



LABOR MARKET EFFECTS OF PUBLIC SECTOR HIRING POLICIES AND INTERNATIONAL APPAREL SECTOR MONITORING IN BANGLADESH

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Shahida Pervin

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Abstract

There are two substantive chapters in this dissertation. Chapter 1 and Chapter 4 are respectively introduction and conclusion of this dissertation. Chapter 2 studies the effects of safety enforcement by multinational stakeholders after the deadly collapse of the Rana Plaza building in the export-oriented apparel industry of Bangladesh. Using population census, business census and other data, this empirical study compares employment in apparel dominant with non-apparel dominant sub-districts (*upazila*) before and after the inception of international safety enforcement episode. The findings suggest that in the decade prior to the Rana Plaza collapse and international involvement, places where apparel was the dominant manufacturing industry experienced substantially higher growth in employment than places with little or less apparel. In the decade that followed, the employment trend reversed. In fact, registered employment and the number of establishments declined in apparel dominant upazilas while they increased in other upazilas. This study finds a trade-off between safety enforcement and industry size, in terms of employment and the number of establishments.

Chapter 3 studies the implications of attractive government jobs for the labor market. Exploiting a policy that sets the age limit for eligibility for public employment at age 30, the study finds that after the end of the period of eligibility for public sector jobs, the likelihood of private sector employment increases by about five percentage points at age 30, mainly driven by females in the later years of the sample period, particularly after doubling the public service salaries. The increase in employment is explained by increasing labor force participation after expiration of government job eligibility age rather than declining unemployment. Candidates repeatedly try for government jobs and delay the pursuit of other opportunities, incurring direct monetary and time costs, and indirect opportunity costs. At the same time, there is some evidence that public sector exam preparation gives rise to brain gain. The data are drawn from population censuses and labor force

surveys for the period 1991–2017 and a primary survey conducted online for this study in Bangladesh, and labor force surveys of India for 2011-12, 2017-18 and 2019-20. A dynamic partial equilibrium life cycle model is used to conceptualize the effects of public sector job premiums on individual's decisions of labor supply.

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Dedication

To the victims of human created catastrophes and bad policies, to the deceased and disabled of Rana Plaza, and to those who strive for the attainment of better paths

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Chapter 1

Introduction

Employment, human capital, and decent work are key issues of labor economics, which are also at the core of international agendas for promoting sustainable development and improving quality of life (UN, 2015; ILO, 2008). Various types of duality and imperfections exist in the labor market, including the segmentation of public vs. private and formal vs. informal employment, and lack of workplace safety and of balance in market power. The duality and segmentation can stem from different phenomena, such as excessive protection or insufficient support for certain sectors, institutional interventions and legal enforcement, geographical variations, mobility status, and availability of facilities (García, 2017; Günther & Launov, 2012; Botelho & Ponczek, 2011; Telles, 1993). The imperfections and lack of workplace safety may arise from deficiencies in legal frameworks and monitoring mechanisms, as well as economic viability. Institutions and public policies play significant roles in the labor market (Arif & Dawson, 2023; MacLeod, 2011) and their actions have consequences for employment and human capital.

Bangladesh is a country where public or government sector jobs are attractive compared to jobs in the private or non-government sector. The public sector, the primary formal employment sector, comprises less than five percent of total employment but offers comparative advantages in terms of earnings, social benefits, and job security. In

contrast, the non-government sector consists of a small fraction of formal jobs, which do not provide comparable benefits to those in the government sector. Moreover, the majority of the non-government sector is informal, providing almost no income stability, and job and social security. As a result, it is rational for individuals to prefer formal public sector jobs over formal or informal private sector jobs. One of the significant contributors to the formal private sector is the Ready Made Garment (RMG) or apparel industry, which serves as the country's main export-oriented industry. However, the industry had been notorious for its poor conditions of workplace safety and occurrences of frequent fire and accidents. Following the devastating collapse of Rana Plaza in 2013, which claimed the lives of over 1,100 individuals and injured more than 2,500 in the RMG industry, initiatives led by international buyers significantly improved safety conditions in the industry. This dissertation aims to investigate the labor market effects resulting from the enforcement of workplace safety measures and the presence of attractive government sector jobs.

Work-related injuries, fatalities, and diseases are high around the world, but industrial workplace safety and workers' rights are particularly vulnerable in developing countries. In cases where existing safety mechanisms are insufficient, the enforcement of safety measures may impose additional costs. Compliance with safety standard by incurring high cost of business operation may affect the size of industry in terms of employment and the number of establishments. The enforcement of safety measures may contribute to workers being laid off or replaced by machines for avoidance of stringent measures. It can also lead to the closure of nonviable factories, leaving workers unemployed or transitioning to other industries, or viable firms may absorb them through mergers enabling continued employment. Against the backdrop of the Rana Plaza tragedy and subsequent safety strengthening measures, Chapter 2 of this thesis investigates the effects of safety enforcement on the supplier industry. Since the entire export-oriented garment industry was affected, instead of establishment-level outcome, examining the industry's performance nationwide provides more meaningful and all inclusive impact of the safety

measures. The study employs difference-in-difference design to compare apparel dominant and comparison locations (upazilas) during the decade 2009–2019 that encompasses safety enforcement period starting in 2013. Total employment from 2001 and 2011 population censuses is used for the upazilas’ employment trend prior to safety enforcement. In the decade prior to safety enforcement, between 2001 and 2011, employment significantly increased in both comparison and apparel dominant upazilas. Over this period, growth in the apparel dominant upazilas was much higher than in the comparison upazilas. In the following decade during safety enforcement 2009–2019, both employment and the number of establishments declined. Recently established factories and potential entrants appear to be affected more by the safety tightening measures. It is likely that the industry laid off workers and enhanced productivity by replacing them with machines. A similar trend is indicated by the number of establishments.

Chapter 3 studies the effects of attractive public sector jobs on employment and human capital. Attractive public sector jobs may cause misallocation and productivity loss and induce the unemployed to prolong their unemployment. Public sector premiums can also affect human capital formation when selection for public sector employment is competitive. Candidates might delay searching for or accepting other employment opportunities by studying for selection exams or getting a required degree. The country’s public service recruitment process imposes an age ceiling on eligibility, a policy practice also prevails in other countries. The age ceiling might prompt aspirants to engage in government job preparation throughout the eligibility period, which would release working-age people for other sectors immediately thereafter and give rise to increased employment. Since 1991, the upper age limit for Bangladesh’s public service has been 30 years for general candidates. Exploiting that age ceiling policy, I examine the impact of becoming ineligible for attractive government jobs on employment. Regression discontinuity design (RDD) results exhibit a discontinuous increase in employment at age 30 after individuals become ineligible for government jobs, primarily for females. This effect is particularly notable

in 2015–16 and 2016–17, likely due to the fact that the government doubled public sector pay in 2015. The increase in employment at age 30 is explained by higher labor force participation rather than reduced unemployment. The RDD results support the argument that individuals queue for attractive public service without showing up in unemployment, but rather by choosing not to actively participate in the labor market during the eligibility period. The evidence from survey suggests that public sector job premiums can affect occupational choice and lead to misallocation by attracting individuals away from the private sector’s employment and entrepreneurship. The survey results indicate substantial monetary expenses, and time spent, and opportunity costs of time for preparation. Additionally, this study provides some evidence of potential human capital or brain gains from preparing for public service exams, although the gains may be outweighed by the high direct and indirect costs of preparation.

Chapter 2 presents the first study, that is, the effects of safety enforcement on export-oriented industry. Chapter 3 presents the second study on the effects of attractive public sector jobs on the labor market. The fourth chapter concludes the dissertation. Primary results are presented at the end of each chapter. References and appendices are presented at the end of this dissertation.

Chapter 2

Effects of Safety Enforcement in the Manufacturing Industry: Evidence from a multinational involvement in the export-oriented garment industry of Bangladesh

2.1 Introduction

Safety measures and compliance in manufacturing industries have been evolving with the nature of industrialization. Work-related injuries, fatalities, and diseases are high around the globe (ILO, 2021), but industrial workplace safety and workers' rights are particularly vulnerable in developing countries. While developing countries envisage achieving the potential performance of their industrial sector to address such economic problems as unemployment and poverty, they must also take safety initiatives to improve the safety and security of their workers. Numerous studies have found that safety measures have posi-

tive implications for safety compliance, employee, and economy (Bossavie et al., 2023; Andersen et al., 2019; Abad et al., 2013; Arocena & Núñez, 2009; Gray & Mendeloff, 2005; Gray & Jones, 1991; Bartel & Glenn Thomas, 1982). Challenges in undertaking the initiatives and making the investment for workplace safety, including costs and financial concerns, financing friction and performance, factory capacity and capability issues may discourage the required safety measures, implementation, and compliance (Wu et al., 2022; Akbar & Ahsan, 2019; Cohn & Wardlaw, 2016; Filer & Golbe, 2003). Where existing safety assurance mechanisms are insufficient, the safety enforcement may impose additional costs. Compliance with safety standard by incurring high business operation costs may affect the size of the industry in terms of employment and the number of establishments. Enforcement of safety measures may contribute to workers being laid off or replaced by machines for avoidance of stringent measures. Safety enforcement may also lead nonviable factories' to shutdown and discharged workers becoming unemployed or moving to other industries, or to merged with viable firms and workers remaining employed in the industry.

Ready Made Garment (RMG) or apparel industry is one of the most flourishing industries in Bangladesh, which is second only to China as a garment exporter. The deadly collapse of Rana Plaza building in April 2013 killed more than 1,100 workers and left injured another more than 2,500. In the aftermath of this calamity, international buyer groups immediately became active in Bangladesh and the country underwent immense safety scrutiny of its export sector (Greenhouse, 2013; MoLE, 2013). In 2013 just after the Rana Plaza collapse, about 250 European and American companies which sourced from Bangladesh's RMG industry signed two initiatives aiming to improve workplace safety and workers' rights in nearly 2,300 factories—major European brands that have garments made in Bangladesh formed Accord on Fire and Building Safety (hereafter Accord) and the North American brands established Alliance for Bangladesh Worker Safety (hereafter Alliance) (Safi & Rushe, 2018; Gu & Baumann-Pauly, 2017). In response to the

local and global outcry, the Government of Bangladesh, the International Labor Organization (ILO), and other stakeholders also took a variety of actions. Thus, nearly the entire export-oriented garment industry in Bangladesh underwent unprecedented surveillance of its workplace safety. Manufacturers joined in the safety governance programs, participated in inspections and remediation programs and adopted several other human rights conventions, the safety enforcement empowered workers, and over the period, garments industry progressed tremendously in safety compliance (Mahmood et al., 2021; Kabeer et al., 2020; Ansary & Barua, 2015). The Accord and the Alliance completed their initial five years tenure by December 2018. After the first phase, the Alliance terminated its operations, while the Accord continued as transition Accord.

This study aims to understand the implications of multinational buyers-led safety enforcement in the export-oriented manufacturing sector, where existing practices undermine workers' safety and rights. In the backdrop of Rana Plaza tragedy and the subsequent safety measures, this study investigates the effects of the safety enforcement on the supplier industry.¹ While the entire export-oriented garment industry was affected, identifying the effects on individual establishment or firm is difficult. Therefore, instead of establishment-level outcome, looking into industry's performance around the country provides more meaningful and all inclusive impact of safety measures. Specifically, I compared the change in registered employment and the number of establishments from 2009 to 2019 between upazilas² where apparel was the dominant industry in 2009 and upazilas where there was less or no apparel manufacturing. I used employment from 2001 and 2011 population censuses for upazilas' employment trend prior to safety enforcement. To accomplish upazila-level comparison, I adjusted for upazilas that had changed borders

¹Relatedly, Greenstone et al. (2012) estimated the effects of environmental regulation on competitiveness, specifically, on the total factor productivity of the manufacturing sector in the United States.

²In Bangladesh, an upazilas is similar to sub-district, the administrative unit after district. Upazila is also equivalent to thana or police station where there are no upazilas, e.g., in metropolitan cities. The hierarchical order of the administrative unit: Division → zila (district) → *upazila/ thana*(sub-district/ police station) → union/ward → village.

during the period 2001–2019 using information from various sources. I incorporated as much of the changes as possible, e.g., splitting, merging with other upazilas, and forming new upazilas from two or more upazilas. After the adjustments, there were some large upazilas because I merged all the upazilas that had originated from different upazilas or had split several times. But the adjustment is not a major issue because I compared the same upazilas over the period.

This study obtained estimates for growth in registered employment and the number of establishments in apparel dominant and comparison upazilas during the decade encompassing safety enforcement, 2009–2019. In the decade prior to safety enforcement, between 2001 and 2011, employment significantly increased in both comparison and apparel dominant upazilas. Over this period, growth in apparel dominant upazilas was much higher than in the comparison upazilas. In the decade during safety enforcement, growth in registered employment became much smaller and insignificant in apparel dominant upazilas, while it became stronger in comparison upazilas. Within manufacturing industries, over the period 2009–2019, employment had significantly grown in comparison group but decreased in apparel dominant one. Within the same industries and time period, the number of establishment significantly declined in apparel dominant upazilas but increased in comparison upazilas.

Safety enforcement in the apparel industry could lead to either a decline in output growth or sustaining growth by increasing productivity or replacing workers with machines. The export data does not indicate a declining growth, but maintaining steady export growth during the period. Therefore, it is most likely that the industry laid off workers and enhanced productivity by replacing them with machines. A similar trend is indicated by the number of establishments, that is, after shutting down nonviable and inefficient establishments, the industry maintained output growth and profitability without increasing the number of establishments. The study's findings of declining employment

and the number of establishments, along with stable export volume, are plausible effects of safety enforcement in the export-oriented apparel industry.

Considering the high employment in apparel dominant upazilas compared to non dominant in the base year 2009, it is reasonable to expect slow growth in apparel dominant upazilas because of high base. Also, stagnation could occur if upazilas' apparel employment had reached its potential before the implementation of safety measures. There is evidence of insignificant small negative growth from the estimates of total registered employment in apparel dominant upazilas, that is, apparel did not decline much compared to all other registered employment. But, within manufacturing industries, registered employment and number of establishments both significantly declined in apparel dominant upazilas from 2009 to 2019. Overall, these results suggest that the industry faced negative growth rather than slow or no growth compared to other manufacturing industry.

The result that the size of apparel industry was negatively affected is highly likely consequence of the safety tightening measures after the Rana Plaza catastrophe, since the measures targeted the apparel industry, while other industries had the business as usual situation and opportunity to grow.³ In robustness checks, I dropped upazilas that had some apparel to check for attenuation effect. I also dropped upazilas that had a high share of textile, to address the spillover effect. The main result remained unchanged, after making a comparison group that excluded upazilas with some apparel and high textile. The textile industry is close to apparel industry and would have been impacted by one or more type of the safety measures. Therefore, as an extended robustness check, I combined apparel and textile together and did the same estimation as in the main analysis. I also took into account upazilas with or near Export Processing Zone (EPZ) that could have policies in

³See a news after two years of the accident: "Up to 150,000 Bangladesh workers lost jobs after Rana Plaza safety overhaul" <https://www.reuters.com/article/bangladesh-ranaplaza-idCNL4N0XM07Y20150425> (Accessed 14 May 2023). Number of RMG factories were 5063 in 2009–10, 5600 in 2012–13, 4222 in 2013–14, and 4621 in 2018–19 (BB, 2021)

effect other than post Rana Plaza safety strengthening. The results did not change in the robustness exercises. Workers might have moved as a result of factory closure due to the monitoring in the apparel sector and this might have contributed to an increase in employment in the comparison upazilas. In this case, the difference in difference estimate would capture a shift in employment from apparel to other sectors, rather than an overall employment reduction. Even so, the results would indicate an employment-safety trade-off, as moving across geographical or industry boundaries is costly for workers. Furthermore, safety enforcement could have rather driven a part of the industry from registered to unregistered sector. It cannot be entirely ruled out that to escape tight safety standards, firms could start operating in the informal sector and continue business as subcontractors through backward linkage. However, informalization of the industry has a limit and does not appear to be big provided that operation may not have economies of scale in the small scale and hiding in the informal sector is difficult for large firms. It is worthwhile to note that the minimum number of employees is 10 in the business censuses and only 10 percent of the RMG establishments have employees between 10 and 11 in 2009, which is 0.3 percent of the total RMG employment. In 2019 as well, 10 percent of RMG establishments have employees between 10 and 11, which is 0.4 percent of the total RMG employment. Moreover, other things could have happened during this period (2009–2019) or even after 2013, including industrial sophistication and labor-saving technology. If automation happened largely after the Rana Plaza incident than before, this can be attributed to the tightening of safety regulations. In fact, importation of RMG machinery was steady in the years preceding Rana Plaza but picked up in the years that followed (planned capital imports were USD 423 million in 2010-11 and 2012-13, USD 557 million in 2013-14, and USD 929 million in 2016-17).⁴

Another issue when studying the effects on an export-oriented industry such as apparel

⁴“Will ‘automation’ lead Bangladesh garment industry to US \$ 50 billion mark”: <https://apparelresources.com/technology-news/manufacturing-tech/will-automation-lead-bangladesh-garment-industry-us-50-billion-mark/> (accessed 3 August 2023).

and garment manufacturing is whether it is a shift in demand that affected the industry instead of the enforcement of workplace safety measures. Between 2009 and 2019, I did not see any noteworthy global issues which could have impacted demand for apparel. In fact, the export figures clearly indicated that apparel export from Bangladesh did not decline during this period. Jacobs & Singhal (2017) studied 39 publicly traded global apparel retailers who sourced a significant portion of their garments from Bangladesh to examine if the Rana Plaza building collapse motivated the firms to source production in high-cost developed countries instead of low-cost developing countries. The study found no significant effects except for the negative stock market effect to retailers on the day of collapse. Instead, the retailer responded by developing two different agreements to improve factory and worker safety in Bangladesh—the Accord and the Alliance. Koenig & Poncet (2022) find similar results using monthly firm-level import data from French Customs that the textile import of firms in France from Bangladesh did not decline, but rather continuously increased after the disaster.

The results above indicate that both employment and the number of establishments declined during the period 2009–2019. As a supplement, I further investigated which type of establishments led the negative growth and whether establishment size by the number of workers changed over the time. When establishments established within six years before 2009 and six years before 2019 were excluded from the estimation, there were less negative growth figure, indicating that the recently established factories and potential entrants appear to be affected more by the safety tightening measures. The average size of firms was not significantly different between this two years. When Dhaka district was examined more closely, it appeared that both mean employment and the number of establishments became smaller in 2019 compared to 2009, and the survival rate was higher for larger firms.

Workplace safety improves when owners are aware and careful and workers are re-

sponsive, which need not incur additional costs. For example, using a fire exit or keeping the main door unlocked would not need additional cost but care. On the other hand, improving infrastructure and logistics, and installing safety tools need additional expenses. It is reality that Bangladesh's manufacturing industries, being underdeveloped in a least developed country, lack both care and infrastructure. There is evidence of safety improvement without much economic cost. Publicizing firms' undesirable actions substantially improved safety compliance as employers seek to avoid costly repercussions (Johnson, 2020). In addition to the market based and regulation approaches, institutional frameworks through public intervention may lead to the successful implementation of workplace safety in the industrial sector and labor market (Silvestre, 2010). Strengthening collective labor rights and increased links with International Non-governmental Organization (INGOs) are associated with fewer workers' deaths, while economic indicators such as economic globalization, foreign direct investment and exports have no significant relationship to fatalities (Kerrissey & Schuhrke, 2016). During the period when workplace safety came under heavy scrutiny, the RMG industry achieved significant breakthroughs in developing a safety culture, but the suppliers experienced difficulties implementing initiatives due to limited support from buyers (S. Rahman & Rahman, 2020). The lack of support for workplace which complied with safety measures affected workers (Kabbeer et al., 2020). Buyers organizations committed to sharing a small fraction of safety improvement cost for those who could not afford the expenses otherwise (ILO & IFC, 2016), but this was not enough for small firms to survive.

Bossavie et al. (2023) used the labor force survey data to evaluate the effects of the reform on garment workers in terms of four outcome variables—wages, index of working conditions, hours of work, and having a written contract. Using a triple difference approach, including geographical district level treatment, the study found positive impact on wages and working conditions but no effect on hours of work and contracts. When synthetic control was used without district level treatment, the result indicated that safety

tightening had damaging consequences for wages and the provision of written contracts but some improvement in terms of sick leave and workplace safety (Bossavie et al., 2019). These studies dealt with the impact on workers and could not determine the impact on the industry size in terms of employment and the number of establishments from survey data. Boudreau (2019), partnering with the Alliance, provided experimental evidence for over a period of one year and covered some 84 factories. In the study, an index based on self-reported measures of job satisfaction and mental well-being and revealed preference measures, including absenteeism and turnover, significantly decreased due to the intervention. Supplier competitiveness, including labor productivity, wages, and employment, did not provide evidence of adverse effects. There were positive but small effects on labor productivity. Estimated treatment effects on wages were negative but were close to zero and not statistically significant, and on employment were close to zero. Boudreau's study experimented with a specific type of safety measure, safety committee assignment, only for one year on 84 factories. Alfaro-Urena et al. (2022) developed a model and combining it with empirical data, studied the effects of responsible sourcing requirements on exposed firms and workers. The study found that the increasing pressure from multinational enterprises for responsible sourcing has negative effects on firm sales and employment, while having a positive effect on low-wage workers in Costa Rica. There was no compelling evidence of workers' productivity increase or change in output demand, and on net, a positive but minor aggregate welfare change was observed due to responsible sourcing requirements.

While these studies dealt primarily with the effects on employees, I study the effects on the industry's performance. The findings of the current study are similar to Grier et al. (2023), which employed synthetic control consisting of weights from other countries as a counterfactual to real Bangladesh. However, no other countries produce and export an equivalent level of RMG as Bangladesh. Perhaps most importantly, the data used for Bangladesh seems inconsistent. Other countries' data was collected from the United Na-

tions Industrial Development Organization (UNIDO), which does not contain data for Bangladesh. The study used data from a document (BB, 2021) of the Central Bank that collected data from the Bangladesh Garment Manufacturers and Exporters Association (BGMEA). The referred document provides only total employment and the number of factories of the industry but no details of the data. In the document, employment in the industry was 4 million in all the years between 2011-12 and 2017-18, and the study appears to have scaled the outcomes to 1 in 2013. By utilizing business census data, I was able to cover the entire industry by locations without concerns about representation and combination for good control. The Garment industry in Bangladesh is concentrated in some geographical hubs. For this reason, comparing employment in places where the apparel is dominant with places where apparel is not dominant is more reasonable than comparing the apparel and other employment in the same location.

Enforcement of target standards improves compliance (Blundell et al., 2020; Ronconi, 2010). In addition to the compliance effect, enforcement mechanisms can have other inadvertent consequences. Strengthening environmental standards affects foreign direct investment and imports in South Korea (Chung, 2014). Land use regulation has negative effects on land value and welfare (Turner et al., 2014). The water quality monitoring system in China negatively affects firms' total factor productivity (He et al., 2020). Increased enforcement of labor regulation leads to an increase in formal employment, an increase in nonemployment, a decrease in self-employment, a decline in wages at the top of the formal wage distribution, and an increase in informal wages in Brazil (Almeida & Carneiro, 2012). Increased campaigns also have an impact, for example, anti-sweatshop campaigns in Indonesia led to wage increases accompanied by reduced investment, falling profits, increased probability of closure for smaller plants, and no significant impact on employment (Harrison & Scorse, 2010), and a negative impact on employment (Makioka, 2021). The findings of the current study support the hypothesis that, in the wake of massive safety tightening, the size of apparel or RMG industry may have contracted in terms

of employment and the number of establishments due to higher costs of safety compliance and the availability of alternative production technologies.

The next section presents a brief background of the RMG industry of Bangladesh. Section three deals with data and research methods. Section four interprets and discusses the results. The final section concludes the study.

2.2 Background of Bangladesh's RMG industry

The Ready Made Garment (RMG) industry is the major manufacturing industry in the economy of Bangladesh. Over time, it has become the single most important export-oriented sector in the country. The sector's share of Bangladesh's total export was 3.9 percent in 1983–84, which had been 79.3 percent in 2008–09, 81.1 percent in 2013–14, and 84.2 percent in 2018–19. Being one of the two major foreign exchange earning sectors (the other being remittance), the RMG industry boosted over time and even remained stable during the tremendous shock following the Rana Plaza disaster. Figure 2.4 shows that Bangladesh's apparel exports surpassed that of other competitor countries and the share of the RMG of Bangladesh's total exports has been more than 80 percent throughout the period since Rana Plaza collapse.

Due to the prevalence of the predominant informal sector in Bangladesh, obtaining information on the exact size of the RMG industry is difficult. It is possible that formal apparel suppliers outsource from informal ones. Recent estimates suggest about 7,000 factories produce for the export market, which was 4,000–4,500 in an earlier estimate (Labowitz & Baumann-Pauly, 2015). The total number of RMG factories provided by another study is 8,020 (CED, 2016). According to data from BGMEA, cited in Bossavie et al. (2023), the number of BGMEA members varied from 4,000 to 5,000 in the period

after Rana Plaza. The time series data is no longer available on the BGMEA website, but as of 13 May 2023, BGMEA had 3,715 general members. According to the data obtained for this study, the total number of apparel manufacturing establishments was 5,196 (according to Business Registry 2009, hereafter BR2009) and 5,249 (according to Business Directory 2019, hereafter BD2019). The total number of RMG and textile manufacturing establishments together was 18,200 in 2009 and 15,264 in 2019.

The RMG industry employs millions of workers, and a large percentage of whom is female. According to BGMEA data in ILO (2020), total employment in the RMG industry was 0.1 million in 1985–86, 2.8 million in 2008–09, and 4 million from 2012–13, which continued till the last available data 2017–18. Again, data is no longer available on the BGMEA website. It is not clear how the employment data was generated. The data could be employment in BGMEA member firms and their subcontractors, estimates for the entire industry, whether formal and informal. In the business census data used in this study, in 2009, the total apparel employee is 1,662,344, and apparel and textiles together is 2,508,567. In 2019, the numbers are 1,731,928 and 2,455,766 respectively. In 2012, 54 percent of the employees in the RMG industry was female (BBS, 2013). Other estimates indicate that the female share was 58.4 percent in 2012 and declined to 53.2 percent in 2016 (CPD, 2019). The data in this study indicates that in 2009, the share of female employees in the RMG industry was 55.8 percent, and in the RMG and textiles industries together was 45.5 percent. In 2019, the figures were respectively 55.6 percent and 50.3 percent. In Bangladesh, the level of education of females used to be very low, the participation of females in the labor force was negligible, and the incidence of child marriage is still one of the highest in the world. The RMG industry took advantage of the abundance of workers willing to work for low wages and under poor conditions and employed female workers. However, the employment of women in the RMG also contributed to some extent to their empowerment (Heath & Mobarak, 2015).

The RMG industry's boom was triggered by the weak economy, pliable work force, and flexible government policies. However, while the RMG industry boomed, the quality of workers' lives, standards of workplace safety, and diversification of the industry did not improve. In addition to low wages and meagre benefits, workplace conditions were precarious, as there was little safety, security, and quality assurance. Fires and small accidents were normalized incidents of the industry (Reuters, 2017). In April 2013, the collapse of the Rana Plaza building, where five garment factories were located, killed more than 1,100 workers and left more than 2,500 injured. Only five months earlier, 112 workers were killed while trapped inside the burning Tazreen Fashions factory. These incidents appalled the apparel industry's stakeholders, including the buyers. The worsening conditions of the workers' lives and frequent accidents finally brought about action from the international buyers after the Rana Plaza catastrophe.

Unprecedented safety initiatives have taken place in the industry since the collapse of the Rana Plaza building. The safety measures implemented included: buyers' agreements, legal reforms, and the forming and strengthening of agencies (Figure 2.6). These actions took into account building inspections, electrical and fire safety enhancement, safety training, workers' empowerment, sustainability, and so on. At present, Bangladesh is said to have the safest RMG industry among developing countries (Guardian, 2018). Between 2005–2009, total death and injuries were 18,044 and between 2012–2019, the number was 5,193, including the victims of the Rana Plaza collapse.⁵ When we deduct the 1,134 deaths and 2,500 injuries from the 2012–2019 period, the number of deaths and injuries become much reduced in the latter period, compared to 2005–2009. Although the

⁵Bangladesh Occupational Safety, Health and Environment (OSHE) reviewed 16 national daily newspapers in Bangladesh and reported accident data for 2005–09. There were 6,261 people killed, 11,783 injured, making a total of 18,044 people killed and injured (OSHE, 2014). The Solidarity Center reported the accidents in the garment sector by factory name, location, date, injuries, death and a brief description of the causes and the outcomes. For the period from November 24, 2012 to November 19, 2019, there were 1,310 people killed, 3,883 people injured, making a total of 5,193 people killed and injured (Solidarity Center, 2019). The Solidarity Center's tracking of newspapers included the deaths of 1,134 people and the injuries of 2,500 during the Rana Plaza collapse on 24 April 2013.

statistics are incomplete and not precisely comparable, the improvement of safety conditions in the RMG industry in Bangladesh is evident.

2.3 Conceptual framework

Profit-maximizing firms continue to operate and employ until the point where their marginal benefit and cost are equal. Price-taking firms maximize their profits by adjusting the factors of production or exit. When the cost of labor increases and cost-effective alternatives are available, firms may maximize profits by substituting labor with capital or adopting labor-saving options, which would lead to a decline in employment in the industry. On the other hand, firms may exit if the value of leaving the industry is greater than the value of operating due to rising operating costs. Exiting leads to reducing the number of firms in the industry and subsequently declining employment unless released workers from the exited firms are absorbed in other firms in the industry. Either one or both could have happened in Bangladesh due to the safety enforcement. Additional safety assurance might have increased the cost of labor and safety compliance, and firms responded by laying off more workers than hiring. Higher operating costs due to the safety enforcement would make it more valuable for non-viable firms to leave than to continue operating. These behaviors of firms are studied as the dynamics of firms (Hubmer & Restrepo, 2021; Clementi & Palazzo, 2016; Hopenhayn, 1992).

2.4 Data and methods

2.4.1 Data

Data type and source

The data that I used primarily in this study is produced by the Bangladesh Bureau of

Statistics (BBS). I used data for four years: three years for the pre safety enforcement and one year for during the safety enforcement. The main data for this study are: Business Register 2009 (BR2009), Business Directory 2019 (BD2019), Population Census 2001 and Population Census 2011. Data 2001 and 2011 are population censuses, and, for convenience, I name BR2009 and BD2019 together as business censuses. I also used data from websites and reports of the Accord and Alliance and other sources for supporting analysis.

BR2009 provides information on the address of establishments, Bangladesh Standard Industrial Classification (BSIC), total employment by sex, and the year of inception. The business registration office, Registrar of Joint Stock Companies and Firms (RJSC), under the Ministry of Commerce kept records of business registration when entrepreneurs starts company (Shonchoy & Tsubota, 2013). In BD2019, I received one file from the BBS with all information similar to that available from BR2009. According to a BBS document from its website “the Business Directory is updated continuously with the latest and best information available from Economic Census and other statistical and administrative records programs. The frequency for updating individual data items varies from 3-5 years. The BD data has been updated continuously since 2001-03. The BD is updated in 2005, 2009 and finally in respectively. The Business Directory is a database with records from multiple sources and used to add or update records of establishments” (BBS, 2019a). To determine the accuracy, I crosschecked some of BD2019 information and they matched. Although the document mentioned earlier business directories, when I contacted BBS office, I learnt that the two registers prior to 2009 are not available. The number of establishment level entry is 100,194 in BR2009 and 127,042 in BD2019. The minimum size of establishment in terms of number of employees is 10 in the business censuses.

Due to the lack of sufficient business census data for the pre period, I approximated the pre period trend by using employment from population censuses which is collected at

the individual level. Bangladesh typically conducts a population census every 10 years. I collected population censuses 2001 and 2011 data from the Integrated Public Use Microdata Series (IPUMS) (IPUMS, 2020). The population census provides good microdata for individual level employment status and other demographic and geographic characteristics. Data from publicly available censuses contain 10 percent observations of the 2001 census and five percent observations of the 2011 census. The information was collected through direct interviews with everyone who spent the survey night in Bangladesh. The 2001 sample census is a systematic sample of every 10th dwelling with a random start, drawn by IPUMS. The 2011 sample census is a systematic sample of every 10th dwelling with a random start, drawn by BBS. While it would have been better to have census 2021, census data collection was delayed because of covid-19. Although data collection is already completed and the report on aggregate statistics is available, the micro data is not yet ready, as of 14 May 2023.

A population census provides information pertaining to type of employment of an individual, while business census provides information pertaining to the number of workers in a registered establishment. From population census data, it is not possible to identify precisely the industry where an individual is employed. Therefore, from the datasets, I cannot compare the apparel sector which was the main target of safety enforcement with controlled other sectors in the periods earlier than 2009. To deal with this issue, instead of identifying establishments whether they were in apparel vs. non-apparel, I identify apparel dominant upazilas in 2009 and compare these upazilas' employment before and after 2013. In the industrial classification code, BSIC, the two-digit code for apparel industry is 14 and for textile industry is 13. For my estimation, I identified only these two types of industry because the apparel industry is the group that is primarily affected due to the safety enforcement and the textile industry might be somewhat linked with the apparel industry.

Data organization

To run regression at the upazila level, I collapsed employment data by upazila separately for population censuses and business censuses since the definition of the employment variable is not the same for both. I multiplied the sample with uniform weight for all observations in a census—10 for 2001 and 20 for 2011—since I could access only 10 percent observations for 2001 and 5 percent observations for 2011. This provides variable in the upazilas for any type of employment for the population census years and registered employment for the business census years. After addressing the administrative reorganization of geographic locations as accurately as possible at the 2001 level, I come up with 492 comparable upazilas for the entire period 2001–2019.⁶

The baseline year is 2009—the pre-safety enforcement year of available business census data. I distinguished the upazilas by the percentage of individuals employed in the apparel industry out of the total number of individuals employed in the registered business. In 2009, the highest share of apparel employment in upazilas was 83 percent. Taking about the middle point of percentage share between 0 and 83, I considered upazilas with more than 40 percent employment in apparel industry as treated or apparel dominant and the remaining as control. Using this approach, I found 20 upazilas as apparel dominant and 472 as control. Thus, in the estimation, the results are upazila-level outcomes of the industry, where the data is converted to upazila-level panel from individual and establishment level information.

Registered or formal employment in upazilas was obtained from business censuses 2009 and 2019 and total employment of any type from population censuses 2001 and 2011. Since data for employment from the business census are unavailable for at least two pre safety enforcement periods, I used the proxy trend using employment from population census instead. Although Bangladesh’s registered or formal employment is small,

⁶See Appendix Table A3 for upazilas adjustment.

there is a strong association between formal and total employment in an upazila. For instance, correlation between registered employment in 2009 and any employment in 2011 is 0.84. Therefore, the relative change in employment from population census in period before the safety enforcement is good indication of upazilas' trend for relative change in outcome variables from registered business during the safety enforcement.

I prepared upazila-level panel converted from individual- and establishment- level employment data. Since the safety enforcement affected primarily the export-oriented apparel sector, a reasonable assumption is that apparel dominant upazilas were affected primarily by the safety enforcement. Therefore, apparel dominant upazilas are considered as the equivalent of treatment group and the rest of the upazilas as comparison group. The number of apparel dominant upazilas, that is, upazilas with an apparel share more than 0.4 in registered employment in 2009 is 20 out of 492. As the baseline business census is 2009 and I compared apparel dominant upazilas with the rest, the number of apparel dominant upazilas is 20 and control or comparison is 472 for each year—population census 2001, business register 2009, population census 2011, and business directory 2019. As a robustness check, I excluded upazilas that have $0 < \text{apparel share} \leq 0.4$ in 2009, which provides us with the number of control upazilas as 408 every year to track downward bias due to attrition. I also excluded upazilas that have $0 < \text{apparel share} \leq 0.4$ and textile share > 0.5 in 2009 as a spillover effect check, since the two sectors are very close. In this case, the number of control upazilas is 391 and the number of apparel dominant upazilas is 20. After dropping upazilas that have Export Processing Zone (EPZ) or are near to an EPZ, the number of apparel dominant upazilas is 10 and comparison upazilas is 443.

Figure (2.5) shows the timeline of safety strengthening and data. The Rana Plaza collapse and the subsequent inception of safety measures took place in 2013. Business census data covers a year before (2009) and a year after (2019) of the safety enforcement period for 5 years since inception 2013–2018. Population census covers two years 2001

and 2011, which are before the period of safety enforcement. I do not have data immediately before the Rana Plaza tragedy. However, to the best of my knowledge, nothing happened during the 2009–2013 period to cause a paradigm shift in the RMG industry. Since the beginning of 2009, the government has remained unchanged in Bangladesh, which is favorable for fostering a stable business environment. The Global financial crisis was also about to an end by 2009.⁷

2.4.2 Methods

Empirical approach for upazila-level estimation

I ran regressions for 2001 and 2011, and 2009 and 2019 separately, since the outcome variables for two periods from different data sources are not exactly the same. The estimates from 2001 and 2011 provide us the trend and an overview of employment in the upazilas before undertaking the safety measures. This study focuses on results from 2009 and 2019. The assumption here is that over the 2009–2019 period, growth in dominant upazilas would have been the same as that in comparison upazilas in the absence of monitoring. The assumption is not testable because of the monitoring. It is possible that growth would have slowed for other reasons, for example, declining apparel demand, and upazilas reaching close to their potential level. Declining demand is not evident from export data, and this may partially set aside concerns regarding the upazilas' potential performance.

I created apparel dominant upazilas taking the mid point of the share of apparel employment in upazilas' total registered employment, which was between 0 and 0.83 in 2009. The selection of the mid point is not arbitrary but based on criteria for apparel

⁷Besides the export data in Figure 2.4, the following information can be considered as support that nothing noteworthy happened during 2009–2013. For the years 2008–09, 2009–10, 2010–11, 2011–12, and 2012–13, the number of garment factories were 4925, 5063, 5150, 5400, and 5876, respectively. The employment in the RMG industry (million workers) was 3.50, 3.60, 3.60, 4.00, and 4.00 for the same years, respectively (BB, 2021; Sarker et al., 2015).

dominance. I consider upazilas that has a share of apparel employment above 0.4 as apparel dominant and the rest as comparison upazilas.

Regression specification as following

$$Y_{ut} = \beta_0 + \beta_1 I[2009 \text{ apparel share} > 0.4] + \beta_2 t + \beta_3 I \times t + e_{ut}$$

$$I = \begin{cases} 1 & \text{apparel share in total registered employment in 2009 is above 0.4 in upazilas } u \\ 0 & \text{otherwise (apparel share in total registered employment in 2009 is equal or below 0.4)} \end{cases}$$

In the regression for the pre safety enforcement period trend between 2001 and 2011

$$Y_{ut} = \text{Employment in upazilas } u \text{ and year } t$$

$$t = \begin{cases} 1 & \text{year 2011} \\ 0 & \text{year 2001} \end{cases}$$

In the regression for estimate between pre- and post- 2013 implementation of safety measures

$$Y_{ut} = \text{registered employment, and number of establishments in upazilas } u \text{ and year } t$$

$$t = \begin{cases} 1 & \text{year 2019 (treatment period 2013 onwards)} \\ 0 & \text{year 2009 (before treatment 2013)} \end{cases}$$

The safety measures after the Rana Plaza tragedy, particularly by the Accord and the Alliance, can be taken as exogenous. The buyer organizations pressured the export-oriented RMG firms to accept and implement the workplace safety measures. Although participation was voluntary, the export-oriented RMG firms had no other choice except going local, underground, or out of business. Needless to say, shifting a business's orientation from international to local is not easy and sometimes impossible, considering the volume

of supply and type of production. This exogenous safety shock allows us to estimate the effects of safety measures in the industry in a difference-in-difference identification strategy. An additional robustness is experimented using honestDiD approach only for manufacturing employment.

Linking establishments of the Dhaka district.

Apart from employment, the business censuses data of 2009 and 2019 also provide information of establishment's identification number (ID), name, address, sex. Having a unique ID would be useful to conduct establishment level analysis, but the data do not contain unique IDs for 2009 and 2019. Matching each establishment by name for the entire datasets is next to impossible, considering the number of observations is large and there are many common and close names. To understand how name matching might look like and the survival probability of firms over the 10 year period, I attempted to link establishments, by name and other information, within upazilas block only for Dhaka district. In upazila-level regression, I considered all sectors because the pre period in the population census covers the entire population and also only manufacturing. When matching, I considered Dhaka district only for manufacturing industries (two-digit BSIC code from 10 to 33).

To match establishments within upazilas between 2009 and 2019, I made upazilas similar for both years with some adjustment.⁸ Using the jarowinkler method in python recordlinkage package, I matched establishment names within upazila block. If no restriction is imposed, the match becomes 100% and millions of matched points for my entire data observations (9457 obs in 2009 \times 5683 obs in 2019), which does not make sense except for a tiny portion. Had the name entry followed the exact same name for both years, taking exact name matches would be much easier. However, there were only few exact name matches and again, many of them are common names repeated many times.

⁸See Appendix Table A4.

Therefore, I put a restriction of 0.75 matching after several trials with different percentage restriction. There were still a lot of matched observations which are really not similar, so I selected good name matches from the matches generated with restriction 0.75 or above. The more flexible percentage I accept, the fewer convincing matches I get, but I wanted to maximize convincing name matches. From recordlinkage match with threshold 0.75, I finalized the matched observations manually by taking into account such information as union or ward, establishment year, sector, etc., and common knowledge. I have sorted step by step, that is, first I kept above 0.90 name match, then I picked up good matches from between 0.85 and 0.90 and from between 0.75 and 0.85. After taking all these steps and putting them together, I came up with only 786 matched establishments between 2009 and 2019.

2.5 Results

2.5.1 Upazila-level results

In Table (2.1), the first column presents benchmark estimates of employment in upazilas using population and business censuses. Panel A presents regression results for total employment outcome in 2001–2011, the decade prior to safety enforcement. Mean employment was 0.81 log point or about 125 percent higher in apparel dominant upazilas compared to non apparel dominant ones in 2001. By 2011, employment increased by about 14 percent in the comparison upazilas and 0.54 log point with confidence interval [0.42 0.66] or about 72 percent in apparel dominant upazilas. Panel B presents results for registered employment outcome in 2013–2018, the period when workplace safety measures were implemented, using business censuses 2009 and 2019. In 2009, the base year of the decade encompassing strengthened safety measures, mean registered employment was 3.05 log points or about 20 times higher in the apparel dominant upazilas than the comparison group. Between 2009 and 2019, employment increased by log point 0.52 or

about 68 percent in the comparison group but decreased by -0.16 log point or 15 percent in apparel dominant group. This reduction is not statistically different from zero and the confidence interval is wide, between -0.43 and 0.11 log point. All coefficients in the first column, except average growth in apparel dominant upazilas during 2009–2019, are significant at one percent level.

Comparing employment of apparel dominant upazilas with other upazilas can cause a downward bias in the estimation if the safety enforcement affects apparel employment and the comparison upazilas also have some apparel employment. To avoid the bias and compare apparel dominant upazilas exclusively with upazilas without apparel employment, in the second column in Table (2.1), I dropped comparison upazilas that have some apparel employment. This move widens employment difference between apparel dominant and the comparison group, both in 2001 and 2009. However, barely any difference in employment growth is observed, compared to benchmark estimation for either apparel dominant or the comparison group over both of the periods, 2001–2011 and 2009–2019. There is only a decline of one percent during 2001–2011 and a two percent decline during 2009–2019 in the comparison upazilas. In addition to upazilas with moderate share of apparel employment, I dropped upazilas that have a share of textile employment of more than 0.5 in column 3. The reason for excluding these upazilas was that the textile industry is very closely related with the apparel industry and is likely to be affected by the safety enforcement. The third column does not actually show any noteworthy result that is different from column two. The difference between apparel dominant and comparison upazilas remained the same in 2001 and slightly widened in 2009. By 2019, employment growth had increased further by an additional two percent in the comparison group.

To address the potential risk of choosing arbitrary mid point at 0.4 cutoff and losing information by using dummy, I estimated slopes of log difference with respect to 2009 apparel share of employment in upazilas for both of the periods. The results are signifi-

cant positive slope (0.67) in the pre safety enforcement period and negative slope (-1.02) during the decade when safety enforcement took place, as expected. These results are also quantitatively consistent with the dummy approach. The mean share of apparel employment in the comparison group is about 0.01, while the share of the apparel dominant group is about 0.61. Multiplying $(0.61-0.01)$ by 0.67 gives about 0.41, which is similar to the difference in difference estimate of 0.41 for the 2001-2011 decade. Similarly, the pre safety enforcement period's positive slope of employment difference between 2001 and 2011 with 2009 apparel share (0.67) times mean of the selected dominant upazilas share (0.61) generates about 0.4. Since the mid point is determined consistently with the slope of pre safety enforcement period, slope changes during the safety enforcement period is due to change from the mid point or for apparel dominant upazilas.

Apparel is the main export-oriented industry in Bangladesh. As part of its export promotion initiatives, Bangladesh has concentrated on Export Processing Zone (EPZ) (Shahidur, 2014), which might be centers of employment for neighboring upazilas too. To address the government's measures targeted at promoting employment and export in the EPZs, which might be unrelated to the safety enforcement but cause a bias, I dropped EPZs and neighboring upazilas in the fourth column in Table (2.1). The exclusion of EPZs and neighboring upazilas dropped some overlapping apparel dominant upazilas too. This exclusion drove a larger difference between apparel dominant and comparison upazilas in both 2001 and 2009, compared to benchmark estimates in the first column. Between 2001–2011, there was no difference in employment growth comparison upazilas but a higher average growth in apparel dominant upazilas. Over the 2009–2019 period, there was no growth difference in comparison upazilas either, but was a decline in growth in apparel dominant upazilas. This pattern indicates a positive association between employment in apparel dominant upazilas and EPZs and neighboring upazilas. Average negative employment growth in apparel dominant upazilas remained insignificant during the decade of safety enforcement.

The apparel industry play a major role in the formal sector, while a vast majority of people in Bangladesh are employed in the informal sector. Because agriculture is least close to the manufacturing formal sector, I excluded agricultural employment in upazilas in the last column of Table (2.1). The exclusion of employment in the agriculture sector excluded more employment in the non-apparel dominant compared to apparel dominant upazilas, since agricultural employment is a major contributor to informal employment dominant upazilas. As a reflection, the difference between the apparel dominant and comparison groups became larger in 2001, compared to results in the benchmark estimate. On the contrary, in 2009, the difference was much closer to the benchmark estimate in column one because of negligible share of agriculture in registered employment. Overall, the high growth trend from 2001 to 2011 in apparel dominant upazilas seems reasonable, considering that during this period manufacturing sector, particularly the RMG industry was gearing up from low base. Although the magnitude was different, the growth pattern of comparison upazilas was similar in 2009–2019 as in 2001–2011. The only difference in the 2009–2019 period was that the average growth in apparel dominant upazilas was disappeared, in fact, there was insignificant negative growth.

Table 2.2 depicts the results only for manufacturing sector and excludes the agriculture and service sectors. Panel A contains results of registered employment outcome in the manufacturing sectors. Within the manufacturing sectors, the apparel dominant upazilas' employment in comparison with employment in other upazilas was stronger in 2009, log point 5.01 with confidence interval [4.35 5.67], which varied between 3.05 and 3.47 in Table 2.1 Panel B. Within manufacturing employment, the decline of registered employment in apparel dominant upazilas was larger and significant. By 2019, registered employment had declined by log point -0.45 and confidence interval is between -0.77 and -0.14.⁹ In contrast, employment stagnated for total or for service and manufacturing

⁹For sensitivity analysis and better understanding of violation of common trend within HonestDiD

together in Table 2.1. The average negative growth in employment in apparel dominant upazilas was larger in column two and column three when apparel and textile and only apparel respectively are singled out. By dropping recent established firms in the last column, I observe that the directions of other coefficients remained the same and only the average growth in apparel dominant upazilas disappeared again. This result implies that recently established firms were a noteworthy driver of employment in apparel dominant upazilas. Comparing the first and last columns, it can be deduced that during the safety enforcement, newly established firms faced the employment growth penalty or older firms had better coping mechanism maybe because of more capital intensity.

Panel B of Table 2.2 presents results for the manufacturing sector's registered number of business establishments. The number of establishments is higher by log point 2.80 with confidence interval [2.25 3.35], if upazilas have apparel share above 0.4 in 2009. By 2019, the log of the number of establishments in the comparison group had grown by 0.46 with confidence interval [0.36 0.55], that is 58 percent but in apparel dominant upazilas declined by -0.49 with confidence [-0.73 -0.25] log point or 39 percent. Average growth in apparel dominant upazilas was slightly better within only apparel and textile (column 2) but worsened within only apparel (column 3). The exclusion of recently established firms led to larger average establishment growth in the comparison group. Interestingly, the exclusion of recent firms in the last column led to an insignificant smaller negative growth of employment and a significant slightly smaller negative growth in number of establishment. This pattern can be interpreted as, more firms were established in apparel dominant upazilas in the recent past of 2009 and they encountered penalties in terms of employment during the safety enforcement episode. However, I am cautious regarding the last column because there were more missing information of establishment year in

(Rambachan & Roth, 2019) framework, I ran two-way fixed effect regression for 2001, 2009 and 2019 using reference year 2009. Along with 'manufacturing employment' from business census, I use 'industry employment' from population census 2001 for this estimation. The result shows that the post-period estimate is significant up to a pre-trend deviation of 0.5. Whether such a deviation is small or large is difficult to assess.

2009 than in 2019 in the data.

In the main results, the presented outcomes are log converted, which is convenient for interpretation as growth or percentage change. For a better understanding of the size of industry, results in level outcomes are presented in the Appendix. In the level outcome variable, the mean of total employment in comparison upazilas in 2001 was about 66 thousand, while high apparel upazilas had more than double of that employment. Between 2001 and 2011, employment increased by about one thousand per year in the comparison group and additional thirteen thousand in the high apparel group. In 2009, the mean registered employment in comparison upazilas was about six thousand and in apparel dominant upazilas, it was an additional 115 thousand. By 2019, the mean employment in comparison upazilas had increased 3.5 thousand but decreased about 13.7 thousand in apparel dominant upazilas. In 2009, the registered number of establishments was 175 in the comparison group and additional 728 in the apparel dominant group. During 2009–2019, the number of registered firms increased by 64 in comparison upazilas, while it reduced by 240 in apparel dominant upazilas.¹⁰

Because apparel and textiles are related industries, both might have been affected by the safety enforcement. Although by dropping moderate apparel and high textile from the comparison group it is already addressed, I did an extended analysis using outcome as apparel and textile together, and the main results remains similar. When apparel and textile are taken into account, industry size together shows stagnation. It is therefore apparent that apparel was the industry that was primarily affected due to the tightened safety. This is reasonable, given that textiles might have been affected slightly but was not the primary industry to weather the shock. Apparel is the export-oriented industry and underwent the comprehensive safety measures.¹¹

¹⁰See Appendix Table A1.

¹¹See Appendix Table A2, Figure A1, and Figure A2.

Between 2009 and 2019, employment had grown significantly over the period in comparison upazilas for registered employment, on average of about six percent per year. This is expected in a country with a large working age population and low economic base. However, differential changes in apparel dominant upazilas observed stagnation in total registered employment and a significant decline in manufacturing employment in 2019. Registered total employment in high apparel upazilas insignificantly declined by about 14 percent, manufacturing employment significantly decreased by about 36 percent, and the number of manufacturing establishments declined by about 39 percent over the period. This is the hypothesized result in the wake of massive safety scrutiny that the measures have hurt the sector's performance in sustaining business and employment, and other formal sectors within the upazilas could not absorb the workers. Of course, workers might have moved as a result of factory shutdowns due to the monitoring in the apparel sector and this might have contributed to employment expansion in the comparison upazilas. In this case, the difference in difference estimates would capture a shift in employment from apparel to other sectors, rather than an overall employment reduction. Even so, the results would indicate an employment-safety trade-off since moving across geographical or industry boundaries is costly for workers.

2.5.2 Firm-level results

Apparel dominant upazilas observed a stagnation within formal employment and significant decline of employment and the number of firms within manufacturing industries. This result appears to be the impact of the safety enforcement in the Ready Made Garment (RMG) industry. During the period of enforced safety measures, it is possible that firms could not survive the cost of complying with safety measures, which is evident from the upazila-level estimate that the number of establishments declined. It is also possible

that firms merged, absorbed laid off workers, and became larger, but this is not evident from the upazilas level results since the estimates suggest declining employment in apparel dominant upazilas. Firm level information can provide supplementary evidence to determine which of these possibilities is more plausible. In the business census, individual firms cannot be linked due to their not having unique IDs, so, the firms which had been affected directly is unknown. I attempted to investigate firm level effects using different data sources.

Accord is one of the two major bodies in the safety enforcement initiatives and website of transitional Accord that evolved from initial Accord is active currently. Accord covered a total of 1,688 factories, employment of which is above 2 million (Accord, 2018). As of March 2023, Accord had 1,885 member factories and 502 factories closed or archived.¹² In the five-year period between 2018 and 2023, only 200 more factories were added to the list of member factories. From the active member factories, I extracted a total of 1,258 by web scrapping. There were 1,740,995 employees in these factories, which make up about 70 percent of total employment in apparel and textile industries in the 2019 business census. In the scrapped data, the average factory had 1,569 employees. If 502 factories were closed, it can be deduced that an approximate $502 \times 1,569 = 787,638$ people lost their employment because of factory closures. This was equivalent to 32 percent of 2019 business census employment. However, it cannot be confirmed whether these factories relocated, operated under different names, or merged with other firms. In 2018, before terminating its operations, Alliance had 714 member factories and 1,305,310 workers (Alliance, 2018). It is to note that the factories were not exclusively covered either by Accord or Alliance. Many factories came under the purview of both associations and beyond for the purposes of monitoring. The number of closed or archived Accord member factories support the point that firms could not survive.

¹²Accord website: <https://bangladeshaccord.org/> (accessed 12 March 2023)

In Table (2.3), the case of Dhaka district is presented to have a better understanding whether the RMG industry evolves as establishments increased in size, merged, or just went out of business. In Dhaka district, the RMG industry experienced reduction in both number of establishments and mean employment. With a fuzzy linking of establishments of 2009 and 2019 within the upazilas in Dhaka district, I came up with 786 matched establishments from 33 upazilas, which made up 8.31 percent of the total in 2009. 514 of these establishments were involved in apparel or textile and 272 were involved in other types manufacturing. Mean employment of the total matched observations was 206 and non-matched observations was 107, matched apparel and textile 284 and non-matched apparel and textiles 194, matched other 56 and non-matched other 35. From the match, I observe that the mean employment of the establishments in 2009 is larger for those who survived the 10 year period, that is, the survival chance is higher for larger firms and the smaller ones are more vulnerable in shocks. Apparel is the leading industry in Bangladesh and its average factory or establishment size is larger, therefore, the probability of survival is also larger for apparel factories. Within the apparel industry, the small firms are more vulnerable to shocks, as we have seen from the regression that the exclusion of recently established factories lessen the negative consequences of safety enforcement.

2.6 Conclusion

This paper studies the implications of the safety tightening for manufacturing industry's outcomes, in terms of employment and the number of establishments. The study exploits the safety enforcement led by multinational buyers' organizations and followed by other stakeholders in the export-oriented Ready Made Garment (RMG) industry of Bangladesh after the Rana Plaza tragedy.

The results suggest that initiatives to enforce workplace safety in the manufacturing industry are likely to affect the industry's size in terms of employment and the number of

establishments. In the decade prior to the Rana Plaza collapse and international involvement, places where apparel or RMG were the dominant manufacturing industry in terms of registered employment experienced substantially higher employment growth compared to places with no or less apparel. In the subsequent decade when safety measures were tightened after the Rana Plaza collapse, this trend reversed. In fact, both registered employment and the number of establishments declined in apparel dominant places, while it increased in comparison places. Recently established factories and potential entrants appear to be affected more, while larger establishments are likely to survive shocks better and sustain longer. This study provides empirical evidence of the implications of safety initiatives after the Rana Plaza collapse, one of the world's worst industrial accidents in recent times.

Upazila-level result

Table (2.1) Log employment in upazilas, 2001–2019

Panel A: Population census 2001 and 2011					
	Total employment				
Apparel dominant	0.81*** (0.15)	0.89*** (0.15)	0.89*** (0.15)	1.05*** (0.17)	1.58*** (0.16)
Year 2011	0.13*** (0.01)	0.12*** (0.01)	0.12*** (0.01)	0.13*** (0.01)	0.09*** (0.01)
Apparel dominant × Year 2011	0.41*** (0.06)	0.42*** (0.06)	0.42*** (0.06)	0.50*** (0.07)	0.57*** (0.07)
Constant	10.95*** (0.03)	10.88*** (0.03)	10.87*** (0.03)	10.93*** (0.03)	10.00*** (0.03)
Average growth in Apparel dominant	0.54*** (0.06)	0.54*** (0.06)	0.54*** (0.06)	0.63*** (0.07)	0.67*** (0.07)
Panel B: Business census 2009 and 2019					
	Registered employment				
Apparel dominant	3.05*** (0.30)	3.26*** (0.30)	3.32*** (0.30)	3.47*** (0.31)	3.06*** (0.30)
Year 2019	0.52*** (0.03)	0.54*** (0.03)	0.56*** (0.03)	0.52*** (0.03)	0.51*** (0.03)
Apparel dominant × Year 2019	-0.68*** (0.14)	-0.70*** (0.14)	-0.72*** (0.14)	-0.91*** (0.12)	-0.67*** (0.14)
Constant	8.04*** (0.05)	7.83*** (0.04)	7.77*** (0.04)	7.99*** (0.05)	8.03*** (0.05)
Average growth in Apparel dominant	-0.16 (0.14)	-0.16 (0.14)	-0.16 (0.14)	-0.39 (0.11)	-0.16 (0.14)
Observations	984	856	822	906	984
Drop $0 < \text{apparel share} \leq 0.4$	✗	✓	✓	✗	✗
Drop textiles share > 0.5	✗	✗	✓	✗	✗
Drop EPZ and neighbor	✗	✗	✗	✓	✗
Exclude agricultural employment	✗	✗	✗	✗	✓

Notes: Table 2.1 presents OLS estimates of total employment for 2001 & 2011, and total registered employment for 2009 & 2019 by upazilas (sub-district) for 2009 apparel dominant upzilas and others. Robust standard errors clustered at upazilas level are in parentheses.

Statistical significance are indicated at the 1% level (***), 5% level (**), and 10% level (*).

Apparel dominant indicates $I[\text{share of apparel employment in total registered employment in upazilas in 2009} > 0.4] = 1$

Table (2.2) Log registered manufacturing employment and number of establishments in upazilas, 2009–2019

Panel A: Registered manufacturing employment				
Apparel dominant	5.01*** (0.34)	8.51*** (0.36)	9.83*** (0.33)	5.28*** (0.32)
Year 2019	1.11*** (0.09)	0.40*** (0.12)	0.27*** (0.09)	1.51*** (0.11)
Apparel dominant × Year 2019	-1.56*** (0.18)	-1.24*** (0.43)	-1.60** (0.63)	-1.68*** (0.23)
Constant	5.87*** (0.12)	2.21*** (0.15)	0.75*** (0.10)	5.17*** (0.14)
Average growth in Apparel dominant	-0.45*** (0.16)	-0.84** (0.41)	-1.33** (0.63)	-0.17 (0.20)
Panel B: Number of registered establishments				
Apparel dominant	2.80*** (0.28)	3.82*** (0.37)	4.11*** (0.34)	2.78*** (0.28)
Year 2019	0.46*** (0.05)	0.04 (0.04)	0.09*** (0.03)	0.65*** (0.05)
Apparel dominant × Year 2019	-0.95*** (0.13)	-0.45*** (0.14)	-0.66*** (0.21)	-1.07*** (0.18)
Constant	2.64*** (0.07)	0.83*** (0.07)	0.22*** (0.03)	2.23*** (0.08)
Average growth in Apparel dominant	-0.49*** (0.12)	-0.41*** (0.13)	-0.56*** (0.20)	-0.42*** (0.17)
Observations	984	984	984	984
upazilas' manufacturing industry	All	App&tex	Apparels	All
Exclude recent established firms	✗	✗	✗	✓

Notes: Table 2.2 presents OLS estimates of employment and registered establishment number in the upazilas. Standard errors clustered at upazilas level in parentheses. Statistical significance are indicated at the 1% level (***), 5% level (**), and 10% level (*)

Firm-level result

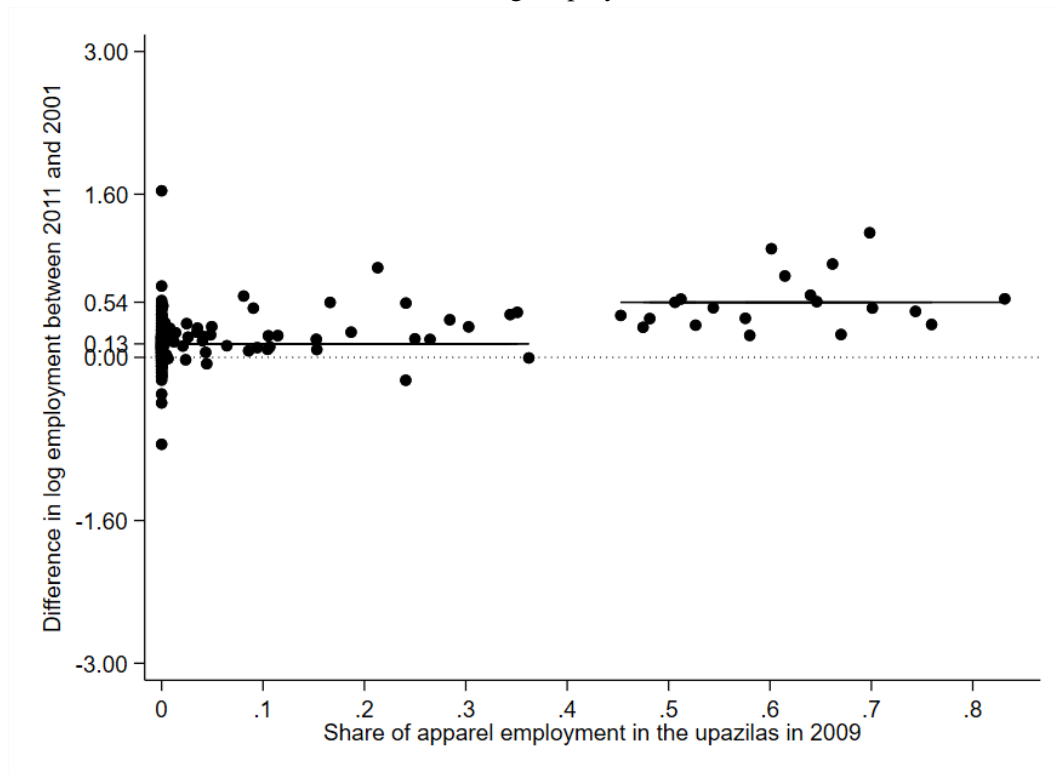
Table (2.3) Mean employment, number and survival rate of establishment in the registered manufacturing industries in Dhaka district, 2009–2019

Manufacturing industries	Mean	Est (N)	Mean	Est (N)	Survival rate
	emp		emp		
	2009		2019		
Apparel and Textiles	204.31	4465	186.15	2993	11.51
Wearing apparel (RMG) (14)	240.31	3,322	195.59	2,620	14.08
Textiles (13)	101.51	1,149	119.83	373	4.09
Other	36.28	4992	38.93	2690	5.83
Food products (10)	30.06	591	45.87	243	5.92
Beverages (11)	109.46	24	40.09	11	4.17
Tobacco (12)	438.75	12	29.14	7	8.33
Leather & related (15)	34.58	604	20.82	365	7.62
Wood & related (16)	12.51	101	28.74	93	4.95
Paper & related (17)	39.15	247	24.35	78	1.21
Printing & media (18)	21.45	616	24.21	253	6.17
Coke & related (19)	26.86	7	20	1	na
Chemicals & related (20)	46.37	111	36.62	97	7.21
Pharma & related (21)	92.99	104	368.21	29	7.69
Rubber & related (22)	22.26	562	28.88	381	8.72
Other non-metallic (23)	138.39	203	107.39	157	4.93
Basic metals (24)	39.58	142	43.70	146	4.93
Fabricated metal & related(25)	23.44	499	32.63	297	3.81
Computer & related (26)	40.93	27	49.80	24	na
Electrical equipment (27)	30.57	169	80.26	39	3.57
Machinery & equipment(28)	24.94	115	40.97	92	5.22
Motor vehicle related (29)	22.61	23	13.63	8	na
Other transport equip (30)	36.91	77	82.18	17	1.30
Furniture (31)	31.45	538	19.73	299	5.20
Other (32)	44.07	159	17.36	36	0.63
Repair & related (33)	17.44	62	17.05	20	na
Total	115.81	9,464	116.40	5,686	8.31

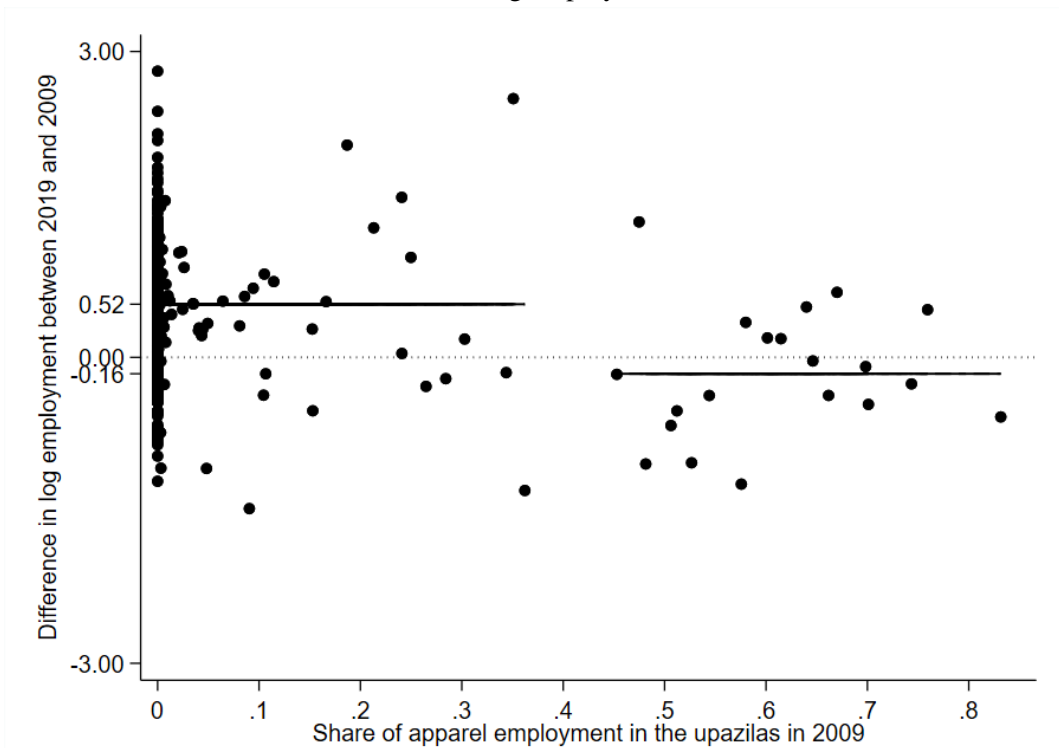
Notes: The first column contains the names of manufacturing industries. The mean employment and total number of establishments in each industry are presented in the second and third columns for 2009, and in the fourth and fifth columns for 2019. The last column calculates the share of 2009 establishments that matched with 2019.

Figure (2.1) Difference in log employment in upazilas

Panel A: Difference in log employment 2011 and 2001



Panel B: Difference in log employment 2019 and 2009



Notes: Horizontal axis shows the share of apparel employment in the upazilas and vertical axis employment differences. Round points are difference of value in each upazilas between 2001 and 2011 (Panel A), and 2009 and 2019 (Panel B). Solid lines are mean values of difference for upazilas with apparel share ≤ 0.4 and apparel share > 0.4 . Continuous dot lines indicate zero.

Figure (2.2) Difference in log manufacturing employment and number of establishments in upazilas

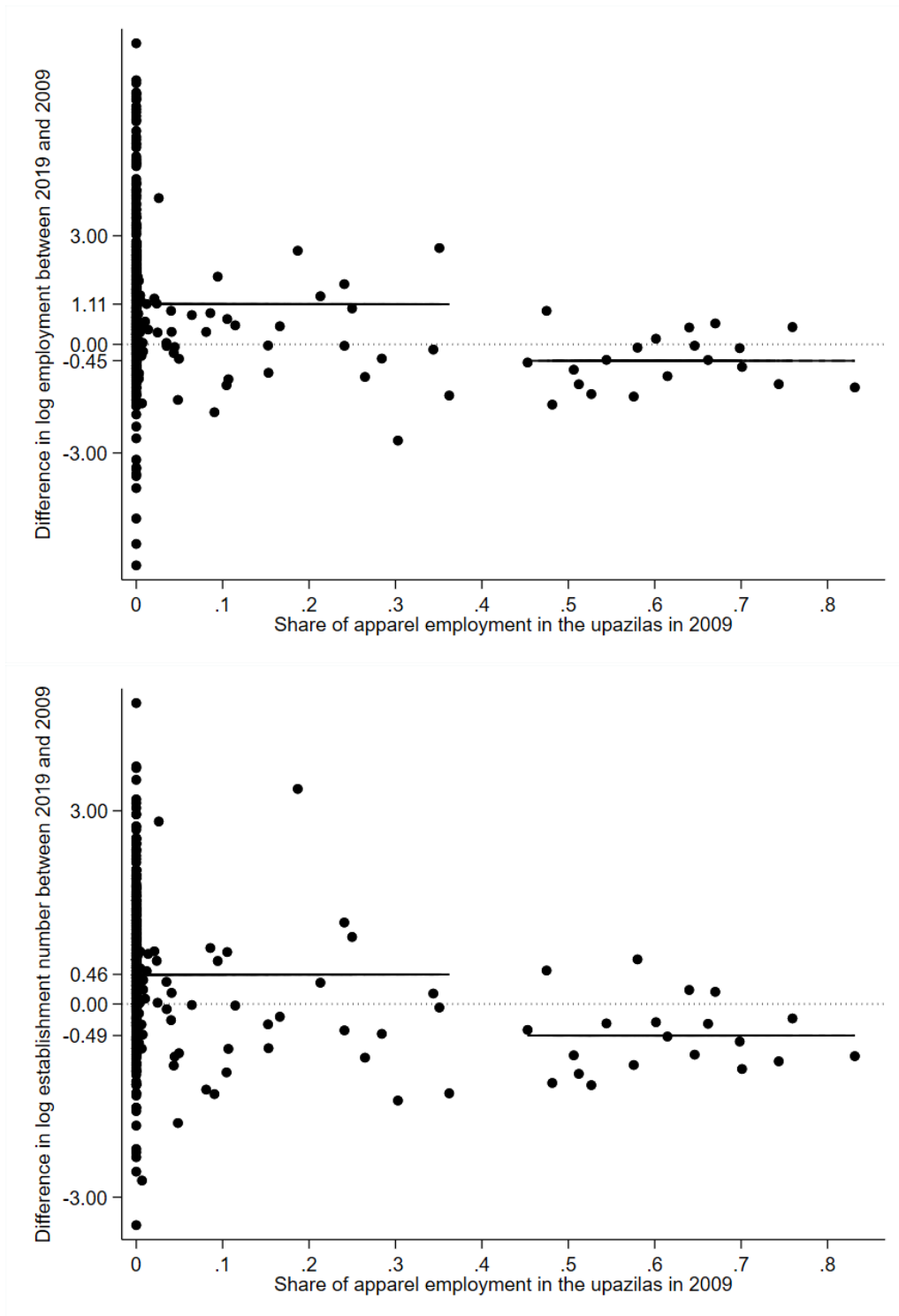
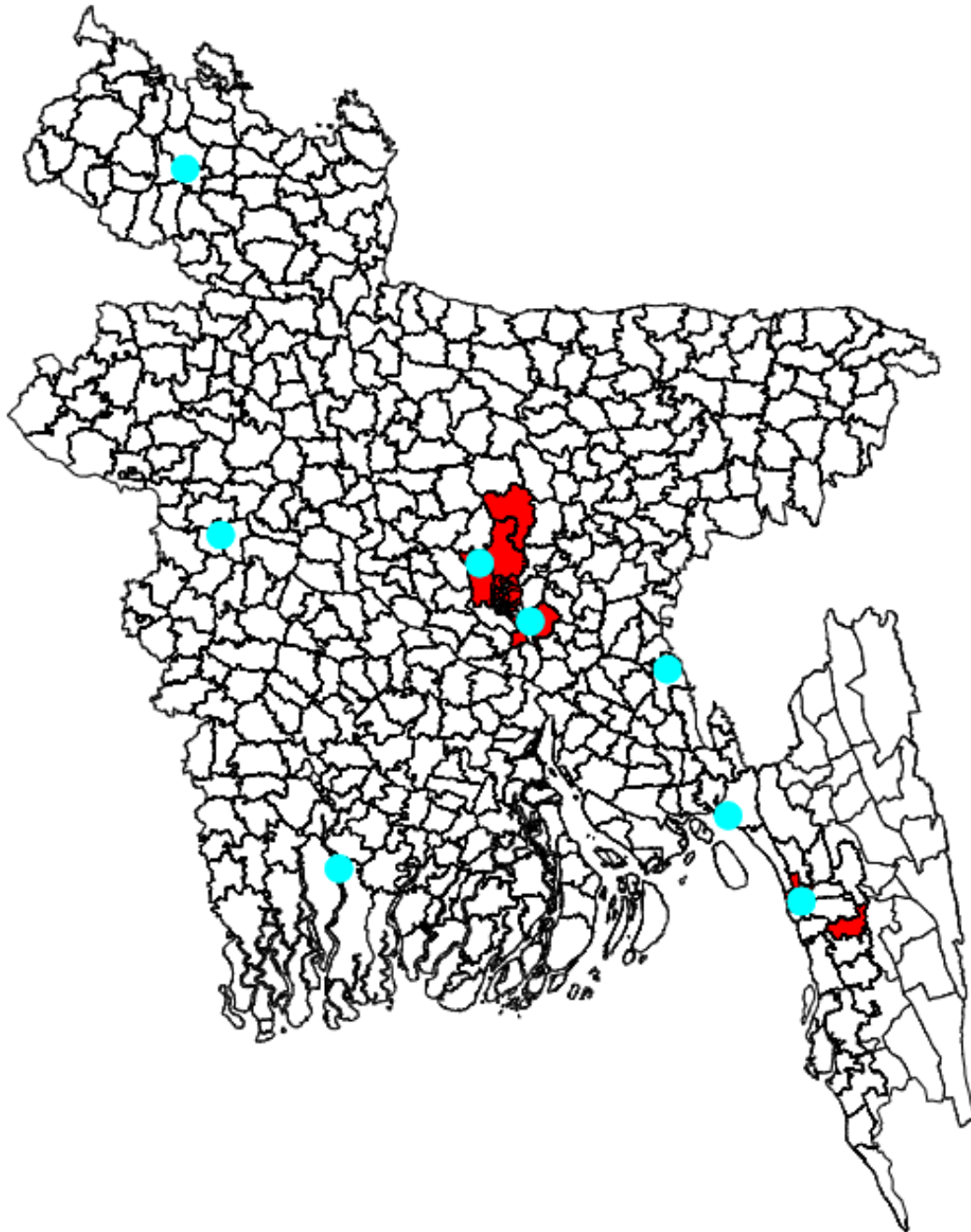


Figure (2.3) Location of Export Processing Zones (EPZs) and apparel dominant upzilas on Bangladesh's map

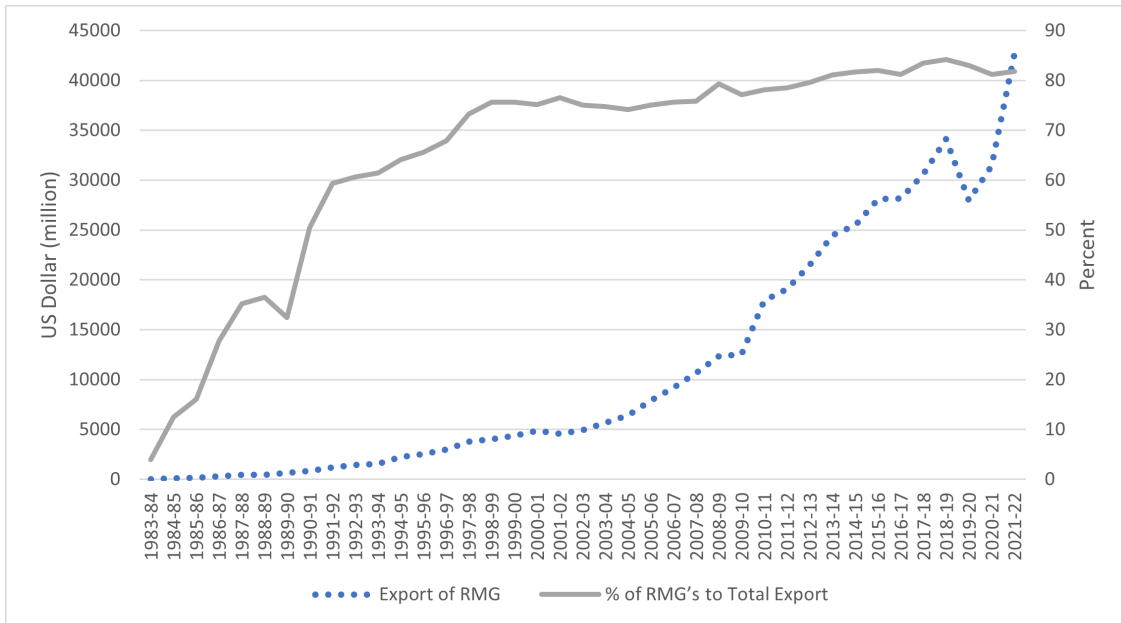


Notes: Filled red blocks are apparel dominant places, white are comparison places, and cyan dots are EPZ locations

Source: Author's illustration using 2018 shape file extracted from GADM database (www.gadm.org)

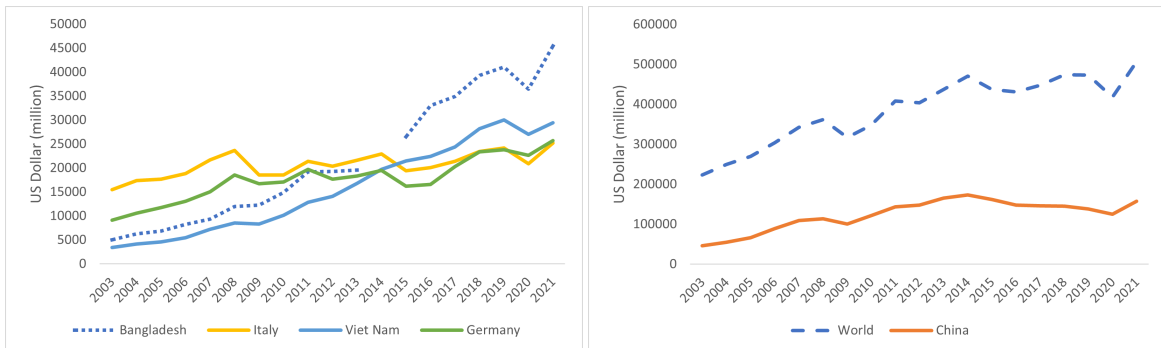
List of EPZ (establishment year): Chattogram EPZ (1983, Extension in 1997), Dhaka EPZ (1993, Extension in 1997), Mongla EPZ (1998), Cumilla EPZ (2000), Ishwardi EPZ (2001), Uttara EPZ (2001), Adamjee EPZ (2006), Karnaphuli EPZ (2006)

Figure (2.4) RMG export and share of total export of Bangladesh
 (a) RMG export of Bangladesh (total and percent)



Source: BGMEA, https://www.bgmea.com.bd/page/Export_Performance

(b) RMG export of top five exporters



Source: Author's illustration based on International Trade Centre (ITC): <https://intracen.org/resources/data-and-analysis/trade-statistics#export-of-goods> (accessed 13 May 2023)

Notes: Total of Product: 61 Articles of apparel and clothing accessories, knitted or crocheted and Product: 62 Articles of apparel and clothing accessories, not knitted or crocheted in (b). 2014 data is missing for Bangladesh.

Figure (2.5) Timeline of data and safety enforcement

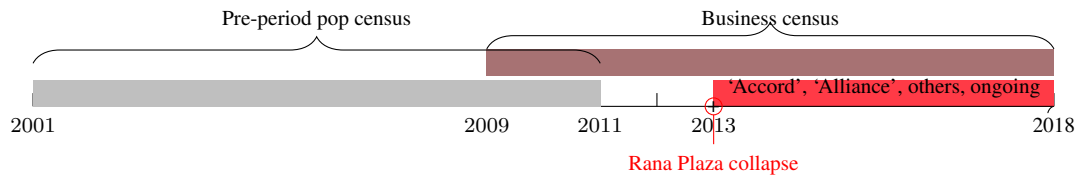
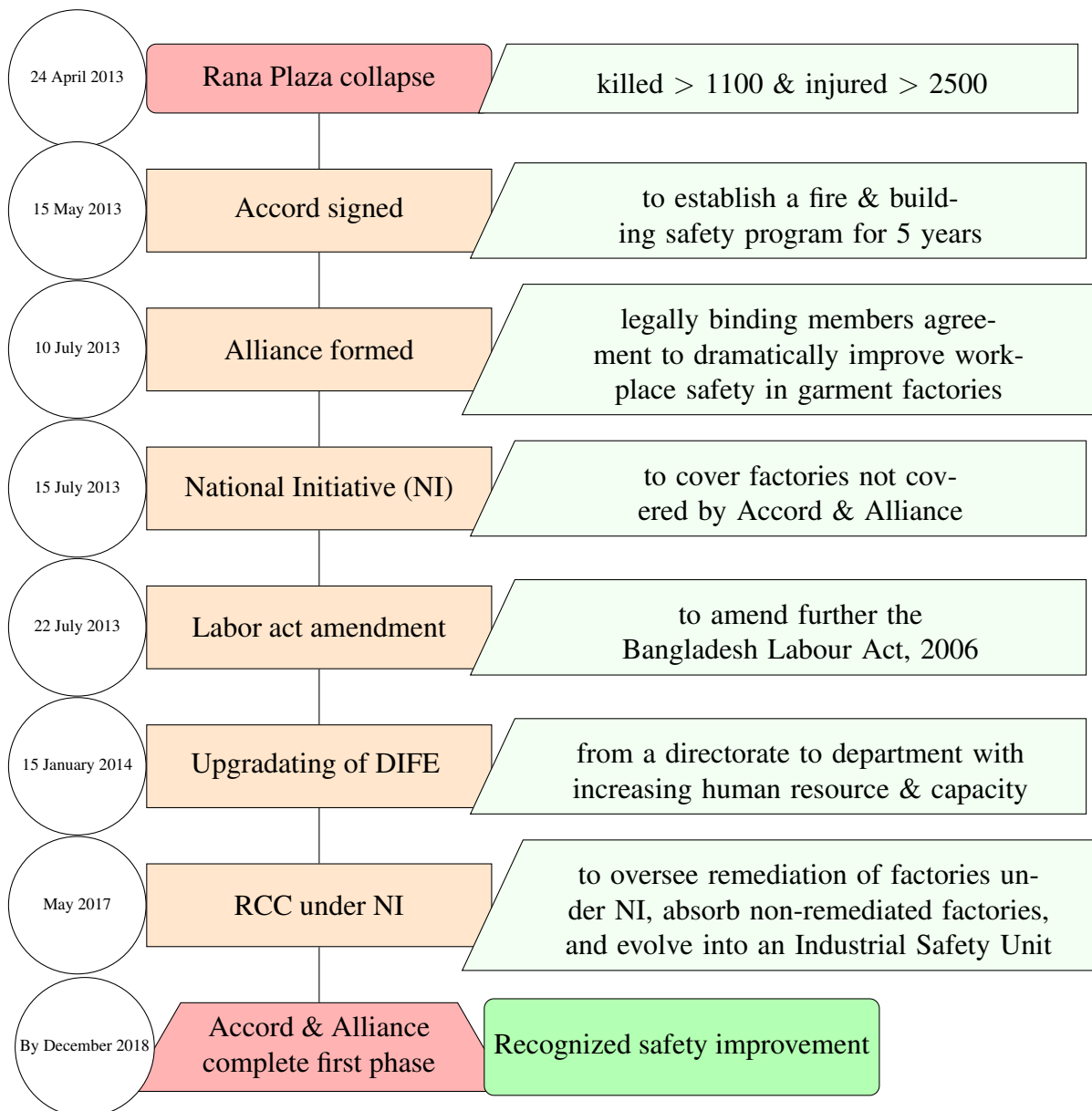


Figure (2.6) Snapshot of major initiatives over the period 2013–2018



Source: Author's compilation and illustration

Notes: Remediation Coordination Cell (RCC); Department of Inspection for Factories and Establishments (DIFE)

Chapter 3

Are Attractive Government Jobs Distorting the Labor Market? Evidence from Bangladesh

3.1 Introduction

Attractive public sector jobs have implications for the labor market. Public service premiums¹ may cause misallocation and productivity loss by diverting highly productive and innately entrepreneurial individuals from private to public sector (Cavalcanti & Santos, 2020). High wages in the public sector may also induce the unemployed to continue seeking public sector jobs instead of applying for private sector ones, which prolong their unemployment (Gomes, 2014). Premiums can also affect human capital formation when selection for public sector employment is competitive. Candidates might delay searching for or accepting other employment opportunities by studying for selection exams or getting a required degree (Banerjee & Chiplunkar, 2020). Since most candidates will not get

¹Public sector premiums may prevail for many reasons including wage, pension, job security, scope for corruption, public service motivation (Rajibul & Kijima, 2021; Gindling et al., 2020; Islam & Hasan, 2020; M. Mahmud et al., 2020; Asseburg et al., 2019; Monem & Baniamin, 2017; Hanna & Wang, 2017; Mahuteau et al., 2017; Zafarullah & Siddiquee, 2001).

a job in the public sector, it is important to understand the direct and indirect costs incurred and the potential return on these investments. If the costs are high or if candidates forego more specialized education in favor of the minimal degree requirement, attractive public sector may distort the labor market. On the contrary, if preparation increases the probability of securing a job, and if the knowledge and skills acquired during preparation are valued by the private sector, public sector premiums can lead to a brain-gain that would not have occurred otherwise.² The effects of public sector job premiums have scarcely been studied empirically in the literature of labor economics.

This study empirically investigates the impact of public sector job premiums on employment and explores the human capital implications of the premiums using secondary and primary surveys from Bangladesh. Public service employment is highly desirable in Bangladesh (M. Rahman & Al-Hasan, 2019). The country's public service recruitment process imposes an age ceiling on eligibility, which is also practiced in other countries.³ Some rich countries also apply a similar ceiling, for example, Japan.⁴ However, the implications of age ceilings in countries like Japan are different, as the public sector benefit is much lower due to several reasons—the private sector is vibrant, pension and health policies apply to all workers regardless of public or private, and there are options for returning to the public sector with private sector experience after age 30. The age ceiling might prompt aspirants to engage in government job preparation throughout the eligibility period, which would release working-age people for other sectors immediately thereafter and give rise to increased employment. Since 1991, the upper age limit for Bangladesh's public service has been 30 years for general candidates.⁵ Exploiting that age ceiling policy, I examine the impact of becoming ineligible for attractive government jobs on

²This is an equivalent concept of brain-gain by migrant-sending countries. For example, education investment in the hope of future migration but only a fraction of those who invest can emigrate; remittance, investment, and shared knowledge from migrant-receiving countries (Gibson & McKenzie, 2011).

³See Appendix Table B18 for a list of some developing countries which impose an age ceiling.

⁴See information on age ceiling for entry-level public sector jobs in Japan: <https://90r.jp/nenrei.html>

⁵There is a slight relaxation for a few select sectors (e.g., army) and groups (e.g., disabled, minority).

employment. Data used for the empirical analysis are obtained from Bangladesh's population censuses and Labor Force Surveys (LFS) of various years between 1991 and 2017. I also conducted an online primary survey via Facebook Messenger to investigate the direct and indirect costs and the potential usefulness of preparation for government jobs in obtaining other jobs. After pre-testing and piloting the questionnaire, I sent it as direct chat message to 1500 individuals selected from five Facebook groups. The following populations were targeted in the survey: those who are currently studying for government jobs; those who had studied in the past but are no longer studying for government jobs; those who plan to study for government jobs; and those who did not study and have no plan to study for government jobs. There are 227 usable responses, which corresponds to an effective response rate of about 55 percent, calculated over the number of individuals who had seen the message.

Regression discontinuity design (RDD) results show a jump in employment at age 30: the likelihood of employment increases by about five percentage points once individuals become ineligible for government jobs. The employment effect occurs mainly with female population and is particularly noticeable in 2015–16 and 2016–17, probably due to the fact that the government doubled public sector pay in 2015. The increase in employment at age 30 is explained by higher labor force participation rather than reduced unemployment.

Attributing the employment jump to becoming ineligible for public sector jobs requires that the reported age is not manipulated and that there are no other policies affecting employment at age 30. Since age reported when participating in the censuses and LFSs was not targeted to determine public sector employment eligibility, it is reasonable to assume that age was not manipulated. Moreover, to the best of my knowledge, in Bangladesh, there are no other policies that take effect at age 30. Furthermore, in a robustness check, conditional expectations of education outcome given age do not show

discontinuity at age 30, which is reassuring. To address bunching at ages ending with zero and five, I evaluated the employment effect by dropping age 30, and the direction of the RDD result remained persistent. The result remained the same with geographical controls. I also conducted a falsification exercise with data from the Indian state of West Bengal, which borders Bangladesh, uses the same language, and performs similarly in terms of economic indicators. Since West Bengal did not have a ceiling at age 30 on public recruitment eligibility during the sample years, we would not expect a discontinuity in employment at this age. Indeed, there is no evident discontinuity in the estimates. The magnitude of the employment jump in Bangladesh would be more pronounced if it had been possible to identify accurately individuals who were aware of the labor market situation and explicitly expressed their preferences. However, while most of the labor force in Bangladesh is destined for informal sector employment, the available data cannot distinguish those who have applied for government jobs from those who have not, or those interested in formal sector employment from those who are not interested. As a result, the effect of public service premiums appears small, although a discontinuous jump is evident at the eligibility age cutoff.

This study examines the effect of public service premiums along several dimensions. First, the RDD results support the argument that people queue for attractive public service (Gomes, 2014), but, not by raising unemployment. Rather, the results indicate that queuing for government jobs is the result of not participating in the labor market actively during the eligibility period for public service. This result is consistent with observations that, in India, individuals who claim to be available for work may not actively looking for jobs in the private sector (Banerjee & Chiplunkar, 2020). The result is also harmonious with labor market effects of social incentive policy, that is, employment abruptly falls when individuals become eligible for more generous social assistance benefits after age 30 (Lemieux & Milligan, 2008).

Second, the evidence from survey is consistent with Cavalcanti & Santos (2020) that overpaid public sector jobs may affect occupational choice and cause misallocation by attracting highly productive individuals to queue for government jobs, thus crowding out private sector employment and entrepreneurship. About 13 to 21 percent of the respondents reported they would have developed their own business had they not been studying for public service jobs, and 32 percent of the respondents reported planning to develop their own business should they fail to secure a public service job. In total, about 85 percent of the respondents who had prepared or are currently preparing for public sector jobs indicated they would have done other jobs, entered other businesses, or taken up other studies, had they not been preparing for the public employment. About 70 percent of the respondents currently preparing favor a plan for those alternative options, should they reach the age cutoff without success. Furthermore, data indicating that about 17 to 21 percent full or part time student of those who currently studying for government jobs points to a possibility of compromising specialized education. However, this survey does not investigate willingness to compromise education or preparation in spare time. The survey evidence reinforces the notion that attractive public sector jobs induce people to prepare for jobs they might not get (Banerjee & Duflo, 2019), given the limited number of government jobs available and the large number of individuals aspire for them.

Third, this is the first study of direct and indirect costs incurred from an exam-based public service selection process. The survey results show that the direct cost or monetary expenses for the preparation such as fees, materials, transportation, etc., is relatively low and that the time spent and opportunity costs of time for preparation are substantial. The median of total monetary expenses is close to that of monthly income for those who had studied for government jobs in the past and about four times the median of monthly income for those who are currently preparing. The median number of exam attempts is 13, and the median number of hours spent is 1,116 for a candidate. Proxy indicators of the opportunity cost of government jobs preparation—developing own business, accept-

ing other jobs, and studying for an academic course—suggest considerable indirect costs. The reasons provided for not preparing by those who have never prepared and do not plan to prepare for a government job also show significant indirect cost. No other study has explored these issues of monetary, time, and opportunity costs related to exam preparation in an age-restricted recruitment process in the lucrative public service, although similar system prevails in many countries.

Fourth, this study also provides some evidence of possibility that human capital or brain gain results from preparation for public service exams. About 32 percent of the respondents who are currently preparing or had prepared found the preparation ‘very’ or ‘extremely’ useful for other jobs; 40 percent find it ‘somewhat’ useful; and about 28 percent find it ‘not at all’ or ‘not so’ useful. To confirm this impression, I reviewed some exam preparation materials and found that candidates generally study Bangla and English language and literature, general knowledge of Bangladesh and global affairs, and general science. However, the extent to which candidates learned what they had skipped or studied during their academic studies or acquired additional human capital is not clearly discernible from the survey or review. The human capital gained may be trivial compared to the high cost of preparation. Providing precise estimation of complex net human capital accumulation is beyond the scope of this study. The indication of human capital gain harmonizes with the brain gain from international migration. In a broader aspect, strict eligibility criteria in public service jobs, which affect both public and private sectors, can be compared to international migration policies that have consequences for both host and migrant sending countries. Theoretical and empirical studies show positive impact of the possibility of emigration on brain gain (Bongers et al., 2022; Docquier & Rapoport, 2012; Batista et al., 2007). Arenas (2020) finds that lifting exam requirements for foreign students in Spain results in increased migration from the treated countries and post-reform migrant students outperform native students, despite lower predicted test scores for migrants. Another study on migration from Malawi to South Africa for mining jobs shows

higher human capital in the school cohorts of Malawi's communities who had easiest access to mining jobs, suggesting a next generation human capital accumulation due to the migration opportunity (Dinkelman & Mariotti, 2016).

The remainder of the paper is organized as follows. Section 2 briefly introduces the institutional and economic background of Bangladesh. Section 3 outlines the conceptual framework. Sources and descriptions of data are presented in Section 4. Section 5 delineates the estimation approach. Section 6 describes the result. The final section presents the conclusion.

3.2 Institutional and economic features of Bangladesh

Public sector, the primary formal sector in Bangladesh's labor market accounts for less than five percent of total employment in the country, e.g., 3.8 percent in 2016-17 (BBS, 2018). Small formal and large unprotected informal segments being a labor market characteristic, public sector jobs have been generally more desirable. The desirability of government jobs has many reasons, along with stable wage benefits, including pension benefits, health and housing facilities, rare termination, public service motivation, the scope for corruption, and social status. Public sector pay scale was revised to double in 2015, which may have fueled the sector's attractiveness in recent time. After that revision, the aspiration for government jobs has intensified that led to protests for revising public sector recruitment policies—ongoing for raising eligibility age ceiling, already abolished recruitment quota system.⁶ The desirability of public sector jobs is reflected in the following numbers of applicants in the Bangladesh Civil Service (BCS) exams, for example. The number of applicants was slightly less than 125,000 in the 28th BCS exam in 2008, which increased to almost 350,000 in the 38th BCS in 2017; 221,575 candidates applied against 2,052 posts in the 34th BCS in 2013 and the number is 412,532 against 1,903

⁶See a snapshot of the demonstrations in Appendix Figure B5.

posts in the 40th BCS exams in 2018.⁷ Female share in the public sector employment is between 26 and 29 percent during 2016–2021 (MoPA, 2022).

With some exceptions for certain people or professions, there have always been age restrictions for entry-level government jobs in Bangladesh. In July 1991, the maximum eligibility age for public service recruitment was raised to 30 years from 27 years. There are ongoing demands and protests to raise the age ceiling for public service eligibility further, from 30 to 35 years. One of the arguments for raising age ceiling is increasing life expectancy. In 1991, life expectancy at birth in Bangladesh was 56.5 for male and 55.7 for female; in 2020, life expectancy had raised to 71.2 and 74.5, respectively (BBS, 2021). Along with questioning the legitimacy of restricting eligibility for jobs at age 30, further argument for raising the ceiling to 35 years include private sector's response to the market as a follower. Following the government standard, the private sector sets invisible preference for younger candidates, and if the age ceiling for public sector jobs is raised, the private sector would discretely follow the suit.

Until a few years back, the government sector had a quota system to show justice and honor to underprivileged and select groups of people. Under the quota system, about 56 percent of the public service recruitment came from distinct special groups—freedom fighters (30%), women (10%), district (10%), indigenous and minority (5%), disabilities (1%) with competitive selection accounting for the remaining 44 percent. Responding to vast movements that demanded quota reform, government abolished the quota system in

⁷Prothom Alo, “Youths’ first choice govt jobs” <https://en.prothomalo.com/youth/Youths%E2%80%99-first-choice-govt-jobs> (accessed 9 January 2023);

The Business Standard, “For a secure life, many graduates even opting for low-grade govt jobs” <https://www.tbsnews.net/economy/secure-life-many-graduates-even-opting-low-grade-govt-jobs-545042> (accessed 9 January 2023);

The Daily Star, “1,963 recommended for recruitment under 40th BCS” <https://www.thedailystar.net/youth/careers/news/40th-bcs-final-results-published-2993956> (accessed 24 January 2023);

The Daily Star, “34th BCS gazette issued, joining on June 1” <https://www.thedailystar.net/country/34th-bcs-gazette-issued-joining-june-1-1224844> (accessed 24 January 2023).

2018.

School curricula in Bangladesh have undergone numerous changes and the percentage of youths being educated has improved significantly. For example, in 1990, gross enrollment ratios for female and male in secondary education were 14 and 28 percent respectively. These figures had increased to 81 and 68 percent respectively in 2020.⁸ I have reviewed several recent statutory regulatory orders and government job vacancy announcements which inform that the minimum education for entry-level government jobs without experience is usually eight years of education, excluding some exceptional flexible cases. Given the low education rate in the earlier years, the requirement for education might have been lower or unrestricted for some jobs, which impedes analysis controlling for education over time. Because of various types of government jobs in different institutional settings, identifying eligibility and employment by education is not viable.

The concentrated attempts to secure public sector jobs can be viewed as efforts to avoid employment in the informal sector, which provides 85 to 90 percent of employment in Bangladesh. While definition of the informal sector and employment varies,⁹ Bangladesh's LFS 2016-17 defines the informal sector as unregistered and/or small unincorporated private enterprises engaged in producing goods or services for sale or barter and informal employment is employment in the informal sector (BBS, 2018). Division of the labor force into two or more segments, differences in working conditions attributed to differences in something other than workers' productivity, and mobility restrictions between segments can be considered features of the labor market segmentation (Cruz et al., 2019).¹⁰ Informality of employment in Bangladesh can be a cause or consequence of the

⁸UNESCO data collected from the World Bank <https://data.worldbank.org/indicator/SE.SEC.ENRR.MA?end=2020&locations=BD&start=1970&view=chart> (accessed 3 December 2022)

⁹Studies in Brazil consider valid employment contracts as a distinction between formal and informal sectors, and they can be subcategorized further (Telles, 1993; Botelho & Ponczek, 2011).

¹⁰Segmentation can be a cause or consequence of market forces, voluntary and involuntary informal employment, and primary and secondary labor market (García, 2017; Günther & Launov, 2012; Leontaridi,

labor market segmentation. Public sector jobs with wages rationed above the equilibrium can be considered the primary labor market. When a sheer part of the labor force is destined for the informal secondary market where the wage is flexible and responds to excess demand conditions, a dedicated attempt for primary public sector jobs appears to be a rational labor market response of the job seekers.

The unemployment rate among Bangladeshi youth has long been a concern and it should be noted that unemployment is even higher among educated youth (R. I. Rahman, 2014). Definition of employment and unemployment changes with time.¹¹ Since a large part of the economy is informal, the definition is sometimes ambiguous and subject to the framing of employment questions and the respondent's understanding of work. Employment question varies within employment status and spending most of time. I use dummy for employment or not, and employment category exists in questions of all years. Therefore, employment over time is comparable, at least for the years that ask employment status in the last week. As Bangladesh does not provide unemployment benefits or other support mechanisms, unemployed people rely on family income/business for survival or live in dire poverty. Note that people living below the upper poverty line (lower poverty line) in Bangladesh was 24.3 (12.9) percent in 2016, 31.5 (17.5) percent in 2010, 40.0 (25.1) percent in 2005, 48.9 (34.3) percent in 2000, and 50.1 (35.2) percent in 1995-96, according to government statistics. The lower poverty line is based on food poverty and the upper poverty line on both food and non-food (BBS, 2019b).

3.3 Conceptual framework

A labor market can be considered as constituted of two broad segments: a smaller government or public sector (g) and a larger non-government or private sector (p). Jobs in the

1998; Demekas, 1990).

¹¹See Appendix Table B12 for employment questions in surveys over the sample period.

public sector are mostly formal. Some of the non-government sector jobs are formal, but the vast majority of them are informal. Public sector jobs have wage and pension security, access to subsidized health and housing, little fear of termination, and higher social status. The formal jobs in the private sector are competitive, and wages and other benefits are not guaranteed. There is almost no job security or support mechanisms with informal jobs in the private sector.

People can earn their livelihoods by working in one or more of the labor market segments. In the presence of better public sector job opportunities, people may perceive a comparative advantage in public sector employment. If they cannot secure public sector employment, they may turn to the formal private sector, and if they are still unsuccessful, they turn to the informal private sector. There are also individuals who figure that the potential in a private sector career is better than that of from public employment, or cannot afford the cost of delaying other opportunities, or are indifferent to employment.

Job candidates can decide whether to work in the government or non-government sector until they pass the age of 30. Because of the age ceiling policy, government jobs are no longer available for candidates after age 30. Their remaining options are non-government employment or entrepreneurship. Therefore, job seekers must decide whether they prefer government jobs as they must apply for government jobs by age 30. They analyze their labors' lifetime cost and benefit in the decision process. Their analysis considers all premiums of government jobs over non-government jobs if they succeed (b_s), the probability of success ($\bar{q} \in [0, 1]$), direct and indirect costs of the preparation (c), and use of human capital gain from the preparation for other jobs, should they fail to obtain a government job (h_f). A rational individual is expected to try for a government job and defer other options until age eligibility expires if $\bar{q}(b_s) + (1 - \bar{q})(h_f) \geq c$.

The opportunity cost of time is different for men and women because of their dif-

ferent market value of time due to differential social norms, household responsibilities, and job benefits. Women predominantly engage in household work, which mostly lacks monetary value. In Bangladesh, the average time spent on Non-System of National Accounts (SNA) activities is 2.5 hours for males and 7.7 hours for females (Khatun et al., 2015). Since men spend less time in the household and more in economic activities, the opportunity cost of time is higher for them. As a result, the response to public sector job preparation would vary between men and women. Women may spend dedicated time for the preparation without doing other jobs, while men may do both simultaneously. Consequently, the observation of employment differences at eligibility cutoff for males and females are expected to be different, more pronounced for female. Not all individuals who attempt during eligibility period will get a public sector job. Those who become unsuccessful in obtaining public sector job would turn up for non-government jobs which would give rise to employment after eligibility age. In the empirical analysis, I study if employment goes up after passing the eligibility age for government jobs, which can be inferred as delaying employment due to attempt for public sector jobs.

Due to an attractive public sector, the labor market may encounter two consequences. First, an allocation effect derived from the self-selected labor supply decision, and second, subsequent human capital accumulation effect. Allocation of labor can take different forms: misallocation of innately entrepreneurs from entrepreneurship to public service; misallocation of specialized workers from specialized fields to general administrative government jobs; diversion of work-ready individuals from work or encouraging them to take below-potential jobs to save time for preparation; encouraging them to take less-challenging jobs in the public sector; and the enrichment of the public service with individuals who produce public goods efficiently. Subsequent human capital investment decisions can lead human capital accumulation: impairment by compromising specialized academic education due to public service jobs; impediment by depleting the knowledge gained before preparation; retaining the same level by revising and replenishing only ex-

isting knowledge; accumulation by studying for the public service recruitment exams, which may be valuable for the private sector after failing to secure a government job; accumulation by studying for the exams, which would make a public servant more productive when recruited.

Empirical analysis of this study examines some dimensions of the Bangladeshi public service premiums' effect on the labor market. I particularly examine the allocation effect as to whether employment increases immediately after becoming ineligible for public service, whether people delay taking up other opportunities, and whether there are opportunity options for the time spent preparing to enter public service. The human capital accumulation channel mainly investigates whether there are substantial costs of preparation, whether job candidates find their preparation useful for non-government jobs, and whether the materials candidates study during the preparation for government jobs against incurred costs would likely augment or deplete existing human capital. The eligibility age ceiling allows me to investigate whether attractive public sector jobs affect employment by observing the employment differences between those who are eligible and those who are not. The primary survey allows for further analysis of opportunity costs and human capital accumulation. A theoretical life cycle model of labor supply decision is presented in Appendix B.6.

3.4 Data

3.4.1 Population censuses and labor force surveys

Population census is good microdata for employment status and individual- and household-level information, although detailed information is not available. Bangladesh conducted censuses in 1974, 1981, 1991, 2001, and 2011. While Bangladesh recently completed the census 2021, the microdata is not yet ready to use in research. I used available population

censuses from 1991 onwards, and the government revised the age ceiling from 27 to 30 years as an eligibility criterion in the public service recruitment process in 1991. Census 1991 was conducted in March 1991 and the age ceiling was revised in July of the same year, which renders the results for 1991 subject to argument. It is likely that candidates for public service employment were aware of the upcoming revision, so census 1991 can be treated as a post-policy revision year. It is also possible that government job aspirants did not know about the upcoming revision, in this case, census 1991 can be considered as a pre-policy revision year. Census data earlier than 1991 is not available. Bangladesh conducts LFSs generally in three-to-five-year intervals. It should be noted that as a trial, LFSs 2015–16 and 2016–17 were conducted on a quarterly basis. LFS provides detailed information about the working-age population. I use LFSs for the years 2002–03, 2005–06, 2010, 2013, 2015–16, and 2016–17. The combination of LFSs with censuses of 10 year intervals provides continuous data from 2001 onwards.

Bangladesh's statistical agency, the Bangladesh Bureau of Statistics (BBS), produces the data used for the empirical estimation of this study. Census data is obtained from IPUMS international (IPUMS, 2020). Publicly available census data contains 10 percent of observations from censuses 1991 and 2001, and five percent of observations from census 2011. The information was collected through direct interviews. Sample censuses for 1991, 2001 are systematic samples of every 10th dwelling with a random start drawn by IPUMS, while sample census 2011 is a systematic sample of every 10th dwelling with a random start drawn by BBS.

LFS 2002–03 was conducted for a short period rather than whole year, so it is not advisable to compare with the later LFSs strictly. LFS 2005–06 is a stratified cluster sample design that utilized the 2001 population census as the sampling frame. The estimate is reliably obtainable at rural, urban, statistical metropolitan area, and district levels in this survey (BBS, 2008). LFS 2010 developed its master sampling frame using the 2001

census enumeration area as the sampling frame. The estimates can be derived at the division level (BBS, 2011). LFS 2013 is representative at division level with rural, urban, and city corporation breakdown and gender disaggregation (BBS, 2015). Quarterly LFSs (QLFS) 2015–16 was the first attempt at quarterly LFS in Bangladesh. The QLFS is representative at the division level with rural, urban, and city corporation breakdown (BBS, 2017). QLFS 2016–17 was a similar approach to QLFS 2015–16 (BBS, 2018). Because every survey methodology and coverage varies, comparing surveys might not appropriate. Therefore, rather than comparing censuses and surveys, I used them together and each year separately in my estimation.¹²

LFS 2002–03 dataset does not have sample weight, so I assigned a uniform weight to all observations that gives the survey an equivalent weight of census 2001. Censuses for 1991 and 2001 cover 10 percent of the population, while the census for 2011 covers 5 percent. QLFSs provide sample weight both quarterly and annually, but I used annual weights to be consistent with other censuses and surveys. I used probability weight in both pooled and year-specific estimation, so the estimate can be interpreted for the entire working age population. Total observations between age 15 and 60 are 5,431,078 in census 1991, 7,044,983 in census 2001, 108,192 in LFS 2003-03, 107,500 in LFS 2005-06, 115,247 in LFS 2010, 4,320,681 in census 2011, 97,342 in LFS 2013, 310,841 in QLFS 2015-16 and 305,090 in QLFS 2016-17.

3.4.2 Primary survey via Messenger

Sample¹³

I conducted a sample survey via Facebook Messenger to further investigate the labor market effect of public sector job premiums. The objective was to determine the cost and

¹²Appendix Table B12 contains detailed information about LFSs and censuses, and employment status variable.

¹³For survey details, see Appendix B.4 Data appendix: Primary survey.

benefits of preparing for government jobs. The target population of the survey were those currently preparing for government jobs, those who had prepared in the past, those who were planning to prepare in the future, and those who had never prepared. Facebook groups were selected based on their objectives and activities. The groups' objectives include sharing knowledge for people currently preparing for government jobs, career exhibitions and updates for current students, and on-the-job issues for government employees. I pretested and piloted the survey questionnaire, and sent it to about 1500 individuals via Facebook Messenger as direct messages. Individuals chosen from five Facebook groups had been recently active in the groups. I received 241 responses against total sent 1500 questionnaires. The coarse response rate, calculated over the number of questionnaires sent, is only 16 percent. However, the effective response rate is above 50 percent, calculated over the number of people who had seen the message with the attached questionnaire. Although the effective response rate from females (53%) was roughly equal to males (56%), the share of female response was low, which is explained by the fact that I could send questionnaires to fewer female, perhaps due to their having less education and lower social media presence. Collected information broadly covers individual characteristics, monetary and time costs, the opportunity cost of time spent on preparation, and perceptions of government jobs. There were total 227 usable observations from the final survey, piloting, and pre-testing phases. The number of responses is different for each question, since respondents were free to decide whether to answer or not to answer each question.

Since the sample was drawn from Facebook groups and individuals were free in their response decision, there might have selection into response bias. To assess the potential degree of selection bias, comparable statistics from the primary survey are presented alongside those from the representative LFS 2016-17 in Appendix Table B17. The differences in income, education, and age between the two surveys are not big for the three groups of respondents—government employees, students, and others. The proportion of

male respondents is high in the online survey for all three groups.

Characteristics of the respondents

The responses were for sex 224, age 224, education 218, current situation 175, and monthly income 123. Share of female respondents was a low 15 percent, probably because of low participation in higher education, the labor force, and social media. About 98 percent of the respondents were up to 40 years old, as expected, since the target group of the survey was social media users. Of the respondents who were currently studying for government jobs, 7.6 percent reported their as age between 31-35. The rate was reasonable even though the age ceiling for government jobs is 30 years. A few respondents were above 30 when studying for government jobs; this is possible because if candidate applies before passing 30, they can participate in exams even after they are past. A small group of candidates enjoy an age ceiling of up to 32. About 62 percent of the respondents have a bachelor's or master's degree. About 80 percent of the respondents who were currently studying and 92 percent of the respondents who studied before for government jobs have a bachelor's or master's degree. About 72 percent of those who stated that they would prepare for government jobs in the future have education between 12th grade and undergraduate degree; probably, they were currently studying for an academic degree. About half of those who were not interested in government jobs had education below bachelor's degree. Education and study status are indicator of how inclined individuals were to government jobs. A quarter of the individuals currently studying for government jobs already had a full-time government job; perhaps they wanted a better one. About 64 percent who had studied for government jobs before have full-time government jobs and about 22 percent have full-time non-government jobs.¹⁴

Cumulative distribution of income for those currently studying is similar to that for those who will study and those who had studied before is similar to that for who never

¹⁴See Appendix Table B15 for descriptive statistics.

have studied. The monthly earnings of those who have studied for government jobs before and those who never studied are higher than those who are currently studying and planning to study in the future. This is likely because perhaps those who studied before are aged above 30 and employed, and those who never studied have found acceptable positions in the non-government sector that were equivalent to government jobs. The median income of those currently studying is Taka 7,500; for those who studied before is Taka 35,000; for those planning to study Taka 2,750; and for those who never studied Taka 35,000. Job preference of the aspirants included: any government job (23%), Bangladesh Civil Service (BCS) jobs (16%), public bank job (12%), autonomous public institution jobs (12%), National Security Intelligence (NSI) jobs (7%), any teaching job (7%), auditor jobs (7%), computer operator jobs (5%), office assistant jobs (5%), others (4%).

3.5 Empirical approach

One of the empirical objectives of this paper is to estimate the causal impact of becoming ineligible for lucrative government jobs. In my estimation, I compared the employment status of working-age people eligible and those ineligible for government jobs. The hypothesis is that if government jobs are more beneficial, people may attempt repeatedly to obtain one during the eligibility period, and after becoming ineligible promptly pursue other employment options, which in turn would drive employment up.

Age ceiling as cutoff

Age-restricted hiring policy makes job aspirants ineligible to apply for government jobs after their 30th birth date in Bangladesh. I exploit this variation of eligibility at age 30, an identification strategy that can be considered a Regression Discontinuity Design (RDD) in the current setting. Based on the age ceiling condition, we know broadly who are eligible to apply for government jobs and who are not. Besides the general condition of age ceiling, there are other requirements by job type, e.g., education. Since I am interested in

overall employment and not any specific type of employment, other requirements than age ceiling are not issues to consider. However, they limit the scope of disaggregated analysis.

Identifying of those individuals who prefer government jobs and those who do not, those who applied for government jobs and those who did not, and the small select group of people, e.g., the off-springs of freedom fighters, who enjoy age eligibility to 32 years old are not distinguishable using the available data. Therefore, estimates for outcome variable will be interpreted as the effect on the probability of aggregate employment rather than individual employment. I use sharp RDD design because my preferred outcome variable is overall employment, age ceiling is applied strictly to the applicable, and identifying individuals is beyond scope. Since I do not identify individuals and the interest outcome is aggregate employment difference due to labor supply decision in the presence of an attractive small sector, eligibility up to age 32 for a few is not a matter to worry because this group itself is too small to dominate the aggregate employment outcome.

I conducted some robustness analysis within the RDD setting, but a robustness check by comparing the employment for age 30 and below with the employment for over age 30 for the pre- and post-revision period is not feasible since comparable data for periods earlier than 1991 are unavailable.

RDD setting for discrete running variable

The age-restricted eligibility features two components of a RDD design in the data: observable covariate, age, and the cutoff that determines assignment to treatment, age 30. If the outcome—the likelihood of employment—shows discontinuity at the cutoff, we might reasonably interpret that as the effect of public service job premiums. Because of the discrete nature of running variable, age, the usual RDD with bandwidth near the cutoff and

nonparametric methods are not applicable. The regression specification is

$$(1) \quad Y_i = \beta_0 + \beta_1 I[Age_i > 30] + f(Age_i - 30) + \epsilon_i$$

β_1 captures the employment effect of switching from eligibility age for public sector jobs to ineligibility age (that is, β_1 can be interpreted as the effect of government job premiums on employment at age 30). $f(\cdot)$ is the spline of age function.

I estimate the results in this study using the specifications outlined in equation (1), where I do not identify individuals eligibility for public sector jobs directly but only age. Eligibility also depends on other factors, such as awareness, interest, education, etc., which I do not observe in my data. For the sake of understanding the magnitude of the results if individuals could be identified for eligibility, an interpretation of the reduced form for coefficient β_1 is provided below.

$$\text{First stage: } D_i = \pi_0 + \pi_z I(Age_i > 30) + g(Age_i - 30) + \mu_i$$

μ_i unobserved determinants of ineligibility

$$D_i = \begin{cases} 1 & \text{ineligible} \\ 0 & \text{eligible} \end{cases}$$

$$\text{Second stage: } Y_i = \alpha_0 + \alpha_1 D_i + g(Age_i - 30) + e_i$$

α_1 : employment effect of switching from becoming eligible to ineligible for public jobs

$$\text{Hence, } \beta_1 = \alpha_1 \pi_z \quad \alpha_1 = \frac{\beta_1}{\pi_z}$$

If we guess, 30% of individuals below age 30 are ineligible and 10% percent of individuals above age 30 are eligible for government jobs, the guesstimated effect would be

$$\alpha_1 = \frac{\beta_1}{0.6}^{15}$$

¹⁵Appendix Figure B6 shows graphical illustration.

Because of the discrete age variable, I rely on polynomial function with normalized age, $f(Age_i - 30)$ and extrapolate at age 30 from 31 backward. Target population in this study is working age group, so the age window is entire 15–60 years. From the visual inspection, we see that linear specification do not fit entire age windows in both sides of age 30 (Figure 3.1, Figure 3.2, Figure 3.3). For the benchmark estimation, I attempted quadratic specification for age window 15–50 and found similar result as to linear specification for discontinuity coefficient, but coefficients of the second order variables are insignificant. Upon multiple error and trial exercises, I decided to use linear specification for the entire window up to age 30 cutoff and up to age 50 above the cutoff. In addition to the linear result, I reported up to third order polynomial.

Other unobservable factors related to age that might cause jump of employment at age 30, which may lead to bias estimate. However, to the best of my knowledge, there are no other policies in Bangladesh with age as a restriction so as to bring about a different outcome at age 30. For example, no social security programs targeting individuals aged 30 was found (GED, 2015). The conventional approach of RDD is to estimate the average effect in a small neighborhood of the cutoff point so that correct model specification is not a concern. Given the small number of mass points, continuity-based analysis that fits a local linear polynomial within mean squared error (MSE) optimal bandwidth is not appropriate (Calonico et al., 2017; Cattaneo et al., 2018). Since the discrete nature of the running variable makes it impossible to compare the outcomes for observations just above and just below the treatment threshold, it is necessary to choose functional form for the relationship between the treatment variable and the outcomes of interest (Lee & Card, 2008). Extrapolation of polynomial function at age 30 from age 31 and above allows comparing the employment of those eligible and ineligible for government jobs at age 30.

If age was intentionally manipulated, it should be reflected in continuity of other pre-determined variables such as education. As a falsification exercise, I checked smoothness

of education using individual's education level for the entire sample period of the chosen age group of individuals with education above 5th grade. I do not see other determining variables that could be affected by age ceiling. I could check continuity of marriage for example, but if there is anything to observe from marriage that is expected to be an outcome variable.

Other identification threats: age randomness and reporting issues

There is no reason to think that respondents may bear in mind the eligibility of government jobs and manipulate their age systematically when respond to survey and census questions, because there is no link between government jobs and surveys. However, age is rounded to a full year in the data, and there may be incoherence between how people report age culturally and how the government job age ceiling is defined. Hence, discussion of age reporting issue in more detail is worthwhile. There are a few concerns of misreporting of age data—age heaping at years ending with 5 or 0, digit preference, age exaggeration, age understatement (Singh et al., 2021; Jowett & Li, 1992; Bhat, 1990; S. Mahmud & Becker, 1984; Bairagi et al., 1982; Edmonston & Bairagi, 1981). Data confirms that people over-report their age that ending with 0 and 5 (Figure 3.1, Panel A0).

There are two issues to consider regarding individual reporting of age at 30—what the individual thinks is meant by age 30 and how much they misreport. People typically report their age as 30 after their 30th birthday and their 31st birthday. Similarly, some censuses and surveys instruct respondents to enter, for example, '00' for age below one year or 12 months.¹⁶ On the other side, the recruitment circular and the common understanding of age 30 in Bangladesh mean before an individual's 30th birthday. In government job vacancy announcements, it is usually mentioned that the applicant's age should not be above 30. For instance, a statutory regulatory order framed the age ceiling policy as 'no person shall be eligible to appear at the examination if he/she is less than 21 years of age

¹⁶See Appendix Table B13 for age questions in the surveys and censuses.

or has exceeded 25 (later revised to 27 and 30) years of age on the first day of the month in which the commission invites applications for holding the examination'. Newspaper reports the age 30 ceiling as up to one's 30th date of birth day.¹⁷ To confirm the situation, I asked some public employees and candidates about the birth date of age ceiling, and they informed me it is up to a person's 30th date of birth. With this understanding, people may report age 30 when they have not reached their 30th birthday. Therefore, there is a chance that respondents who are 29 years old, who have not reached their 30th birthday would report their age as 30. Those who are 29 and report they are 30 do not create any problems in the estimation since they are still eligible for the public service job under the age eligibility rule. After their 30th birthday and before 31st birthday, people may report their age as 31, since people tend to exaggerate age. Such cases are not problems either. Nonetheless, those who passed their 30th birthday may introduce measurement error in the estimate if they report their age as 30 since there is a chance of overreporting 0 and 5. For identification with discontinuity, I took cutoff at age 30 to mean up to 30th birthday for the eligibility of public sector jobs. Evidence has been found of avoidance of numbers ending with 1, 4, and 9 in age reporting (Singh et al., 2021). If this is true, those who are 31 but report as 30 could lead to bias estimate. To address the misreporting of age, in addition to the benchmark estimation, I dropped observations in the age bin 30 and extrapolate at age 30 from both sides of age 30, as a robustness check.

¹⁷Appendix Figure B5 Panel B, caption of the photo of a demonstration "Job seekers stage a demonstration at Shahbag of Dhaka and later bring out a token coffin march on April 27, 2018, demanding the age ceiling to be raised to 35 in government service from what it is 30 now".

3.6 Results

3.6.1 Regression discontinuity estimates

This section presents regression discontinuity results, i.e., the results of the linear specification along with the quadratic and cubic in the pooled figures and tables only, skipping the linear specification in other cases. The reason for this is that the quadratic and cubic specifications fit the average value for the entire age window 15–60, but the linear specification fits a smaller age window after 30.

Main RDD results

In the main RDD results, to make the non-linearity and data fitting issues clearly visible, estimates for all years are presented together in Figure 3.1 and Figure 3.2, and presented separately for each year in Figure 3.3 and Figure 3.4. To show the precise coefficients, estimates for all years together are in Table 3.1, and for each year separately are in Table 3.2 and Table 3.3. The solid vertical line in the figures is the age cutoff, and the vertical dashed lines mark age-heaping in the data generating process at ages ending with 0 and 5. The cubic specification seems to fit the age cell mean better than other specifications—actually, the quadratic and cubic prediction fits are very close. The spikes in the age histogram at ages ending with 0 and 5 (Figure 3.1, Panel A) do not seem to disrupt the employment rate; the only clear jump is at age 30, but not at other ages ending with 0 or 5.

The estimated employment effect of becoming ineligible for government jobs, derived from pooled data spanning 1991–2017 and across all three specifications, shows minimal variation in both magnitude and significance (Table 3.1, and Figure 3.1 Panel A and Figure 3.2). For all individuals, the likelihood of employment increases by four to five percentage points at one percent significance level for all three specifications at age 30. Average employment at age 30 ranges between 50 and 52 percent across the specifications.

Referring to Figure 3.2, the employment effect of becoming ineligible for government jobs stems primarily from the female population. Regarding the employment of males, there is no significant difference between being eligible and being ineligible at age 30, except for a slightly positive increase in the cubic specification at five percent level of significance. The average employment of males is already high at age 30, between 89 and 94 percent. In contrast, the likelihood of female employment after becoming ineligible for public service at age 30 increases by between 0.042 and 0.047 for three specifications at one percent level of significance. The average female employment at age 30 is between 15 and 17 percent. Overall, the average employment of females is quite low and employment of males is rather high, which may have affected their comparative responsiveness to the age ceiling in extensive margin.

The employment effect of the age ceiling in government jobs appears to be different for the male and female populations. The employment of males does not increase after becoming ineligible for government jobs at age 30 at one percent significance level, during the entire period 1991–2017 (Table 3.2 and Figure 3.3). There are a slight increase at five percent significance level in the cubic specification for a few years—0.010 in 1991, 0.012 in 2011, 0.058 in 2013, 0.022 in 2015-16. Only 2010 employment increases in both the quadratic (0.041) and cubic (0.048) specifications at five percent significance. There are insignificant decreases in some years. In all years between 1991–2017, average male employment at age 30 is between 84 and 97 percent. In the female population, the main increases in employment outcomes at age 30 after becoming ineligible for public service jobs are in the later years, primarily in 2015-16 and 2016-17 (Table 3.3 and Figure 3.4). In the earlier years, there are small increases and some insignificant decreases. The mean employment of female at age 30 was extremely low in the earlier years, e.g., six percent in 1991. However, this employment increased steadily, reaching 29 percent in 2016-17. With more females being employed at age 30, the increase of employment after losing

eligibility became more visible. In addition to more women being educated and participating in the work force, the increase in remuneration may also explain the increased desire in women to obtain government jobs. Note that the pay scale was doubled in 2015.

Additional results: labor force and unemployment, education, work hours

I ran regression for the dependent variables labor force vs. non-labor force for working age people and employment vs. unemployment for the labor force. The estimates show that the labor force is significantly higher after becoming ineligible for government jobs, but no difference in employment vs. unemployment in the labor force is detected at age 30 between those who are eligible and those who are not. Based on these results, the increase in employment at age 30 after becoming ineligible for government jobs can be interpreted as increased labor force participation rather than declining unemployment. I ran regressions with different levels of education to understand the data better and decided not to segment the data by education, since the sample data are not representative for the education category. As an example of estimate for the education category, there is no noteworthy difference between individuals with at least eighth grade education and those with less than eighth grade, for both males and females. The reason might be the certificate issuing process—identifying the exact level of education for grades below SSC/10th grade is difficult. I also estimated the effect of age on the work hours of employed men and women, and found no significant difference in work hours at age 30, aside from a few decreases. The finding is reasonable since formal jobs are usually full-time and there is hardly any part-time work in Bangladesh's labor market.

The RDD results confirm the hypothesis that in a segmented labor market, people prefer a more beneficial segment and queue for employment in that segment, while delaying searching for other opportunities. As a result, employment is seen to increase just after individuals are no longer eligible for desirable public service jobs because of their age.

3.6.2 Falsification and robustness checks

Education outcome

If age was intentionally manipulated, it should be reflected in education continuity. Discontinuity is not found at the individual's education level for the entire sample period of the chosen age group of individuals with education above 5th grade (Figure 3.5).¹⁸ While the cubic specification seems significant, there is no abrupt change or discontinuity at this age, compared to the other points in the figure. This result confirms that age is not a determining factor of education at age 30, i.e., there is no abrupt discontinuity of age at 30.

The case of West Bengal

India has similar age restriction policies for its public sector jobs. However, the age ceiling is not uniform, unlike Bangladesh. Rather India has different age ceilings targeting many groups. There is no restriction at age 30 in the sample years in West Bengal State—the ceiling there starts way above age 30.¹⁹ West Bengal borders Bangladesh on the west side, uses same language, Bangla, and performs similarly in economic terms. Since there is no restriction at age 30, we would not expect an employment jump in West Bengal at this age; and indeed, there is no similar jump at age 30 (Figure 3.8 and Appendix Table B11).

Dropping age 30 and public employee, controlling for geographic variables

After dropping age 30, the likelihood of an increase in employment after becoming ineligible for government jobs remain positive at age 30, but not at one percent but at five percent significance level (Figure 3.6 and Figure 3.7).²⁰ To check robustness, I also dropped

¹⁸See corresponding Appendix Table B6.

¹⁹“In the year 2006, the Government had raised the upper age limit for entry into Govt. service from 32 to 37 years with a validity of 5 years. Now the Government again raised the limit to 40 years for entry into Govt service in Group C and D only. The minimum age is unchanged i.e.18 years. The age relaxation for the SC/ ST candidates fixed at 45 years and that for OBC/ PH candidates at 43 years”. <https://advocatetanmoy.com/2018/09/21/upper-age-limit-for-entry-into-west-bengal-govt-jobs-is-40-years/> (accessed 30 July 2023).

²⁰See corresponding Appendix Table B8.

public service employees from the survey data for the period 2003–2017, since this information is available only in the LFSs, but not in the censuses. This estimation is to check if the increase in employment after age 30 comes from recruitment by the public sector. The result remains similar to the main result,²¹ which implies that public service premiums affect private sector employment. I also checked robustness by controlling for geographic variables like division and rural-urban, and using year dummy.²² There is no reason for the employment to be much different for eligible and ineligible people in public sector employment at age 30 due to geography, and accordingly the results remain unchanged. Therefore, it can be concluded that employment is likely to increase at age 30 after individuals become ineligible for government jobs due to the age ceiling policy.

3.6.3 Online primary survey and exam materials review

Government job exam attempts behavior

Of the 227 responses to the online primary survey, 41 percent were currently studying for government job exams, 19 percent studied before but were not longer studying, 24 percent planned to study in the future, and 16 percent had never studied before and did not plan to study. The survey shows that during the eligibility period, the respondents repeatedly attempt to secure government jobs until successful, even when other opportunities are available. Numerous respondents who were currently studying for government jobs had sat for the exam before. Some of the respondents have successfully obtained other full-time jobs, but were still studying for government jobs. Of those who were currently studying for government jobs, 69 percent (n=48) had taken exams before. Of the individuals who were currently studying, 28 percent (n=22) already have a full-time job type (whether government or non-government). About half (n=7) of those who are currently studying and have ever secured a full-time job (n=15), secured the job even before they start for government job preparation. Candidates for government jobs generally sit for the

²¹See Appendix Table B9.

²²See Appendix Table B10.

examinations multiple times and continue trying until they obtain a job or become ineligible. The median number of attempts: 15 (n=44) for those who were currently trying for government jobs and 10 (n=35) for those who sat before and who were no longer sitting. Those who were planning to sit for exams in the near future estimated they would need a median of six (n=40) exams attempts. It seems that respondents who have not yet begun the process to secure a public sector job underestimate the cost of preparing for such exams and overestimate their capabilities.

Direct cost of preparation for government jobs

The direct cost of preparation, measured in terms of money and time, is in Figure 3.9—cumulative distribution of total money (Panel A) and time (Panel B) spent by those who were currently studying for government jobs, and those who had studied before. Those who were preparing have already spent a median of Taka 27,500 (3.7 times monthly median income) and those who prepared for government jobs before spent a median of Taka 41,875 (1.2 times monthly median income) over the entire preparation. To understand the magnitude of money spent, it should be noted that yearly median income in Bangladesh is about Taka 96,000 (\$1,131).²³ The cost of preparation, especially in terms of time, is substantial. Those who were preparing already spent 1,194 hour and who prepared before 1,046 hour in median for their entire preparation. The Median hour spent together for both groups is 1,116 hours. If we consider full-time work as 8 hours a day or 40 hours a week, the median time spent comes up to 140 work-days or 28 work-weeks.

Indirect cost of preparation for government jobs

The total cost of preparing for government jobs is difficult to measure without precise data or experiments on opportunity cost. However, in addition to the direct costs, I estimated the approximate opportunity cost from information on potential opportunities, alternative

²³2022 income, Source: <https://worldpopulationreview.com/country-rankings/median-income-by-country> (accessed 11 September 2022)

plans, and perceived costs. Figure 3.10 uses proxy indicators to represent the opportunity cost of time for preparing for government jobs. About 80 percent of the respondents who were currently studying for government jobs or those who studied for government jobs before stated that they would have taken up other jobs, studied, or developed their own businesses with the time they spent studying for government jobs. Panel A presents the respondent's alternatives had they not studied for government jobs: 36–45 percent would have taken up other jobs, 21–23 percent would have studied academic courses, 13–21 percent would have developed their own businesses, 8–13 percent would have done household chores, helped with the family business, and spend time with family and friends or in leisure, and 8–13 percent did not know. Panel B presents respondents' plan if they failed to secure a government job and exceeded the eligibility age. Those who were currently studying for government jobs reported they would engage in: developing own businesses (32%); do not know or find the future uncertain (27%); overseas work or study (20%); further studies (11%); trying for other jobs (6%); and spending time with family and others (4%). These forgone and planned alternatives are clear indicators of opportunity cost related to government job seeking. The reasons provided by the 40 respondents for never trying for a government job included: already have a preferred job (25%), low chance of getting a government job (28%), high indirect cost (33%), and high direct cost (5%) (Figure 3.12).

Public service job premiums may impact human resource allocation between the public and private sectors through selection channel. For example, an engineering student might opt for an administrative public service job; an individual with entrepreneurial capabilities might not explore opportunities and excel. The responses—developing own business as an opportunity option (20–13%) and as a fall back plan in case of failure to obtain a government job (32%)—indicate allocation effect of public service premiums. A large number of the respondents indicated they would have taken up other jobs, had they not been studying for government jobs.

Attractive public service jobs may affect long-term human capital accumulation. Public sector job aspirants might compromise regarding their knowledge and expertise from primary sources, e.g., academic study. For example, a full-time student in an educational institution might prepare for public service jobs instead of academic studies. In the survey results, 21 percent of respondents whose current status is full-time study and 17 percent of respondents whose current status is study and part-time work are currently studying for government jobs (Table B15). However, this information does not constitute the full picture since I have not looked into whether the students are studying in their spare time or are preparing for public sector job instead of academic study.

Benefits of preparation for government jobs

If the time spent on preparation for government jobs are useful beyond attaining government jobs, this would be evidence of human capital or brain gain. Figure 3.11 presents the respondents' reported perceptions of the usefulness of government job preparation for those who were currently studying for government jobs and those who had studied before. The response distribution of a five-point scale from 'Extremely useful' to 'Not at all useful' appears to be symmetric. Responses of 'very or extremely useful' are about 32 percent, 'somewhat useful' are about 40 percent, and 'not so or not at all useful' are about 28 percent for both groups together. Those who obtained government jobs partly influence the perceived usefulness, and exclusion of current government employees shifts some share from favoring usefulness to not usefulness.

In addition, I reviewed the preparation materials for some select exams arranged by Bangladesh Public Service Commission (BPSC). Most people with required education prefer BCS jobs.²⁴ In government jobs hierarchy, BCS is the top cadre job, although there are categories within BCS jobs. The BPSC is the agency responsible for arranging BCS

²⁴See Appendix Table B16.

and some other exams. Sometimes, based on BCS cadre exam scores, candidates are assigned non-cadre job, rather than sitting for non-cadre job exams separately. I briefly reviewed the exam structure and study materials for these two exams. The exam structure and study materials are similar—perhaps the main difference is the level of difficulty. Broadly, aspirants study Bangla and English (language & literature), general knowledge (Bangladesh & international), and basic science (including math, computer, environment, etc.) (Table 3.5).

From the review, I got the impression that little practical learning or training is garnered in the syllabus and exams. The basic materials covered in the exams are taught in standard academic study up to the higher secondary (HSC/12 grade) level. Bangla is the native language and medium of study up to HSC; English is taught simultaneously with Bangla from the beginning of schooling; and university studies are mostly in English or language-neutral, that is, student can choose either Bangla or English as their medium of study. Undergraduate and masters' students study their major subjects to the intermediate-advanced level and their minor subjects to the basic-intermediate level. Judging by the contents of the exam syllabi, it is difficult to conclude whether the candidate simply review knowledge that had been acquired earlier, or whether they learn materials they had skipped during academic study, or learn and gain new knowledge and skills. It was also unclear whether during preparation they lost useful knowledge that they have already gained and whether they could obtain other jobs and gain equivalent or more human capital from on the job training.

Whether a job aspirant gains or loses from the preparation for government jobs depends on the balance between the opportunity they cost and net human capital gained. In any case, an economy incurs a cost to build human capital; however, the monetary, time, and other opportunity costs revealed in the survey do not tell us much about net human capital accumulation. If the preparation materials develop human capital that is useful

beyond the search for government jobs, this would contribute to human capital accumulation or brain gain. The reported perceptions of government job aspirant lend support to the claim of some capital gain. About one-third of the respondents reported finding preparation for government jobs highly useful for other jobs or professions in the labor market. On the other hand, the direct and indirect cost of preparation is high, while my review of the exam materials does not support the view that there is much human capital accumulation. Although the study has some shortcomings, such as having only one treatment state, Mangal (2022) lends some support to my observation by studying the effects of higher competition in public sector jobs due to a hiring freeze on male college graduates in the state of Tamil Nadu, India. The study applies a difference-in-difference strategy to compare Tamil Nadu with other states of India for variation in exposure to the hiring freeze. It provides some evidence that candidates respond to higher competition in public sector jobs by reducing employment and investing more time in exam preparation, but the investment of unsuccessful candidates does not translate into productive gains in other sectors.

3.7 Conclusion

Government jobs in Bangladesh are highly coveted for a number of reasons in addition to wages, for example, pension benefits and job security. This study examined the effect of the high desirability of government jobs on employment and human resource accumulation. The findings suggest that premiums or attractiveness of government jobs in a government vs. non-government sector segmented labor market affect the allocation of labor and may distort the labor market. With the goal of attractive government jobs, individuals are likely to delay searching for and taking up other opportunities, repeatedly try for public sector jobs until they become ineligible, and incur direct and indirect costs related to preparation. On the other hand, there is a possibility that human capital gain results from preparation for public service selection exams.

Exploiting the age ceiling rule, the RDD finding suggests that the likelihood of employment increases by about five percentage points, once working age people reach age 30 and fare no longer eligibility for government jobs. Employment increases mainly for females, and noticeably so after the doubling of public service pay in 2015. The increase in employment appears to be the result of increased labor force participation rather than declining unemployment. The primary survey data suggests that candidates sit for multiple public recruitment exams during the eligibility period, and incur monetary, time, and opportunity costs. A part of the respondents reported that preparation is usefulness for obtaining other jobs, but the review of exam materials does not provide definitive answers on human capital accumulation. Even if the preparation process results in human capital gain, the gain is likely to be trivial, compared to the high cost.

To avoid the negative consequences of public service premiums, Banerjee & Duflo (2019) recommend measures other than reducing government wages, because wage cut would invite strong opposition. Such measures would include limiting the number of times an individual can apply for government jobs and setting a more stringent age cutoff. Similar approaches with some modifications can be adopted in the case of Bangladesh in the short run.

Main RDD Results

Table (3.1) Estimates of employment effect at age 30 after becoming ineligible for government jobs, 1991–2017

Dependent variable: Employment status (0/1)					
Panel A: All					
Age>30	0.04*** (0.01)	0.05*** (0.01)	0.06*** (0.01)	0.04*** (0.01)	0.05*** (0.01)
Mean at age 30	0.52*** (0.01)	0.51*** (0.01)	0.50*** (0.00)	0.51*** (0.01)	0.50*** (0.01)
Observations	16,300,207	10,878,397	4,963,150	17,840,954	17,840,954
Panel B: Male					
Age>30	-0.01 (0.02)	-0.00 (0.02)	0.01** (0.00)	-0.01 (0.01)	0.02** (0.01)
Mean at age 30	0.94*** (0.02)	0.92*** (0.01)	0.90*** (0.00)	0.91*** (0.01)	0.89*** (0.01)
Observations	8,117,362	5,260,769	2,486,692	8,960,245	8,960,245
Panel C: Female					
Age>30	0.04*** (0.01)	0.05*** (0.01)	0.08*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
Mean at age 30	0.17*** (0.01)	0.16*** (0.01)	0.16*** (0.00)	0.16*** (0.01)	0.16*** (0.01)
Observations	8,182,845	5,617,628	2,476,458	8,880,709	8,880,709
Age group	15-50	20-40	26-35	15-60	15-60
Model	Linear	Linear	Linear	Quadratic	Cubic

Notes: OLS regression discontinuity estimates of likelihood of being employed at age 30 for the group age between 15 and 60. Panel A presents all individuals, Panel B Males and Panel C Females. Pooled dataset consists of population census 1991, population census 2001, LFS 2002-03, LFS 2005-06, LFS 2010, population census 2011, LFS 2013, QLFS 2015-16, QLFS 2016-17. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (3.2) Estimates of employment effect at age 30 after becoming ineligible for government jobs, 1991–2017, by year, male

Dependent variable: Employment status (0/1)							
	Panel A: 1991		Panel B: 2001		Panel C: 2002-03		
Age>30	-0.00	0.01**	0.02	0.02	-0.01	-0.01	
	(0.01)	(0.00)	(0.02)	(0.02)	(0.02)	(0.02)	
Mean at age 30	0.95***	0.94***	0.84***	0.85***	0.89***	0.88***	
	(0.01)	(0.00)	(0.02)	(0.01)	(0.02)	(0.02)	
Observations	2,762,521	2,762,521	3,564,726	3,564,726	54,720	54,720	
	Panel D: 2005-06		Panel E: 2010		Panel F: 2011		
Age>30	-0.05	0.04	0.04**	0.05**	-0.01	0.01**	
	(0.04)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	
Mean at age 30	0.92***	0.84***	0.85***	0.84***	0.94***	0.94***	
	(0.04)	(0.02)	(0.01)	(0.01)	(0.01)	(0.00)	
Observations	54,383	54,383	57,331	57,331	2,119,383	2,119,383	
	Panel G: 2013		Panel H: 2015-16		Panel I: 2016-17		
Age>30	-0.04	0.06**	-0.01	0.02**	-0.01	0.01	
	(0.04)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)	
Mean at age 30	0.97***	0.90***	0.92***	0.91***	0.91***	0.92***	
	(0.04)	(0.03)	(0.01)	(0.00)	(0.01)	(0.01)	
Observations	47,705	47,705	151,448	151,448	148,028	148,028	
Spline	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic	

Notes: OLS regression discontinuity estimates of likelihood of being employed at age 30 for the male population group age between 15 and 60. Each year separately presented in Panel: A–I. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (3.3) Estimates of employment effect at age 30 after becoming ineligible for government jobs, 1991–2017, by year, female

		Dependent variable: Employment status (0/1)					
		Panel A: 1991		Panel B: 2001		Panel C: 2002-03	
Age>30		0.00	-0.00	0.01**	0.02***	0.02*	-0.01
		(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Mean at age 30		0.06***	0.06***	0.11***	0.11***	0.14***	0.16***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Observations		2,668,557	2,668,557	3,480,257	3,480,257	53,472	53,472
		Panel D: 2005-06		Panel E: 2010		Panel F: 2011	
Age>30		-0.01	0.01	0.10***	0.02	0.00	-0.00
		(0.01)	(0.02)	(0.03)	(0.04)	(0.00)	(0.00)
Mean at age 30		0.13***	0.10***	0.14***	0.16***	0.10***	0.10***
		(0.01)	(0.02)	(0.02)	(0.01)	(0.00)	(0.00)
Observations		53,117	53,117	57,916	57,916	2,201,298	2,201,298
		Panel G: 2013		Panel H: 2015-16		Panel I: 2016-17	
Age>30		0.06	0.06	0.02**	0.04***	0.06***	0.06***
		(0.05)	(0.05)	(0.01)	(0.01)	(0.01)	(0.01)
Mean at age 30		0.17***	0.18***	0.25***	0.24***	0.29***	0.29***
		(0.02)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
Observations		49,637	49,637	159,393	159,393	157,062	157,062
Spline		Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic

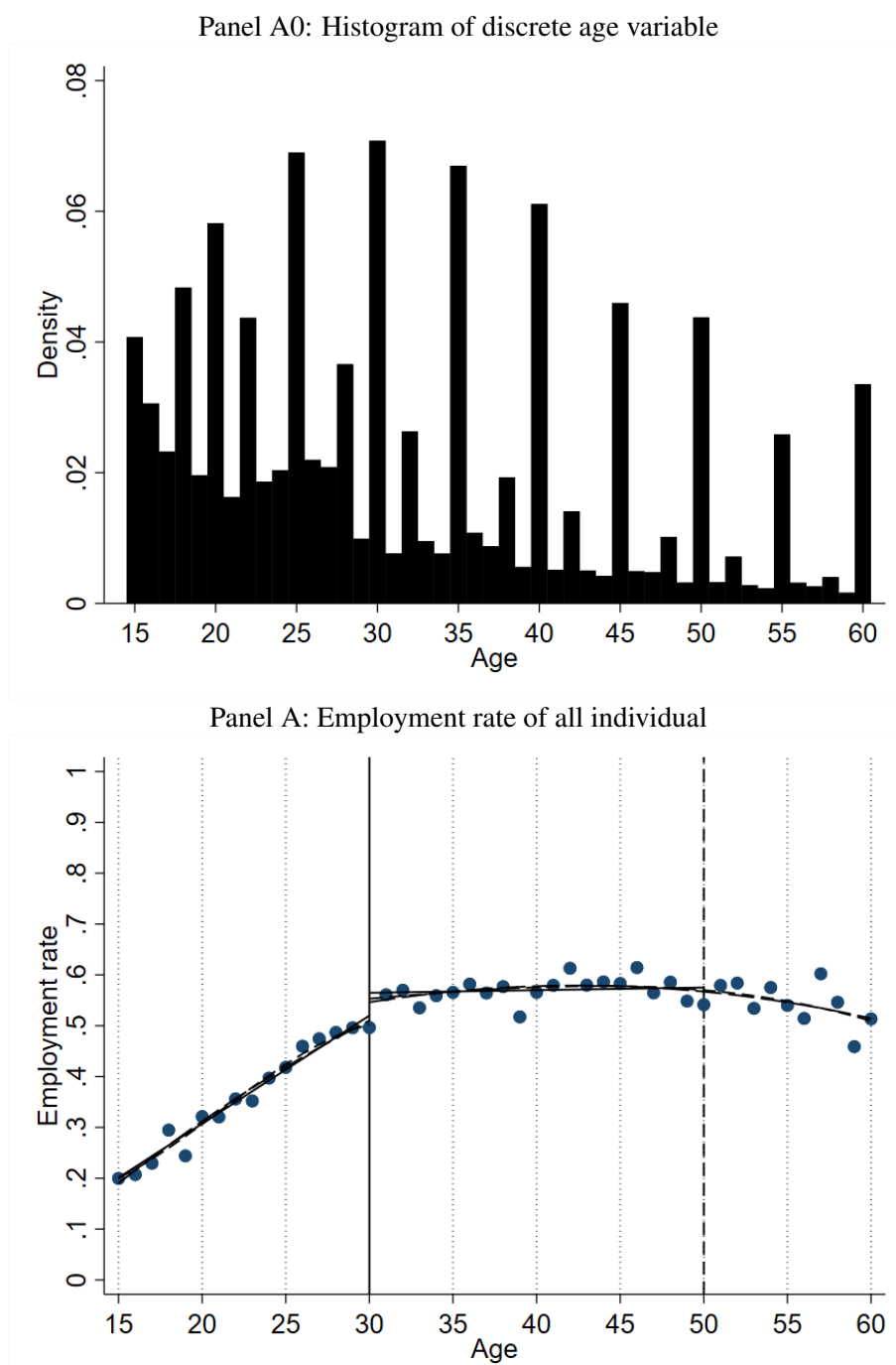
Notes: OLS regression discontinuity estimates of likelihood of being employed at age 30 for the female population group age between 15 and 60. Each year separately presented in Panel: A–I. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (3.4) Effects of becoming ineligible for government jobs at age 30 on labor force and employment, 1991–2017

Panel A: Dependent variable: Labor force (0/1) (working age population)						
	All		Male		Female	
Age>30	0.04** (0.01)	0.05*** (0.01)	-0.01 (0.01)	0.02** (0.01)	0.05*** (0.01)	0.05*** (0.02)
Mean at age 30	0.53*** (0.01)	0.52*** (0.01)	0.93*** (0.01)	0.91*** (0.01)	0.18*** (0.01)	0.18*** (0.01)
Observations	17,840,954	17,840,954	8,960,245	8,960,245	8,880,709	8,880,709
Panel B: Dependent variable: Employment status (0/1) (only labor force)						
Age>30	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.01)	0.00 (0.01)
Mean at age 30	0.96*** (0.00)	0.96*** (0.00)	0.98*** (0.00)	0.98*** (0.00)	0.89*** (0.01)	0.89*** (0.00)
Observations	8,270,243	8,270,243	7,388,405	7,388,405	881,838	881,838
Spline	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic

Notes: OLS regression discontinuity estimates at age 30 for labor force over not labor force, and for employment over unemployment for the period 1991–2017 and age group 15–60. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

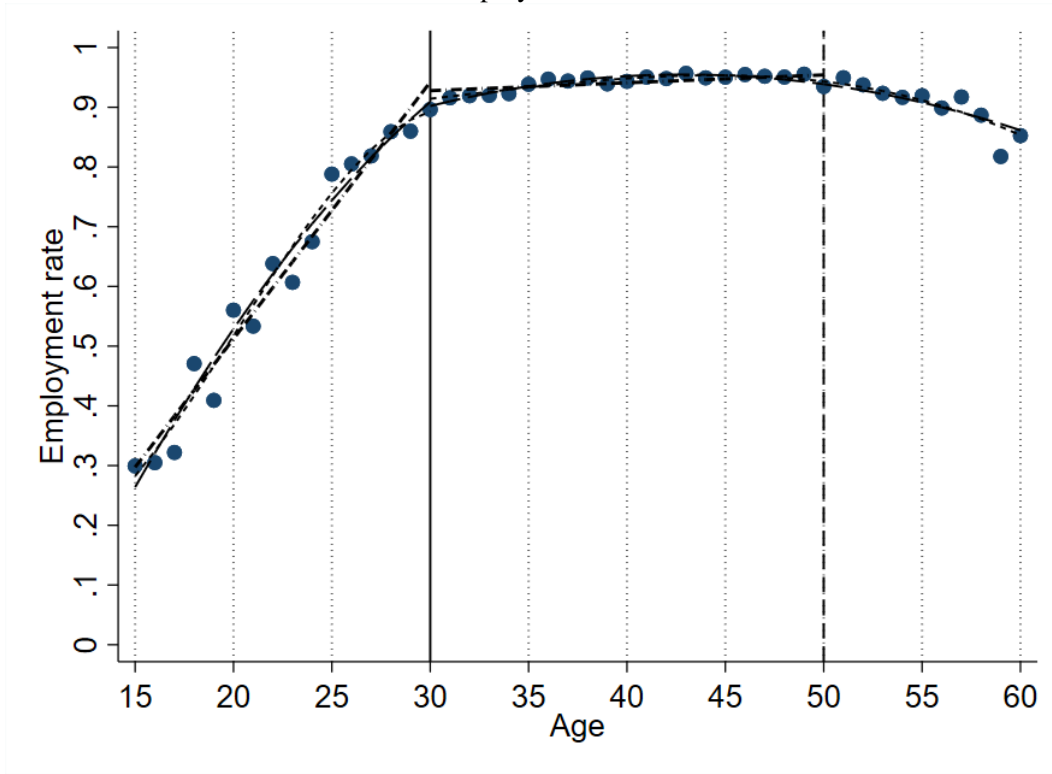
Figure (3.1) Age histogram and employment effect at age 30 after becoming ineligible for government job for all individuals of age between 15 and 60, 1991–2017 pooled



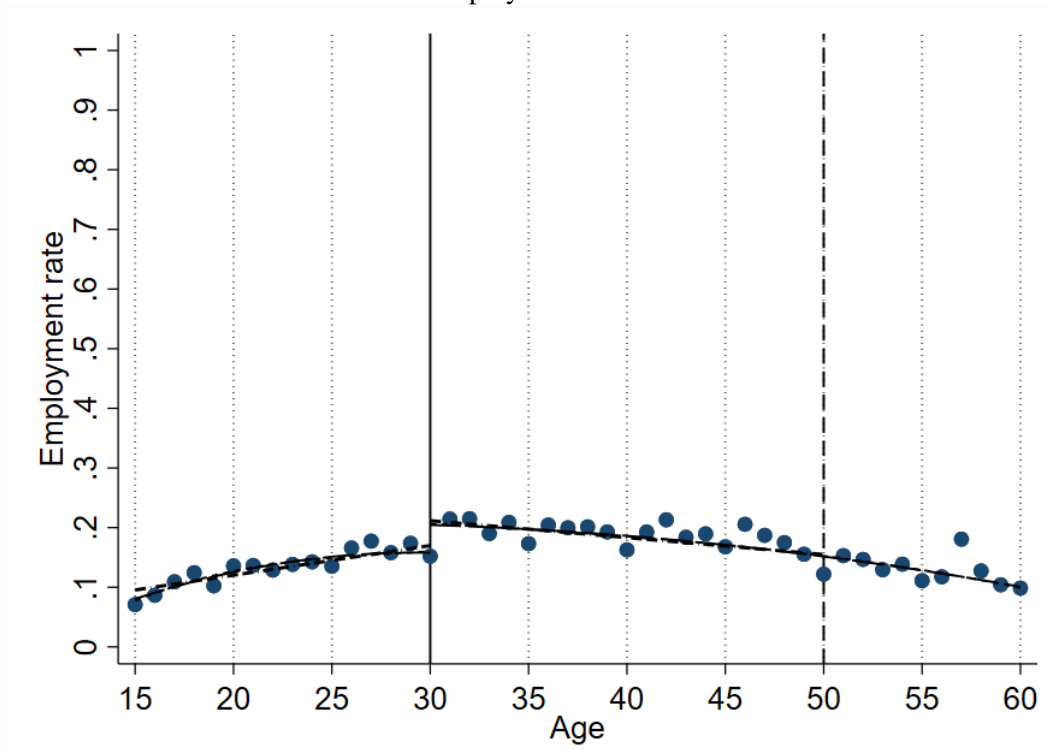
Notes: Panel A corresponds the Panel A of regression Table 3.1. OLS regression discontinuity estimates, extrapolated at age 30 from age ≥ 31 . Pooled dataset consists of population census 1991, population census 2001, LFS 2002-03, LFS 2005-06, LFS 2010, population census 2011, LFS 2013, QLFS 2015-16, QLFS 2016-17.

Figure (3.2) Employment effect at age 30 after becoming ineligible for government jobs, 1991–2017, by sex

Panel B: Employment rate of male

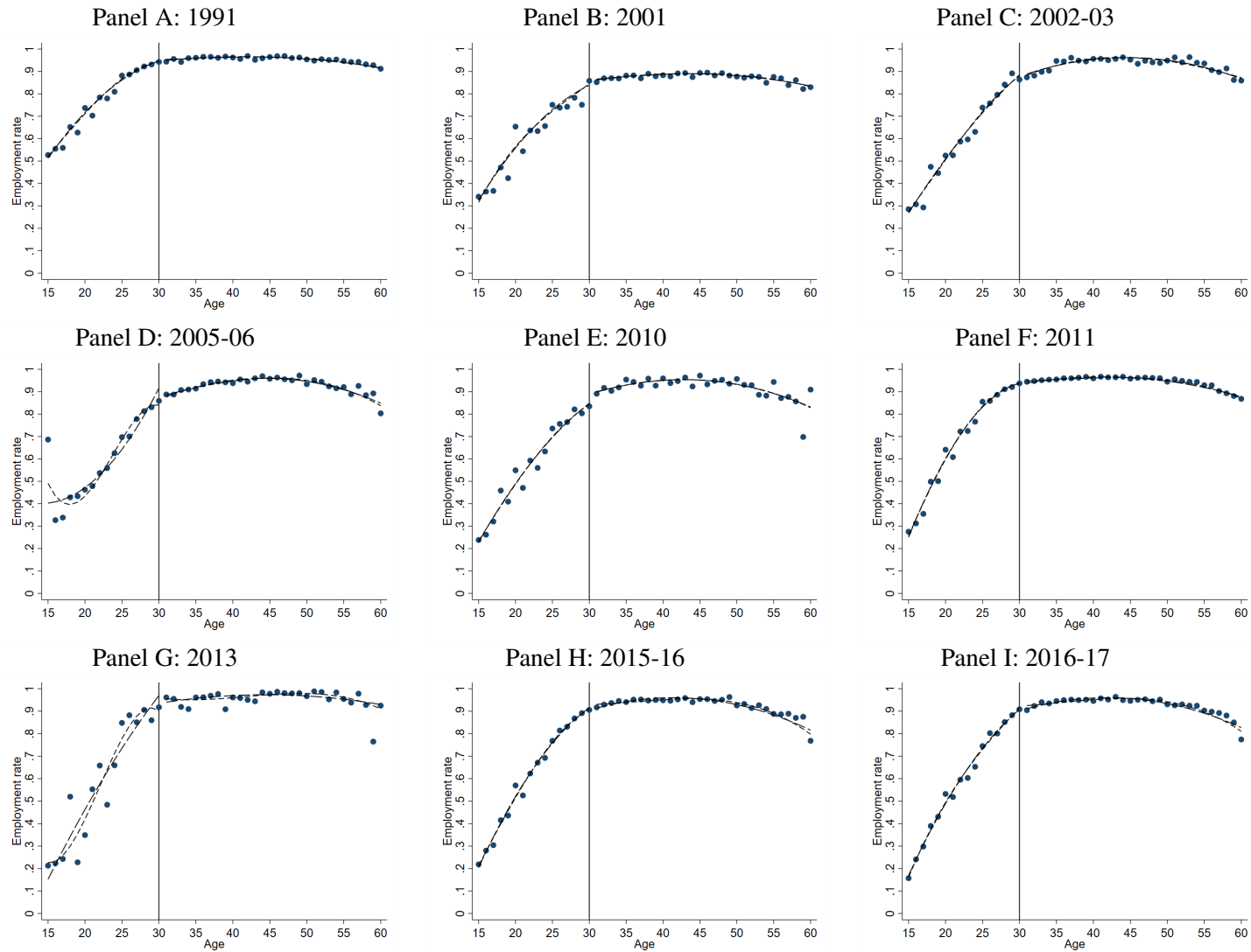


Panel C: Employment rate of female



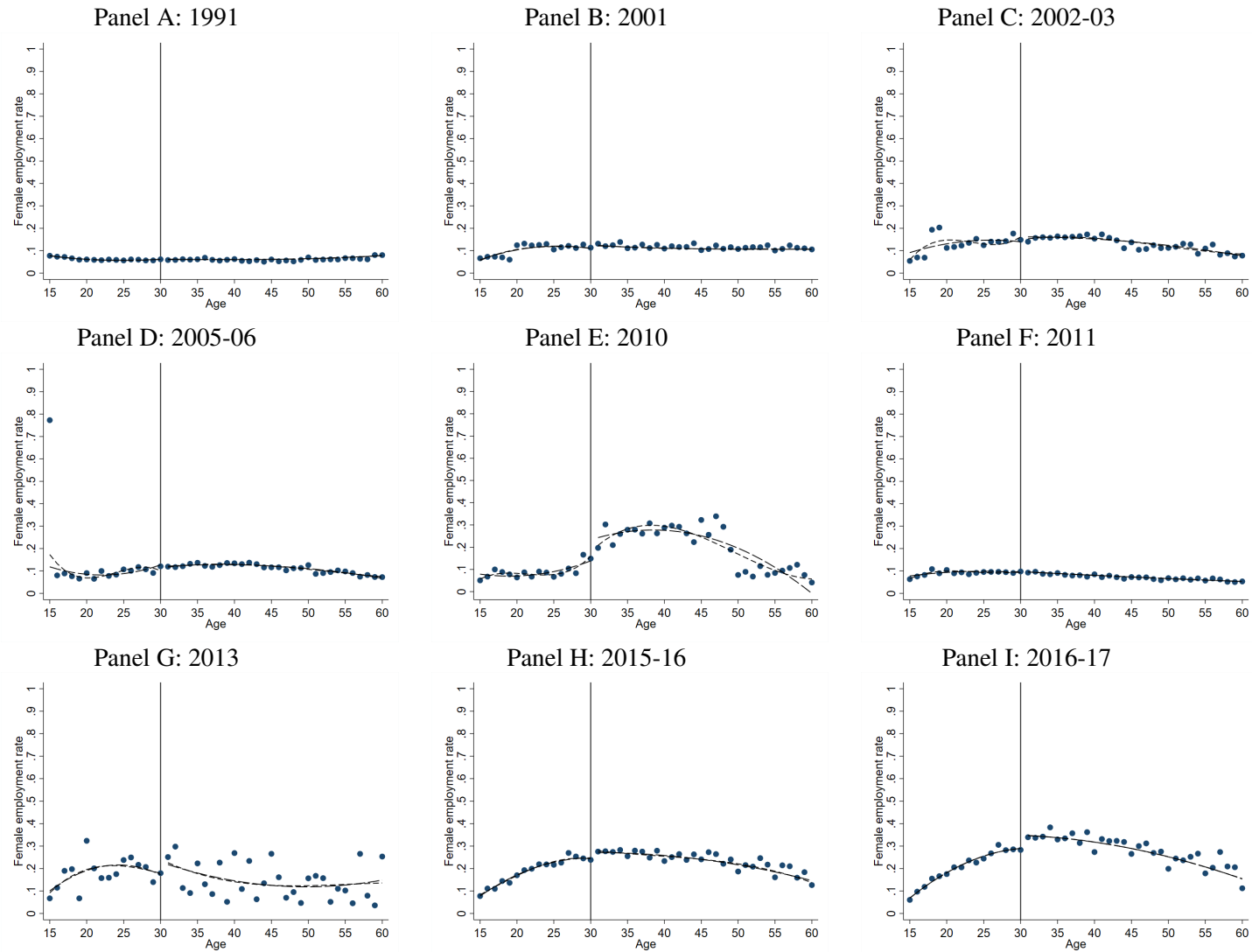
Notes: Panel B and Panel C correspond the regression Panel B and Panel C respectively of Table 3.1. OLS regression discontinuity estimates, extrapolated at age 30 from age ≥ 31 . Pooled dataset same as Figure 3.1.

Figure (3.3) Employment effect at age 30 after becoming ineligible for government jobs, 1991–2017, male



Notes: Figure 3.3 corresponds the regression Table 3.2.

Figure (3.4) Employment effect at age 30 after becoming ineligible for government jobs, 1991–2017, female

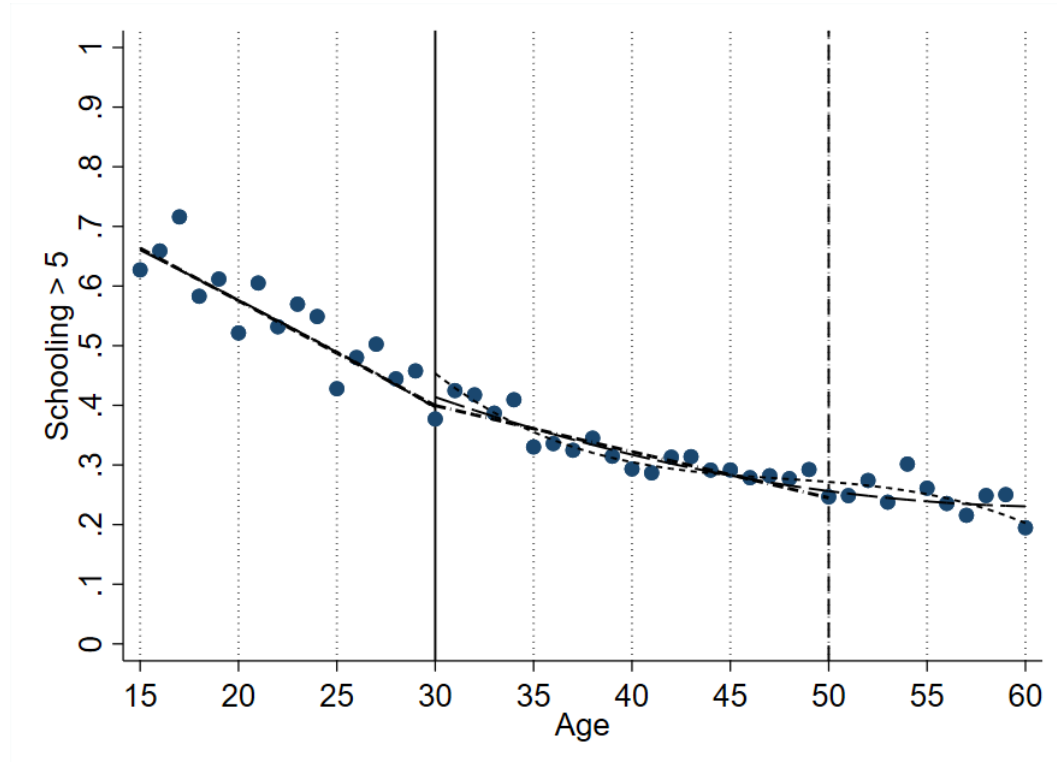


Notes: Figure 3.4 corresponds the regression Table 3.3.

Main RDD Results: Falsification and robustness checks

Figure (3.5) Effect of becoming ineligible for government jobs at age 30 on education, 1991–2017

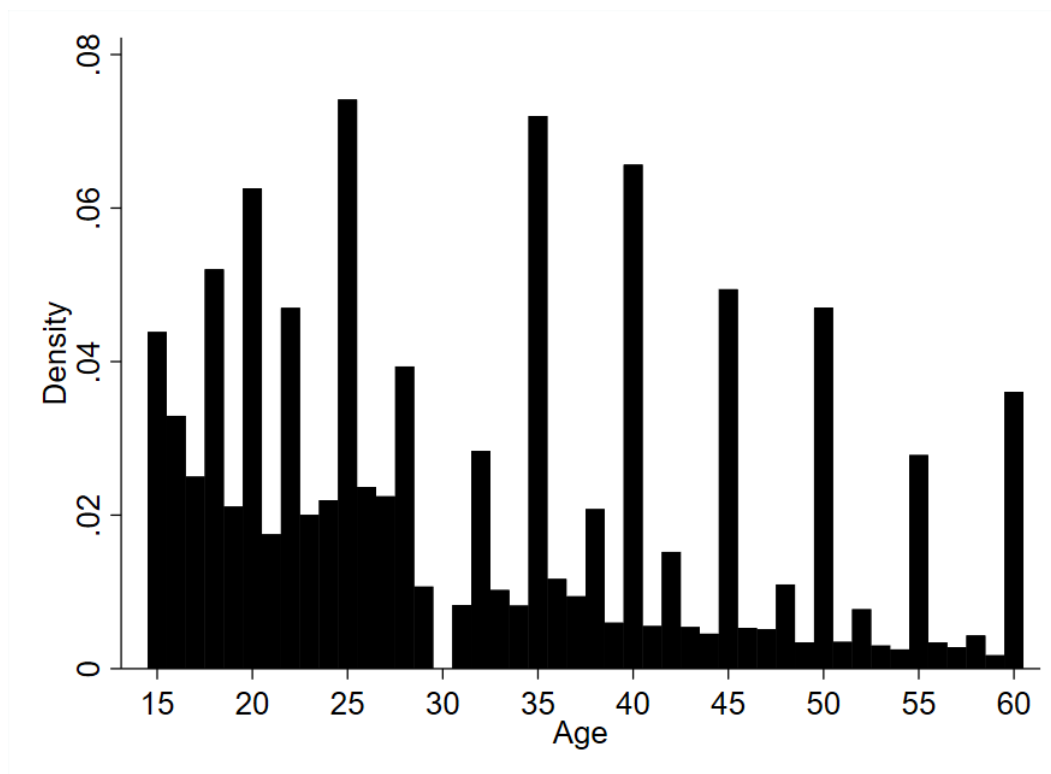
Dummy for education above 5th grade



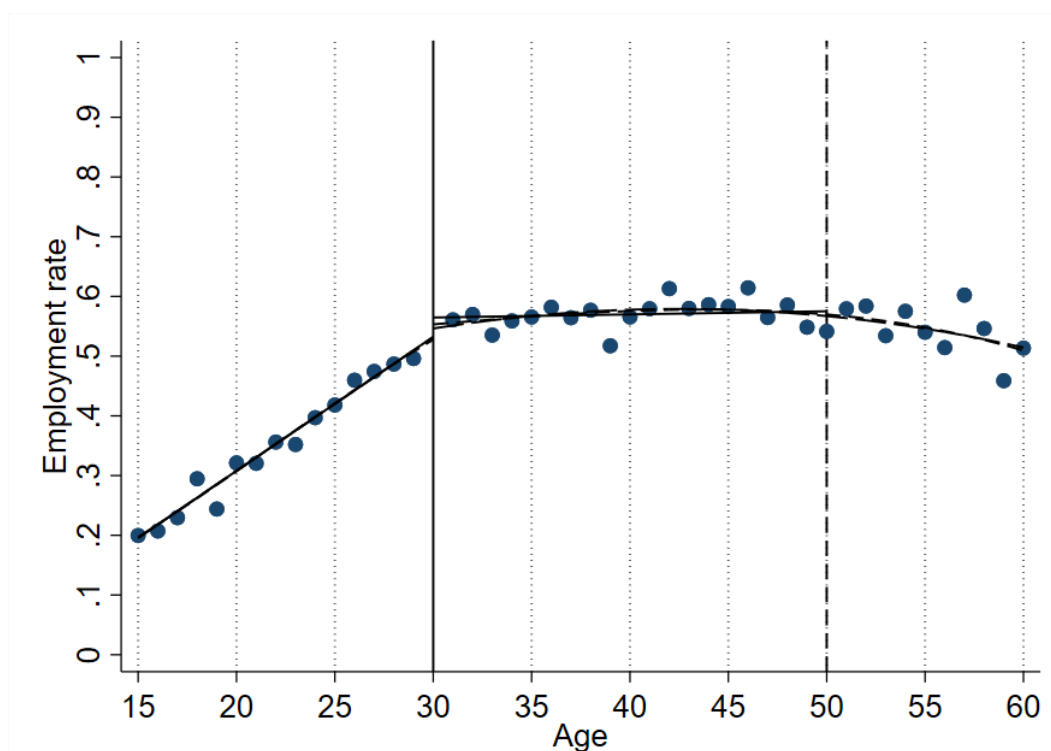
Notes: Corresponding regression result is in Appendix Table B6. OLS regression discontinuity estimates, extrapolated at age 30 from age ≥ 31 . The 1991–2017 pooled data consists of population census 1991, population census 2001, LFS 2002-03, LFS 2005-06, LFS 2010, population census 2011, LFS 2013, QLFS 2015-16, QLFS 2016-17.

Figure (3.6) Age histogram and employment effect of becoming ineligible for government jobs for all individuals (excluding age 30), 1991–2017

Panel A0: Histogram of discrete age variable



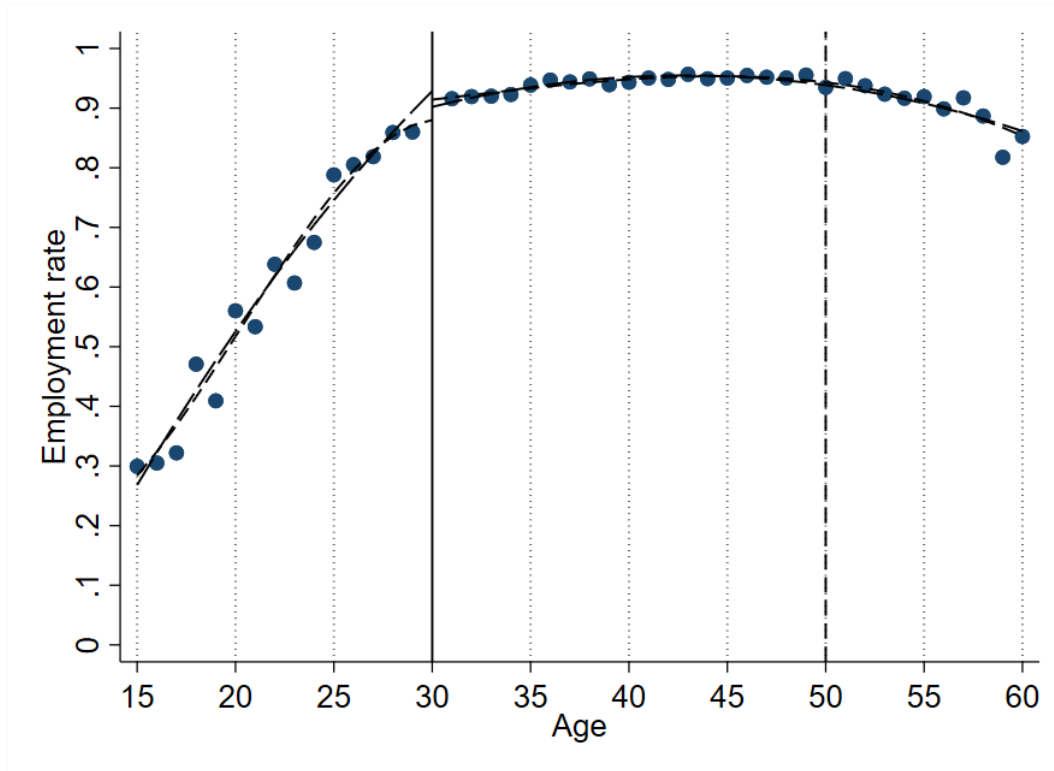
Panel A: Employment rate of all individual



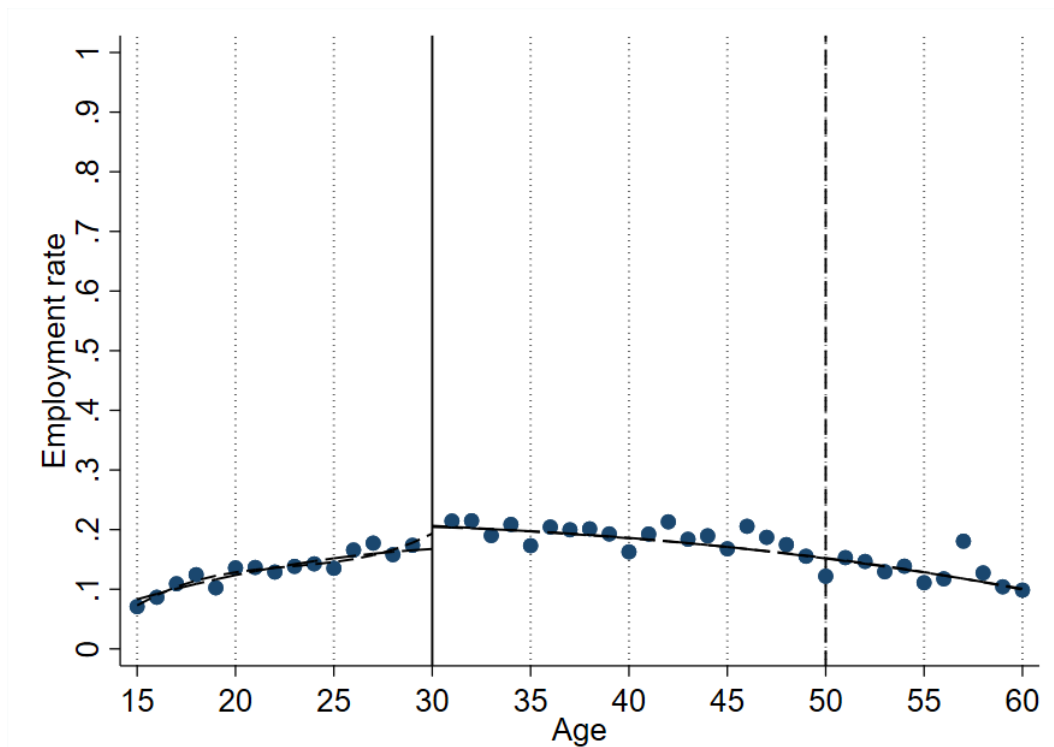
Notes: Panel A is OLS regression discontinuity estimates, extrapolated at age 30 from from below and above age 30. Corresponding regression result is Panel A in Appendix Table B8.

Figure (3.7) Employment effect at age 30 after becoming ineligible for government jobs by sex (excluding age 30), 1991–2017

Panel B: Employment rate of male



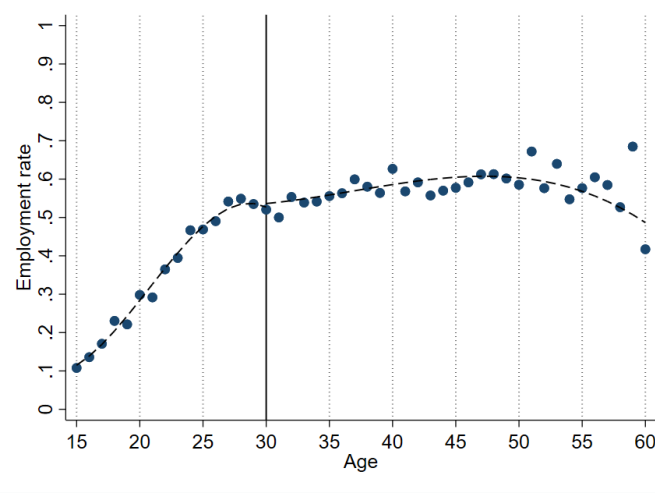
Panel C: Employment rate of female



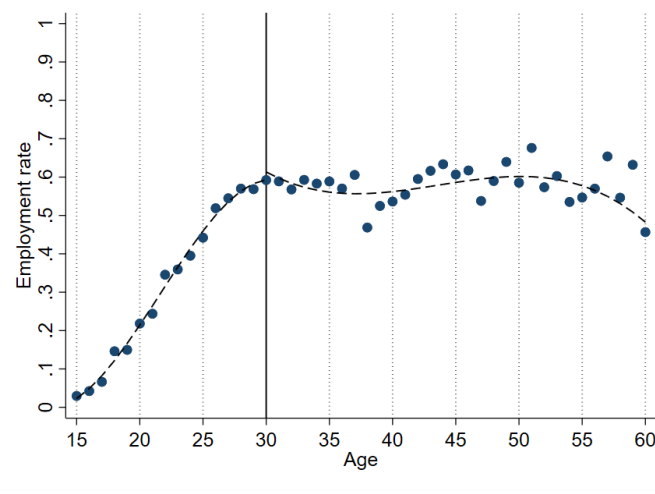
Notes: OLS regression discontinuity estimates, extrapolated at age 30 from below and above age 30. Corresponding regression result is in Appendix Table B8 (Panel B & Panel C).

Figure (3.8) Employment rate by age in West Bengal, India

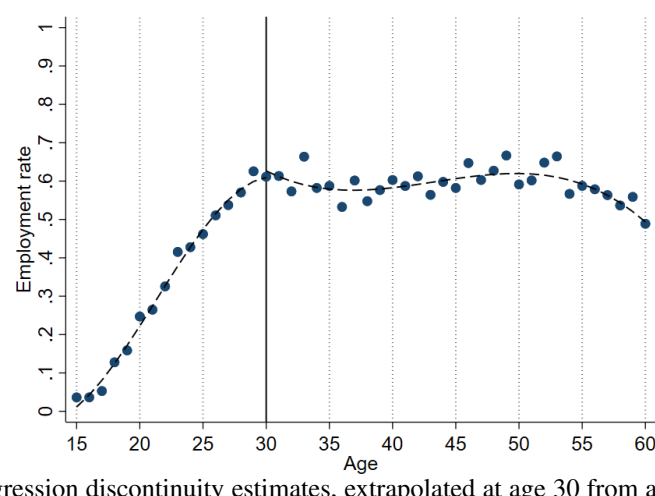
Panel A: 2011-12



Panel B: 2017-18



Panel C: 2019-20

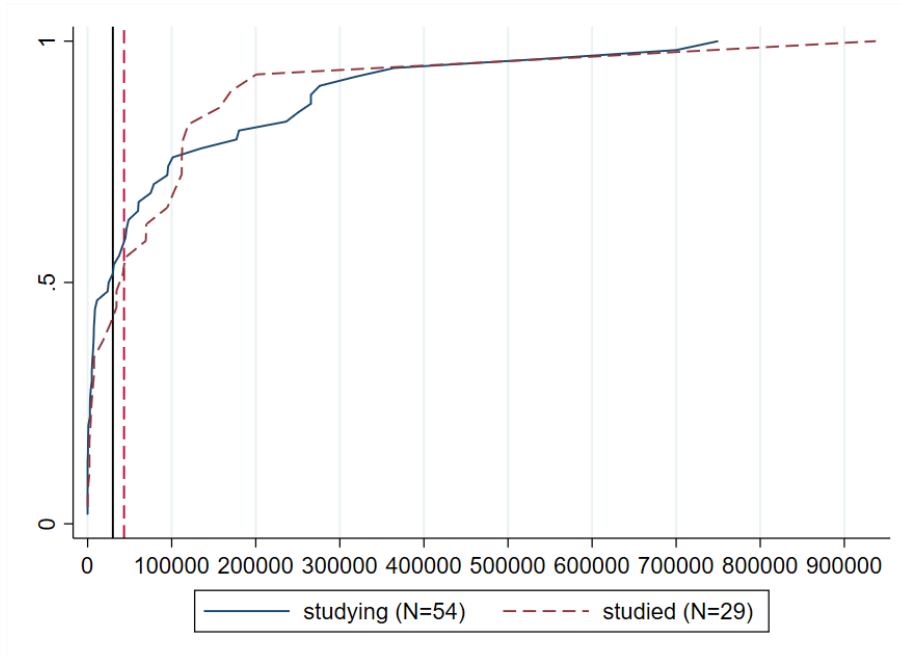


Notes: OLS regression discontinuity estimates, extrapolated at age 30 from age ≥ 31 for individuals living in the Indian state of West Bengal. Employment is defined based on the principal usual activity for one year. No weight is adjusted in the estimation. Data: Employment and unemployment 2011–12; Periodic Labor Force Survey 2017–18 and 2019–2020. Data collected from National Data Archive, Ministry of Statistics and Programme Implementation, India. Corresponding estimates are provided in Appendix Table B11 .

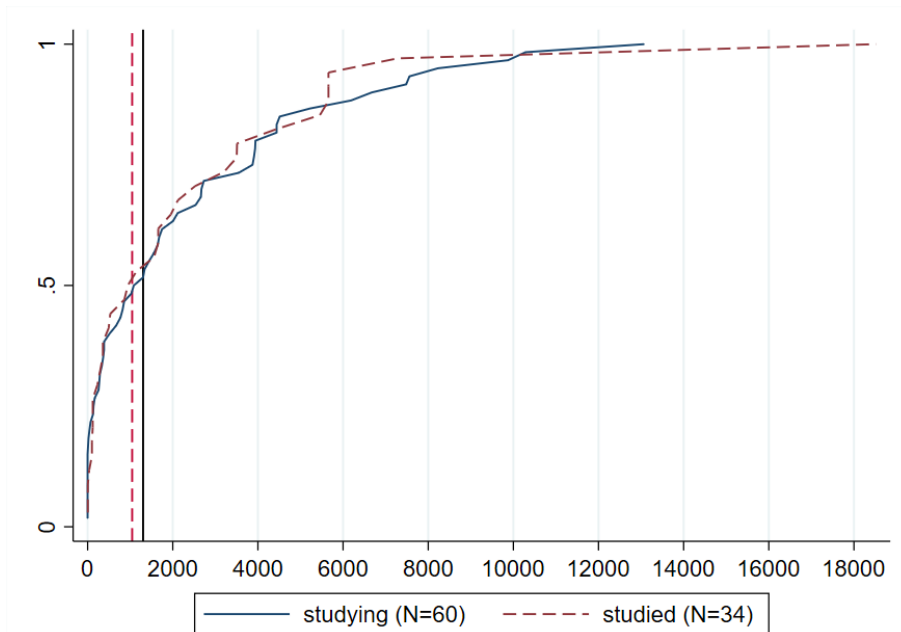
Survey Results

Figure (3.9) Direct (money and time) costs of preparation for government jobs preparation

Panel A: Cumulative distribution of total money spent (Taka)



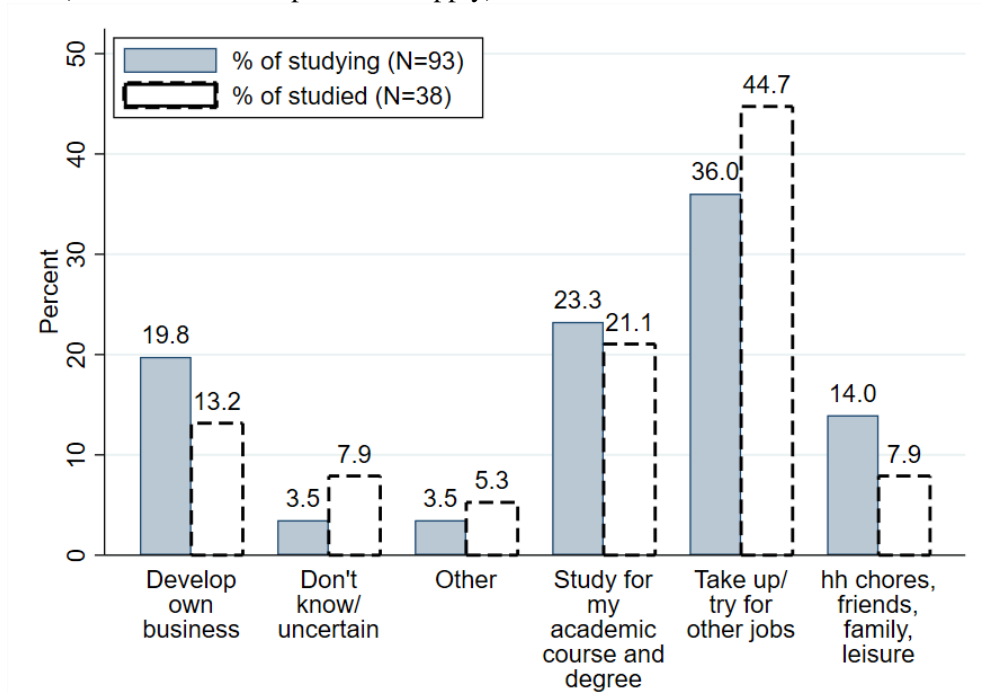
Panel B: Cumulative distribution of total time spent (Hour)



Notes: Vertical lines are median values; for studying and studied respectively: money spent Taka 27,500 & 41,875, time spent Hour 1,194 & 1,046

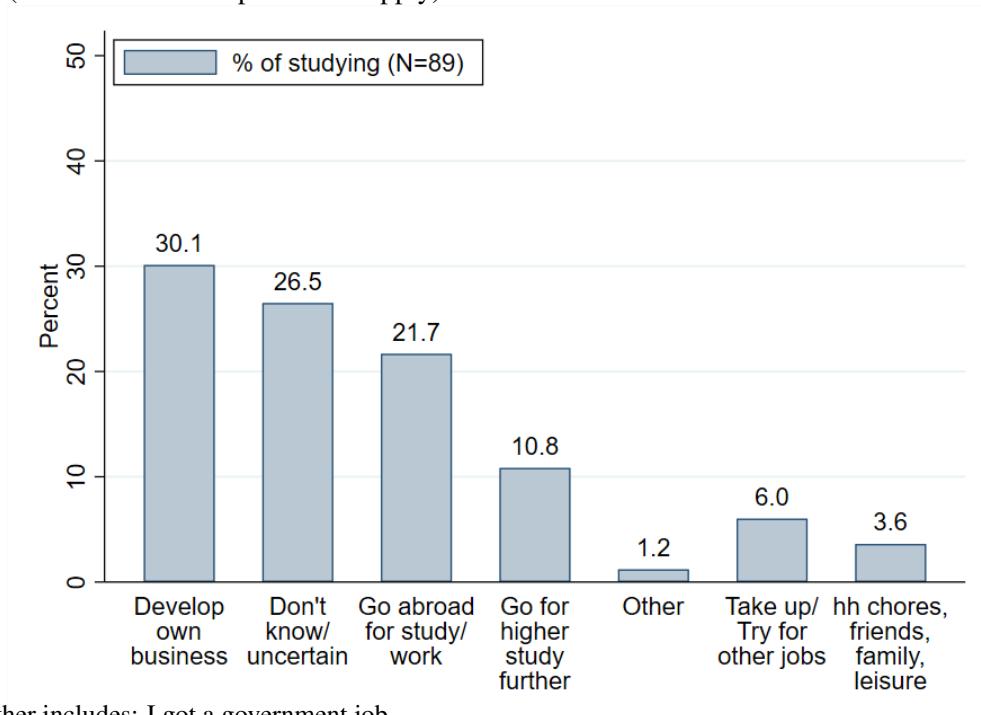
Figure (3.10) Indirect (proxy indicators for opportunity costs) costs of preparation for government jobs

Panel A: If you had not been studying for government job exams, what would you have done with your time instead? (Please choose all options that apply)



Notes: Other includes: I am doing a private job; Increase my soft skills; Trying to achieve online skill

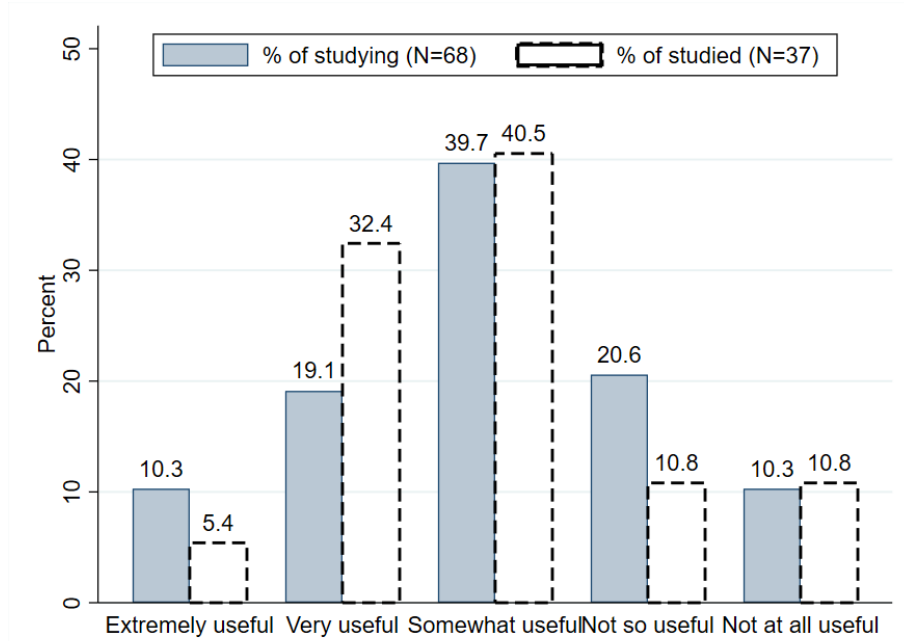
Panel B: In case you cannot get one government job before reaching age ceiling, what would you plan to do later? (Please choose all options that apply)



Notes: Other includes: I got a government job

Figure (3.11) Usefulness of government job preparation

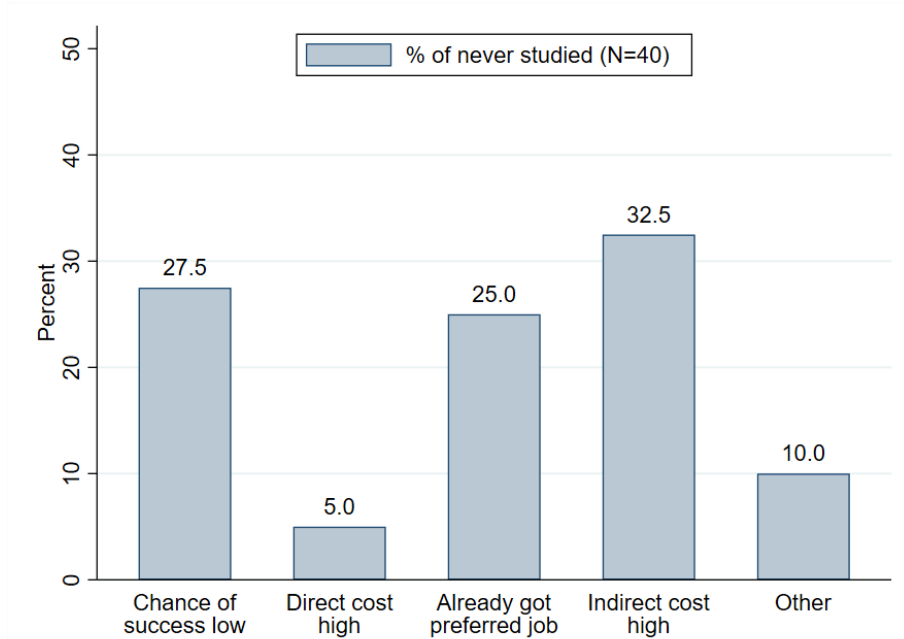
Do you think your preparation for government jobs (e.g., study materials, networking, etc.) is useful per se in the labor market for other jobs or professions apart from government jobs?



Notes: Multiple response not allowed, so the number of responses and respondents are the same. Response excluding current government employees: 6% Extremely useful, 20% Very useful, 39% Somewhat useful, 21% Not so useful, and 14% Not at all useful

Figure (3.12) Reasons for never having studied for government jobs

Why have you never studied for government jobs? (please choose all that apply)



Notes: Other includes: Developing my skill, after graduation I will not waste time for government job; Want to do something related to my discipline; Not interested to do a government job

Exam Materials Review

Table (3.5) A brief summary of some public services examinations

Exam authority	Type	Exam pattern briefly
PSC	BCS	<p>Under 'BCS Recruitment Rule 2014', PSC arranges 3-steps exam for 26 cadre to select candidate. Until 34th BCS, Preliminary test was 100 marked, Under 2014 rule, 200 marked exam for 2 hours on 10 topics was initiated from 35th BCS. Steps with marks distribution are below.</p> <p><i>Step 1.</i> 200 marks MCQ Type Preliminary Test: (Bengali language & literature 35; English language & literature 35; Bangladesh affairs 30; International affairs 20; Geography (Bangladesh & global), environment & disaster management 10; General science 15; Computer & information technology 15; Mathematical logic 15; Mental aptitude 15; Moral, values & good-governance 10).</p> <p><i>Step 2.</i> 900 marks written test (average pass mark 50%): Those who pass preliminary exam take one or both of this two category exam- general cadre and technical/professional cadre. (General: Bengali 200; English 200; Bangladesh affairs 200; International affairs 100; Mathematical logic & mental aptitude 100; General science and technology 100. Technical/Professional: Bengali 100; English 200; Bangladesh affairs 200; International affairs 100; Mathematical logic & mental aptitude 100; Post related topic 200.)</p> <p><i>Step 3.</i> 200 marks viva voce (pass mark 50%): Those who pass written exam take part in oral exam.</p>
	Non-cadre	<p>Revised on 27 February 2019. This exam is to fill up the vacancy through PSC for non-cadre technical/professional & non-technical positions (9th & 10th to 13th grade) of different ministries/divisions.</p> <p>9th grade technical/professional: If number of applicant is 1000 or less, 200 marks written exam for 4 hours (Bengali 40; English 40; General knowledge 40; relevant technical/professional subject 80. Pass marks: aggregate 45% and technical/professional 30%). If number of applicant is more than 1000, first 100 marks MCQ for one hour (Bengali 20; English 20; General knowledge (Bangladesh & international affairs) 20; relevant technical/professional subject 40). The selected candidate in MCQ take part in the above test of 200 marks. The selected candidate in written exam attend 100 marks viva voce exam, pass marks 45%.</p> <p>10-13th grade technical/professional: Similar arrangement and marks distribution as 9th grade; in this case viva voce is for 50 marks and pass 40%.</p> <p>9th grade non-technical: If number of applicant is 1000 or less, 200 marks written exam for 4 hours (Bengali 50; English 50; General knowledge 40; Math and mental aptitude 60. Pass marks: aggregate 45%). If number of applicant is more than 1000, first 100 marks MCQ for one hour (Bengali 25; English 25; General knowledge (Bangladesh & international affairs) 25; Math and general science 25). The selected candidate in MCQ take part in the above test of 200 marks. The selected candidate in written exam attend 100 marks viva voce exam, pass marks 45%.</p> <p>10-13th grade technical/professional: Similar arrangement and marks distribution as 9th grade; in this case viva voce is for 50 marks and pass 40%.</p>
	Departmental Examination	<p>There are 26 different cadres of the Bangladesh civil service. Every officer of the entry level posts of a cadre service must qualify in a departmental examination conducted by the Public Service Commission. The BPSC also conducts departmental examinations for certain categories of non cadre services. The examination is held twice a year, preferably in June and December.</p>

Notes: Based on <http://www.bpsc.gov.bd/> (accessed 14 December 2021)

Chapter 4

Conclusions

4.1 Summary

The first paper studies the implications of the safety tightening for manufacturing industry's outcomes, specifically industry size in terms of employment and the number of establishments. The study exploits the safety enforcement led by multinational buyers' organizations and followed by other stakeholders in the export-oriented Ready Made Garment (RMG) or apparel industry of Bangladesh after the Rana Plaza tragedy. The results suggest that initiatives to enforce workplace safety in a manufacturing industry where existing mechanisms are poor likely affect the size of the industry. In the decade prior to the Rana Plaza collapse and international involvement, places where apparel or RMG were the dominant manufacturing industry in terms of registered employment experienced substantially higher employment growth compared to places with no or less apparel. In the subsequent decade when safety measures were tightened after the Rana Plaza collapse, this trend reversed. In fact, both registered employment and the number of establishments declined in apparel dominant places, while it increased in comparison places. Recently established factories and potential entrants appear to be affected more, while larger establishments are likely to survive shocks better and sustain longer. This study provides empirical evidence of the implications of safety initiatives after the Rana Plaza collapse, one of the world's worst industrial accidents in recent times.

The second study examines the effects of the high desirability of government jobs on employment and human resource accumulation. The findings suggest that premiums or attractiveness of government jobs in a government vs. non-government sector segmented labor market affect the allocation of labor and may distort the labor market. With the goal of obtaining attractive government jobs, individuals are likely to delay searching for and taking up other opportunities, repeatedly try for public sector jobs until they become ineligible, and incur direct and indirect costs related to preparation. On the other hand, there is a possibility that human capital gain results from preparation for public service selection exams. Exploiting the age ceiling rule, the RDD finding suggests that the likelihood of employment increases by about five percentage points, once working age people reach age 30 and are no longer eligible for government jobs. Employment increases mainly for females, and noticeably so after the doubling of public service pay in 2015. The increase in employment appears to be the result of increased labor force participation rather than declining unemployment. The survey data suggests that candidates sit for multiple public recruitment exams during the eligibility period, and incur substantial monetary, time, and opportunity costs. A part of the respondents reported that preparation is usefulness for obtaining other jobs. On the other hand, my review of exam materials suggests limited human capital accumulation from the exam preparation.

4.2 Policy implications

The first study finds a trade-off relationship between industry size and safety enforcement in existing underdeveloped settings. Meanwhile, the industry maintains steady growth in capitalization and exports. The finding evokes serious thoughts about policy implications, which can be viewed through different lenses depending on the underlying motivations and priorities regarding economic problems. If ensuring employment is the main goal regardless of the quality of employment and people's lives, then allowing the industry

to function without requiring any safety compliance might seem like a good policy. If safety is the highest priority, irrespective of employment, enforcing the most stringent measures and encouraging industry owner to adopt mechanization by substituting labor could also be seen as a sound policy. To address the complex problem beyond the safety-employment and yes-no binary simplification, other issues should be considered such as redefining fiscal mechanisms, stakeholder relations, and ownerships of industry. If the core economic motivation is equitable well-being, then stakeholders need to approach the problem with fresh and innovative perspectives. This study considered only simplified safety-employment nexus in the prevailing state of affairs. The results and recommendations of this study may help policymakers and industry stakeholders undertake the necessary steps to address workplace safety without jeopardizing employment and the industry's performance in countries with economic and structural conditions similar to Bangladesh's.

To avoid the possible negative consequences of public service premiums, the second study recommends a restriction on the number of times a candidate can sit for exams rather than the current uniform age ceiling at age 30 in the short run, considering other factors such as the variability of number of years for university graduation, discrimination against older candidates, and special conditions like sickness, pregnancy. Achieving optimum wages and other benefits for the entire labor market in the long run—with no public vs. private segmentation—would be a more sustainable and efficient approach. For sustainability and comprehensive well-being, policies should target the entire labor market, for instance, ensuring minimum wage, unemployment benefits, job and social security for everyone in the labor force.

4.3 Limitations and future research

To study the effects of workplace safety enforcement, this dissertation used data for 2009 and 2019 while safety enforcement began in 2013. Although there was no big shock between 2009 and 2013 to cause a paradigm shift in the industry, it would have been ideal to study the effect using data for 2013 and 2019 if such data were available.

Further research would need to evaluate the public service efficiency margin due to the premiums. As this study explored only a scope of brain gain through preparation for government jobs, an estimation of net human capital gain would be valuable too. The research approach used in this study can be adapted to any segmented labor market scenario. Many countries, including India, have similar labor market features and different types of segmentation. Given sufficient data, the magnitude of employment effect can be estimated more precisely by identifying individuals who prefer public sector employment compared to those who do not. Regarding the primary survey presented here, I carefully selected the sample and designed the survey following a systematic approach to collect primary data. However, the sample, drawn from selected Facebook groups, may have selection into response bias and hence may be not statistically representative of the target population. Follow-up research which accesses suitable data may remedy this gap.

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Appendices

A Appendix: Chapter 2

A.1 Result appendix: Level outcomes and analysis of apparel and textile together

Table (A1) Total employment and number of establishments in upazilas, 2001–2019

Panel A: Population census 2001 and 2011			
		Total employment	
Apparel dominant	93,403*** (25,617)	99,199*** (25,611)	99,529*** (25,615)
Year 2011	10,715*** (874.3)	7,604*** (584.6)	7,425*** (597.7)
Apparel dominant × Year 2011	128,883*** (34,116)	131,994*** (34,122)	132,173*** (34,127)
Constant	66,364*** (1,721)	60,568*** (1,466)	60,238*** (1,486)
Panel B: Registered business census 2009 and 2019			
		Register employment	
Apparel dominant	115,936*** (25,779)	118,159*** (25,785)	118,676*** (25,788)
Year 2019	3,591*** (474.5)	2,503*** (228.0)	2,711*** (211.1)
Apparel dominant × Year 2019	-13,782 (16,737)	-12,694 (16,738)	-12,902 (16,740)
Constant	6,004*** (520.7)	3,780*** (254.3)	3,263*** (154.6)
Panel C: Registered business census 2009 and 2019			
		Registered establishment	
Apparel dominant	727.5*** (206.7)	774.5*** (206.5)	790.2*** (206.4)
Year 2019	64.39*** (6.498)	60.45*** (4.677)	63.72*** (3.928)
Apparel dominant × Year 2019	-239.9* (131.1)	-235.9* (131.0)	-239.2* (131.0)
Constant	174.8*** (12.24)	127.8*** (8.191)	111.1*** (3.831)
Observations	984	856	822
Drop $0 < \text{apparel share} \leq 0.4$	✗	✓	✓
Drop textiles share > 0.5	✗	✗	✓

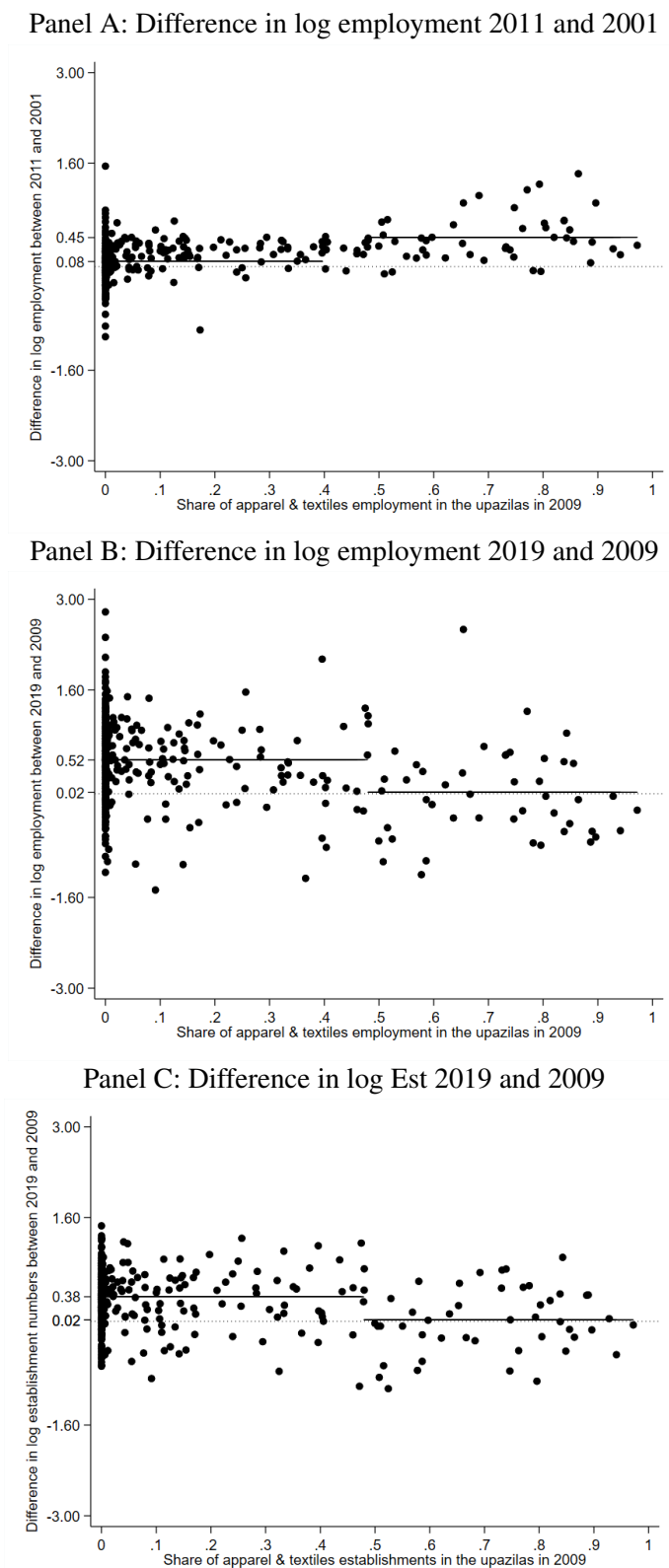
Notes: OLS estimates. Standard errors clustered at upazilas level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (A2) Log employment and number of establishments in upazilas for industry and service (excluding agriculture), 2001–2019

Panel A: 2001-2011 (log of apparel & textile employment)		
Apparel & textiles dominant	1.04*** (0.13)	1.25*** (0.13)
year 2011	0.08*** (0.01)	0.03** (0.02)
Apparel & textiles dominant × 2011	0.38*** (0.05)	0.42*** (0.05)
Constant	9.96*** (0.03)	9.75*** (0.04)
Panel B: 2009-2019 (log of apparel & textile employment)		
Apparel & textiles dominant	2.28*** (0.20)	2.60*** (0.20)
year 2019	0.53*** (0.03)	0.57*** (0.03)
Apparel & textiles dominant × 2019	-0.51*** (0.11)	-0.55*** (0.11)
Constant	7.93*** (0.05)	7.61*** (0.04)
Panel C: 2009-2019 (log of apparel & textile number of establishments)		
Apparel & textiles dominant	1.29*** (0.17)	1.53*** (0.17)
year 2019	0.38*** (0.02)	0.40*** (0.02)
Apparel & textiles dominant × 2019	-0.36*** (0.08)	-0.38*** (0.08)
Constant	4.65*** (0.04)	4.41*** (0.04)
Observations	984	716
Exclude 0 < Appael & Textile share <= 48	✗	✓

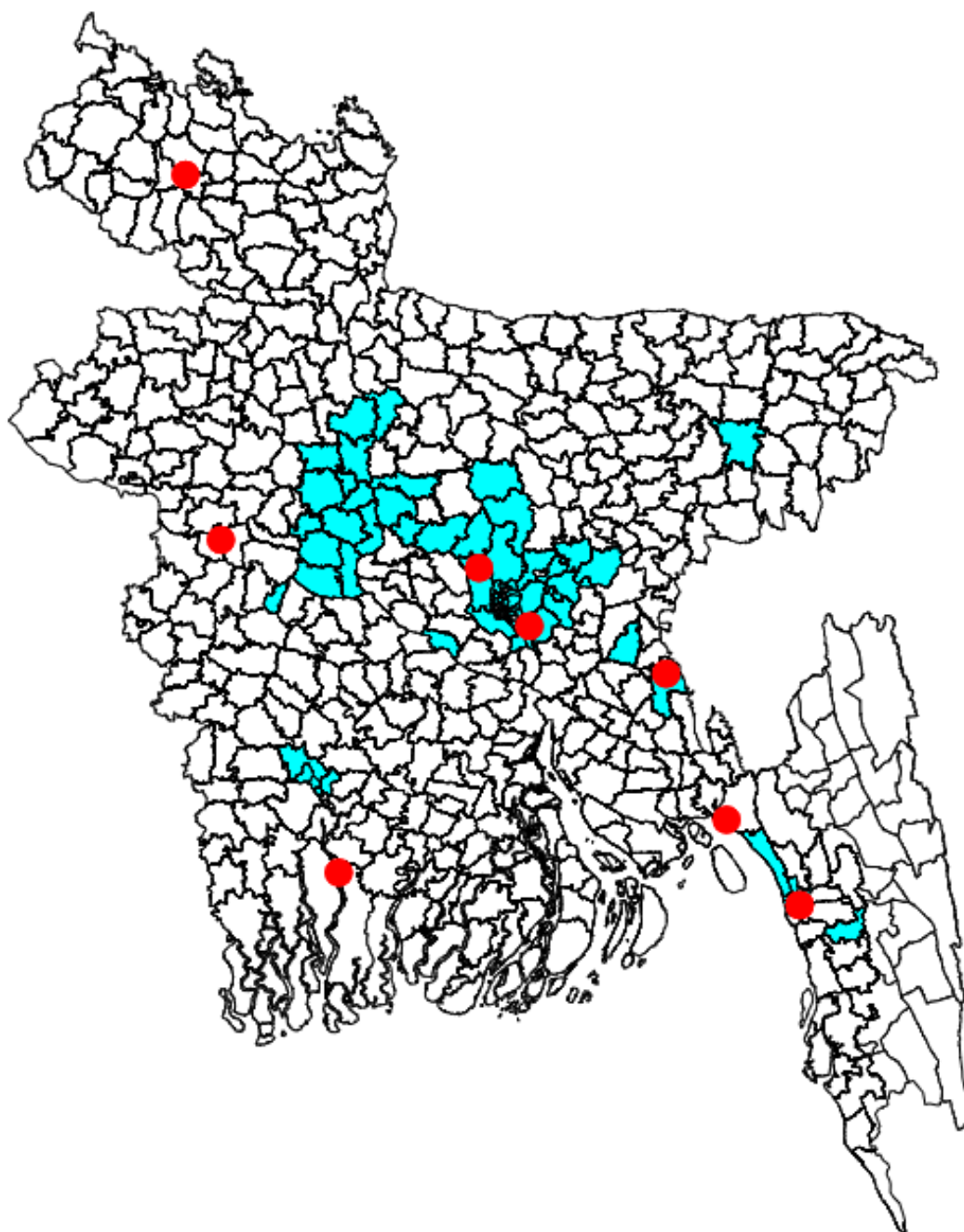
Notes: OLS estimates. Standard errors clustered at upazila-level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Figure (A1) Difference in log employment for industry and service (exclude agriculture)



Notes: Horizontal axis is the share of apparel and textile employment in upazilas in 2009 and vertical axis plots the differences between 2001 and 2011, and 2009 and 2019. Round points are the difference in employment in each upazila between 2001 and 2011 (Panel A) and 2009 and 2019 (Panel B), and difference in the number of establishment between 2009 and 2019 (Panel C). Solid lines are mean values of difference for upazilas with apparel and textile share ≤ 0.48 and apparel and textile share > 0.48 . Continuous dot lines indicate zero.

Figure (A2) Location of Export Processing Zones (EPZs) and apparel-textile dominant upzilas



Notes: Cyan filled blocks are apparel-textile dominant places, white are comparison places, and red filled round dots are EPZ locations

Source: Author's illustration using 2018 shape file extracted from GADM database (www.gadm.org)

A.2 Data appendix: Adjustment of upazilas

Table A3 presents the gist of upazila reorganization over the period between 2001 and 2019. Before any adjustment, the total number of upazilas in the population data was 507 in 2001 and 543 in 2011. To make 2001 and 2011 equivalent, I checked which new upazilas were created between 2001 and 2011 from the websites of the upazilas and other online sources. I then merged the new upazilas with the old ones, and in this step, I came up with 507 upazilas in 2001 and 510 in 2011, after the adjustment of 31 upazilas. I then checked which upazila originated from more than one upazila and merged them. I dropped Mirsharai upazila even though it was not a new upazila and also existing currently because this upazila did not exist in the 2019 business census dataset. I dropped Karnafuli upazila because it did not exist in the 2011 population census dataset. Thus, I came up with 500 upazilas in both 2001 and 2011. But to address the changes between 2009 and 2019, I finally ended up with 492 upazilas.

I adjusted the 2009 and 2019 upazilas to make them equivalent to arranged population census upazilas. In the 2009 dataset, upazila names were missing for 93 observations. Instead of dropping the observation with missing names, I filled up the missing information by taking information from other observation rows and address columns, searching online and making best guesses. After addressing these missing information, the total number of upazilas was 536 in 2009 and 565 in 2019. To make BR2009 and BD2019 upazilas equivalent, I checked the change, split and merge of upazilas between 2009 and 2019, and changed the 2019 upazila accordingly. To address this, I searched the upazila website, used Google search, Wikipedia, online Banglapedia and best guesses using the existence and non-existence of this or related upazilas in the years. After the adjustments, the total number of upazilas was 492 for all four years.

Table (A3) Upazila adjustment for all the years at 2001 level

Upazila Change	Notes (collected from various sources: upazila website, other sources such as Wikipedia, Banglapedia, online open search, BR2009 address, etc.)
Titas to Daudkandi (Comilla)	Decision was taken on 22 February 2004 to form new Titas upazila taking 9 unions from Daudkandi upazila. Titas upazila was established on 4 April 2004 separating 9 unions from Daudkandi upazila.
Mahoharganj & Lalmai & Comilla Adarsha Sadar & Comilla Sadar Dakshin to Laksam (Comilla)	Manoharganj upazila was formed in 2005 with 11 unions in the southern region known as the watershed of the greater Laksam upazila. In January 2017, administrative reorganization implementation related committee decided to form Lalmai upazila of 9 unions with 8 unions from Comilla Sadar Dakshin- (1) Bagmara (North) (2) Bagmara (South) (3) Vuloin (North) (4) Vuloin (South) (5) Perul (North) (6) Perul (South) (7) Belghor (North) (8) Belghor (South), and 1 union from Laksam upazila- Bakoi (North). Administration Comilla Sadar Dakshin upazila was formed comprising 6 unions of Comilla Adarsha Sadar upazila and 4 unions on Laksham upazila on 4 April 2005, then part of Sadar Dakshin went to newly formed Lalmai in 2017.
Kabirhat & Subarnachar to Noakhali Sadar (Noakhali)	On 6 August 2006, the Kabirhat upazila was formed from some unions of Noakhali Sadar upazila. Subarnachar upazila was formed on 2 April 2005, with 7 unions of southern side of Noakhali Sadar upazila.
Sonaimuri to Begumgonj (Noakhali)	Sonaimuri upazila of Noakhali district was formed in 2005. Sonaimuri upazila split from Begumgonj upazila.

Bijoynagar to Brahmanbaria Sadar (Brahmanbaria)	Bijoynagar upazila was established on 3 August 2010. Previously it was included in Brahmanbaria Sadar upazila.
Fulgazi to Parshuram (Feni)	Fulgazi upazila was split from Parshuram upazila in 2002.
Kamalnagar to Ramgoti (Laksmipur)	On 6 June 2006, Kamalnagar upazila was formed with 5 unions of Ramgoti upazila, subsequently 4 unions were divided into 8 and the upazila consists of 9 unions, according to the 29 November 2007 gazette.
Tarakanda to Phulpur (Mymensingh)	Tarakanda was established as a thana on 19 May 1999. In 2012, the Tarakanda thana was upgraded into an upazila, making it Mymensingh District's latest upazila. Prior to this, Tarakanda was a part of the Phulpur upazila.
Saltha to Nagarkanda (Faridpur)	Nagarkanda upazila was founded in 1984. With 8 unions from Nagarkanda, Saltha upazila was founded on 24 September 2006.
Dhanbari to Madhupur (Tangail)	Dhanbari existed in every year except in 2001. According to decision of 6 Jun 2006, by splitting Modhupur upazila of Tangail, 7 unions and 1 <i>poursava</i> forms Dhanbari upazila on 11 July 2006.
Dakshin Sunamganj to Sunamganj Sadar (Sunamganj)	Dakshin Sunamganj began to function as a new upazila on 18 May 2008 with 8 unions from Sunamganj upazila. On 27 July 2006, Dakshin Sunamganj was formed with 8 unions from Sunamganj sadar upazila.
Dakshin Surma to Sylhet Sadar (Sylhet)	Dakshin Surma existed in 2009, 2011, 2019 but not in 2001 since it was formed in 2005. On 29 January 2005, Dakshin Surma was formed with 9 unions out of 17 of Sylhet Sadar upazila. Later on 30 June 2011, part of Mollargaon and Tetli unions form Kamal bazar union. Daskhin surma now has 10 unions.
Barlekha & Juri to Kulaura (Moulavibazar)	On 26 August 2004, Juri upazila with 8 unions (4 from Kulaura and 4 from Barlekha) was established.
Shahjahanpur to Bogra Sadar (Bogra)	On 21 January 2003, Shahjahanpur upazila was formed. It used to be with Bogra Sadar upazila (I talked on phone to upazila Nirbahi Office on March 21, 2021).
Zianagar/Indurkandi to Pirojpur Sadar (Pirojpur)	It was included in Pirojpur Sadar upazila. Later on 21 April 2002, it began operation as an upazila with 3 unions. On 28 July 1980, President Ziaur Rahman turned Indurkani River police station into a full police station. On 21 April 2002, Prime Minister Khaleda Zia renamed Indurkani into Zianagar upazila. On 9 January 2017, the National Implementation Committee for Administrative Reform led by Prime Minister Sheikh Hasina renamed Zianagar upazila back to Indurkani upazila.
Osmaninagar to Balaganj (Sylhet)	Osmani Nagar thana was established with 8 unions of Balaganj on 23 March 2001. On 2 June 2014, the thana was turned into an upazila.
Rangabali to Galachipa (Patuakhali)	On 7 June 2011, Rangabali became an upazila after being partitioned from the Galachipa upazila.
Naldanga to Natore Sadar (Natore)	Naldanga was previously a union of Natore upazila in Rajshahi division of Bangladesh but, in the May 2013 Government gazette, Naldanga was declared as an upazila.
Guimara & Ramgarh & Mahalchhari to Matiranga (Khagrachhari)	On 6 June 2014, Guimara upazila was approved. There are 3 unions in Guimara upazila. Guimara union was a union of Guimara upazila, Hafchari union was a union of Ramgarh upazila and Sindukchari union was a union of Mohanchari upazila.
Tongi & Joydebpur to Gazipur Sadar (Gazipur)	Tongi, a thana within the Gazipur Sadar upazila along with Joydebpur since 1983. No Joydebpur and Tongi in 2009, but Gazipur Sadar.
Pekua to Chokoria (Cox's Bazar)	Pekua upazila was formed on 23 April 2002, by separating 7 unions from 25 of Chokoria upazila.
Akbarshah & Khulshi to Pahartali (Chittagong)	On 30 May 2013, Akbar Shah thana was established, with parts of Pahartali thana and Khulshi thana.

Chalk Bazar & Panchlaish & Double Mooring & Sadarghat to Kotwali (Chittagong)	On 30 May 2013, Chalk Bazar thana was established taking part of Panchlaish thana and Kotwali thana. On 30 May 2013, Sadarghat thana was established with part of Double Mooring thana and Kotwali thana.
EPZ & Patenga to Chittagong port (Chittagong)	No EPZ upazila/thana in 2009 but I found some address with EPZ in chittagong port in 2009 dataset. On 30 May 2013, EPZ thana was established, taking part of Bandar(port) and Potenga.
Drop Karnafuli (Chittagong)	I do not know why Karnafuli does not exist in the 2011 dataset. It's just missing.
Drop Mirsharai upazila (Chittagong)	Mirsharai dropped, I do not know why it is not in 2019 even though the upazila exists now.
Kotwali to Jashore Sadar (Jashore)	There was only Jessore Sadar and no Kotowali in the 2019 dataset, and only Kotowali & no Jessore Sadar in the 2009 dataset. These two are only upazila-level mismatch, in some other locations Kotowali and Sadar is synonymous, so I changed here.
Kalukhali to Pangsha (Rajbari)	Kalukhali started as an administrative upazila in June 2010, with 7 unions of big Pangsha upazila of Rajbari district.
Taltali to Amtali (Barguna)	Taltali upazila was established on 25 April 2012. It was previously part of Amtali upazila.
Mugda to Sabujbagh (Dhaka)	The areas of this upazila was under Sabujbagh thana. There was no Mugda in the upazila level in 2009 but I found Mugda addresses in Sabujbagh in the 2009 dataset.
Gendaria & Wari to Sutrapur (Dhaka)	Administration Gandaria thana was formed on 4 February 2010 comprising parts of Sutrapur thana. There was no Gendaria in upazila level in the 2009 dataset but I found Gandaria addresses in Shyampur in the 2009 dataset. On 3 April 2012, dividing Sutrapur thana, Wari thana was formed as the 42nd thana of Dhaka. There was no Wari in the upazila level in the 2009 dataset but I found Wari addresses in Sutrapur in the 2009 dataset.
Newmarket & Kalabagan to Dhanmondi (Dhaka)	Administration New Market thana was formed on 27 June 2005, comprising parts of Dhanmondi thana. Dhanmondi existed in all the years of the datasets but Newmarket did not exist in 2001. Administration Kalabagan thana was formed in 2008 with ten <i>mahallas</i> of ward number 50 and 51 (part) of Dhanmondi thana. There was no Kalabagan upazila level in the BR2009 dataset but I found Kalabagan addresses in Dhanmondi in the BR2009 dataset. In the populations censuses, Kalabagan existed only in 2011 and Dhanmondi in both the years 2001 and 2011.
Paltan & Shahjahanpur to Motijheel (Dhaka)	Paltan thana was formed on 27 June 2005, comprising part of Motijheel thana. Motijhil existed in all the years but Paltan did not exist in the 2001 dataset. Established on 27 April 2012 by splitting Motijheel thana. There was no Shahjahanpur in the upazila level in 2009 dataset but I found Shahjahanpur addresses in Motijheel in the 2009 dataset.
Lalbagh & Chak Bazar & Bangshal to Kotwali (Dhaka)	Chak Bazar was formed in August 2009 from parts of Lalbagh Thana and Kotwali Thana. There was no Chak Bazar upazila in BR2009 and Chak Bazar was available only in 2011 census but I found Chak Bazar addresses in Lalbagh in the 2009 dataset. Administration Bangshal Thana was formed on 30 September 2009, comprising part of Kotwali thana. There was no Bangshal upazila in the 2009 dataset but I found all the Bangshal addresses in Kotwali in the BR2009 dataset. In business censuses BR2009 and BD2019 datasets Bangshal is in Kotwali, Bangshal existed only in 2011 population census but not in 2001. So, I put Bangshal in Kotwali.

Turag & Biman Bandar & Dakkhinkhan & Uttarkhan to Uttara (Dhaka)	Uttara and Biman Bandar are together in the population censuses. Uttara existed in all the years but Turag did not exist in 2001. Administration Turag thana was formed on 27 June 2005, comprising part of Harirampur union of Uttara thana. Dakshinkhan thana was formed in 2006, named after the Dakshinkhan union. Uttara existed in all the years but Dakkhinkhan did not exist in 2001. Administration Uttarkhan thana, named after Uttarkhan union, was formed in 2006. It consists of union 1, mouza 14. Uttara existed in all the years but Uttarkhan did not exist in 2001.
Bhatara & Khilkhet to Badda (Dhaka)	On 11 April 2012, Vatara thana was established by splitting Badda thana. There was no Bhatara upazila in 2009 but I found Bhatara addresses in Badda in the 2009 dataset. Administration Khilkhet thana was established on 27 June in 2005, consisting of south parts of Badda thana. Khilkhet existed all the years but Badda did not exist in 2001.
Shahbag to Ramna (Dhaka)	Administration Shahbagh thana was formed on 7 August 2006, comprising parts of Ramna thana. Ramna existed all the years but Shahbagh did not exist in 2001.
Bhasantek to Kafrul (Dhaka)	On 13 April 2012, Bhasantek thana was established dividing Kafrul thana. There was no Bhasantek upazila in the 2009 dataset but I found Bhasantek addresses in Kafrul in the 2009 dataset.
Rupnagar to Pallabi (Dhaka)	On 15 April 2012, Rupnagar thana began functioning as the 46th thana of Dhaka by splitting Pallabi thana. There was no Rupnagar in the upazila level in the 2009 dataset but I found Rupnagar addresses in Mirpur in the 2009 dataset.
Shah Ali & Darus Salam to Mirpur (Dhaka)	Mirpur Model thana was formed in 1962. Mirpur thana was recently divided into the three thanas- Shah Ali, Pallabi, and Kafrul. Administration Pallabi thana was formed on 15 March 1995. Administration Kafrul thana was formed in 1998, consisting parts of Mirpur Model thana and Cantonment thana. Administration Shah Ali thana was formed in 2005. Administration Darus Salam thana was formed on 23 August 2008, comprising part of Mirpur Model thana. There was no Darus Salam upazila in the BR2009 dataset but I found Darus Salam addresses in Mirpur in BR2009, Darus Salam was Mirpur in the BR2009 and BD2019 datasets. In the population census, Darus Salam was available only in 2011 but not in 2001. So, I changed Darus Salamt to Mirpur.
Banani to Gulshan (Dhaka)	Banani Model Town is a part of Ward 19 of Gulshan thana. There was no Banani upazila level in 2009 but I found all the Banani address in Gulshan in the 2009 dataset.
Tejgaon & Tejgaon Industrial Area & Kafrul & Gulshan & Sher-E-Bangla Nagar & Adabor to Mohammadpur (Dhaka)	Administration Tejgaon thana was formed in 1953. This thana was reconstituted when Tejgaon Industrial Area thana was formed on 7 August 2006. Administration Sher-E-Bangla Nagar thana was formed on 4 August 2009, comprising parts of Tejgaon thana, Kafrul thana and Mohammadpur thana. There was no Sher-e-bangla Nagar in the upazila level in 2009 but I found Sher-e-bangla nagar addresses in both Tejgaon and Mohammadpur in 2009 dataset. Mohammadpur upazila code was 2650, while Sher-e-bangla Nagar thana code was 2650 too. But Tejgaon's code was 2690 and Tejgaon Ind. Area's code was 2692 in 2019. so I changed them to Mohammadpur. Administration Gulsan thana was formed in 1972, part of ward number 20 of this thana was included in the Tejgaon Industrial Area thana when it was formed in 2006. Administration Adabar thana was formed on 27 June 2007, comprising part of Mohammadpur thana. Mohammadpur existed all the years but Adabar did not exist in 2001.

Rampura to Khilgaon (Dhaka)	Administration Rampura thana was formed on 2 August in 2009. Administration Khilgaon thana was formed in 1998, comprising part of Sabujbagh thana, Gulshan thana and Demra thana. Rampura Thana was formed in 2009, comprising wards number 22 and 23. There was no upazila level Rampura in 2009 but I found Rampura addresses in Khilgaon in the 2009 dataset and Kilgaon is available in 2009.
Jatrabari & Kadamtali & Shympur to Demra (Dhaka)	Administration Jatrabari thana was formed in 2007. Demra existed all the years but Jatrabari did not exist in 2001. Administration Kadamtali thana was formed on 23 September 2008, comprising parts of Shympur thana and Demra thana. Administration Demra thana was formed in 1973, later the thana was reconstituted. Shympur existed in all the years but Kadamtali did not exist in 2001.

Table (A4) Matching upazilas within Dhaka district, 2009–2019

The total number of two digit manufacturing establishment observations are 9464 in the 2009 dataset and 5686 in the 2019 dataset. There were 39 upazilas, 199 unions/wards and 763 mauzas in the 2009 dataset. None of the observation ID is repeated, so the observations are unique in each dataset by ID. I dropped Biman Bandar upazila from 2009 because although there were a few observations in 2009, there was no observation in 2019 for sectors 10-33. Hence, I had 38 upazilas and 9457 observations in 2009. One observation was repeated in ID in 2019, so I dropped the repeated row and have 5683 observations. The total number of upazilas is 52 in the 2019 dataset. To be consistent with the 2009 dataset, I changed the spelling of some 2019 upazila names which also existed in 2009. I then convert 2019 upzilas that existed only in 2019 but not 2009 to 2009 upazila level. In doing so, I searched the address keywords of 2019 observation in the 2009 dataset and I renamed 2019 upazilas according to the 2009 upazila that had the keyword. Thus, I found 38 upazilas in 2019 too. It is possible that this approach has a little probability of flawed matching, for example, if the keyword is the same but the location is in another upazila, then the upazila adjustment is incorrect.

Using the Jaro-Winkler method in Python recordlinkage package, I matched establishment names within the upazila block. Before executing the command, I cleaned the name and other string variables slightly to adjust dot, case, slash, hyphen, etc. While an upazila is quite a large geographic unit to compare names, I could not use a smaller unit like union/ ward or mauza because tracing their borders and name changes over time from the data was nearly impossible. I contacted BBS for assistance with smaller geographic borders but realized that it is not possible, so, I matched establishments within upazila block. In Jaro-Winkler procedure, string observations of one dataset catch string observations from another dataset and vice versa, 0 means no match and 1 means complete match.

In recordlinkage package, the number of matches depends on the threshold restriction I put on the name match. If I allow no restriction, the match becomes 100% and millions of matched points for my entire data observations (9457 obs in 2009 \times 5683 obs in 2019). This match does not make any sense except for a tiny portion. Had the name entry followed the exact same name for both years, taking just the exact name match would be much easier. Therefore, I put a restriction of 0.75 matching, based on several trials with different percentage restrictions. 0.75 restriction also provided many matches which are really not similar, so I picked up good name matches from the matches generated with restriction 0.75 or above. The more flexible percentage I accepted, the fewer convincing matches I got, but I wanted to maximize convincing name matches.

From recordlinkage matches with threshold 0.75, I finalized the matched observations manually, taking into account other information such union or ward, inception year, sector, etc., and applying my common knowledge. I sorted step by step, that is, I first kept above 0.90 name matches, then I picked up good matches between 0.85 and 0.90, and between 0.75 and 0.85. Putting all these observations together, total matched establishments between 2009 and 2019 are 786.

B Appendix: Chapter 3

B.1 Result appendix: Subgroup results by education and sex

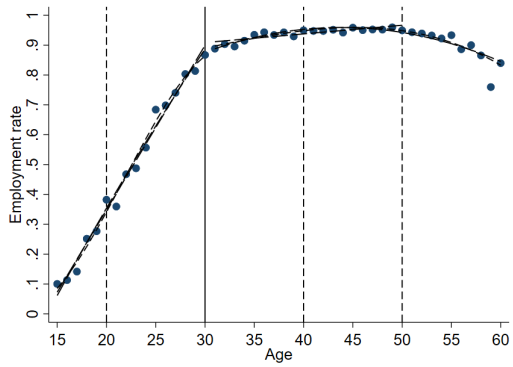
Table (B5) Employment effect at age 30 after becoming ineligible for government jobs, 1991–2017, by sex and education

Dependent Variable: Employment status (0/1)						
Male employment status						
	Panel A: Education ≥ 8			Panel B: Education < 8		
Age > 30	0.01 (0.02)	-0.01 (0.02)	0.03** (0.01)	-0.02 (0.02)	0.01 (0.01)	0.01 (0.01)
Mean at age 30	0.90*** (0.02)	0.89*** (0.02)	0.87*** (0.01)	0.96*** (0.02)	0.91*** (0.01)	0.92*** (0.01)
Observations	2,659,516	2,858,760	2,858,760	5,457,846	6,101,485	6,101,485
Female employment status						
	Panel C: Education ≥ 8			Panel D: Education < 8		
Age > 30	0.03** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.06*** (0.01)	0.04*** (0.01)	0.04** (0.02)
Mean at age 30	0.22*** (0.01)	0.19*** (0.00)	0.20*** (0.01)	0.14*** (0.01)	0.15*** (0.01)	0.15*** (0.01)
Observations	1,838,580	1,882,017	1,882,017	6,344,265	6,998,692	6,998,692
Age group	15-50	15-60	15-60	15-50	15-60	15-60
Spline	Linear	Quadratic	Cubic	Linear	Quadratic	Cubic

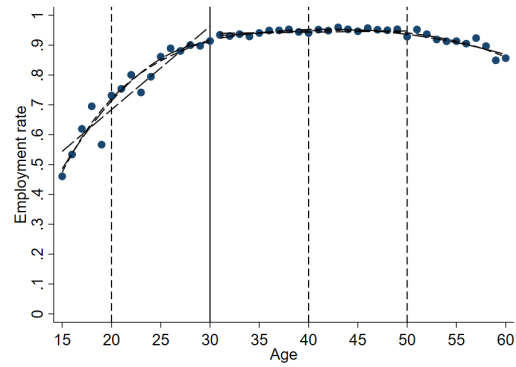
Notes: OLS regression discontinuity estimates of likelihood of being employed at age 30 for the age 15–60 male and female of two education group. Male population with education ≥ 8 grade in Panel A and with education < 8 grade in Panel B. Female population with education ≥ 8 grade in Panel C and with education < 8 grade in Panel D. The 1991–2017 pooled data consists of population census 1991, population census 2001, LFS 2002-03, LFS 2005-06, LFS 2010, population census 2011, LFS 2013, QLFS 2015-16, QLFS 2016-17. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Figure (B3) Employment effect at age 30 after becoming ineligible for government jobs, 1991–2017, by sex and education

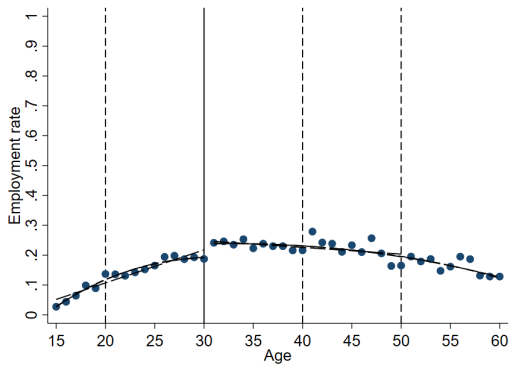
Panel A: Employment status of males with education ≥ 8



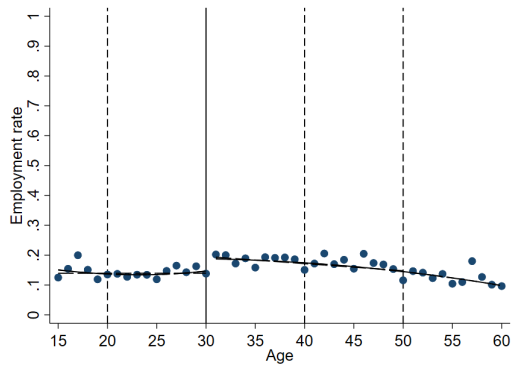
Panel B: Employment status of males with education < 8



Panel C: Employment status of females with education ≥ 8



Panel D: Employment status of females with education < 8



Notes: Panel A ,Panel B, Panel C, Panel D correspond the result of respective Panels in Table B5

B.2 Result appendix: Falsification and robustness

Table (B6) Effect of becoming ineligible for government jobs at age 30 on education, 1991–2017

Dependent variable: Education above 5 grade (0/1)			
Age>30	0.000 (0.022)	0.017 (0.024)	0.058*** (0.021)
Mean at age 30	0.400*** (0.017)	0.397*** (0.017)	0.395*** (0.018)
Observations	16,300,207	17,840,954	17,840,954
Age group	15-50	15-60	15-60
Spline	Linear	Quadratic	Cubic

Notes: As a robustness check, OLS regression discontinuity estimates of likelihood of having above five grade of education at age 30 for the age group between 15 and 60. The 1991–2017 pooled data consists of population census 1991, population census 2001, LFS 2002-03, LFS 2005-06, LFS 2010, population census 2011, LFS 2013, QLFS 2015-16, QLFS 2016-17. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (B7) Effect of becoming ineligible for government jobs at age 30 on work hour of employed people, 2003–2017

Dependent Variable: Weekly male work hour												
	2002-03		2005-06		2010		2013		2015-16		2016-17	
Age>30	0.05 (0.45)	-0.41 (0.40)	-0.44 (0.50)	0.00 (0.69)	-0.55 (0.41)	-0.77 (0.64)	0.21 (0.70)	-1.15 (1.04)	0.08 (0.21)	0.06 (0.22)	-0.56** (0.23)	-0.217 (0.329)
Mean at age 30	46.91*** (0.43)	47.12*** (0.32)	54.25*** (0.24)	54.21*** (0.26)	53.64*** (0.13)	53.66*** (0.13)	48.99*** (0.56)	49.74*** (0.90)	56.04*** (0.15)	55.85*** (0.07)	55.75*** (0.09)	55.67*** (0.08)
Observations	41,170	41,170	41,276	41,276	42,876	42,876	36,791	36,791	117,442	117,442	113,571	113,571
Dependent Variable: Weekly female work hour												
Age>30	0.11 (0.71)	1.22 (0.73)	-0.29 (1.40)	-4.11*** (1.47)	-3.54*** (0.84)	-4.70** (1.79)	-0.35 (0.84)	-0.55 (1.04)	-0.79 (0.58)	-0.74 (0.58)	-0.55 (1.03)	-1.44 (1.15)
Mean at age 30	34.03*** (0.51)	33.57*** (0.24)	42.77*** (0.76)	44.22*** (0.56)	52.22*** (0.32)	52.08*** (0.33)	46.41*** (0.78)	46.75*** (0.91)	46.88*** (0.29)	46.13*** (0.35)	42.05*** (0.80)	42.17*** (0.88)
Observations	7,269	7,269	6,437	6,437	8,720	8,720	8,655	8,655	34,086	34,086	38,161	38,161
Spline	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic	Quadratic	Cubic

Notes: As a robustness check at intensive margin, OLS regression discontinuity estimates at age 30 on work hour for the age 15–60 of employed male individuals. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and *for the 10% level.

Table (B8) Employment effect at age 30 after becoming ineligible for government jobs (excluding age 30), 1991–2017

Dependent variable: Employment status (0/1)			
Panel A: All			
Age>30	0.03*** (0.01)	0.02 (0.01)	0.03 (0.02)
Mean at age 30	0.53*** (0.01)	0.53*** (0.01)	0.53*** (0.02)
Observations	15,038,843	16,579,590	16,579,590
Panel B: Male			
Age>30	-0.04* (0.02)	-0.03 (0.02)	0.03 (0.04)
Mean at age 30	0.97*** (0.02)	0.93*** (0.02)	0.88*** (0.04)
Observations	7,515,024	8,357,907	8,357,907
Panel C: Female			
Age>30	0.03** (0.01)	0.04** (0.01)	0.01 (0.02)
Mean at age 30	0.18*** (0.01)	0.17*** (0.01)	0.19*** (0.01)
Observations	7,523,819	8,221,683	8,221,683
Age group	15-50	15-60	15-60
Spline	Linear	Quadratic	Cubic

Notes: As a robustness check, OLS regression discontinuity estimates of likelihood of being employed at age 30 for the age between 15 and 60 for all individuals excluding who reported their age 30. Panel A presents male and female together, Panel B Male, and Panel C Female. The pooled datasets are LFS Census 1991, census 2001, 2002-03, LFS 2005-06, LFS 2010, LFS 2013, QLFS 2015-16, QLFS 2016-17. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (B9) Employment effect at age 30 after becoming ineligible for government jobs (excluding public employee), 2003–2017

Dependent Variable: Employment status (0/1)			
		Panel A: All	
Age>30	0.05*** (0.02)	0.05*** (0.02)	0.07*** (0.02)
Mean at age 30	0.48*** (0.01)	0.46*** (0.01)	0.45*** (0.01)
Observations	816,220	920,427	920,427
		Panel B: Male	
Age>30	-0.00 (0.02)	-0.01 (0.02)	0.04*** (0.01)
Mean at age 30	0.92*** (0.02)	0.90*** (0.02)	0.87*** (0.01)
Observations	371,690	423,352	423,352
		Panel C: Female	
Age>30	0.04*** (0.01)	0.05*** (0.01)	0.04** (0.02)
Mean at age 30	0.17*** (0.01)	0.16*** (0.00)	0.16*** (0.01)
Observations	444,530	497,075	497,075
Age group	15-50	15-60	15-60
Model	Linear	Quadratic	Cubic

Notes: As a robustness check, OLS regression discontinuity estimates of likelihood of being employed at age 30 for the age between 15 and 60 for all individuals excluding who has already secured a government job. Panel A presents male and female together, Panel B Male and Panel C Female. The pooled datasets are LFS 2002-03, LFS 2005-06, LFS 2010, LFS 2013, QLFS 2015-16, QLFS 2016-17. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (B10) Employment effect at age 30 after becoming ineligible for government jobs (controlling for location & year), 2003–2017

Dependent variable: Employment status (0/1)				
Panel A: All				
Age>30	0.04** (0.02)	0.04** (0.02)	0.04** (0.02)	0.04** (0.02)
Mean at age 30	0.53*** (0.01)	0.55*** (0.01)	0.56*** (0.01)	0.58*** (0.01)
Observations	936,020	936,020	936,020	936,020
Panel B: Male				
Age>30	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Mean at age 30	0.91*** (0.02)	0.91*** (0.02)	0.92*** (0.02)	0.91*** (0.02)
Observations	458,895	458,895	458,895	458,895
Panel C: Female				
Age>30	0.05*** (0.01)	0.05*** (0.01)	0.04*** (0.01)	0.058*** (0.01)
Mean at age 30	0.20*** (0.01)	0.25*** (0.01)	0.25*** (0.01)	0.31*** (0.01)
Observations	477,125	477,125	477,125	477,125
Age group	15-60	15-60	15-60	15-60
Model	Quadratic	Quadratic	Quadratic	Quadratic
Rural-urban		✓	✓	✓
Division			✓	✓
Year				✓

Notes: As a robustness check, OLS regression discontinuity estimates of likelihood of being employed at age 30 for the age between 15 and 60 with controlling for geographic and time variables —rural-urban, division and year dummy. Panel A presents male and female together, Panel B Male, and Panel C Female. The pooled datasets are LFS 2002-03, LFS 2005-06, LFS 2010, LFS 2013, QLFS 2015-16, QLFS 2016-17. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Table (B11) Employment difference at age 30 in West Bengal, India

Dependent Variable: Employment status (0/1)		
Panel A: 2011-12		
Age>30	-0.01 (0.02)	0.01 (0.02)
Mean at age 30	0.53*** (0.01)	0.53*** (0.01)
Observations	4,345	17,239
Panel B: 2017-18		
Age>30	-0.02 (0.01)	0.02 (0.02)
Mean at age 30	0.59*** (0.00)	0.59*** (0.00)
Observations	4,066	18,361
Panel C: 2019-20		
Age>30	-0.02 (0.03)	0.02 (0.03)
Mean at age 30	0.62*** (0.01)	0.61*** (0.01)
Observations	3,633	16,015
Age group	26-35	15-60
Model	Linear	Cubic

Notes: As a falsification check, OLS regression discontinuity estimates of turning 31 years old on employment for the age 15–60 for individuals living in the Indian state of West Bengal. Employment is defined based on the principal usual activity for one year. No weight is adjusted in the estimation. Standard errors clustered at age level in parentheses. *** Indicates statistical significance at the 1% level, ** for the 5% level, and * for the 10% level.

Data: Employment and unemployment 2011-12; Periodic Labor Force Survey 2017–18 and 2019–2020. Data collected from National Data Archive, Ministry of Statistics and Programme Implementation, India.

B.3 Data appendix: Population census and labor force survey

Table (B12) Employment variable in the censuses and surveys

Census/ Survey	Interview period	Employment question	Employment answer	Emp. share
Census 1991	12 a.m. to 5 a.m., March 12, 1991	Main field of ac- tivities (last one month)	1. employed: agriculture; industry; water/electricity/gas; construction; transport/communication; business; ser- vice; other. 2. unemployed: looking for work. 3. HH work: household work. 4. not working: not working. 8. dot (unknown). 9. not in the universe	46.62 1.39 43.37 8.62
Census 2001	12 a.m. to 5 a.m., January 23, 2001	Main field of ac- tivities (last one month)	1. employed: agriculture; industry; water/electricity/gas; construction; transport/communication; hotel/restaurant; business; service; other. 2. unemployed: looking for work. 3. HH work: hh work. 4. not working: not working. 9. not in the universe	42.71 2.29 37.57 17.42
LFS 2002-03	..	What was the status in em- ployment of (name) where you worked last week?	1. employed: regular paid employee; employer; self- employed; day laborer; domestic worker; paid/unpaid ap- prentice. 2. unemployed: If you did not have work or job attach- ment during last 7 days, were you available or looking for work/job? Yes. 3. HH work: unpaid family work 4. Not working: if zero (none of the above) and other	44.77 2.72 10.39 42.12
LFS 2005-06	October 2005 -September 2006	What was your status in employ- ment where you worked most of the time during last week?	1. employed: regular paid employee; employer; self- employed; irregular paid worker; day laborer (agri and non-agri); domestic worker; paid/unpaid apprentice. 2. unemployed: If you did not work during last 7 days, were you prepared for job or searching job? Yes. 3. HH work: unpaid family worker 4. Not working: if zero (none of the above) and other.	44.38 2.32 12.61 40.69
LFS 2010	10 May 2010 - 25 May 2010	What is your em- ployment status? (last 7 days).	1. employed: employee; employer; self-employed (agri and non-agri); casual/irregular paid worker; day la- borer(agri and non-agri); domestic worker 2. unemployed: Did you look for a paid job or try to start your own business (including the 7 days of the survey) during last 4 weeks? Yes I looked for paid job and Yes I tried to start my own business 3. HH work: unpaid worker/ family member 4. Not working: if dot (none of the above).	44.77 1.75 13.62 39.87
Census 2011	12 a.m. to 6 a.m., March 15, 2011	Activity status (last 7 days)	1. employed: employed. 2. unemployed: looking for work. 3. HH work: hh work. 4. not working: not working. 8. unknown (1 obs.) 9. not in the universe	44.33 1.21 39.92 14.55

LFS 2013	January 2013 - December 2013	What is the status of her/his involvement in this job/business?	1. employed: employer; self-employed (agri and non-agri); paid employee; day laborer(agri and non-agri); apprentice/intern/trainees(paid); domestic worker. 2. unemployed: Did he/she look for job/ work during the last 1 month? Yes. 3. HH work: contributing family member. 4. Not working: if dot (none of the above) and others (specify).	46.69 3.72 9.38 40.22
LFS 2015-16	July 2015 - June 2016	What is your employment status in this work? (last week)	1. employed: employer; self-employed; paid employee; day laborer; apprentice/intern/trainees(paid); domestic worker. 2. unemployed: Did you look for job/ work during the last 1 month for pay/wage/profit? Yes. 3. HH work: contributing family member. 4. Not working: if dot (none of the above) and others (specify).	48.75 2.53 7.31 41.41
LFS 2016-17	July 2016 - June 2017	What is your employment status in this work? (last week)	1. employed: employer; self-employed; paid employee; day laborer; apprentice/intern/trainees(paid); domestic worker. 2. unemployed: Did you look for job/ work during the last 1 month for pay/wage/profit? Yes. 3. HH work: contributing family member. 4. Not working: if dot (none of the above) and others (specify).	49.73 3.17 5.81 41.30

Notes: In constructing the dummy variable for employment status, I use the 'Employment answer' category 1 (employed) as 1 and all other categories as 0.

Table (B13) Age questions in the census and survey questionnaires

Census/ Survey	Age question
Census 1991	Age (In completed years) (Bangla)
Census 2001	Age (In completed years) (English)
LFS 2002-03	Age (In completed years) (English)
LFS 2005-06	Age (Incompleted years, if less than one year write 00) (English)
LFS 2010	Age as of last birthday (If less than 12 months enter "00") (English)
Census 2011	Age (Completed years) (English)
LFS 2013	Age of the member (completed years) (If age < 1 year >> '00' ; age ≥ 100 >> '99') (English)
LFS 2015-16	Age (completed year) write 00 if age < 1 ; write 99 if age ≥ 99 (Bangla)
LFS 2016-17	Age (completed year) write 00 if age < 1 ; write 99 if age ≥ 99 (Bangla)

Sources: Questionnaires of censuses and surveys.

B.4 Data appendix: Primary survey

Pre-testing. In the first half of February 2022, to pretest the viability of questionnaire, I sent the questionnaire to 11 individuals who were familiar to me. The respondents of the pre-test comprised of public employees, private service holders, individuals currently studying for the government jobs, and students. All 11 individuals responded.

Piloting. Based on the pretest response, I revised the questionnaire and sent it to 20 members of each target group on Facebook except government employee group in the second half of February 2022. Piloting hinted at a the potential response rate in the final survey setting—only 8 responses out of the 101 questionnaires sent. I realized that the response rate was too low, probably because the messages containing questionnaire were sent to Facebook group members who might not be very active on Facebook or messenger. From piloting experience, I decided to send the final survey questionnaire to individuals who were recently active in the groups through posts, likes, shares, and comments, with the hope of improving the response rate.

Main survey. The questionnaire was finalized after extensive discussion, pre-testing, and piloting survey. I sent the questionnaire to about 1500 individuals on Facebook messenger, target individuals were chosen from five Facebook groups who were recently active in the groups (Table B14). Within two weeks, I sent them a reminder message. The survey questionnaire was sent and remained open from the last week of February to mid-June 2022. Since I was not connected with the sampled individuals on Facebook, many of them had not seen my message, probably because of their messenger settings for unknown people. As a result, the coarse response rate, calculated over the total number of questionnaires sent, is only 16 percent. But the effective response rate, calculated over the number of messages seen, is 64 percent. The total number of responses received is 241 out of the total sent questionnaires 1500. The SurveyMonkey software was used to conduct the survey.

Social media profile may not be fully identifiable in different times for reasons like name changes, profile delete, etc. Although questionnaire was sent to a total of 1500 individuals, after the survey period when count individuals, I could retrieve 1465 profiles as of 13 June 2022. From available information and best guess of name of the individual, out of total 1500 individuals, I could identify the sex of 1491 individuals—1200 male, 291 female, and the remaining 9 were unidentifiable from the name. Out of counted individuals of 1465, 1178 were male, 283 female, and sex of 4 individuals were not identifiable. Out of 1465 individuals, only 375 had seen the message and the remaining 1090 had not seen the message or questionnaire. The questionnaire actually reached to only about 26 percent of sample individuals. As a result, total effective response rate is 64 percent based on those who had seen the message containing questionnaire and coarse response rate is 16 percent over number of questionnaire sent. The number of female response is very low although the effective response rate for male and female are close. This is simply the reflection of low female participation rate in education, labor force, and social media.

Table (B14) Characteristics of sample Facebook groups

Features	Group 1	Group 2	Group 3	Group 4	Group 5
Related to mostly	Government jobs preparation	Government jobs preparation	Public employees	Public university students	Private university students
Group status	Public	Public	Private	Public	Private
Member	101,694	44,501	35,000	13,167	38,257
About	Platform to share knowledge and help each other for all government jobs preparation	Specific objectives not provided, but there was mention of some public exams like BCS, banks	All public employees of grade 1-20 to discuss various on the job issues	Career club to make students competent for the professional world, in home and abroad	For the private university students to be united, discuss about problems, and help each other
Piloting	20	21	0	20	20
Survey	300	300	300	300	300
Chat message with survey link: We request you to respond to a 5-10 minutes survey related to preparation for government jobs. Thank you. (In Bangla)					

Initially, I received total response 241 out of total questionnaire sent 1500. After adding the pre-testing and piloting, and cleaning the data, total observation becomes 227.

Response number to each question is different, since I allowed respondents to skip questions. Descriptive statistics of the online survey are in the following tables and figure.

Table (B15) Characteristics of respondents (%)

Characteristics	Study status				Total
	Studying	Studied	Will study	Never studied	
Sex (N)	93	42	53	36	224
Female	15.05	7.14	22.64	11.11	14.73
Male	84.95	90.48	77.36	86.11	84.38
Prefer not to disclose	0.00	2.38	0.00	2.78	0.89
Age (N)	92	42	54	36	224
16-20 years	6.52	2.38	37.04	13.89	14.29
21-25 years	28.26	4.76	48.15	38.89	30.36
26-30 years	57.61	19.05	12.96	36.11	36.16
31-35 years	7.61	33.33	0.00	8.33	10.71
36-40 years	0.00	30.95	0.00	2.78	6.25
Above 40 years	0.00	9.52	1.85	0.00	2.23
Education (N)	88	42	53	35	218
Below HSC(<12 grade)	3.41	0.00	9.43	2.86	4.13
HSC/equiv.(12 grade)	4.55	2.38	45.28	14.29	15.60
Undergrad	9.09	2.38	26.42	34.29	16.06
Bachelor	36.36	11.90	13.21	22.86	23.85
Master	43.18	80.95	5.66	25.71	38.53
Other (dip,tech)	3.41	2.38	0.00	0.00	1.83
Current status (N)	66	36	39	34	175
Full-time gov job	24.24	63.89	0.00	0.00	22.29
Full-time non-gov job	10.61	22.22	2.56	23.53	13.71
Own business(f/p/fo/i)*	6.06	0.00	7.69	14.71	6.86
Full-time study	21.21	2.78	43.59	29.41	24.00
Study & part-time job	16.67	0.00	30.77	20.59	17.14
Looking for any work	19.70	11.11	12.82	5.88	13.71
Other	1.52	0.00	2.56	5.88	2.29

Notes: This table presents the descriptive statistics of the respondents by their status of government jobs preparation—currently studying, studied before, will study in the future, and never studied for government jobs.

* f full-time, p part-time, fo formal, i informal

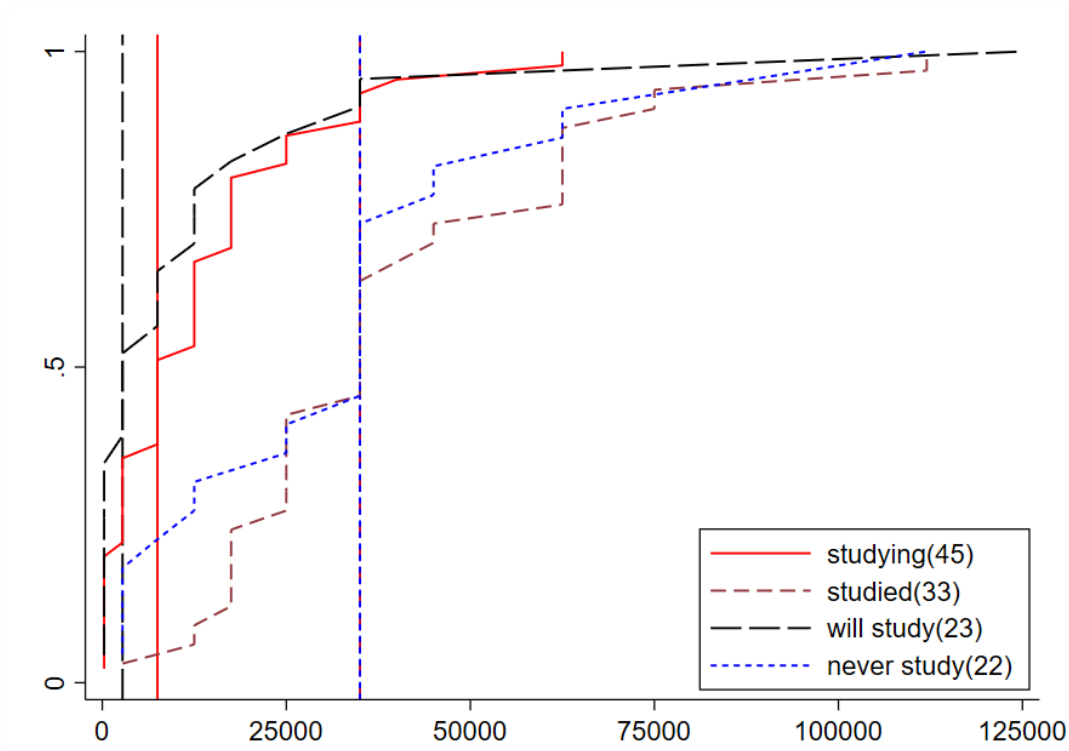
Table (B16) Job preference by study status (job attended or wish to attend)

Job Preference	Study status			Total
	Studying	Studied	Will study	
Public bank	17	15	10	42
School (primary, secondary) teaching	13	6	5	24
Autonomous public institutions (e.g., central bank, university)	17	11	15	43
Auditor	15	5	5	25
National Security Intelligence (NSI)	17	5	9	31
Computer operator	7	7	2	16
Office assistant	12	4	2	18
Any Bangladesh Civil Service (BCS)	24	18	16	58
Any government	43	22	17	82
Other	6	3	4	13

Notes: Study status categories: those who are studying for government jobs (attended exam before and will attend for the first time); those who studied for government jobs and attended exams before but no longer; those who will attend for government jobs in the future.

Question: What kind of government job exams have you attended? or plan/wish to attend? (Please choose all options that apply)

Figure (B4) Cumulative distribution of monthly income (Taka)



Notes: The vertical lines are the median values. Monthly income median (mean) are for currently studying Taka 7,500 (13,588), studied before Taka 35,000 (40,204), will study Taka 2,750 (13,500), never studied Taka 35,000 (34,227).

Table (B17) Comparing primary survey and Labor Force Survey (LFS)

Current status	Primary survey			LFS 2016-17		
	Mean	Obs	Std. dev.	Mean	Obs	Std. dev.
			Monthly income (Tk)			
Govt employee	31525	30	19848	25188	8774	17827
Student	13556	42	25470	15768	2421	7157
Others	22918	70	25566	12046	68637	8693
			Highest education			
Govt employee	14	39	1	12	6,668	2
Student	13	71	1	11	24,395	1
Others	13	90	1	11	43,004	2
			Age			
Govt employee	32	39	5	40	8779	11
Student	24	73	5	19	32154	3
Others	26	92	7	36	160564	11
			Sex (Male proportion)			
Govt employee		0.90			0.73	
Student		0.85			0.56	
Others		0.86			0.70	

Notes: In the primary survey, data was collected in group. For comparison, I used mid value of the range, so deviation is less informative.

In the Highest education, there is no less than 10 grade & Madrasha in primary survey, so, I excluded these category from LFS. Class passed 10 through 15, 15 is PhD.

B.5 Motivation for studying government job premiums effects

Figure (B5) Snapshot of protest to revise policies regarding government jobs

Panel A: Protest for revising quota system in the public service jobs



Source: Wikipedia, (accessed 24 Jan 2021) https://en.wikipedia.org/wiki/2018_Bangladesh_quota_reform_movement

Panel B: Protest for raising age ceiling for public service jobs



Job seekers stage a demonstration at Shahbagh of Dhaka and later bring out a token coffin march on April 27, 2018, demanding the ceiling to be raised to 35 in government service from what it is 30 now. Photo: Prabir Das

Source: The Daily Star, (accessed 24 Jan 2021) <https://www.thedailystar.net/city/demonstration-demo-shahbagh-raising-age-ceiling-government-job-age-limit-35-bangladesh-1568647>

Table (B18) Government jobs age ceiling in different countries

Country	Age ceiling	Other information	Information source
Bangladesh	30	In general. For a few select group 32	Detailed in the paper
Pakistan	Between 28 & 43	Have different categories	Online ¹
Sri Lanka	45	Raised from previous 35	Online press release ²
Nepal	Between 35 & 42	A few categories	Online ³
India	Between 32 & 45	Various categories	Online ⁴
Nigeria	30	Abolished recently after university strike	Online ⁵
Cameroon	30	In general. For disabled recently raised to 35	Online newspaper ⁶
Mauritius	40	Recently revised to 50 with other conditions	Ministry of Public Service, Administrative and Institutional Reforms, Circular Letter No. 46 of 2022 E/247/1/21 T

¹<https://tribune.com.pk/story/2379334/age-limit-increased-for-govt-jobs> (accessed 24 Nov 2022).

²<https://www.presidentsoffice.gov.lk/index.php/2020/02/10/age-limit-for-applying-under-programme-to-employ-unemployed-graduates-now-45-years/> (accessed 24 Nov 2022).

³<https://www.shikshasanjal.com/lok-sewa-aayog-nepal> (accessed 24 Nov 2022).

⁴<https://wbxpress.com/upper-age-limit-raised-to-40-years-for-entry-into-govt-jobs/>; <https://testbook.com/punjab-civil-service-exam/eligibility> (accessed 24 Nov 2022);

<https://economictimes.indiatimes.com/news/economy/policy/bengal-raises-maximum-age-limit-for-govt-jobs/articleshow/11306253.cms?from=mdr> (accessed 30 July 2023).

⁵<http://www.agediscrimination.info/news/2019/5/15/new-age-discrimination-law-in-nigeria-bans-age-limits-in-government-jobs> (accessed 24 Nov 2022).

⁶<https://english.news.cn/20220813/2e6d6e39b2654da6bd03467a341bf723/c.html> (accessed 24 Nov 2022).

B.6 Labor supply in the presence of attractive government job: Life cycle partial equilibrium model approach

Public policies in many countries protect government employees against market competition. Economic activity in government (g) and non-government (p) sectors are generally different—government sector mostly produces public goods, while private sector produces private goods for profit. Therefore, required skills and efficiency in these two sectors may be different. Incentives in public sector jobs may affect individual's decision of taking part in especial exam of public sector recruitment process and compromise with other options. Labor supply is expected to be tilted to the sector that provides comparative advantage of the jobs. The distinctive advantage of one or some specific sector affects individual's labor supply decisions and subsequently economic outcomes. If people with higher ability choose less productive public sector because of higher benefits rather than choosing more productive private sector, then this may lead to a distortion for the economy.

Cavalcanti & Santos (2020) study the effects of overpaid public sector in life cycle model consistent with Brazilian economy for heterogeneous agents with endogenous occupational choice. I take into account the labor market of Bangladesh, where public sector jobs are attractive, an eligibility age ceiling is applied in public recruitment process, and job seekers attempt multiple times for securing a public sector job. The main distinguishing feature of the current model is that individuals can choose public sector jobs up to their age 30 and thereafter these jobs are not available in the decision making process. The distortion arises from the labor supply decisions up to age 30. Human capital is important determinant of labor market outcomes. Omission of human capital accumulation may lead to bias result (Imai & Keane, 2004). Therefore, I use both physical and human capital state spaces, which most life cycle studies used to avoid earlier because of demanding computation time. Fan et al. (2022) analyze changes in social security rule allowing individual making decision about consumption, human capital investment, and labor supply. I include ability state space on which individual's probability of success depends in obtaining a public sector job.

In this model, everyone above the cutoff of certain probability in obtaining a government job choose to take exams, where probability is function of individual's ability. If people value public sector jobs above more productive sector and decide to take part in selection exams, they also decide how much to save and invest in human capital, which affect their consumption and human capital formation. These decision rules affect the economy's aggregate outcomes. However, this is a partial equilibrium model and cannot explain aggregate outcomes. Updating this model to a general equilibrium is due for the future research. The current model only solves for partial decision rules.

Time and utility

The economy is populated by a continuum of individuals of mass one who live for period $t = 1, 2, \dots, T_r, T$. They work until age T_r , get retirement benefit at age T_r and die at age $T+1$. Agents are ex-ante heterogeneous by their ability (Λ) which follows a

normal distribution. Individual maximizes utility by consumption (C_t). A standard utility function of consumption

$$(1) \quad \sum_{t=1}^T \beta^{t-1} u(C_t), \quad u(C_t) = \frac{C_t^{1-\gamma}}{1-\gamma}$$

β individual's discount factor and γ constant relative risk aversion coefficient. In the following formulation of dynamic program, I ignore time notation and use prime ($'$) to indicate the next period.

Human capital accumulation

Individual enhances future skills by investing in human capital accumulation. Law of motion for human capital as following

$$(2) \quad h_i' = \psi h_i^{\phi_h} x^{\phi_x} + (1 - \delta_h) h_i, \quad i \in (g, p)$$

h efficiency units of labor, x investment in human capital, δ depreciation.

Budget constraint

Individual satisfies consumption with their income of wage earning from government sector, or private sector, or the business they run and with return of their asset, $c = f(y, a)$. Individuals make decision on their career preference between government and non-government jobs by age 30 and accordingly decisions on asset accumulation and investment. The probability of success in obtaining a government job is a function of ability, $\bar{q}(\Lambda)$. Everyone above some threshold ability (Λ^*) sits for public sector selection exam and the indicator of choosing to apply for government jobs is $\Gamma \in (0, 1)$. Income depends on wage and current human capital excluding investment on future human capital and cost of preparation for government job if take exams.

$$(3) \quad y = \begin{cases} (1 + \zeta)wh(1 - x), & (\text{public service, } \zeta \text{ wage premium}) \\ wh(1 - x - \epsilon_t \times \Gamma), & (\text{private service, } \epsilon_t \text{ time cost of preparation age} \leq 30) \end{cases}$$

Opportunity cost of time is different for male and female because market value of time is different due to differential social norms, household responsibilities, and benefits of jobs. Since male spend less time in household and more in economic work, opportunity cost of time is higher for them and as a result, response to public sector job preparation would be different from female.

Budget constraint for working people:

$$(4) \quad C_i = (1+r)a + y_i - a' + tr - \epsilon_m \times \Gamma, \quad i \in (g, p)$$

ϵ_m is monetary expenses of preparation.

Budget constraint for retirees:

$$(5) \quad C_i = (1+r)a + b_i - a' + tr, \quad i \in (g, p)$$

At age T_r , they retire with pension b , which is function of income and social security. Government retirees receive social security (rg) and private sector retirees receive no or close to zero social security (rp).

Retirement benefits:

$$(6) \quad b_i = \eta_{ri} y_i, T_r - 1, \bar{b} \quad i \in (g, p) \quad \bar{b} \rightarrow 0 \text{ for } i = p$$

a asset trading, tr transfer, b retirement benefit, y income, η_r replacement rate.

Recursive formulation of individual problems

With state space asset and human capital, individual's value function is V . The person dies at age T and no altruistic link across generations, so $V_{T+1}(a_{T+1}, h_{T+1}, \Lambda_{T+1}) = 0$.

Public sector and private sector age > 30:

$$(7) \quad V_i(a, h, \Lambda, t) = \max_{c, a', h', x} u(C) + \beta \nu' (V'_i(a', h', \Lambda', t')) \quad i \in (g, p)$$

Private sector age ≤ 30 :

$$(8) \quad V_p(a, h, \Lambda, t) = \max_{c, a', x, \Gamma \in (0,1)} u(C) + \beta [\Gamma (\bar{q}(\Lambda) (V'_g(a', h', \Lambda', t')) + (1 - \bar{q}(\Lambda)) (V'_p(a', h', \Lambda', t')))] \\ + (1 - \Gamma) (V'_p(a', h', \Lambda', t'))$$

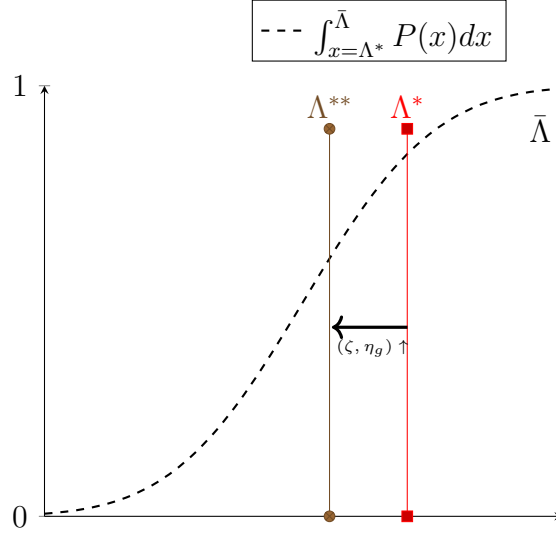
(7) and (8) are subject to (2), (3), (4)

Retiree for next period:

$$(9) \quad V_i(a, b, t) = \max_{c, a'} u(C) + \beta [V'(a', b'_i, t')] \quad i \in (g, p)$$

(9) is subject to (5) and (6)

$\zeta \geq 0$ & $\eta_{rg} \geq \eta_{rp}$. Individuals with ability above some threshold ($\Lambda \geq \Lambda^*$) have a probability of success \bar{q} . Since government job gives higher life cycle value, this induces individuals with higher ability to take exam as their probability obtaining a job is higher $\bar{q}(\Lambda)$. The threshold becomes lower ($\Lambda^* \Rightarrow \Lambda^{**}$) with higher return on public employment ($\uparrow \zeta, b_g$) that offset against the lower probability.



There are costs for preparing for public service jobs in terms of monetary expenses (ϵ_m) and time spent (ϵ_t), opportunity cost of which differs between male and female. Therefore, individuals with a certain minimum level of ability are likely to attempt public sector jobs during their eligibility period. Due to the difference in the opportunity cost of time, men are less likely than women to forgo other employment opportunities while preparing for government jobs.

Analytical solution and intuition

Public sector

$$(10) \quad L = \max_{c,x,a',h'} u(C_g) + \beta(V'_g(a', h', \Lambda', t')) + \lambda_1[(1+r)a + (1+\zeta)wh(1-x) - a' + tr - C_g] + \lambda_2[\psi_g h^{\phi_h} x^{\phi_x} + (1-\delta_h)h - h']$$

$$(10.1) \quad \frac{\delta L}{\delta C_g} : C_g^{-\gamma} = \lambda_1 \quad \Rightarrow \lambda_1 = C_g^{-\gamma}$$

$$(10.2) \quad \frac{\delta L}{\delta x} : \lambda_2 \psi_g \phi_x h^{\phi_h} x^{\phi_x-1} = \lambda_1 (1+\zeta)wh \quad \Rightarrow \lambda_2 = \frac{(1+\zeta)wh^{1-\phi_h} x^{1-\phi_x} C_g^{-\gamma}}{\psi_g \phi_x} \text{ (using 10.1)}$$

$$(10.3) \quad \frac{\delta L}{\delta a'} : \beta \frac{\delta}{\delta a'} (V'_g(a', h', \Lambda')) = \lambda_1 \quad \Rightarrow \beta \lambda'_1 (1+r) = \lambda_1 \text{ (using 10 & envelop theorem)}$$

$$\Rightarrow \beta C_g'^{-\gamma} (1+r) = C_g^{-\gamma} \quad \text{(using 10.1)}$$

$$\Rightarrow C_g = C_g' [\beta(1+r)]^{-\frac{1}{\gamma}} \quad \text{[Euler equation]}$$

$$\begin{aligned}
(10.4) \quad & \frac{\delta L}{\delta h'} : \beta v' \frac{\delta}{\delta h'} (V'_g(a', h', \Lambda')) = \lambda_2 \\
& \Rightarrow \beta[\lambda'_1(1 + \zeta)w(1 - x')] = \lambda_2 \quad (\text{using 10 and envelop theorem}) \\
& \Rightarrow \beta[C'_g{}^{-\gamma}(1 + \zeta)w(1 - x')] = \frac{(1 + \zeta)wh^{1-\phi_h}x^{1-\phi_x}C'_g{}^{-\gamma}}{\psi\phi_x} \quad (\text{using 10.1 \& 10.2}) \\
& \Rightarrow x = \left[\frac{(1 - x')\phi_x\psi}{h^{(1-\phi_h)}(1 + r)} \right]^{\frac{1}{1-\phi_x}} \quad (\text{using Euler equation 10.3})
\end{aligned}$$

$$\begin{aligned}
(10.5) \quad & \frac{\delta L}{\delta \lambda_1} : (1+r)a + (1+\zeta)wh(1-x) - a' + tr = C_g \\
& a' = (1 + r)a + (1 + \zeta)wh(1 - \left(\frac{(1 - x')\phi_x\psi}{h^{(1-\phi_h)}(1 + r)} \right)^{\frac{1}{1-\phi_x}}) + tr - [\beta(1 + r)]^{-\frac{1}{\gamma}} C'_g
\end{aligned}$$

$$\begin{aligned}
(10.6) \quad & \frac{\delta L}{\delta \lambda_2} : \psi h^{\phi_h} x^{\phi_x} + (1 - \delta_h)h = h' \\
& h' = \psi h^{\phi_h} \left[\frac{(1 - x')\phi_x\psi}{h^{(1-\phi_h)}(1 + r)} \right]^{\frac{\phi_x}{1-\phi_x}} + (1 - \delta_h)h
\end{aligned}$$

Solve similarly for private sector age ≤ 30 who take exam and who do not, for private sector age > 30 , and for retired people.

Private sector, age ≤ 30

$$\begin{aligned}
(11) \quad & L = \max_{c,x,a',h'}: u(C_p) + \beta[\Gamma(\bar{q}(V'_g(a', h', \Lambda')) + (1 - \bar{q})(V'_p(a', h', \Lambda')))) + (1 - \Gamma)(V'_p(a', h', \Lambda'))] \\
& \lambda_1[(1 + r)a + (1 + \zeta)wh(1 - x - \epsilon_t) - a' - \epsilon_m + tr - C_p] + \lambda_2[\psi h^{\phi_h} x^{\phi_x} + (1 - \delta_h)h - h']
\end{aligned}$$

If take exam ($\Gamma = 1$)

$$(11.1) \quad \frac{\delta L}{\delta C_p} : C_p^{-\gamma} = \lambda_1 \quad \Rightarrow \lambda_1 = C_p^{-\gamma}$$

$$(11.2) \quad \frac{\delta L}{\delta x} : \lambda_2 \psi \phi_x h^{\phi_h} x^{\phi_x - 1} = \lambda_1 wh \quad \Rightarrow \lambda_2 = \frac{wh^{1-\phi_h}x^{1-\phi_x}C_p^{-\gamma}}{\psi\phi_x} \quad (\text{using 11.1})$$

$$\begin{aligned}
(11.3) \quad & \frac{\delta L}{\delta a'} : \beta \frac{\delta}{\delta a'} [\bar{q}(V'_g(a', h', \Lambda')) + (1 - \bar{q})(V'_p(a', h', \Lambda'))] = \lambda_1 \\
& \Rightarrow \beta(1 + r)[\bar{q}\lambda'_{1g} + (1 - \bar{q})\lambda'_{1p}] = \lambda_1 \quad (\text{using 11 \& envelop theorem})
\end{aligned}$$

$$\begin{aligned} &\Rightarrow \beta(1+r)[\bar{q}C_g'^{-\gamma} + (1-\bar{q})C_p'^{-\gamma}] = C_p^{-\gamma} \quad (\text{using 11.1}) \\ &\Rightarrow C_p = (\beta(1+r)[\bar{q}C_g'^{-\gamma} + (1-\bar{q})C_p'^{-\gamma}])^{-\frac{1}{\gamma}} \quad [\text{Euler equation}] \end{aligned}$$

$$(11.4) \quad \frac{\delta L}{\delta h'} : \beta \frac{\delta}{\delta h'} [\bar{q}(V_g'(a', h', \Lambda')) + (1-\bar{q})(V_p'(a', h', \Lambda'))] = \lambda_2$$

$$\begin{aligned} &\Rightarrow \beta[\bar{q}(\lambda_{1g}'(1+\zeta)w(1-x')) + (1-\bar{q})(\lambda_{1p}'w(1-x'-\epsilon_t))] = \frac{(1+\zeta)wh^{1-\phi_h}x^{1-\phi_x}C_p^{-\gamma}}{\psi\phi_x} \quad (11 \ \& \ \text{envelop}) \\ &\Rightarrow \frac{\psi\phi_x\beta[\bar{q}(\lambda_{1g}'(1+\zeta)w(1-x')) + (1-\bar{q})(\lambda_{1p}'w(1-x'-\epsilon_t))]}{(1+\zeta)wh^{1-\phi_h}(\beta(1+r)[\bar{q}C_g'^{-\gamma} + (1-\bar{q})C_p'^{-\gamma}])} = x^{1-\phi_x} \\ &\Rightarrow x = \left[\frac{\psi\phi_x[\bar{q}(C_g'^{-\gamma}(1+\zeta)w(1-x')) + (1-\bar{q})(C_p'^{-\gamma}w(1-x'-\epsilon_t))]}{(1+\zeta)wh^{1-\phi_h}((1+r)[\bar{q}C_g'^{-\gamma} + (1-\bar{q})C_p'^{-\gamma}])} \right]^{\frac{1}{1-\phi_x}} \end{aligned}$$

$$(11.5) \quad a' = (1+r)a + (1+\zeta)wh(1-x-\epsilon_t) + tr - C_p'$$

$$(11.6) \quad h' = \psi h^{\phi_h} x^{\phi_x} + (1-\delta_h)h$$

If do not take exam ($\Gamma = 0$)

$$(11.10) \quad \frac{\delta L}{\delta C_p} : C_p^{-\gamma} = \lambda_1 \quad \Rightarrow \lambda_1 = C_p^{-\gamma}$$

$$(11.20) \quad \frac{\delta L}{\delta x} : \lambda_2 \psi \phi_x h^{\phi_h} x^{\phi_x-1} = \lambda_1 wh \quad \Rightarrow \lambda_2 = \frac{wh^{1-\phi_h}x^{1-\phi_x}C_p^{-\gamma}}{\psi\phi_x} \quad (\text{using 11.10})$$

$$(11.30) \quad \frac{\delta L}{\delta a'} : \beta \frac{\delta}{\delta a'} [(V_p'(a', h', \Lambda'))] = \lambda_1$$

$$\Rightarrow \beta(1+r)\lambda_1' = \lambda_1 \quad (\text{using 11 \& envelop theorem})$$

$$\Rightarrow \beta(1+r)C_p'^{-\gamma} = C_p^{-\gamma} \quad (\text{using 11.10})$$

$$\Rightarrow C_p = (\beta(1+r))^{-\frac{1}{\gamma}} C_p'^{-\gamma} \quad [\text{Euler equation}]$$

$$(11.40) \quad \frac{\delta L}{\delta h'} : \beta \frac{\delta}{\delta h'} [(V_p'(a', h', \Lambda'))] = \lambda_2$$

$$\begin{aligned}
\Rightarrow \beta[(\lambda'_1 w(1-x'))] &= \frac{wh^{1-\phi_h} x^{1-\phi_x} C_p'^{-\gamma}}{\psi\phi_x} \quad (11 \text{ \& \; envelop}) \\
\Rightarrow \frac{\psi\phi_x \beta[(\lambda'_1 w(1-x'))]}{wh^{1-\phi_h} \beta(1+r) C_p'^{-\gamma}} &= x^{1-\phi_x} \\
\Rightarrow x &= \left[\frac{\psi\phi_x [(w(1-x'))]}{wh^{1-\phi_h} (1+r)} \right]^{\frac{1}{1-\phi_x}}
\end{aligned}$$

$$(11.50) \quad a' = (1+r)a + wh(1-x) + tr - C_p'$$

$$(11.60) \quad h' = \psi h^{\phi_h} x^{\phi_x} + (1-\delta_h)h$$

Private sector age above 30 is same as private sector below age 30 and $\Gamma=0$

Retiree

$$(12) \quad L = \max_{c, a'} u(C_i) + \beta(V_i'(a', b')) + \lambda_1 [(1+r)a + \eta_{ri} y_i - a' + tr - C_i] \quad i \in (g, p)$$

Euler equation:

$$\begin{aligned}
C_g &= C_g' [\beta(1+r)]^{-\frac{1}{\gamma}} && \text{[Public sector]} \\
C_{ex} &= (\beta(1+r) [\bar{q} C_g'^{-\gamma} + (1-\bar{q}) C_p'^{-\gamma}])^{-\frac{1}{\gamma}} && \text{[Private sector, age } \leq 30 \text{ \& \; } \Lambda > \Lambda^*] \\
C_p &= C_p' (\beta(1+r))^{-\frac{1}{\gamma}} && \text{[Private sector of age } > 30, \text{ or age } \leq 30 \text{ \& \; } \Lambda < \Lambda^*] \\
C_{ri} &= C_{ri}' (\beta(1+r))^{-\frac{1}{\gamma}} && \text{[retiree]}
\end{aligned}$$

The Euler equation between consumption at current period and next period implying marginal utility of current period's consumption (C) equals the discounted present value of marginal utility from next period's consumption (C').

$$\begin{aligned}
x_g &= \left[\frac{(1-x') \phi_x \psi}{h^{(1-\phi_h)(1+r)}} \right]^{\frac{1}{1-\phi_x}} && \text{[Public sector]} \\
x_{ex} &= \left[\frac{\psi \phi_x [\bar{q} (C_g'^{-\gamma} (1+\zeta) w(1-x')) + (1-\bar{q}) (C_p'^{-\gamma} w(1-x' - \epsilon_t))]}{(1+\zeta) wh^{1-\phi_h} ((1+r) [\bar{q} C_g'^{-\gamma} + (1-\bar{q}) C_p'^{-\gamma}])} \right]^{\frac{1}{1-\phi_x}} && \text{[Private, age } \leq 30 \text{ \& \; } \Lambda > \Lambda^*] \\
x_{ex} &= \left[\frac{(1-x') \phi_x \psi g (1+\bar{q}\zeta)}{h^{(1-\phi_h g)(1+r)}} \right]^{\frac{1}{1-\phi_x g}} && \text{[Private sector, age } \leq 30 \text{ \& \; } \Lambda > \Lambda^*] \\
x_p &= \left[\frac{(1-x') \psi \phi_x}{h^{1-\phi_h} (1+r)} \right]^{\frac{1}{1-\phi_x}} && \text{[Private sector, age } \leq 30 \text{ \& \; } \Lambda > \Lambda^*]
\end{aligned}$$

Human capital investment and asset now has an additional cost of exams. Given the exogenously assigned parameters, current human capital investment (x) is negatively associated with next period's human capital investment (x') and current period human capital (h). Intuitively, this is because if individuals investment more now they have less

human capital at current period and they need less investment in the future, and vice versa.

$$\begin{aligned}
 a'_g &= (1+r)a + (1+\zeta)wh(1-x_g) + tr - C_g && \text{[Public sector]} \\
 a'_{ex} &= (1+r)a + wh(1-x_{ex} - \epsilon_t) + tr - C_{ex} && \text{[Private sector, age } \leq 30 \text{ \& } \Lambda > \Lambda^*] \\
 a'_p &= (1+r)a + wh(1-x_{nex}) + tr - C_{nex} && \text{[Private sector, age } \leq 30 \text{ \& } \Lambda > \Lambda^*]
 \end{aligned}$$

Next period's asset positively depends on current savings and human capital, and negatively on human capital investment and consumption. If people save more and consume less at present, it will be accumulated to next period's asset or investment (a'). On the other hand, if people have high human capital that requires less human capital investment at current period, this promotes current savings and so next period's assets.

$$h'_g = \psi h^{\phi_{hg}} \left[\frac{(1-x')\phi_{xg}\psi}{h^{(1-\phi_{hg})}(1+(1-\tau_k)r)} \right]^{\frac{\phi_x}{1-\phi_x}} + (1-\delta_h)h$$

Law of motion of human capital formation

$$\begin{aligned}
 h'_g &= \psi h^{\phi_h} x^{\phi_x} + (1-\delta_h)h \\
 h'_{ex} &= \psi h^{\phi_h} x^{\phi_x} + (1-\delta_h)h \\
 h'_p &= \psi h^{\phi_h} x^{\phi_x} + (1-\delta_h)h
 \end{aligned}$$

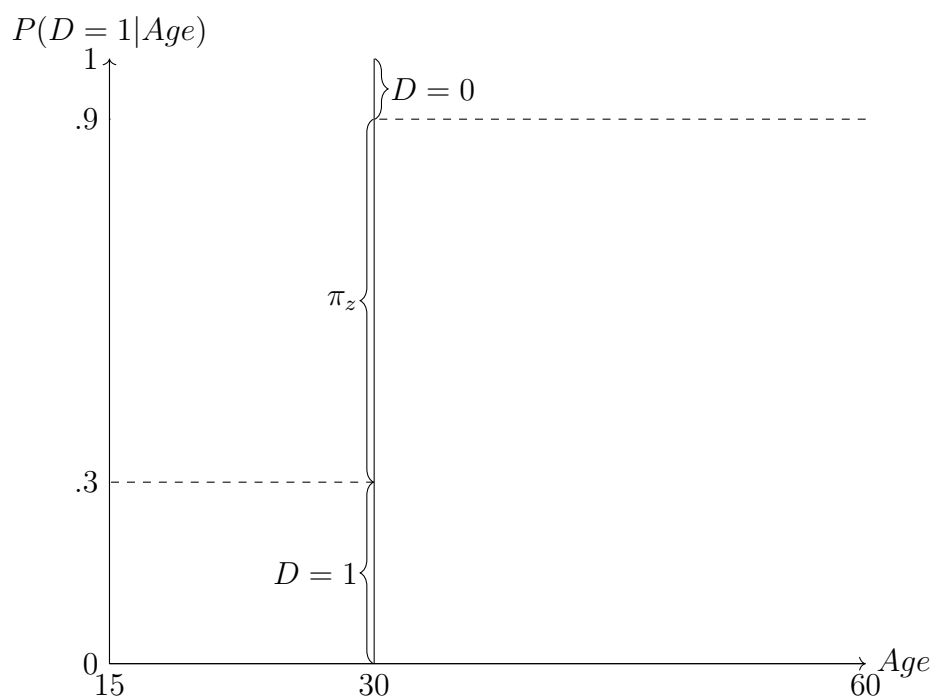
Next period's human capital is positively associated with the current amount human capital and human capital investment.

There are two choices for individuals up to age 30—take public recruitment exams or do not take. If they take exams, one additional term could be added in the law of motion of human capital to adjust for net human capital gain. For private sector worker after age 30, decisions are the same for all.

Many individuals have higher ability before they pass eligibility age 30, $\Lambda > \Lambda^*$. These individuals study for public sector rather than engaging in productive sector, but the public sector cannot accommodate all the individuals willing to work. These individuals leave for private sector, which are likely to impact private sector through their human capital accumulation during preparation. A significant part of candidates investment in human capital, attempt multiple exams instead of going to productive sector and end up with private sector. A portion of high ability individuals are recruited in the public sector who would produce more in the private sector. The aggregate effects are only inference but is not possible to estimate in the partial equilibrium model.

Main distinguishing features in labor supply decision with respect to more beneficial government jobs are derived from the human capital profile with cost and benefit up to age 30, income difference over the life cycle before retirement between government and non-government sector, and the difference in retirement benefits in public and private sector. This model shows individuals labor supply decisions due to public sector premiums in a simple partial equilibrium model. Developing a more comprehensive model, maybe general equilibrium model, could be considered in the future.

Figure (B6) Graphical illustration of reduced form interpretation for sharp RDD β_1



B.7 Survey questionnaire



Graduate Research Project, GRIPS, Japan. <https://www.grips.ac.jp/en/>
You are invited to participate in a survey about preparation for government jobs in Bangladesh. The survey is conducted by Shahida Pervin for her PhD study at the National Graduate Institute for Policy Studies (GRIPS). It should not take more than 10 minutes to complete the response.

The information you share if you participate in this study will be kept completely confidential and used only for the purpose of this study. The researcher will not record any identifiable information (e.g., IP address, location data, and contact info) of the respondents.

Participation in this study is voluntary. If you decide to participate in this research survey, you may withdraw at any time or choose not to answer any question you find inconvenient. Participating in this study may not benefit you directly but it will help generating knowledge. If you are interested about findings of this study, the researcher will be happy to share research output with you.

If you have any questions or concerns related to this study and your participation, please contact Shahida Pervin at phd18101@grips.ac.jp.

বাংলাদেশে সরকারি চাকরির প্রস্তুতি সম্পর্কিত একটি জরিপ অংশগ্রহণের জন্য আপনাকে আমন্ত্রণ জানানো হচ্ছে। ন্যাশনাল গ্র্যাডুয়েট ইনস্টিটিউট ফর পলিসি স্টাডিজ (GRIPS) এ শাহিদা পারভীন তার পিএইচডি গবেষণার জন্য জরিপটি পরিচালনা করছেন। জরিপের উত্তর সম্পন্ন করতে ১০ মিনিটের বেশি সময় লাগার কথা নয়।

যদি জরিপ অংশগ্রহণ করেন তবে আপনি যে তথ্য শেয়ার করবেন তা সম্পূর্ণ গোপন রাখা হবে এবং শুধুমাত্র এই গবেষণার উদ্দেশ্যে ব্যবহার করা হবে। গবেষক উত্তরদাতাদের কোনো শনাক্তযোগ্য তথ্য (যেমন, আইপি ঠিকানা, অবস্থান এবং যোগাযোগের তথ্য) সংগ্রহ করবেন না।

এই গবেষণায় অংশগ্রহণ বেঞ্ছসেবী। গবেষণা জরিপে অংশগ্রহণ করার সিদ্ধান্ত নিলেও আপনি যেকোনো সময় চাইলে তা প্রত্যাহার করতে পারেন বা আপনার অসুবিধাজনক মনে হয় এমন কোনো প্রশ্নের উত্তর না দেওয়ার সিদ্ধান্ত নিতে পারেন। এই গবেষণায় অংশগ্রহণ আপনাকে সরাসরি উপকৃত নাও করতে পারে, তবে এটি জ্ঞান তৈরিতে সাহায্য করবে। আপনি গবেষণার ফলাফল সম্পর্কে আগ্রহী হলে, ফলাফল প্রস্তুত করার পর গবেষক তা আপনার সাথে সানন্দে শেয়ার করবে।

আপনার যদি এই গবেষণা এবং আপনার অংশগ্রহণের সাথে সম্পর্কিত কোন প্রশ্ন বা উদ্বেগ থাকে, তাহলে অনুগ্রহ করে শাহিদা পারভীনের সাথে যোগাযোগ করুন phd18101@grips.ac.jp

If you like to participate in this survey, please select 'I agree' and proceed.

আপনি যদি এই জরিপে অংশগ্রহণ করতে চান, অনুগ্রহ করে 'আমি সম্মত' নির্বাচন করুন এবং এগিয়ে যান।

- I agree. আমি সম্মত
- I do not agree. আমি সম্মত নই

Gender: Please indicate what is your gender?

লিঙ্গ: অনুগ্রহ করে নির্দেশ করুন আপনার লিঙ্গ কি?

- Female. নারী
- Male. পুরুষ
- Others. অন্যান্য
- Prefer not to disclose. প্রকাশ করতে অনিচ্ছুক

Education: Which highest class/level of education you passed?

শিক্ষা: আপনি শিক্ষার কোন সর্বোচ্চ শ্রেণী/স্তর পাস করেছেন?

Other (please specify). অন্য (অনুগ্রহ করে উল্লেখ করুন)

Age: Please indicate what is your age?

বয়স: অনুগ্রহ করে নির্দেশ করুন আপনার বয়স কত?

- Under 16. ১৬ বছরের নিচে
- 16-20 years. ১৬-২০ বছর
- 21-25 years. ২১-২৫ বছর
- 26-30 years. ২৬-৩০ বছর
- 31-35 years. ৩১-৩৫ বছর
- 36-40 years. ৩৬-৪০ বছর
- 41-45 years. ৪১-৪৫ বছর
- 46-50 years. ৪৬-৫০ বছর
- 51-55 years. ৫১-৫৫ বছর
- 56-60 years. ৫৬-৬০ বছর
- Above 60 years. ৬০ বছরের উপরে।

*** Have you ever specifically studied or are you currently studying or will you study for government job exams?**

আপনি কি কখনও সুনির্দিষ্টভাবে সরকারি চাকরির পরীক্ষার জন্য অধ্যয়ন করেছেন বা বর্তমানে অধ্যয়ন করছেন বা ভবিষ্যতে অধ্যয়ন করবেন?

- Yes, I am currently studying for government job exams. হ্যাঁ, আমি বর্তমানে সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা করছি
- Yes, I studied for government job exams before but no longer. হ্যাঁ, আমি আগে সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা করেছি কিন্তু এখন আর করছি না
- Yes, I will study for government job exams in the future. হ্যাঁ, আমি ভবিষ্যতে সরকারি চাকরির পরীক্ষার জন্য পড়ব
- No, I never studied for government job exams and will not study. না, আমি কখনো সরকারি চাকরির পরীক্ষার জন্য পড়িনি এবং ভবিষ্যতে পড়ব না

Currently studying for government job exams. বর্তমানে সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা করছি

When did you start studying for government job exams?

আপনি কখন সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা শুরু করেন?

Please choose year and month correctly, and then any date in the month if you do not remember the date. তারিখ মনে না থাকলে সমস্যা নেই, বছর ও মাস বাছাই করুন সঠিকভাবে এবং মাসের যেকোনো তারিখ বেছে নিন

Date

DD/MM/YYYY

Have you ever secured a full-time job of any type (any full-time jobs: government/non-government)?

আপনি কি কখনো পূর্ণকালীন কোনো সরকারি বা বেসরকারি চাকরি পেয়েছেন?

- Yes. হ্যাঁ
 No. না

Currently studying for government job exams. বর্তমানে সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা করছি

If you secured a full-time job ever, when did you secure your first full-time job (any full-time jobs: government/non-government)?

আপনি যদি কখনও একটি পূর্ণকালীন চাকরি পেয়ে থাকেন, তাহলে আপনি কখন আপনার প্রথম যেকোন পূর্ণকালীন চাকরি পেয়েছেন (যেকোন পূর্ণকালীন চাকরি: সরকারি/বেসরকারি)?

Please choose year and month correctly, and then any date in the month if you do not remember the date. তারিখ মনে না থাকলে সমস্যা নেই, বছর ও মাস বাছাই করুন সঠিকভাবে এবং মাসের যেকোনো তারিখ বেছে নিন

Date

DD/MM/YYYY

On average, across all your attempts since the beginning, approximately how many hours do you spend every week for government job exams study?

স্ক্র থেকে আপনার সমস্ত প্রচেষ্টা জুড়ে, সরকারি চাকরির পরীক্ষার অধ্যয়নের জন্য আপনি প্রতি সপ্তাহে গড়ে প্রায় কত ঘণ্টা ব্যয় করেন?

- | | |
|--|--|
| <input type="radio"/> Up to 5 hours. ৫ ঘণ্টা পর্যন্ত | <input type="radio"/> 26-30 hours. ২৬-৩০ ঘণ্টা |
| <input type="radio"/> 6-10 hours. ৬-১০ ঘণ্টা | <input type="radio"/> 31-35 hours. ৩১-৩৫ ঘণ্টা |
| <input type="radio"/> 11-15 hours. ১১-১৫ ঘণ্টা | <input type="radio"/> 36-40 hours. ৩৬-৪০ ঘণ্টা |
| <input type="radio"/> 16-20 hours. ১৬-২০ ঘণ্টা | <input type="radio"/> 41-45 hours. ৪১-৪৫ ঘণ্টা |
| <input type="radio"/> 21-25 hours. ২১-২৫ ঘণ্টা | <input type="radio"/> More than 45 hours. ৪৫ ঘণ্টার বেশি |

Approximately, how much money have you spent in a typical year for government jobs across your all exam attempts in the year (e.g., application fees, buying books and materials, coaching fees, accommodation and food, travel, and others)?

একটি সাধারণ বছরে আপনার সমস্ত সরকারি চাকরির পরীক্ষার প্রচেষ্টা জুড়ে, সরকারি চাকরির জন্য আপনি এক বছরে আনুমানিক কত টাকা ব্যয় করেছেন (উদাহরণ: আবেদন ফি, বই এবং উপকরণ কেনা, কোচিং ফি, যাতায়াত, থাকা-খাওয়া এবং অন্যান্য)?

If you had not been studying for government job exams, what would you have done with your time instead? (Please choose all options that apply)

আপনি যদি সরকারি চাকরির পরীক্ষার জন্য পড়াশুনা না করতেন, তাহলে আপনার এই সময় দিয়ে কী করতেন? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে নিন)

- Study for my academic course and degree. আমার একাডেমিক কোর্স এবং ডিগ্রীর জন্য অধ্যয়ন করতাম
- Take up other jobs. অন্য চাকরি করতাম
- Develop own business/entrepreneurship (any: agri, non-agri). নিজস্ব ব্যবসা/উদ্যোগ বিকাশ করতাম (যেকোনো: কৃষি, অকৃষি)
- Spend time with friends, family, leisure. বন্ধু, পরিবার, অবসর নিয়ে সময় কাটাতাম
- Help with family business/household chores. পারিবারিক ব্যবসায় সাহায্য করতাম/গৃহস্থালীর কাজে সাহায্য করতাম
- Don't know. জানি না

Others (please specify). অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)

Do you think your preparation for government jobs (e.g., study material, networking, etc.) is useful per se in the labor market for other jobs or professions apart from government jobs?

আপনি কি মনে করেন যে সরকারি চাকরির জন্য আপনার প্রস্তুতি (যেমন, অধ্যয়নের উপাদান/যোগাযোগ ইত্যাদি) সরকারি চাকরি ছাড়াও শ্রমবাজারে অন্যান্য চাকরি বা পেশার জন্য কাজে লাগে?

- Not at all useful. মোটেও কাজে লাগে না
- Not so useful. তেমন কাজে লাগে না
- Somewhat useful. কিছুটা কাজে লাগে
- Very useful. খুব কাজে লাগে
- Extremely useful. অত্যন্ত কাজে লাগে

In case you cannot get one government job before reaching age ceiling, what would you plan to do later? (Please choose all options that apply)

বয়সসীমা অতিক্রম করার আগে কোন কারণে যদি একটি সরকারি চাকরি না পান, তাহলে পরে কী করার পরিকল্পনা আপনার? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে নিন)

- Develop own business/entrepreneurship (anything- agri, non-agri). নিজস্ব ব্যবসা/উদ্যোগ বিকাশ করা (যেকোনো- কৃষি, অকৃষি)
- Do family business/household chores. পারিবারিক ব্যবসা/গৃহস্থালীর কাজ করা
- Go abroad for study/work. পড়াশোনা/কাজের জন্য বিদেশে যাওয়া
- Don't know/uncertain. জানি না/অনিশ্চিত
- Go for higher study further. আরও উচ্চতর অধ্যয়ন করা

Others (please specify). অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)

Are you studying to take government job exams for the first time or did you attempt before?

আপনি কি প্রথমবার সরকারি চাকরির পরীক্ষা দিতে অধ্যয়ন করছেন নাকি আগে পরীক্ষা দিয়েছেন?

- I will take the exams for the first time. প্রথমবার পরীক্ষা দেব
- I took exams before. আগে পরীক্ষা দিয়েছি

Currently studying for government job exams. বর্তমানে সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা করছি

How many government job exams have you attended in total?

আপনি সর্বমোট কতটি সরকারি চাকরির পরীক্ষায় অংশগ্রহণ করেছেন?

What kind of government job exams have you attended? (Please choose all options that apply)

আপনি কোন ধরনের সরকারি চাকরির পরীক্ষায় অংশগ্রহণ করেছেন? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে দিন)

- | | |
|---|---|
| <input type="checkbox"/> Public bank job. সরকারি ব্যাংকের চাকরি | <input type="checkbox"/> Computer operator job. কম্পিউটার অপারেটরের চাকরি |
| <input type="checkbox"/> School (primary, secondary) teaching job. স্কুলে (প্রাথমিক, মাধ্যমিক) শিক্ষকতার চাকরি | <input type="checkbox"/> Office assistant job. অফিস সহকারীর চাকরি |
| <input type="checkbox"/> Autonomous public institutions (for example, central bank, research organization) job. স্বায়ত্তশাসিত সরকারি প্রতিষ্ঠান (উদাহরণস্বরূপ, কেন্দ্রীয় ব্যাংক, গবেষণা সংস্থা) চাকরি | <input type="checkbox"/> Any BCS job. যেকোনো বিসিএস চাকরি |
| <input type="checkbox"/> Auditor job. নিরীক্ষক চাকরি | <input type="checkbox"/> Any government job. যেকোনো সরকারি চাকরি |
| <input type="checkbox"/> NSI job. এনএসআই চাকরি | |

Other jobs (please specify). অন্যান্য চাকরি (অনুগ্রহ করে উল্লেখ করুন)

Currently studying for government job exams. বর্তমানে সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা করছি

What kind of government job exams do you want to attend? (Please choose all options that apply)

আপনি কোন ধরনের সরকারি চাকরির পরীক্ষায় অংশগ্রহণ করতে চান? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে নিন)

- | | |
|---|---|
| <input type="checkbox"/> Public bank job. সরকারি ব্যাংকের চাকরি | <input type="checkbox"/> Computer operator job. কম্পিউটার অপারেটরের চাকরি |
| <input type="checkbox"/> School (primary, secondary) teaching job. স্কুলে (প্রাথমিক, মাধ্যমিক) শিক্ষকতার চাকরি | <input type="checkbox"/> Office assistant job. অফিস সহকারীর চাকরি |
| <input type="checkbox"/> Autonomous public institutions (for example, central bank, research organization) job. স্বায়ত্তশাসিত সরকারি প্রতিষ্ঠান (উদাহরণস্বরূপ, কেন্দ্রীয় ব্যাংক, গবেষণা সংস্থা) চাকরি | <input type="checkbox"/> Any BCS job. যেকোনো বিসিএস চাকরি |
| <input type="checkbox"/> Auditor job. নিরীক্ষক চাকরি | <input type="checkbox"/> Any government job. যেকোনো সরকারি চাকরি |
| <input type="checkbox"/> NSI job. এনএসআই চাকরি | |

Other jobs (please specify). অন্যান্য চাকরি (অনুগ্রহ করে উল্লেখ করুন)

Currently studying for government job exams. বর্তমানে সরকারি চাকরির পরীক্ষার জন্য পড়াশোনা করছি

What best describes your current situation? কোনটি আপনার বর্তমান অবস্থা সবচেয়ে ভাল ব্যাখ্যা করে?

- Full-time study (e.g., undergrad, master, technical, other academic degrees). পূর্ণকালীন অধ্যয়ন (যেমন, স্নাতক, মাস্টার, প্রযুক্তিগত, অন্যান্য একাডেমিক ডিগ্রি)
- Full-time non-government formal job. পূর্ণকালীন বেসরকারি আনুষ্ঠানিক চাকরি
- Full-time government job. পূর্ণকালীন সরকারি চাকরি
- Full-time formal own business/entrepreneurship. পূর্ণকালীন আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ
- Informal own business/entrepreneurship other than agriculture. কৃষি ব্যতীত অনানুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ
- Informal own business/entrepreneurship related to agriculture. কৃষি ভিত্তিক অনানুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ
- Household chores, and helping in family. গৃহস্থালী কাজ এবং পরিবারে সাহায্য করা
- Study and part-time work (e.g., tuition, internship, others). অধ্যয়ন এবং খণ্ডকালীন কাজ (যেমন, টিউশন, ইন্টার্নশিপ, অন্যান্য)
- Looking for any work. কোন কাজ খুঁজছেন

Other (please specify). অন্য (অনুগ্রহ করে উল্লেখ করুন)

If you earn money now, how much you earn on average per month?

আপনি যদি এখন টাকা উপার্জন করেন, আপনি প্রতি মাসে গড়ে কত আয় করেন?

Studied before but no longer. আগে সরকারি চাকরির পরীক্ষার জন্য পড়েছি কিন্তু এখন আর পড়ছি না

If you secured a full-time job ever, how much time has passed between when you first started studying for a government job exam and when you secured your first full-time job (any full-time job: government/non-government)?

আপনি যদি কখনও যেকোনো একটি পূর্ণকালীন চাকরি পেয়ে থাকেন তবে, সরকারি চাকরির পরীক্ষার জন্য পড়া শুরু করার কত সময় পর প্রথম পূর্ণকালীন চাকরি পেয়েছেন (যে কোনো পূর্ণকালীন চাকরি: সরকারি/বেসরকারি)?

- | | |
|--|---|
| <input type="radio"/> I have not secured my first full-time job yet. আমি এখনও আমার প্রথম পূর্ণকালীন চাকরি পাই নি | <input type="radio"/> 25-30 months. ২৫-৩০ মাস |
| <input type="radio"/> Less than one month. এক মাসেরও কম | <input type="radio"/> 31-36 months. ৩১-৩৬ মাস |
| <input type="radio"/> 1-6 months. ১-৬ মাস | <input type="radio"/> 37-42 months. ৩৭-৪২ মাস |
| <input type="radio"/> 7-12 months. ৭-১২ মাস | <input type="radio"/> 43-48 months. ৪৩-৪৮ মাস |
| <input type="radio"/> 13-18 months. ১৩-১৮ মাস | <input type="radio"/> 49-54 months. ৪৯-৫৪ মাস |
| <input type="radio"/> 19-24 months. ১৯-২৪ মাস | <input type="radio"/> 55-60 months. ৫৫-৬০ মাস |

More than 60 months (please specify). ৬০ মাসের বেশি (অনুগ্রহ করে মাস বা বছর উল্লেখ করুন)

For how long have you studied for government job exams across all your attempts since the beginning?

শুরু থেকে আপনার সমস্ত প্রচেষ্টা জুড়ে আপনি কত সময় সরকারি চাকরির পরীক্ষার জন্য অধ্যয়ন করেছেন?

- | | |
|---|---|
| <input type="radio"/> Less than one month. এক মাসেরও কম | <input type="radio"/> 31-36 months. ৩১-৩৬ মাস |
| <input type="radio"/> 1-6 months. ১-৬ মাস | <input type="radio"/> 37-42 months. ৩৭-৪২ মাস |
| <input type="radio"/> 7-12 months. ৭-১২ মাস | <input type="radio"/> 43-48 months. ৪৩-৪৮ মাস |
| <input type="radio"/> 13-18 months. ১৩-১৮ মাস | <input type="radio"/> 49-54 months. ৪৯-৫৪ মাস |
| <input type="radio"/> 19-24 months. ১৯-২৪ মাস | <input type="radio"/> 55-60 months. ৫৫-৬০ মাস |
| <input type="radio"/> 25-30 months. ২৫-৩০ মাস | |

More than 60 months (please specify). ৬০ মাসের বেশি (অনুগ্রহ করে মাস বা বছর উল্লেখ করুন)

On average, across all your attempts since the beginning, approximately how many hours did you spend every week for government job exams study?

শুরু থেকে আপনার সমস্ত প্রচেষ্টা জুড়ে, সরকারি চাকরির পরীক্ষার অধ্যয়নের জন্য আপনি প্রতি সপ্তাহে গড়ে প্রায় কত ঘণ্টা ব্যয় করেছেন?

- | | |
|--|--|
| <input type="radio"/> Up to 5 hours. ৫ ঘণ্টা পর্যন্ত | <input type="radio"/> 26-30 hours. ২৬-৩০ ঘণ্টা |
| <input type="radio"/> 6-10 hours. ৬-১০ ঘণ্টা | <input type="radio"/> 31-35 hours. ৩১-৩৫ ঘণ্টা |
| <input type="radio"/> 11-15 hours. ১১-১৫ ঘণ্টা | <input type="radio"/> 36-40 hours. ৩৬-৪০ ঘণ্টা |
| <input type="radio"/> 16-20 hours. ১৬-২০ ঘণ্টা | <input type="radio"/> 41-45 hours. ৪১-৪৫ ঘণ্টা |
| <input type="radio"/> 21-25 hours. ২১-২৫ ঘণ্টা | <input type="radio"/> More than 45 hours. ৪৫ ঘণ্টার বেশি |

Approximately, how much money have you spent in a typical year for government jobs across your all exam attempts in the year (e.g., application fees, buying books and materials, coaching fees, accommodation and food, travel, and others)?

একটি সাধারণ বছরে আপনার সমস্ত সরকারি চাকরির পরীক্ষার প্রচেষ্টা জুড়ে, সরকারি চাকরির জন্য আপনি এক বছরে আনুমানিক কত টাকা ব্যয় করেছেন (উদাহরণ: আবেদন ফি, বই এবং উপকরণ কেনা, কোচিং ফি, যাতায়াত, থাকা-খাওয়া এবং অন্যান্য)?

If you had not been studying for government job exams, what would you have done with your time instead? (Please choose all options that apply)

আপনি যদি সরকারি চাকরির পরীক্ষার জন্য পড়াশুনা না করতেন, তাহলে আপনার এই সময় দিয়ে কী করতেন? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে নিন)

- Study for my academic course and degree. আমার একাডেমিক কোর্স এবং ডিগ্রীর জন্য অধ্যয়ন করতাম
- Take up other jobs. অন্য চাকরি করতাম
- Develop own business/entrepreneurship (any: agri, non-agri). নিজস্ব ব্যবসা/উদ্যোগ বিকাশ করতাম (যেকোনো: কৃষি, অকৃষি)
- Spend time with friends, family, leisure. বন্ধু, পরিবার, অবসর নিয়ে সময় কাটাতাম
- Help with family business/household chores. পারিবারিক ব্যবসায় সাহায্য করতাম/গৃহস্থালীর কাজে সাহায্য করতাম
- Don't know. জানি না

Others (please specify). অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)

Do you think your preparation for government jobs (e.g., study material, networking, etc.) is useful per se in the labor market for other jobs or professions apart from government jobs?

আপনি কি মনে করেন যে সরকারি চাকরির জন্য আপনার প্রস্তুতি (যেমন, অধ্যয়নের উপাদান/যোগাযোগ ইত্যাদি) সরকারি চাকরি ছাড়াও শ্রমবাজারে অন্যান্য চাকরি বা পেশার জন্য কাজে লাগে?

- Not at all useful. মোটেও কাজে লাগে না
- Not so useful. তেমন কাজে লাগে না
- Somewhat useful. কিছুটা কাজে লাগে
- Very useful. খুব কাজে লাগে
- Extremely useful. অত্যন্ত কাজে লাগে

How many government job exams have you attended in total?

আপনি সর্বমোট কতটি সরকারি চাকরির পরীক্ষায় অংশগ্রহণ করেছেন?

What kind of government job exams have you attended? (Please choose all options that apply)

আপনি কোন ধরনের সরকারি চাকরির পরীক্ষায় অংশগ্রহণ করেছেন? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে নিন)

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| <input type="checkbox"/> Public bank job. সরকারি ব্যাংকের চাকরি | <input type="checkbox"/> Computer operator job. কম্পিউটার অপারেটরের চাকরি |
| <input type="checkbox"/> School (primary, secondary) teaching job. স্কুলে (প্রাথমিক, মাধ্যমিক) শিক্ষকতার চাকরি | <input type="checkbox"/> Office assistant job. অফিস সহকারীর চাকরি |
| <input type="checkbox"/> Autonomous public institutions (for example, central bank, research organization) job. স্বায়ত্তশাসিত সরকারি প্রতিষ্ঠান (উদাহরণস্বরূপ, কেন্দ্রীয় ব্যাংক, গবেষণা সংস্থা) চাকরি | <input type="checkbox"/> Any BCS job. যেকোনো বিসিএস চাকরি |
| <input type="checkbox"/> Auditor job. নিরীক্ষক চাকরি | <input type="checkbox"/> Any government job. যেকোনো সরকারি চাকরি |
| <input type="checkbox"/> NSI job. এনএসআই চাকরি | |

Other jobs (please specify). অন্যান্য চাকরি (অনুগ্রহ করে উল্লেখ করুন)

What best describes your current situation? কোনটি আপনার বর্তমান অবস্থা সবচেয়ে ভাল ব্যাখ্যা করে?

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| <input type="radio"/> Full-time study (e.g., undergrad, master, technical, other academic degrees). পূর্ণকালীন অধ্যয়ন (মেম, স্নাতক, মাস্টার, প্রযুক্তিগত, অন্যান্য একাডেমিক ডিগ্রি) | <input type="radio"/> Informal own business/entrepreneurship related to agriculture. কৃষি ভিত্তিক অনানুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ |
| <input type="radio"/> Full-time non-government formal job. পূর্ণকালীন বেসরকারি আনুষ্ঠানিক চাকরি | <input type="radio"/> Household chores, and helping in family. গৃহস্থালীর কাজ এবং পরিবারে সাহায্য করা |
| <input type="radio"/> Full-time government job. পূর্ণকালীন সরকারি চাকরি | <input type="radio"/> Study and part-time work (e.g., tuition, internship, others). অধ্যয়ন এবং খণ্ডকালীন কাজ (মেম, টিউশন, ইন্টার্নশিপ, অন্যান্য) |
| <input type="radio"/> Full-time formal own business/entrepreneurship. পূর্ণকালীন আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ | <input type="radio"/> Looking for any work. কোন কাজ খুঁজছেন |
| <input type="radio"/> Informal own business/entrepreneurship other than agriculture. কৃষি ব্যতীত অনানুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ | |

Other (please specify). অন্য (অনুগ্রহ করে উল্লেখ করুন)

If you earn money now, how much you earn on average per month?

আপনি যদি এখন টাকা উপার্জন করেন, আপনি প্রতি মাসে গড়ে কত আয় করেন?

Will study for government job exams in the future. ভবিষ্যতে সরকারি চাকরির পরীক্ষার জন্য পড়ব

When are you going to start your study for government jobs?

আপনি কখন সরকারি চাকরির জন্য আপনার পড়াশোনা শুরু করতে যাচ্ছেন?

Please choose year and month correctly, and then any date in the month if you do not know the date. তারিখ নিয়ে ভাববেন না, বছর ও মাস বাছাই করুন সঠিকভাবে এবং মাসের যেকোনো তারিখ বেছে নিন

Date

MM/DD/YYYY

What kind of government job do you mainly aim for? (Please choose all options that apply)

আপনি প্রধানত কোন ধরনের সরকারি চাকরির লক্ষ্য রাখেন? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে নিন)

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| <input type="checkbox"/> Public bank job. সরকারি ব্যাংকের চাকরি | <input type="checkbox"/> Computer operator job. কম্পিউটার অপারেটরের চাকরি |
| <input type="checkbox"/> School (primary, secondary) teaching job. স্কুলে (প্রাথমিক, মাধ্যমিক) শিক্ষকতার চাকরি | <input type="checkbox"/> Office assistant job. অফিস সহকারীর চাকরি |
| <input type="checkbox"/> Autonomous public institutions (for example, central bank, research organization) job. স্বায়ত্তশাসিত সরকারি প্রতিষ্ঠান (উদাহরণস্বরূপ, কেন্দ্রীয় ব্যাংক, গবেষণা সংস্থা) চাকরি | <input type="checkbox"/> Any BCS job. যেকোনো বিসিএস চাকরি |
| <input type="checkbox"/> Auditor job. নিরীক্ষক চাকরি | <input type="checkbox"/> Any government job. যেকোনো সরকারি চাকরি |
| <input type="checkbox"/> NSI job. এনএসআই চাকরি | |

Other government jobs (please specify). অন্যান্য সরকারি চাকরি (অনুগ্রহ করে উল্লেখ করুন)

How much time do you need to prepare to pass the exam of your above preferred job, you think?

আপনার উপরোক্ত পছন্দের চাকরির পরীক্ষায় উত্তীর্ণ হওয়ার জন্য প্রস্তুতি নিতে আপনার কত সময় লাগবে বলে আপনি মনে করেন?

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| <input type="radio"/> Less than one month. এক মাসেরও কম | <input type="radio"/> 31-36 months. ৩১-৩৬ মাস |
| <input type="radio"/> 1-6 months. ১-৬ মাস | <input type="radio"/> 37-42 months. ৩৭-৪২ মাস |
| <input type="radio"/> 7-12 months. ৭-১২ মাস | <input type="radio"/> 43-48 months. ৪৩-৪৮ মাস |
| <input type="radio"/> 13-18 months. ১৩-১৮ মাস | <input type="radio"/> 49-54 months. ৪৯-৫৪ মাস |
| <input type="radio"/> 19-24 months. ১৯-২৪ মাস | <input type="radio"/> 55-60 months. ৫৫-৬০ মাস |
| <input type="radio"/> 25-30 months. ২৫-৩০ মাস | |

More than 60 months (please specify). ৬০ মাসের বেশি (অনুগ্রহ করে মাস বা বছর উল্লেখ করুন)

How many attempts you may need to secure a government job, you think?

একটি সরকারি চাকরি পেতে আপনার কতগুলো পরীক্ষা দেওয়ার প্রয়োজন হতে পারে বলে আপনি মনে করেন ?

- 1-5
- 6-10
- 11-15
- More than 30 (please specify). ৩০ এর বেশি (অনুগ্রহ করে উল্লেখ করুন)
- 16-20
- 20-25
- 26-30

Do you think the way aspirants prepare for government jobs (e.g., study material, networking, etc.) is useful per se in the labor market for other jobs or professions apart from government jobs??

আপনি কি মনে করেন যে প্রার্থীরা সরকারি চাকরির জন্য যেভাবে প্রস্তুতি নেন (যেমন, অধ্যয়নের উপাদান, নেটওয়ার্কিং ইত্যাদি) তা সরকারি চাকরি ছাড়াও অন্যান্য চাকরি বা পেশার জন্য শ্রমবাজারে কাজে লাগে?

- Not at all useful. মোটেও কাজে লাগে না
- Not so useful. তেমন কাজে লাগে না
- Somewhat useful. কিছুটা কাজে লাগে
- Very useful. খুব কাজে লাগে
- Extremely useful. অত্যন্ত কাজে লাগে

What best describes your current situation? কোনটি আপনার বর্তমান অবস্থা সবচেয়ে ভাল ব্যাখ্যা করে?

- Full-time study (e.g., undergrad, master, technical, other academic degrees). পূর্ণকালীন অধ্যয়ন (যেমন, স্নাতক, স্নাতক, প্রযুক্তিগত, অন্যান্য একাডেমিক ডিগ্রি)
- Full-time non-government formal job. পূর্ণকালীন বেসরকারী আনুষ্ঠানিক চাকরি
- Full-time formal own business/entrepreneurship. পূর্ণকালীন আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ
- Informal own business/entrepreneurship other than agriculture. কৃষি বাদে অন্য আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ
- Informal own business/entrepreneurship related to agriculture. কৃষিভিত্তিক আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ
- Household chores and helping in the family. গৃহস্থালির কাজ এবং পরিবারে সাহায্য করা
- Study and part-time work (e.g., tuition, internship). অধ্যয়ন এবং খণ্ডকালীন কাজ (যেমন, টিউশন, ইন্টার্নশিপ)
- Looking for any work. কোন কাজ খুঁজছেন

Other (please specify). অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)

If you earn money now, how much do you earn on average per month?

আপনি যদি এখন টাকা উপার্জন করেন, আপনি প্রতি মাসে গড়ে কত আয় করেন?

Never studied for govt. jobs and will not study. কখনো সরকারি চাকরির জন্য পড়িনি এবং ভবিষ্যতে পড়ব না

Why have you never studied for government jobs? (please choose all that apply).

কেন আপনি কখনও সরকারি চাকরির জন্য পড়াশোনা করেননি? (অনুগ্রহ করে প্রযোজ্য সমস্ত বিকল্প বেছে নিন)

- I got my preferred job already. আমি ইতিমধ্যে আমার পছন্দের কাজ পেয়েছি
- Chance of getting a government job is too low. সরকারি চাকরি পাওয়ার সম্ভাবনা খুবই কম
- Direct cost of studying for government jobs is high for me (e.g., application fees, buying study materials, coaching fees, transportation, accommodation cost, etc.). সরকারি চাকরির জন্য অধ্যয়নের সরাসরি খরচ আমার জন্য বেশি (যেমন- আবেদন ফি, অধ্যয়নের উপকরণ কেনা, কোচিং ফি, যাতায়াত ও বাসস্থান খরচ ইত্যাদি)
- Indirect cost of waiting for a government job is high for me (e.g., losing income from other job, losing other opportunity like scholarship, foreign study, taking care of family, etc.). একটি সরকারি চাকরির জন্য অপেক্ষা করার পরোক্ষ খরচ আমার জন্য বেশি (যেমন- অন্য উপার্জন, বৃত্তি, বিদেশে পড়াশোনা, পরিবারের যত্ন নেওয়া ইত্যাদির মতো অন্যান্য সুযোগ হারানো)

Other (please specify). অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)

What best describes your current situation? কোনটি আপনার বর্তমান অবস্থা সবচেয়ে ভাল ব্যাখ্যা করে?

- | | |
|---|---|
| <ul style="list-style-type: none"> <input type="radio"/> Full-time study (e.g., undergrad, master, technical, other academic degrees). পূর্ণকালীন অধ্যয়ন (যেমন, স্নাতক, মাস্টার, প্রযুক্তিগত, অন্যান্য একাডেমিক ডিগ্রি) <input type="radio"/> Full-time non-government formal job. পূর্ণকালীন বেসরকারি আনুষ্ঠানিক চাকরি <input type="radio"/> Full-time formal own business/entrepreneurship. পূর্ণকালীন আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ <input type="radio"/> Informal own business/entrepreneurship other than agriculture. কৃষি বাদে অন্য আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ | <ul style="list-style-type: none"> <input type="radio"/> Informal own business/entrepreneurship related to agriculture. কৃষিভিত্তিক আনুষ্ঠানিক নিজস্ব ব্যবসা/উদ্যোগ <input type="radio"/> Household chores and helping in the family. গৃহস্থালির কাজ এবং পরিবারে সাহায্য করা <input type="radio"/> Study and part-time work (e.g., tuition, internship, others). অধ্যয়ন এবং খণ্ডকালীন কাজ (যেমন, টিউশন, ইন্টার্নশিপ, অন্যান্য) <input type="radio"/> Looking for any work. কোন কাজ খুঁজছেন |
|---|---|

Other (please specify). অন্য (অনুগ্রহ করে উল্লেখ করুন)

If you earn money now, how much do you earn on average per month?

আপনি যদি এখন টাকা উপার্জন করেন, আপনি প্রতি মাসে গড়ে কত আয় করেন?

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