the earnings of workers with short-cycle program degrees, as shown in Appendix Figure A.3. his distribution indicates that a significant portion of formal sector workers with short-cycle degrees earn minimum wage. Additionally, the median entry-level earnings for these workers is approximately 310 USD per month. In contrast, the entry-level salary for base-rank officers is around 435 USD, this is, among the top 20 percent of the earnings distribution. We also present in this figure the monthly salaries of base-level officers by hierarchical rank. Salaries exhibit significant variation based on rank, which serves as the primary source of wage differences among base-rank officers.

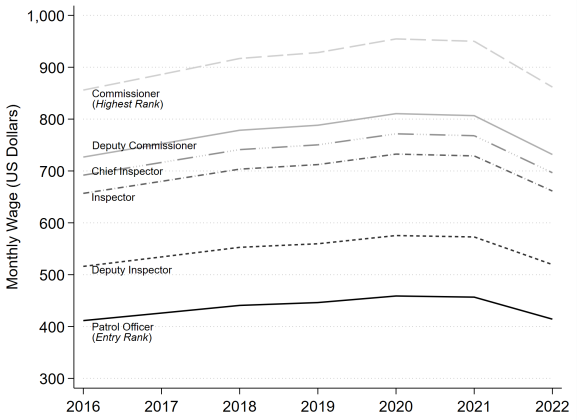
Officers are eligible for a pension after 20 or 25 years of service, depending on their year of hire. Officers who remain in service receive this pension in addition to their regular salary.[51] However, only 6 percent of officers remain working in the force after reaching their pension year (See Appendix Figure A.2). On average, officers receive a pension at age 46, representing an attractive benefit, as the legal pension age in Colombia is 62 for men and 57 for women.

Appendix Figure A.3: Police Officers' and College Graduates' Larbor Market Earnings

(a) Earnings of Short Cycle College Graduates



(b) Monthly Earnings of Base-rank Officers



Notes. Panel (a) displays the monthly salary of base-rank officers at constant prices of 2016 and US dollars. We use an exchange rate of 3,050.98 COP per 1 USD to express wages into dollar values. The source of this information is the annual salary decrees issued by the Colombian National Police: Decree 214 of 2016, Decree 984 of 2017, Decree 324 of 2018, Decree 1002 of 2019, Decree 318 of 2020, Decree 976 of 2021, and Decree 466 of 2022. Panel (b) presents the distribution of entry-level earnings for graduates of two- and three-year college programs. We define entry-level earnings as the first observed earnings post-graduation and between 2012 and 2016. Only graduates from 2012 and 2015 are included. The earnings information comes from Social Security Records (PILA) and the Observatory for the Higher Education (OLE).

A.2. Exam-based Promotion Policy

Promotions among patrol officers are primarily determined by performance in a written exam. This *promotion exam* evaluates different skill sets, divided into two com-

[51] Officers may continue working in the police unless they choose to retire, reach the age of compulsory retirement, or are issued a mandatory separation by the police.

ponents. The *general abilities* component lasts for four and a half hours, during which officers must answer 125 questions. It includes four tests:

(i) *Quantitative Reasoning*: Evaluates the understanding of basic mathematical concepts and the ability to analyze, model, and solve problems using quantitative methods. This test consists of 30 questions;

(ii) *Critical Reading*: Assesses the ability to read analytically and reflectively. This skill involves understanding the arguments presented in a text and identifying their perspectives and value judgments. Test takers must gather information from one or more texts, make overall sense of it, establish relationships between statements, and evaluate the authors' intentions. This test consists of 30 questions;

(iii) *Civic Competencies*: Assesses the ability to analyze actions taking place around the individual, as well as the capacity to judge those actions based on the ethical and legal framework of the Colombian Constitution. The test focuses on understanding basic constitutional concepts and the ability to think systematically. This test consists of 30 questions;

(iv) *Personality Traits*: Inquires about specific personality traits divided into two dimensions. The first dimension evaluates the individual's personal behavior and their self-assessment of characteristics such as responsibility, kindness, and openness to experience. The second dimension evaluates orientation towards achievement and the fulfillment of personal interests. This test consists of 35 questions.

The *police-specific* component consists of 100 questions that must be answered within three hours. The objective of this component is twofold: assessing officers' understanding of the responsibilities of the position they are competing for and evaluating their ability to solve specific problems related to this new rank, as well as their knowledge of the legal framework regulating police service. The following enacted laws and administrative acts are evaluated through this component:

- The Political Constitution of Colombia
- Laws: 62 of 1993, 418 of 1997, 906 of 2004, 1015 of 2006, 1098 of 2016, 1407 of 2010, 1421 of 2010, 1453 of 2011, 1474 of 2011, 1476 of 2011, 1801 of 2016
- Decrees: 1070 of 2015
- Executive orders: 00912 of 2009, 00911 of 2009, 03302 of 2010, 00068 of 2015, 03392 of 2015, 03678 of 2016

– Police National Code. Code: 1CS-GU-0005

– Police Service Guide for Vulnerable Populations. Code: 1IP-GU-0004

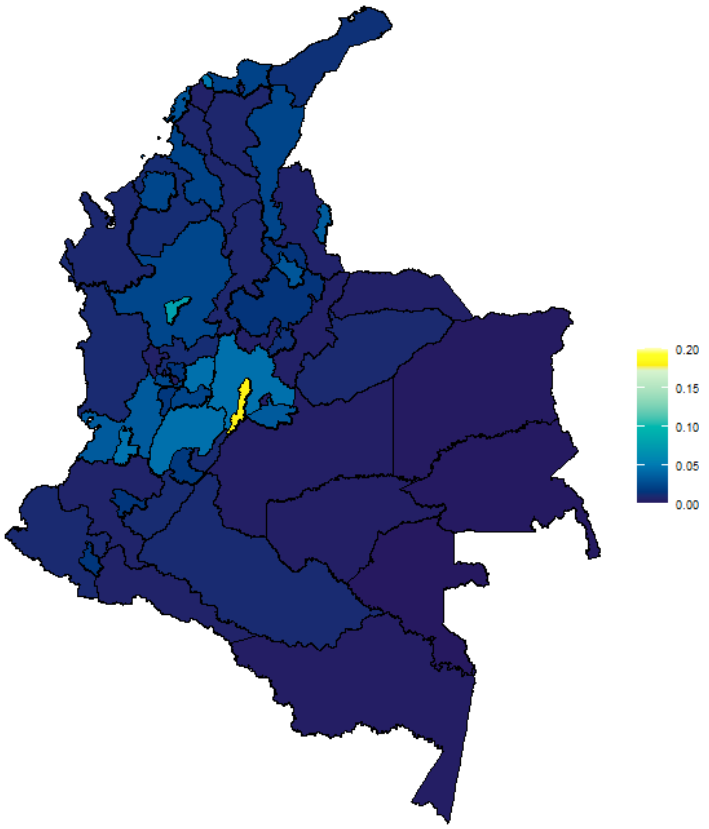
Exam scores range from 0 to 100. Between 2016 and 2017, the general abilities component accounted for 60% of the score, while the police knowledge component represented the remaining 40%. Starting in 2018, the weighting changed so that each component represents 50% of the score. Until 2019, exam scores were the primary determinant of an officer's promotion. However, since 2020, the overall score used to allocate promotions also includes points based on the number of years of service, with experience points contributing up to 50 units to an officer's overall score. Appendix Table A.2 presents the dates on which the promotion exam was administered from 2016 to 2019, including the weighting of each component on the exam. It also lists the dates when the National Testing Agency (ICFES) announced the overall scores for each promotion process.

Appendix Table A.2: Promotion Exam Schedule, Tests, and Test Weights, 2016-2023

Year	Exam Date	Components & Weights	Scores Announcement
2016	06/19	Critical Reading (15%) Quantitative Reasoning (15%) Civic Competencies (15%) Personality Test (15%) Police Knowledge (40%)	08/19
2017	10/29	Critical Reading (15%) Quantitative Reasoning (15%) Civic Competencies (15%) Personality Test (15%) Police Knowledge (40%)	12/15
2018	09/23	Critical Reading (10%) Quantitative Reasoning (10%) Civic Competencies (15%) Personality Test (15%) Police Knowledge (50%)	11/03
2019	09/29	Critical Reading (10%) Quantitative Reasoning (10%) Civic Competencies (15%) Personality Test (15%) Police Knowledge (50%)	12/27

Notes. This table presents the dates of promotion exams and score announcements from 2016 to 2019.

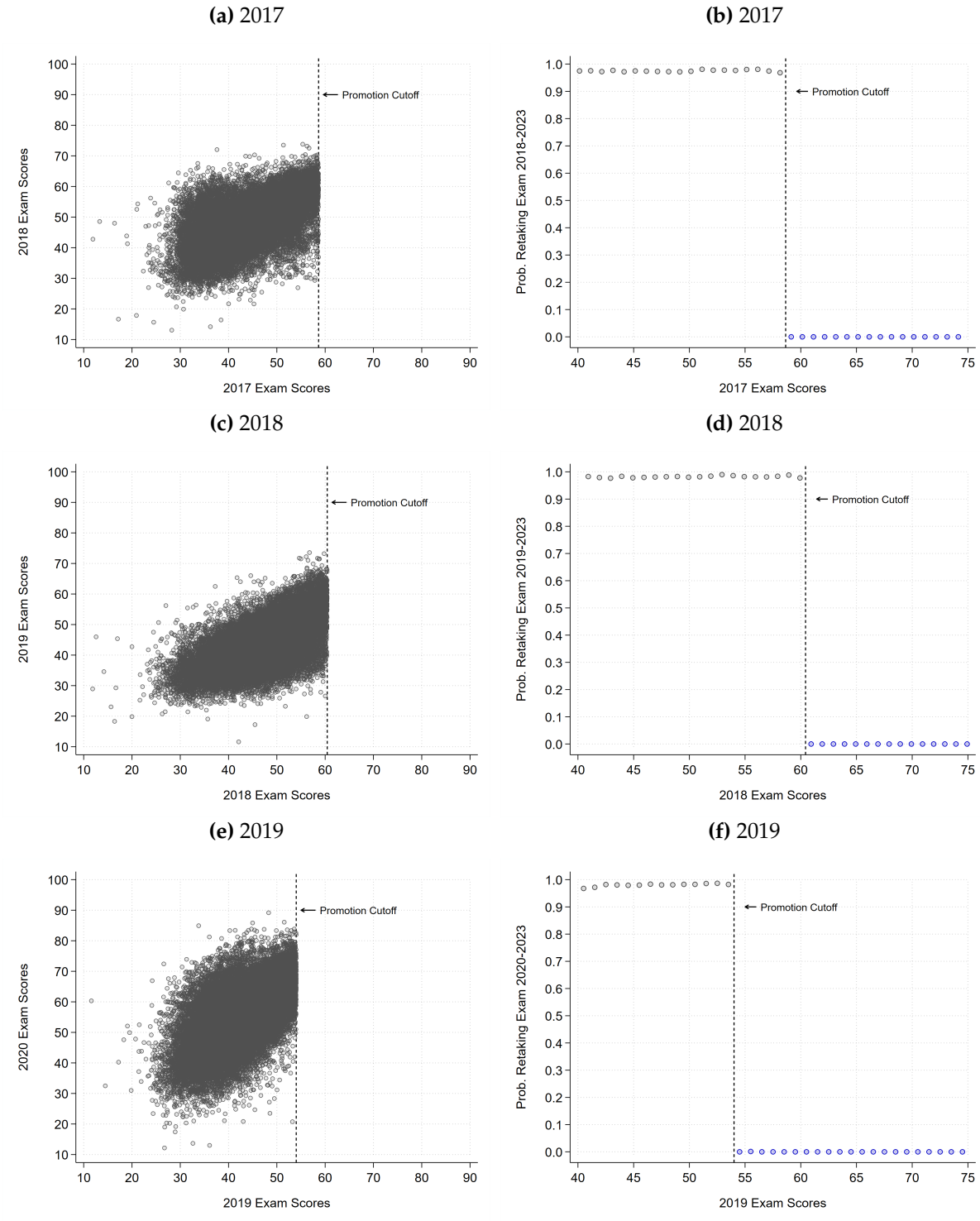
Appendix Figure A.4: Officers Taking the Promotion Exam by Police Department



Notes. Geographic distribution of patrol officers who take the promotion exam between 2016 and 2019. Resolutions 03257 of 2004 and 00010 of 2006 divide the country into 53 strategic divisions. The scale represents the fraction of officers who take the exam out of the total number of test takers. Information on the city of residence by 2017 from the census data was used to plot this map.

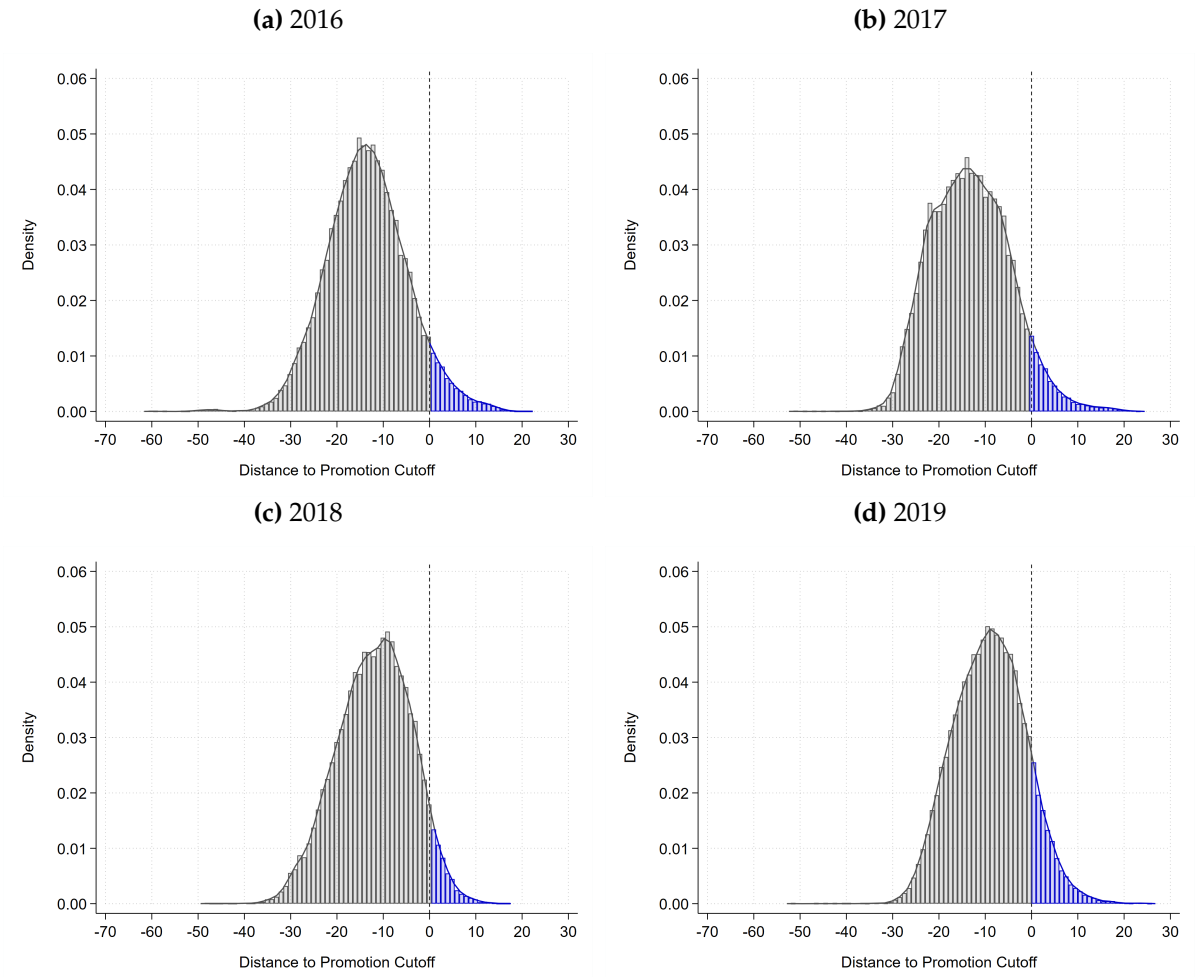
A.3. Additional Evidence on RD Validity

Appendix Figure A.5: Exam-based Promotion Policy: Cutoff and Retake Rates



Notes. Panels (a), (c), and (e) present the bivariate distribution of officers' performance in the promotion exams in year $t \in \{2017, 2018, 2019\}$ and $t+1$. Panels (b), (d), and (f) show the probability that patrol officers retake the exam between 2017 and 2023 as a function of their scores in year t.

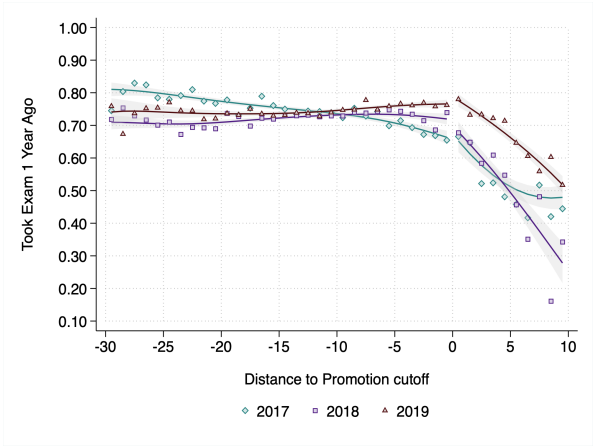
Appendix Figure A.6: Density Smoothness Around the Promotion Cutoff



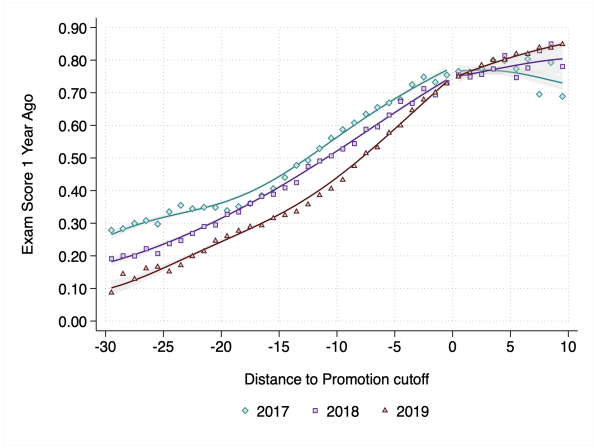
Notes. Each panel presents the estimated density of scores in the promotion exam in year $t \in \{2016, 2017, 2018, 2019\}$. Scores are recentered by subtracting the promotion cutoff.

Appendix Figure A.7: Continuity in Pre-Treatment Covariates Around the Promotion Cutoff

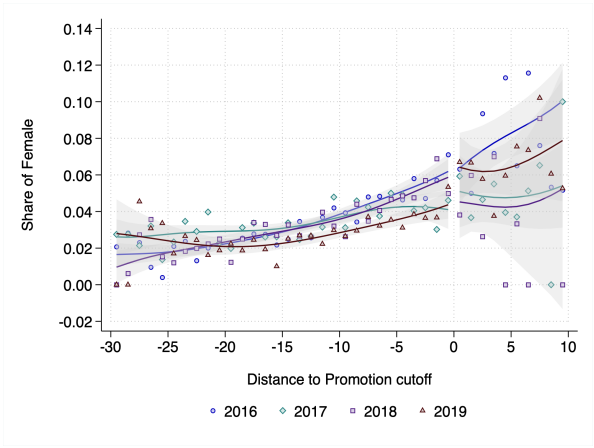
(a) Likelihood of Taking Exam 1 Year Ago



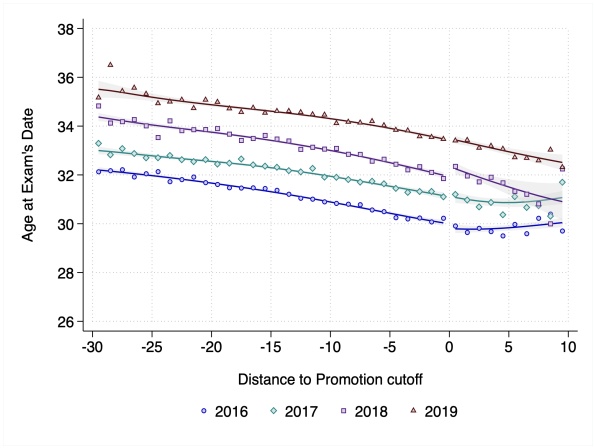
(b) Scores in Promotion Exam 1 Year Ago



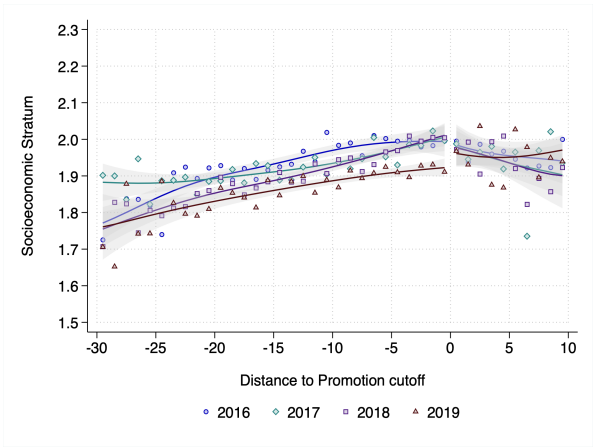
(c) Female



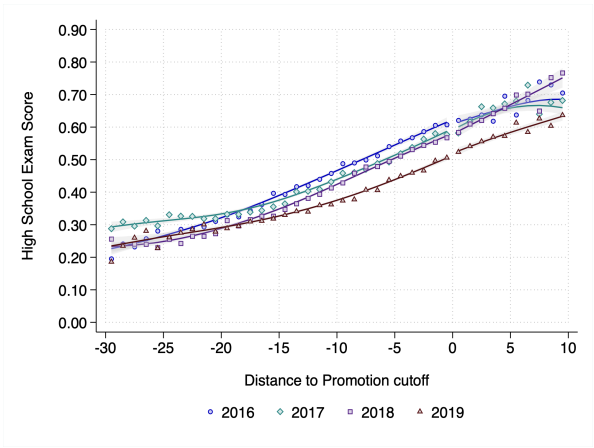
(d) Age at Exam Date



(e) Socioeconomic Status



(f) High School Exit Exam Score

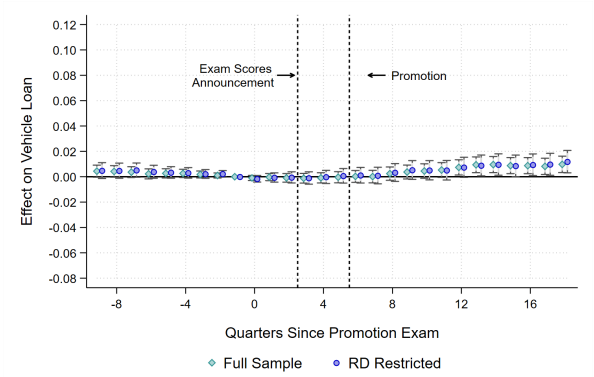


Notes. Each panel plots a covariate as a function of the running variable (i.e., the distance of scores to the promotion cutoff). Only test takers for the promotion process carried out in 2016 are considered. Across panels, plotted dots represent local averages within equidistant bins of the running variable. A width of 0.5 is used to compute local averages. Solid lines represent linear local regressions using a bandwidth equal to 5 and an Epanechnikov kernel. 95 percent confidence intervals are displayed around each local regression on both sides of the cutoff. Panel (a) plots an indicator equal to 1 for all female patrol officers. Panel (b) plots the age of officers at the exam date. Panel (c) plots the socioeconomic stratum of officers. Panel (d) plots the percentile score in the high school exit exam (known, as *Saber 11*).

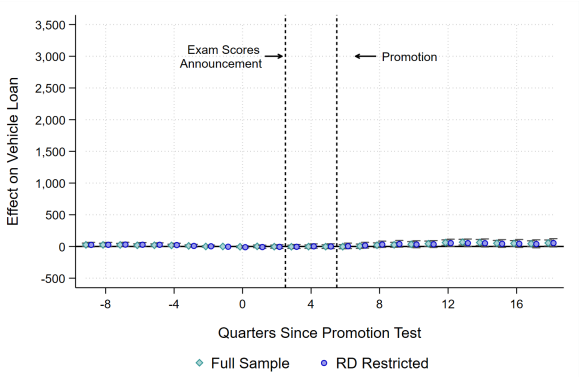
B. Additional Results on Credit Responses

Appendix Figure B.1: Credit Responses to a Promotion-based Pay Raise, by Loan Type

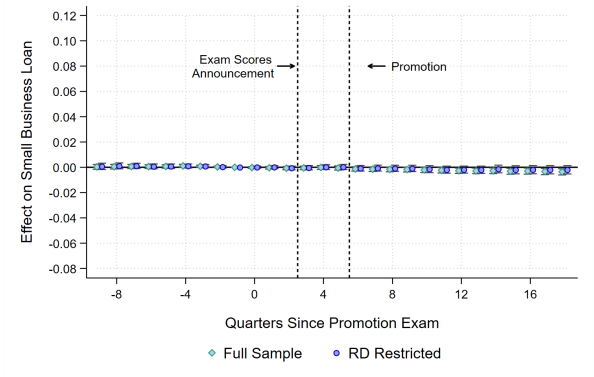
(a) Extensive Margin: Vehicle Loans



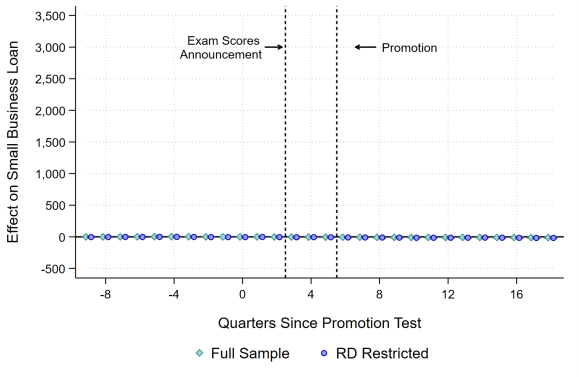
(c) Intensive Margin: Vehicle Loans



(b) Extensive Margin: Small Business Loans



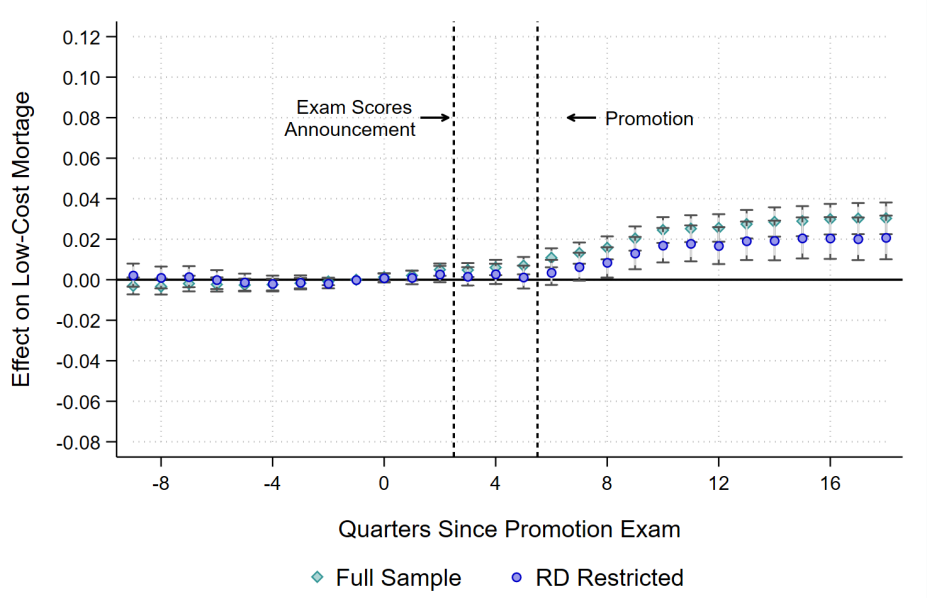
(d) Intensive Margin: Small Business Loans



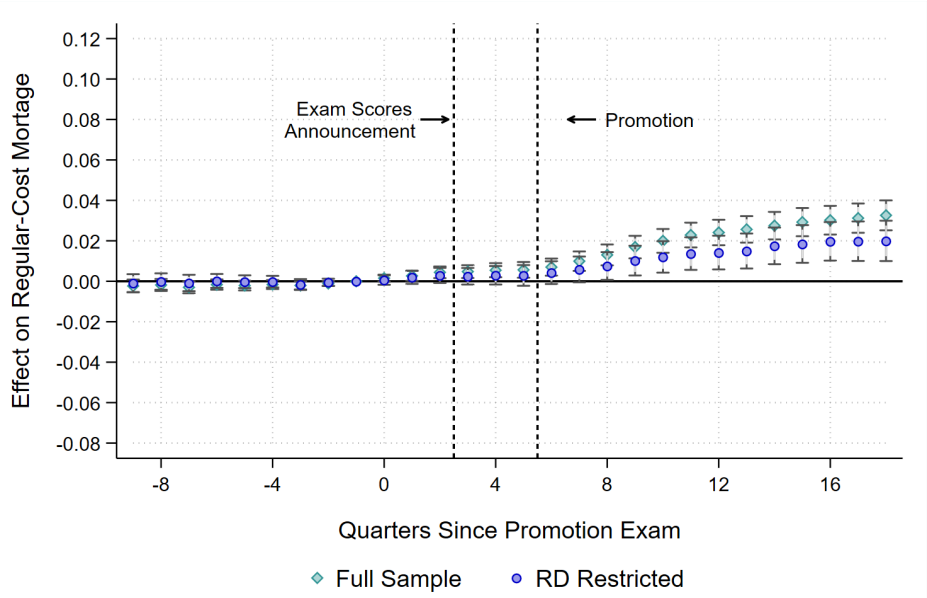
Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. The outcome variables in panels (a), (c), and (e) indicate whether the individual is a credit card holder, has an outstanding personal loan, or holds a mortgage in a given year-quarter. In panels (b), (d), and (f), the outcome variables correspond to the outstanding credit card debt, personal loan debt, and mortgage debt. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Appendix Figure B.2: Dynamic Effect of a Job Promotion on Mortgage Loans by Type of Housing

(a) Low-Cost Housing

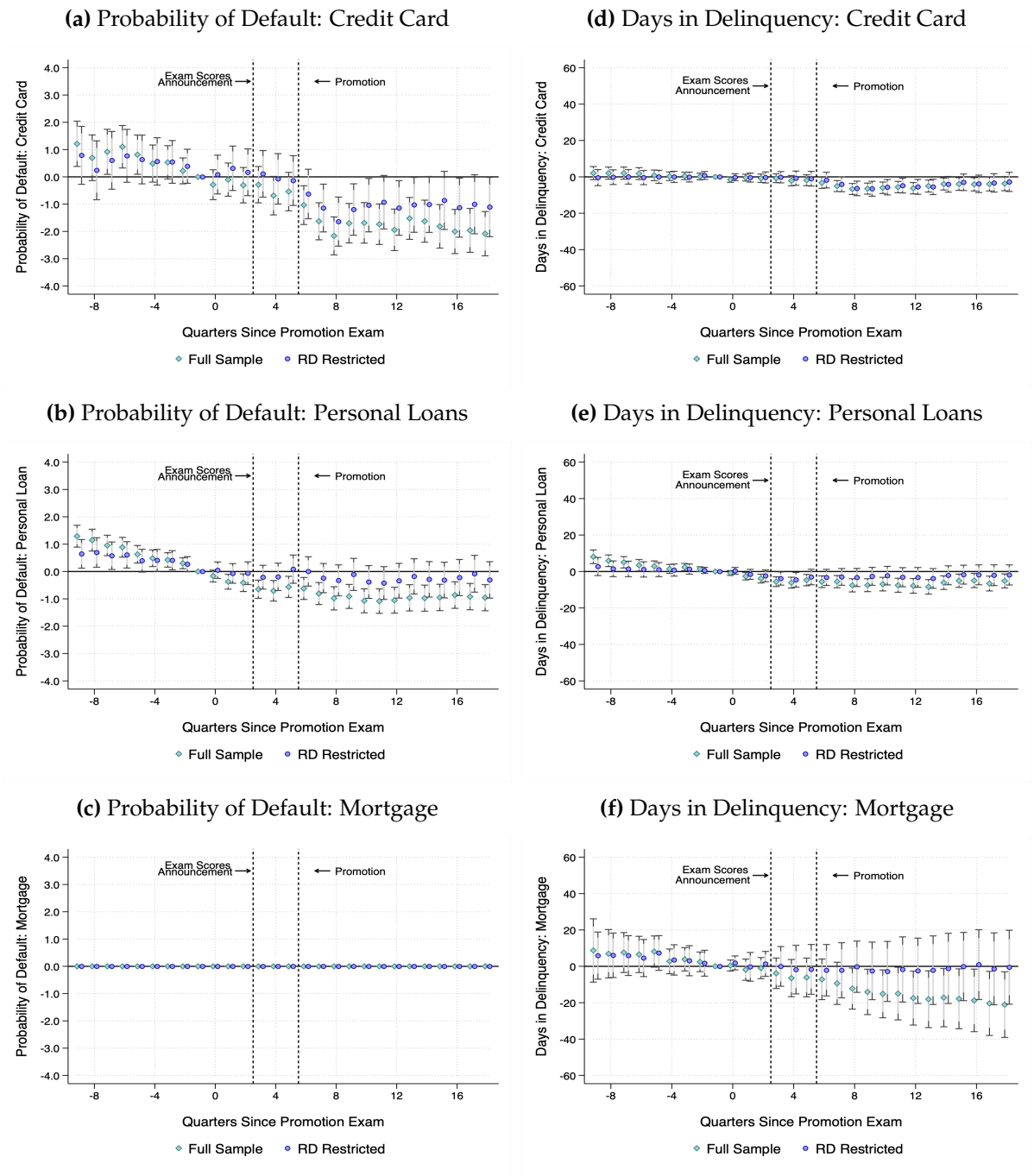


(b) Regular-Cost Housing



Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. The outcome variable is an indicator equal to 1 if a worker has a mortgage for a low-cost house or a mortgage for a regular-cost house. Estimates control for individual and year-quarter fixed effects. The restricted sample only includes workers who obtained a score within 4.4 points from the promotion cutoff between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Appendix Figure B.3: Credit Response Mechanisms: Probability of Default and Delinquency



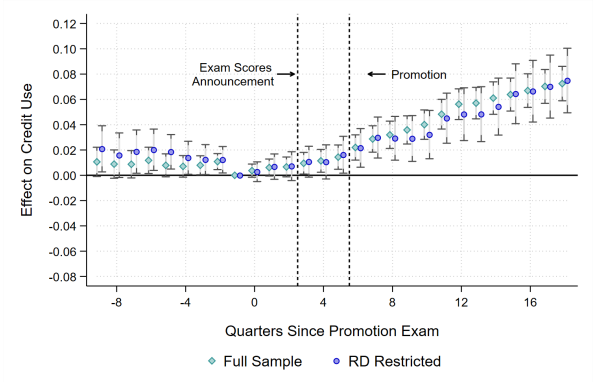
Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. The outcome variables in panels (a), (c), and (e) are the total credit card payments, personal loan payments, and mortgage payments made in a given year-quarter. In panels (b), (d), and (f), the outcome variables correspond to the payments made on top the minimum due for credit cards, personal loans, and mortgage in a given year-quarter. We express payments in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

B.1. Robustness to Sample Restrictions

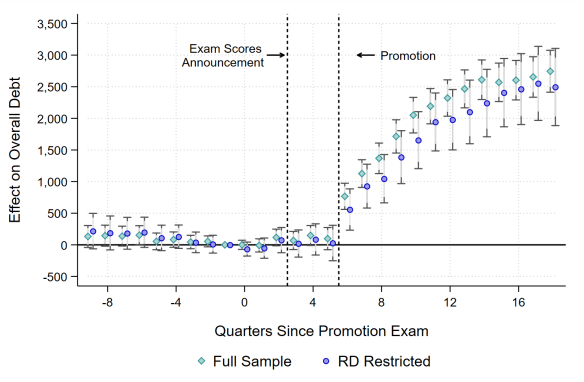
Estimates for First-time Exam Takers

Appendix Figure B.4: Robustness of the Credit Responses: Estimates for First-time Takers

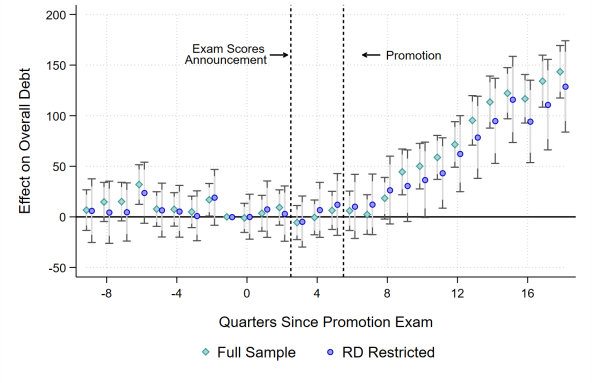
(a) Extensive Margin: Credit Use



(b) Intensive Margin: Debt



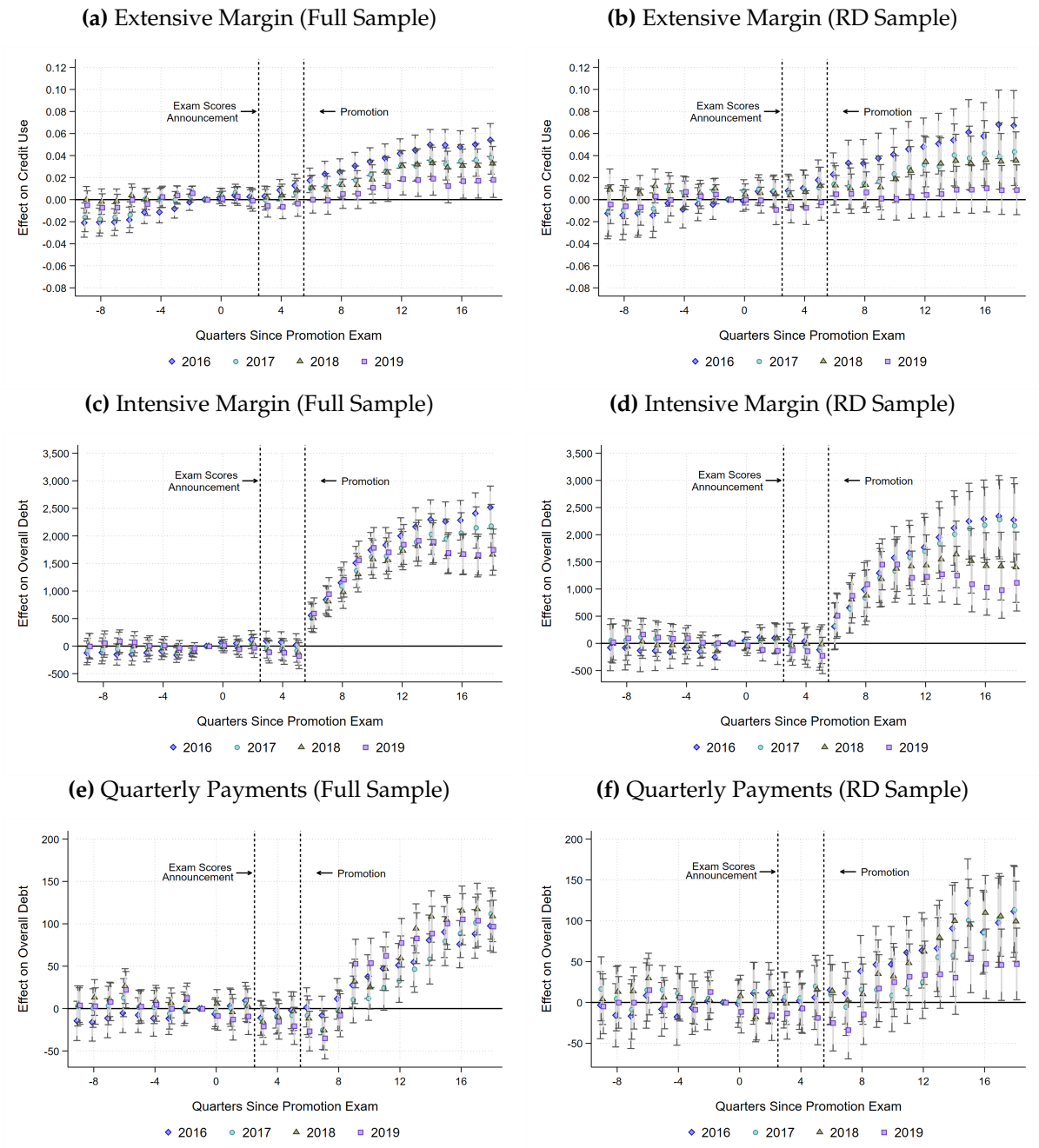
(c) Quarterly Payments



Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. In Panel (a), the outcome variable is an indicator equal to 1 if the individual has any outstanding loans in a given year-quarter. In Panel (b), the outcome variable is accumulated debt, defined as the sum of principal amounts across outstanding loans in a given year-quarter. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Individuals can hold five types of credit, including credit cards, personal loans, mortgages, vehicle loans, and small business credit. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Estimates by Exam Cohort

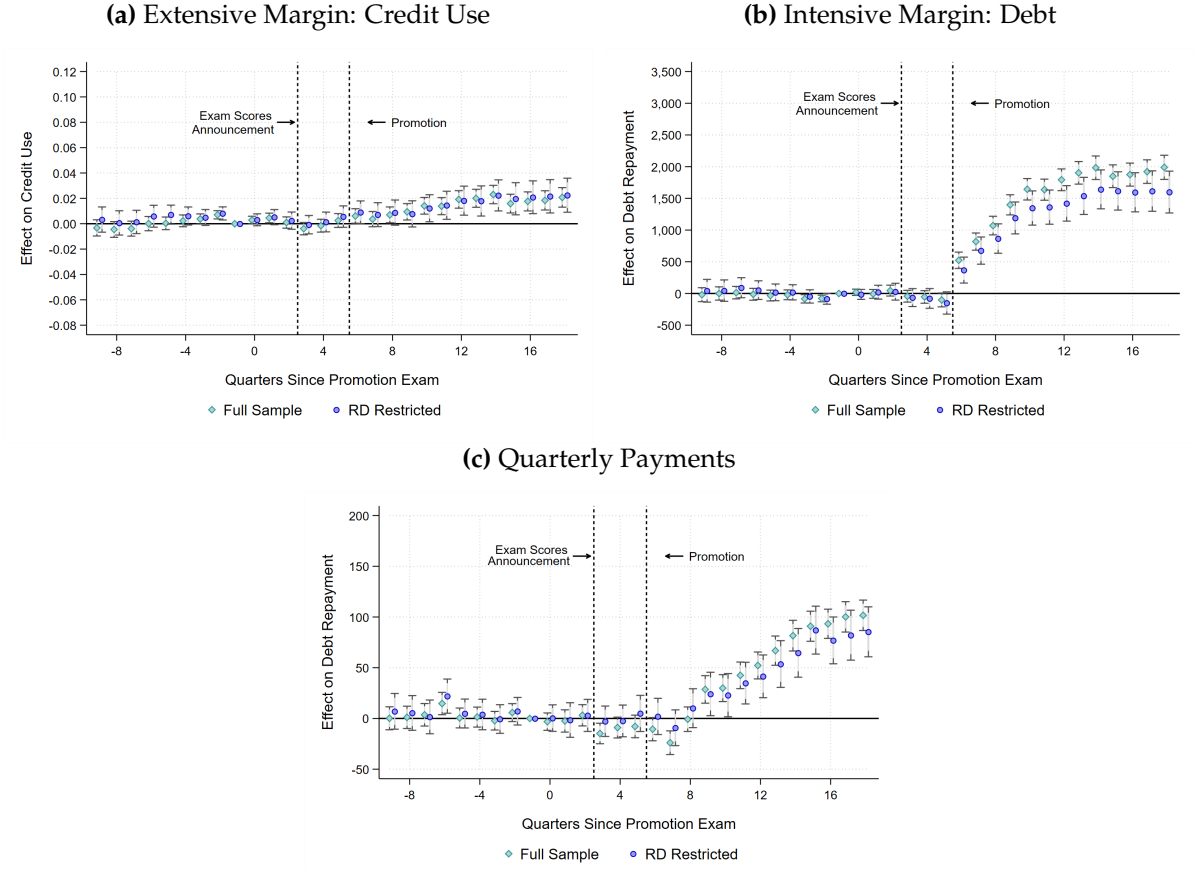
Appendix Figure B.5: Robustness of the Credit Responses: Estimates by Exam Cohort



Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. In Panel (a), the outcome variable is an indicator equal to 1 if the individual has any outstanding loans in a given year-quarter. In Panel (b), the outcome variable is accumulated debt, defined as the sum of principal amounts across outstanding loans in a given year-quarter. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Individuals can hold five types of credit, including credit cards, personal loans, mortgages, vehicle loans, and small business credit. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

Estimates to Stacking Exam Cohorts

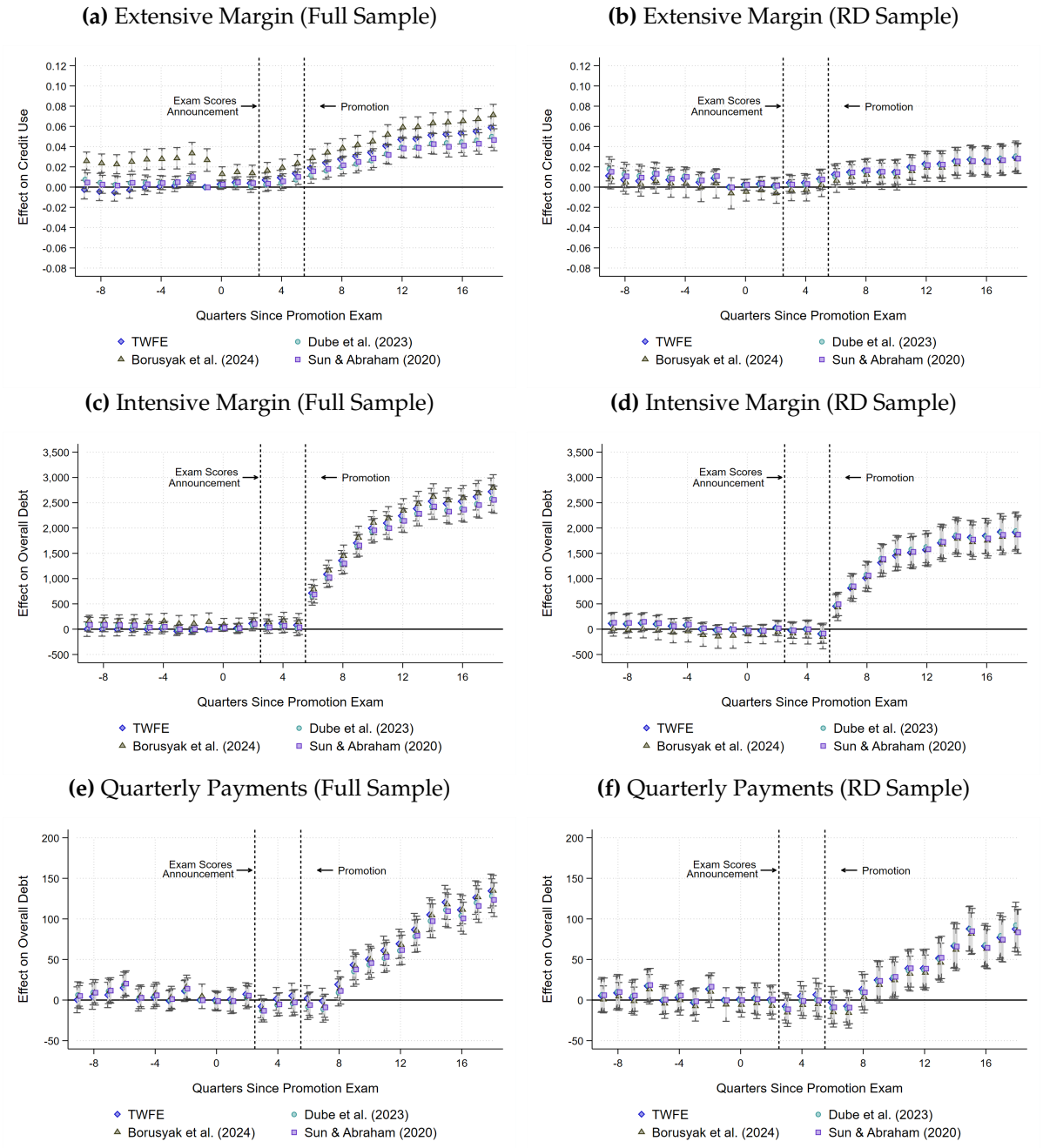
Appendix Figure B.6: Robustness of the Credit Responses: Estimates Staking Exam Cohorts



Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. In Panel (a), the outcome variable is an indicator equal to 1 if the individual has any outstanding loans in a given year-quarter. In Panel (b), the outcome variable is accumulated debt, defined as the sum of principal amounts across outstanding loans in a given year-quarter. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Individuals can hold five types of credit, including credit cards, personal loans, mortgages, vehicle loans, and small business credit. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

B.2. Robustness to Alternative Estimation Methods

Appendix Figure B.7: Robustness of the Credit Responses: Alternative Estimation Methods

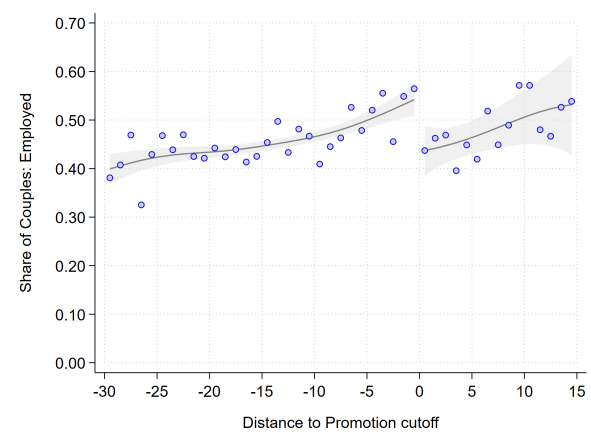


Notes. Ordinary Least Squares estimates of the dynamic effects, β_k, from equation 1. In Panel (a), the outcome variable is an indicator equal to 1 if the individual has any outstanding loans in a given year-quarter. In Panel (b), the outcome variable is accumulated debt, defined as the sum of principal amounts across outstanding loans in a given year-quarter. We express debt in US dollars, after adjusting for inflation. For this purpose, we use an exchange rate of 3,050.98 COP per 1 USD and constant prices of 2016. Individuals can hold five types of credit, including credit cards, personal loans, mortgages, vehicle loans, and small business credit. Estimates across panels control for individual fixed effects, year-quarter fixed effects, age-square, and linear trends for individuals who take the exam in the same year. Estimates labeled as 'RD restricted' correspond to the sample of individuals who obtained a score within 4.4 points to the promotion cutoff in any exams between 2016 and 2019. 95 and 99 percent confidence intervals are displayed around plotted coefficients. Intervals are computed using standard errors clustered at the individual level.

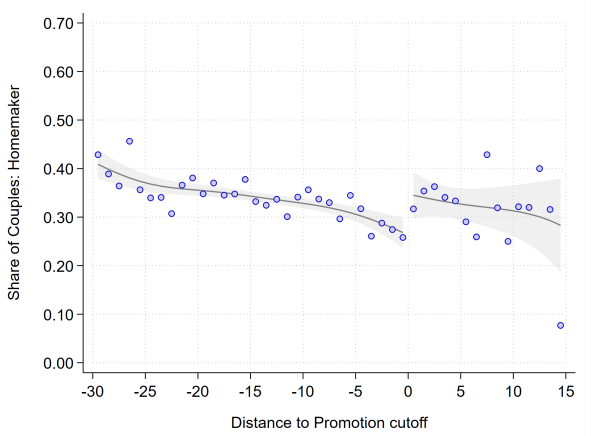
C. Additional Results on Household Labor Supply

Appendix Figure C.1: Effect of a Worker's Promotion on the Spouse's Labor Supply

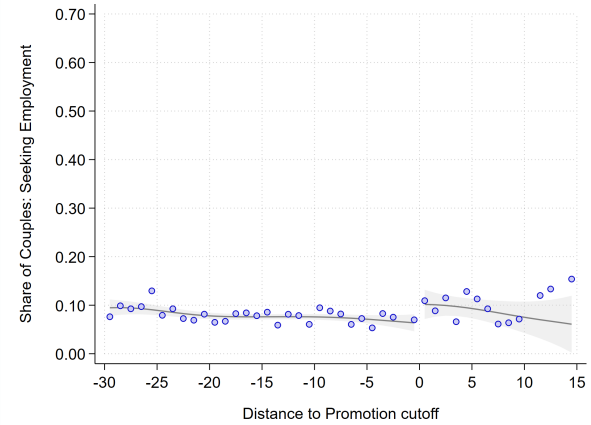
(a) Spouse is Employed



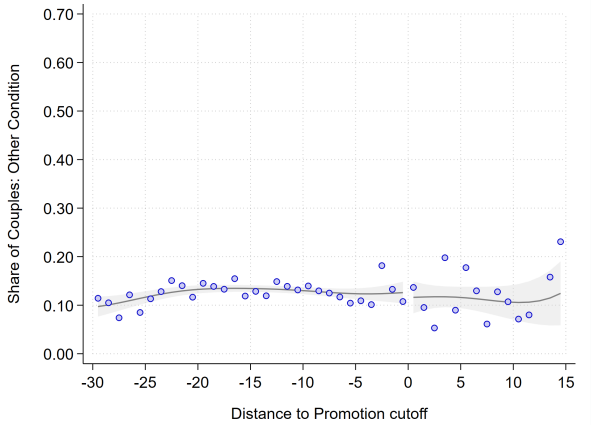
(b) Spouse involved in Home Production



(c) Spouse is Seeking Job



(d) Spouse in Other Situation



Notes. Likelihood of a promoted worker's spouse to be employed as a function of the running variable (i.e., the distance of scores to the promotion cutoff). Only police officers taking the promotion exam in 2016 are considered to compute estimates. Across panels, plotted dots represent local averages within equidistant bins of the running variable. A width of 0.5 is used to compute local averages. Solid lines represent linear local regressions using a bandwidth equal to 5 and an Epanechnikov kernel. 95 percent confidence intervals are displayed around each local regression on both sides of the cutoff.