The Effects of Business School Education on Manager Career Outcomes

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Abstract: This paper studies the effects of business school education on manager career outcomes, using evidence from the Engineering, Science, and Management War Training (ESMWT), which offered MBA-style education to middle managers and production supervisors working at U.S. war industrial facilities during WWII. Employing a regression discontinuity design (RD), I show that managers who scored right above the ESWMT entry exam threshold had a substantially higher probability of being promoted to both middle and top management positions during their career, and engaged systematically more in self-employment and innovative entrepreneurial activities than similar managers who scored right below. These effects were stronger for nonwhite and female managers. In terms of mechanisms, the increased promotions followed sizable improvements in facility performance, consistent with the idea that the program content mattered, more than with a signaling hypothesis. Finally, exposure to a network of classmates from better-performing firms resulted in higher chances of moving into peer companies and founding a business with them.

Keywords: business school education, promotions, entrepreneurship, WWII, network effects
JEL Classification: I23, L25, L26, M51, M53, N42

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1 Introduction

Individual managers play a key role in shaping firm performance and worker outcomes. Several works have shown that CEOs' characteristics and behavior affect firm output, adoption of managerial practices and strategic decisions (Bertrand and Schoar, 2003; Bloom and Van Reenen, 2007; Bandiera et al., 2020; Prat and Cai, 2022), and that manager talent can increase employee productivity and reduce turnover (Lazear et al., 2015; Hoffman and Tadelis, 2021; Fenizia, 2022). A few papers have instead focused on the role of CEOs' with an MBA education, finding some evidence of a positive short-run impact on firm outcomes (Bhagat et al., 2010), but negative longer-term effects due to increased self-serving practices and reduced employees' wages (Miller and Xu, 2016, 2019; Acemoglu et al., 2022).

However, to what extent business school education affects manager career path remains an open question, in particular for middle managers for whom information on both education and performance over time is usually hard to collect. Moreover, little we know on whether attending business school education acts as a signal, if its content matters per se, or if the professional network created through business school attendance contributes to manager professional achievements.

In this paper I study the effects of business school education on middle managers' career outcomes, using evidence from the Engineering, Science, and Management War Training (hereafter ESMWT). The ESMWT, sponsored by the U.S. government during WWII, on top of training for engineers and scientists, offered free MBA-style programs to middle managers and production supervisors employed at war industrial facilities, civilian plants that produced essential war-related items. Through this program, more than 200,000 managers attended management courses, that lasted 18 months and offered "a comprehensive business education to organize, coordinate and supervise production within and across plants" (Armsby, 1946). A distinctive feature of the ESMWT is that it prohibited any discrimination based on gender and race, and therefore gave nonwhite and female managers a unique opportunity to attend business schools for free.

I use newly-assembled panel data, collected from several historical and university archives, that link managers who applied to the ESMWT with their career outcomes, that I measure using the occupations reported in reunion books between 1950 and 1975. I complement this information with data on the performance of the war facilities where applicant managers worked at the time of ESMWT application and on universities and colleges that hosted the ESMWT classes.

To identify the causal effects of the ESMWT on manager career outcomes, I exploit the fact that applicant managers had to score at least 80 points in an ESMWT-set entry exam. More specifically, I implement a regression discontinuity (RD) design, comparing managers

who scored right above the 80-point threshold and thus were admitted to the program to managers who scored right below and therefore were not admitted. I show that there was no entry exam score manipulation around the threshold, and that managers' professional and personal characteristics, as well as their facility performance, varied smoothly around the threshold. Moreover, while no managers who scored below the threshold enrolled in the ESMWT, 97 percent of managers who scored above participated in the program, indicating very high compliance.

I find three key results. First, participation in the ESMWT increased manager promotion. Specifically, managers who scored right above the 80-point threshold had a 25.6 percentage points higher probability of promotion during their entire career than managers who scored right below, which corresponds to a 42.5 percent increase relative to the baseline mean. This raise involved both promotions to middle management positions, such as plant or general managers, and to top management roles, like business executives and CEOs. Such managers had also higher chances to move to other, better-performing firms than war facilities, such as listed firms or firms included in Fortune 500.

Second, managers who scored right above the 80-point threshold engaged systematically more in entrepreneurial activity than managers who scored right below. They were 10.9 percentage points more likely to become business owners relative to managers who scored right below the threshold, and had 9.8 percentage points higher chances to (co)found their own business, respectively a 72.3 and a 78.4 percent increase relative to the baseline mean. These effects were concentrated in nascent innovative businesses, like consulting firms and small business investment companies.

One question raised by the RD design is whether the positive impact of ESMWT attendance only holds for managers who scored close to the threshold or may be extended more broadly to all applicant managers. Using the statistical procedure from Angrist and Rokkanen (2015), I document that the average treatment effects are approximately constant along the score window of 15 points above and below the threshold, which covers 82% of the applicants. On this sample, ESMWT attendance would increase the probability of promotion between 19.8 and 20.7 percentage points and probability of becoming business owner between 8.4 and 9.5 percentage points. Therefore, the estimation results hold also away from the threshold.

Third, participation in the ESMWT had larger effects on the career outcomes of underrepresented groups in firm management, such as nonwhite and female managers. The probability of promotions for nonwhite and female managers who scored right above the ESMWT threshold doubled relative to comparable managers who scored below the threshold, while the probability of owning or co-founding a business tripled. Extending the results away from the threshold, a back-of-the-envelope calculation indicates that participation in the ESMWT

closed the occupation gap between white and nonwhite managers around the threshold by 17 percentage points and between male and female managers by 14 percentage points.

Which mechanisms drove the increased manager promotions upon ESMWT attendance? I first study if the ESMWT acted as a signal: promotions may have been a reward for attending the program, rather than motivated by better manager performance. To investigate this possibility, I compare the timing of manager promotions within war facilities right after the ESMWT to that of changes in facilities outcomes. While production and productivity in admitted manager facilities differentially raised since the first month after the ESMWT completion, promotion probability of admitted managers started to increase only a year after the program. Therefore, managers were promoted only after they had an impact on their facility outcomes.

The fact the facility outcomes improved upon ESMWT completion suggests that the program content mattered. To further investigate the link between the content of business school education and changes within war facilities, I test whether ESMWT attendance increased the adoption of managerial practices. I document that admitted managers facilities widely adopted managerial practices related to factory operations, quality control, human resources management and production planning, taught in compulsory classes by the ESMWT, that in turn resulted in a reduction of worker injuries, scrapped output, absenteeism and late delivered orders. Moreover, there is a positive correlation between the share of facility managers who attended the ESMWT classes and the boost in firm performance.

In addition to receiving advanced management education, while attending the ESMWT, admitted managers may have met colleagues from other facilities, and built a professional network, which may have in turn affected their labor market perspectives. To investigate this channel, I exploit the fact that admitted managers could only enroll in the closest university to their industrial facilities and were *randomly* assigned to sections of roughly 40 students. I find that being exposed to a higher share of managers from better-performing or listed facilities is associated with an increased probability of moving into section-mate firms or co-founding a business with them. By contrast, a higher share of section-mates from different or larger war facilities or facilities in the same industry does not lead to significant results, indicating that the quality rather than the width of the network impacted manager career outcomes.

This paper contributes to several strands of the existing literature. First, it contributes to an extensive literature studying how individual managers affect firm behavior and economic outcomes. Previous papers have shown that CEOs and top executives are central in shaping companies' capital structure and investment strategies (Bertrand and Schoar, 2003; Kaplan et al., 2012; Benmelech and Frydman, 2015; Bandiera et al., 2020; Huber et al., 2021; Prat and Cai, 2022); and that manager talent and interpersonal skills reduce employee attrition

and turnover (Lazear et al., 2015; Hoffman and Tadelis, 2021), improve workers' allocation to jobs and their career progression (Minni, 2023), and increase productivity also in the public sector (Fenizia, 2022). Notably, Metcalfe et al. (2023) document that individual managers affect store-level productivity in retail, even when management practices are set by firm policy and largely fixed. Focusing on CEO education, Bhagat et al. (2010) and Miller and Xu (2016, 2019) find that managers with MBA improve short-term firm operating performance, but do not affect long-run outcomes and adopt short-term strategic expedients that may harm firm market valuations, while Acemoglu et al. (2022) show that CEOs with business education reduce their employees' wages by not sharing profits with their workers. This work complements prior findings by examining the effects of business school education on manager career outcomes and firm performance. Moreover, while existing works have mostly focused on top executives' degrees, I focus on middle managers and supervisors, and their impact on firm organizations and productivity.

Second, this research adds to the literature on management and firm performance. Several papers have provided causal evidence that the adoption of better managerial practices has large and positive effects on firm outcomes (e.g., Bloom et al., 2013; Bruhn et al., 2018; Iacovone et al., 2022; Gosnell et al., 2020; Macchiavello and Morjaria, 2022; Manaresi et al., 2022). Taking a long-run perspective, Giorcelli (2019), Bloom et al. (2020), and Bianchi and Giorcelli (2022) have shown that the impact of management interventions can be long-lasting. This paper contributes to these findings by analyzing the effects of a large program of structured and comprehensive business education on plant performance, with a scale and scope that could be hardly reproduced in modern settings, instead of focusing on specific training or consulting episodes. Moreover, it assesses the role of middle managers in adopting managerial practices, while previous works have focused on higher level of management.

Third, this paper is also related to studies on gender and racial inequalities in the labor market. It is well known that women face a gender gap in earnings, have lower promotion chances and are less present in high-paid jobs (see Goldin, 2014 and Blau and Kahn, 2017 for overviews), patterns that are in a fairly large part explained by demand-side gender discriminations (Sarsons et al., 2021). Focusing on MBA's professionals, Bertrand et al. (2010) show that male and female earnings are nearly identical at the outset of their careers, but soon diverge mostly due to motherhood, while Hampole et al. (2023) document that a larger proportion of female MBA section peers increases women likelihood of reaching corporate leadership positions. An increasing body of research has also analyzed the origin and persistence of racial inequalities, ranging from the Great Migration (Boustan, 2009; Derenoncourt, 2022) to changes in labor market regulations (Derenoncourt and Montialoux, 2021; Farber et al., 2021). I provide novel micro-level evidence at the nationwide level of how offering managerial education during WWII to under-represented groups increased nonwhite

and female managers promotions and engagement in entrepreneurship, reducing the career gap with white colleagues. My results echo Goldin and Olivetti (2013) that show that WWII benefitted primarily women in the top half of the education distribution. Consistent with Aneja and Xu (2022), my paper also confirms the key role of government policies in exacerbating or reducing racial inequalities.

Finally, this paper contributes to the literature studying the effects of US government's wartime programs on long-run industrialization and innovation. Jaworski (2014) find that counties that received more investment in American South during WWII did not exhibit differential postwar growth, while Garin and Rothbaum (2022) document that government-financed plant construction caused a persistent expansion of high-wage manufacturing jobs and a permanent increase in regional employment. Focusing on innovation, Gross and Sampat (2022) show that large government-sponsored R&D programs during WWII affected both the direction and the location of US inventions in the war aftermath. This paper provides new evidence on a largely unexplored WWII managerial educational intervention and its effect in shaping managers' careers and entrepreneurship in the 1950s and 1960s.

The rest of the paper is organized as follows. Section 2 describes the history and the implementation of the ESMWT. Section 3 describes the data collection and reports key summary statistics. 4 presents the empirical strategy and discusses the identification strategy. Section 5 examines the effects of the ESMWT on manager career outcomes. Sections 6 and 7 investigate the mechanisms and the network effects created by the ESMWT. Section 8 concludes.

2 Historical Background

In Spring 1940, a few months after the start of WWII, the collapse of France and the Low Countries made it clear that also the US had to prepare for war. Henry Armsby, the Specialist in Engineering Education for the U.S. Office of Education, argued that "warfare had become a test of the relative total scientific, engineering, and management capacities of the belligerent nations" (ESMWT, 1940). It was, therefore, necessary to promote advanced training for engineers and scientists to foster technological advancements, and for managers to efficiently organize, coordinate and supervise production (Khurana, 2010).

Under these auspices, on October 9, 1940 President Franklin Roosevelt signed a bill authorizing the Engineering Defense Training (EDT) for "engineers working for the national defense" (Armsby, 1946). In July 1941, the Labor-Federal Security Appropriations Act approved the addition of chemistry, physics, and management-related training, changing program's name to Engineering, Science, and Management Defense Training (ESMDT). Finally, after the Japanese attack on Pearl Harbor (December 7, 1941) and the entry of the

U.S. into World War II, the War-Time Commission became responsible for this program, that was renamed Engineering, Science, and Management War Training (ESMWT hereafter). Despite the name changes, the content of the program and its delivery remained substantially unchanged.

The goal of the ESMWT was to "provide without charge college and postgraduate education to engineers, scientists and managers employed at war industrial facilities", civilian plants that, although did not directly produce war items, were considered essential for war production and therefore placed under the control of the War Production Board (ESMWT, 1941).[1] The program costs USD 60 million (USD 1,093 million in 2022 values), a mere 0.025 percent of the total U.S. war spending, and trained almost 1.8 million students, equivalent to 40 percent of the college population in 1940 (Census, 1940). Over a five years, it offered courses in engineering, chemistry, physics, and management for a total of 7,037 classes. A distinctive feature of the ESMWT is that it prohibited any discrimination based on age, gender, and race, and therefore gave women and nonwhite workers a unique opportunity to participate in free graduate and post-graduate education (Armsby, 1946).

From an organizational point of view, the ESMWT was run by its central office in Washington DC, that focused on administrative tasks at the national level, such as working with other government agencies, publishing program material, and preparing course guidelines. Given the large number of students involved, it was decided to hold the ESMWT courses at already existing universities and colleges. To do so, each of the twelve War Manpower Commission regions in which the US had been divided appointed an ESMWT national representative and two ESMWT advisers (Figure A.1, Panel A). The national representative took care of communications with the central ESMWT office in DC. The advisors, "recognized leaders in education", that did not receive any compensation, were responsible for selecting participating universities and colleges in their regions, working close to them to evaluate the needs of the local industries, and "supervising the training programs in the field" (ESMWT, 1941).

To select which universities and colleges would have hosted the ESMWT program, the advisors surveyed the degree-granting institutions in their Manpower Commission regions and chose those within 50 km of war industrial facilities (ESMWT, 1941). This would allow ESMWT trainees to maintain their jobs. Despite hosting the ESMWT program was voluntary, universities and colleges were eager to "to sacrifice space and personnel for patriotic reasons" (Cardozier, 1993). Between 1940 and 1945, out of 1,209 degree-granting institutions existing in the US 218 (18.03 percent) hosted at least one ESMWT course (Figure A.1,

[1] Notably, workers of the 25,393 US war contractors, companies that received contracts for war supplies worth at least $50,000 between June 1940 and September 1945, were not eligible to enroll in the ESMWT program. These companies could apply for another war program, the Training Within Industry Program that provided free management consulting, as analyzed in Bianchi and Giorcelli (2022).

Panel B).

The philosophy of the ESMWT was to set the content of the program at the centralized level and train faculty chosen by their own universities and colleges to teach the ESMWT classes (ESMWT, 1942). Participating institutions were not expected to realize a profit from the program, but were reimbursed for all proper costs incurred in organizing and conducting courses under the program after submitting a yearly report (Armsby, 1946).

To ensure a full collaboration with the war facilities where trainees were working, the ESMWT regional advisers established a continuous communication with their executives, by checking their war-related needs and asking their opinion about the program (ESMWT Administration, 1941). As a result of this tight cooperation, war facilities widely advertised the ESMWT courses to their eligible workers, with announcements on company bulletin boards, as well as in local newspapers and through radio announcements (Armsby, 1946). Moreover, the vast majority of companies' reports made enthusiastic statements about the ESMWT benefits to their production (Armsby, 1946).

To recruit students across all disciplines, the ESMWT set an entry examination, based on a formal test, in-person interviews as well as an overall evaluation of the candidate curriculum (ESMWT, 1942). The ESMWT established that the exam grade should be expressed in hundred points and that only applicants who score above 80 points were admitted.

The organization of the ESMWT differed substantially between engineers and scientists, and managers. In fact, engineers and scientists had a strong technical background and needed training only for dealing with specific, sometimes local, war-related issues. As a result, training in engineering, physics, and chemistry offered three-month-long courses on specific topics, such as war explosives, bombproof structures, and aircraft and tank design. By contrast, it was decided that "managers nationwide required a comprehensive business education to be able to organize, coordinate and supervise production within and across plants" (Khurana, 2010), and were therefore offered an 18-month MBA-style program.

2.1 The Managerial Component of EMSWT

The major problem that the ESMWT faced in setting up its managerial component was that business school education was still in its infancy at the eve of WWII (Giorcelli (2021)). Despite a sharp increase in their number since the 1920s, "in 1940 business schools were not offering a professional education yet" (AACSB, 1966). First, there was no widespread agreement on the nature of a curriculum that would prepare students for a career in business" (Khurana, 2010). MBA programs were fairly heterogeneous. They either offered courses in subjects relevant for business, like accounting, finance, business correspondence, or training for specific jobs, such as bankers, or industries with little to no analytical classes (AACSB, 1966). Second, business school faculty often lacked preparation in basic research methods

and their published research largely consisted of anecdotical examples or broad generalizations that were rarely subjected to rigorous testing or peer review (Khurana, 2010).

After reading several surveys on the status of business schools and discussing with the Manpower Commission, in Summer 1940 the ESMWT decided that its managerial component had to be organized from scratch and that this was a unique opportunity to create a professional management education in the US (ESMWT Administration, 1941). To do so, the ESMWT relied on the American Association of Colleges and Schools of Business (AACSB), an association born with the goal of "promoting and improving higher business education in North America." Among other activities, the AACSB periodically compiled a list of accredited business schools and of the courses they offered.[2] The ESMWT asked help to the trustees of the AACSB, Deans at twenty-five business schools, who worked close to the U.S. commissioner of education and the twelve local Manpower Commissions to determine the educational needs of U.S. managers.[3] After an intense activity of interviews with business leaders and visits of war facilities in Fall 1940, it became clear that the program should have included a comprehensive business education with a strong focus on analytic tools to systematically organize and measure production. The ESMWT managerial component took an MBA-style format with compulsory classes in accounting, statistics, quality control, strategy, human resources management, production planning, finance, marketing, and only a class that dealt specifically with local wartime production management techniques (ESMWT Administration, 1941, 1942).

Once the curriculum of the program was set, the Deans organized full-time training for business school faculty who had to deliver the management classes. The faculty trainings happened every year from January 1941 to May 1945 and needed to be completed once. During this period, perspective ESMWT instructors travelled to DC where they attended a month-long orientation class in management and a four-month training in the specific course they would have taught, decided with the Deans and ESMWT experts agreement (ESMWT Administration, 1941).

The Deans decided to make this program available to production supervisors and middle managers with a B.A. degree working at the war industrial facilities, as defined by the

[2] The list of accredited business schools was compiled after a peer-reviewed process that evaluated the quality of curriculum and the professor-to-student ratio. AACSB also ran surveys on the courses offered by business schools, the content of their curricula, the qualification and publication of business school professors and the professor-to-student ratio to assess the state of business school education (AACSB, 1966).

[3] In 1940 the trustees were the Deans of Wharton, Harvard Business School, MIT Sloan, Berkeley Haas, Dartmouth Tuck, Chicago Booth, Northwestern Kellogg, Columbia Business School, NYU Stern, Stanford GSB, Ohio State, Tulane, Purdue, University of Illinois Urbana-Champaign, University of Nebraska, Pittsburgh, University of Texas-Austin, University of Wisconsin-Madison, Yale University, University of Colorado Boulder, Boston University, Washington University, University of Michigan, UCLA, St. Louis University.

Manpower Commission.[4] Application windows were established every six months from August 1941 to January 1945. Admitted managers attended courses in sections of around 40 workers. For the first time, the allocation of students across different sections was random, anticipating a practice later adopted by several business schools, for instance by Harvard Business School since 1949 (Shue, 2013). Students usually took classes full-time three days a week and work in their manufacturing facilities in the rest of the week, and received a certification upon completing the program (ESMWT Administration, 1942).

3 Data

I assembled a new dataset that links managers who applied to the ESMWT to their career outcomes and the performance of war industrial facilities they were employed at the time of ESMWT application. These data, collected and digitized from historical archives, provide an unusual level of details and reflect the exceptional effort undertaken by the U.S. government during WWII to monitor the publicly funded programs it was supporting and to collect systematic information on production of the war facilities. In this section, I describe the data sources and provide key summary statistics. Additional information on the data collection process and the variable definitions can be found in Appendix B.

3.1 Managers that Applied for ESMWT

The first step of the data collection targeted the universe of applicants to the managerial component of the ESMWT. As explained in Section 2.1, this program was available to middle managers and production supervisors, holding a B.A. degree and working in a war industrial facility at the time of application, as determined by the regional Manpower Commission (ESMWT Administration, 1941). Specifically, I retrieved the list of applicant managers from the records of the U.S. Office of Education, available at the U.S. National Archives (NARA).

For each applicant manager, the records include the candidate's full name, date and place of birth, a curriculum with information on education (type of B.A. and university attended) and employment (war facility in which the candidate was working, position, number of years spent there, and previous employment), as well as personal characteristics, such as gender, race and marital status. The records also contain candidate's score in the entry exam and for managers who scored above the 80-point threshold, information on courses taken, grades received, and program completion.

[4] While surveying war industrial facilities, the regional Manpower Commission classified workers based on their occupation. Workers classified as production supervisors or middle managers with a B.A. degree were eligible to enroll in the managerial component of ESMWT (ESMWT Administration, 1941).

In total, 675,463 managers applied to the ESMWT between July 1941 and January 1945. Applicant managers were on average 26.54 years old, had spent 17.03 years in school, had been employed for 4.39 years, 2.61 of which working in the war industrial facility they were employed at when they applied for the ESMWT (Table 1, Panel A, column 1). Manager education background was almost equally split between Economics or Business majors and STEM majors (47 and 45 percent respectively). While the great majority of applicants were white men, female and nonwhite managers represented 15 and 8 percent of the total. These numbers were fairly high relative to the college population at that time, where female and Afro-American students only represented 4 and 2 percent of enrollment (U.S. Census Bureau, 1940). Slightly more than half applicants were married. Not surprisingly, admitted managers appear positively selected relative to their non-admitted colleagues. On top of being slightly older, they have more years of education, tenure in war facilities and overall employment (Table 1, Panel A, columns 5 and 6, significant at 1 percent). While B.A. majors, gender composition and marital status is substantially the same across the two groups, Afro-Americans managers represent 10 percent of admitted managers and only 4 percent of the non-admitted ones (Table 1, Panel A, columns 5 and 6, significant at 1 percent).

In the ESMWT entry exam applicant managers earned an average score of 74.70, a mean lower than the program threshold of 80 points (Table 1, Panel B). The five lowest achieving applicants only scored 37 points, while 65 managers were able to get the maximum score of 100. Applicants that got more than 80 points and were therefore admitted to the ESMWT were 205,933 (30.49 percent), while the remaining 469,530 were excluded. In principle managers who scored below the threshold could apply for the program again in the following application window. However, only 5.22 percent of them did so. Out of these 24,509 re-applicants, 58 percent scored above the ESMWT threshold at the second attempt. No manager applied to the program more than three times.

3.2 Career Outcomes of Applicant Managers

I next reconstructed the career outcomes of applicant managers through the reunion books of universities and colleges where they got their B.A., that I collected between 1950 and 1975. Reunion books contain updates about professional and personal achievements of students who graduated in a given year, and are compiled either five or ten years, depending on how often institutions organize class reunions. It is worth noting that I use reunion books of managers' B.A. institutions, an information available regardless of whether they were eventually admitted to the ESMWT.

Given the voluntary and self-reported nature of reunion books, information provided shows a substantial heterogeneity across individuals, institutions and years. However, student's

full name, date and place of birth, education, and current and past occupations are systematically reported.[5] Using students' full name, date and place of birth and B.A. majors within institutions, I matched 74.6 percent of applicant students at least once between 1950 and 1975. The matching rate for admitted students, slightly higher than on the full sample, becomes comparable to that of non-admitted students 10 points above and below the threshold, and is substantially identical 3 points above and below the threshold (Table A.1). Specifically, I match 78.14% of admitted and 76.59% of non-admitted managers who scored 10 points above and below the threshold, and 77.14% of admitted and 77.23% of non-admitted students who scored 3 points above and below the threshold (Table A.1, columns 3, 4, 7 and 8). I fail the reject the null hypothesis of same matching rate between the two groups with p-values of 0.388 and 0.913, respectively.[6]

Middle managers, more educated managers, and managers with more working experience are more likely to be matched, likely due to a positive correlation between managers' success and their probability of submitting a reunion book entry. Female and nonwhite managers are also more likely to be matched, as for them exposure in the reunion books may have been more important than for white men, given their low numbers. While the score in the ESMWT entry-exam is associated with a higher matching rate on the full sample, this is no longer the case 10 and 3 points above and below the threshold, the samples used for the analysis in the rest of the paper (Figures 1 and A.2, Panel B, and Table A.1). Finally, predictors of the matching rates are not statistically different between admitted and non-admitted managers who scored 10 and 3 points above and below the threshold (Table A.1, columns 6 and 9).

3.3 U.S. War Industrial Facilities

War industrial facilities, whose middle managers and production supervisors could apply to the ESMWT management component, were civilian plants that were considered essential for war production and therefore under the control of the War Production Board (WPB,

[5] Section 5.5 and Appendix B.3 discuss potential issues of using self-reported information in the reunion books and describe data cross-checks with alternative sources.

[6] I show matching rates within 10 and 3 points of the ESMWT threshold as the first window corresponds to the sample used to estimate equation 1, while the second is the maximum bandwidth that the Stata command `rdrobust` selects across all the outcome variables used in the analysis, as explained in Section 4. These matching rates are substantially higher than those obtained through historical Census matches, which usually range between 15 and 30 percent (see Bailey et al., 2020 and Abramitzky et al., 2021 for overviews). Higher matching rates likely depend on the fact that I match students over a rich set of information reported in a very precise manner, such as full names, date and place of birth, and B.A. majors. Moreover, applicant managers are positively selected relative to the Census population, for instance in terms of education, improving the quality of the matching. A more detailed description of the matching procedure could be found in Appendix B.

ESMWT, 1940; ESMWT Administration, 1941).[7] Even if they did not directly receive war contracts from the U.S. government, given their importance for the warfare, such facilities were monthly surveyed by the regional Manpower Commissions, that collected detailed information on their production, performance, workforce, and implementation of managerial practices. I retrieved and digitized this information for the facilities where ESMWT applicant managers were working from the U.S. National Archives (NARA), monthly between January 1940 and December 1947.

Applicant managers were working at 53,674 war industrial facilities, mostly located around established industrial areas, such as New England and the Mid-West, and where industrialization was nascent, such as in the South (Figure A.1, Panel A). Such companies had on average 2.6 plants and were employing 349.6 workers (Table A.2, Panel A). Most of them (75 percent) were concentrated in the manufacturing sector, followed by services (11 percent), transportation (8 percent) and agriculture (6 percent). On average, 12.6 eligible middle managers and production supervisors per facility applied to ESMWT.

The implementation of key managerial practices, such as factory operation, human resources management, quality, inventory, and sales and orders control appear extremely limited in these firms. The Manpower Commission surveys reported that only between 4 and 9 percent of them were systematically using at least one of such practices before the ESMWT (Table A.2, Panel B), which in turn created severe bottlenecks to their production. For instance, not regularly maintaining machines and safety conditions within the firms resulted in average 27.3 monthly interventions for repairing equipment and 46.5 monthly worker injuries. Poor personnel practices were associated to high absenteeism: the number of absences over the number of work days reached 6 percent, with the risk of jeopardizing war production. Finally, lack of quality, inventory, and sales and orders control determined a substantial fraction of scraped output (12 percent), a massive inventory, accounting for 75 percent of current assets, and a 22 percent of orders delivered past deadline. These statistics show that war facilities were dysfunctional in many aspects of their production and are fully consistent with the need perceived by U.S. government of offering managers a comprehensive business education to organize and supervise war production (Armsby, 1946).

3.4 Institutions that Hosted ESMWT Management Classes

Finally, I collected and digitized data on institutions that hosted the ESMWT management courses. While the U.S. National Archives (NARA) provide the list of the 218 U.S.

[7] The War Production Board was established in January 1942 with Executive Order 9024, replacing the Supply Priorities and Allocations Board and the Office of Production Management. The WPB organized the conversion of production from peacetime work to war needs, allocated scarce materials, established priorities in the distribution of materials and services, and prohibited nonessential production (Herman, 2012).

universities and colleges that participated in the management component of the program, university library archives contain detailed information on course offerings, including name and curricula of faculty involved in teaching, enrollment reports, and correspondence with ESMWT instructors in D.C. regarding courses.

Not surprisingly, the 218 participating institutions were located close to the war industrial facilities, to allow managers to work there while taking ESMWT classes (Figure A.1, Panel B). Universities were 136 (62.38 percent), and colleges 82 (37.61 percent). Only eight of them were women colleges, that allowed only women, and 28 negro colleges, that allowed only "colored students" (Armsby, 1946). Finally, almost half institutions (103) had already a business school, where the management courses took place.

On average, each institution provided instructions to 944.65 managers, 188.93 per year (Table A.3). The ESMWT grouped them into 5,148 different sections, 23.61 per institution, of approximately 40 students each. However, universities and colleges show substantial heterogeneity in the number of sections. While Harvard Business School provided 253 sections and taught 10,120 students alone, Regis College, Massachusetts, only hosted five for a total of 202 students.

Overall, 1,716 faculty taught the ESMWT managerial courses. While this number implies an average of 7.88 faculty per institution, Harvard Business School granted to the program the highest number of faculty (175), and Loyola University, Illinois, the lowest, with only three faculty serving in the ESMWT.

4 Identification Strategy

To identify the causal effect of business school education on manager career outcomes, I implement a regression discontinuity (RD) design, exploiting the fact that managers had to score at least 80 points in the entry exam to enroll into ESMWT classes. The intuition for this empirical design is that managers who scored right above the 80-point threshold and thus were admitted to the program were very similar to those who scored right below and therefore were not admitted.

Specifically, I estimate the following specification:

$$\text{career outcome}_i = \alpha + \gamma \cdot \text{Enrollment}_i + f(\text{Exam Score}_i) + \epsilon_i \tag{1}$$

where career outcome$_i$ is one of the key career outcome metrics of promotion and entrepreneurial activity. Specifically, I use indicators that equal one if manager i was ever promoted, promoted to middle management positions, to top management positions, became self-employed, or (co)-founded a business. Enrollment$_i$ is an indicator that equals one if manager i eventually participated in the ESMWT program. Exam Score$_i$ is the regression

discontinuity polynomial which controls for a smooth function of the entry exam score of managers i. Following Calonico et al. (2014a,b) the baseline specification for equation 1 uses a local linear specification estimated separately on each side of the threshold. The baseline bandwidth is the optimal bandwidth that minimizes the mean squared error of the point estimator, as suggested by Calonico et al. (2014b, 2017).[8] Standard errors are clustered at the decimal-point entry exam score bin level, following Lee and Lemieux (2010)'s advice to cluster at the running variable level. The baseline specification is estimated on the sample of managers whose entry exam score ranged from 10 points below to 10 points above the threshold and excludes managers who scored below the threshold and reapplied. However, the results are not sensitive to selecting a different entry exam score window or including re-applicant managers (Tables A.24 and A.25).

The coefficient of interest is γ, that estimates the causal difference in career outcomes of managers who participated in the ESMWT relative to managers that did not, under the two following identification assumptions. First, managers must not have selectively sorted around the threshold. Second, all other factors that could affect manager outcomes other than receiving ESMWT managerial education vary smoothly at the threshold. The rest of this section provides empirical evidence in support to these identification assumptions.

4.1 No Evidence of Sorting around Entry Exam Score Threshold

A potential violation of the identification assumptions would be represented by managers sorting around the entry exam score threshold. This would happen, for instance, if faculty who graded the entry exam inflated the scores of managers who scored right below 80 points to let them enroll into the ESMWT. However, looking at the full distribution of the decimal-point entry exam score bins, there is no evidence of a clear discontinuity around the 80-point threshold, normalized to zero (Figure A.2).

To check for sorting more systematically, I implement the McCrary (2008) test, that uses the number of observations in each decimal-point entry exam score bins on both sides of the threshold as the dependent variable in equation 1. Figure 1 shows that there is not a discontinuous change in the number of observations in the bins around the threshold. The estimated discontinuity t-statistics is 0.018 with a p-value of 0.706, which further confirms lack of sorting or score manipulation.

This result is consistent with the ESMWT set up. Faculty serving in the program received a five-month training in D.C. to make sure the program was implemented in a very similar way across the country. More specifically, faculty received specific indications of how to evaluate candidates in the entry exam (ESMWT, 1942). Moreover, as universities were not

[8] I perform this analysis using the Stata command `rdrobust`, with a triangular kernel. Tables A.12 – A.15 show that the estimates are robust to using different order polynomials orders and bandwidths.

making any profit from the program, faculty had no incentives to admit more students by artificially increasing their score (Armsby, 1946).

4.2 Testing for Continuity of the Matching Rate with Reunion Books at the Threshold

Another threat to identification may arise if managers who scored above the 80-point threshold had a higher probability of being matched to the reunion books' entries than managers who scored below. If it was the case, results may be driven by the positive selection of admitted managers in reunion books rather than by ESMWT attendance. In Section 3.2, I showed that the matching rate between admitted and non-admitted managers are comparable for managers who scored 10 and 3 points above and below the threshold, and that observable characteristics that predict the matching are not statistically different between admitted and non-admitted workers (Table A.1). In addition to that, Figure 2 graphically shows that the matching rate varies smoothly at the 80-point threshold. Moreover, the estimated γ coefficient from equation 1 using the matching rate as dependent variable, reported in the same figure, is 0.012, small in magnitude and not statistically different from zero. These results further confirm that matching rate does not show a discontinuity related to the ESMWT admission.

4.3 Manager Characteristics Vary Smoothly at the Threshold

A crucial identification assumption of the RD design is that relevant factors that may affect manager career outcomes aside from the ESMWT enrollment vary smoothly at the 80-point threshold. This assumption ensures that managers who scored right above the threshold are comparable to managers that scored right below, and may be violated if the latter were systematically different in their characteristics than the former.

To assess whether this identification assumption holds, I graphically show that manager professional characteristics, such as years of education, tenure in war facilities, employment and type of B.A. major, and personal features, like age, gender, race, and marital status, vary smoothly at the threshold (Figure 3, Panels A-H). Moreover, I estimate equation 1 using each of these characteristics as a dependent variable. None of the eight estimated γ coefficients are statistically significant, which further confirms lack of a discontinuity in manager personal and professional outcomes across the two sides of the threshold. It is worth noting that white male managers had not a higher probability of getting admitted to the program relative to female and nonwhite applicants, which confirms the ESMWT effort in not discriminating against historically under-represented groups (Armsby, 1946).

4.4 Facility Characteristics Vary Smoothly at the Threshold

Despite being very comparable in terms of their characteristics, managers who scored above and below the threshold may have been working in different war facilities, a factor that may have affected their career outcomes. To address this potential issue, I test whether characteristics and outcomes of war facilities – measured in the month the first manager of the facility applied to ESMWT – are comparable across the two sides of the threshold. Since multiple managers from the same facility may have applied to the ESMWT, I associate each facility to the highest applicant manager score. γ estimates of equation 1 using facility characteristics as dependent variables are always small in magnitude and never statistically significant. Moreover, some coefficients are positive and some are negative, which confirms a substantial balance of war facilities across the two sides of the threshold in terms of performance, productivity, size, geographical location, and sectors (Figure A.5, Panel A). Similarly, the number of ESMWT applicant managers and of engineers and scientists that applied to other ESMWT programs is statistically indistinguishable across facilities around the threshold, which suggests that admitted managers were not coming from firms more eager to participate into government programs. I repeat the same exercise looking at managerial practices, whose implementation appears almost identical in war facilities right above or right below the threshold (Figure A.5, Panel B).

Even if war facilities of managers who scored right above or right below the threshold were comparable at the time of ESMWT application, they may have been on a different performance trend in the months before, an instance likely to impact manager careers. To check if this is the case, I estimate a constant linear time trend model that allows for an interaction of the constant linear trend with an Above 80 Points indicator, that equals one for facilities whose manager highest score in the ESMWT entry exam was above 80 points. The estimated coefficients on the interaction term are very close to zero and never statistically significant (Table A.4). Moreover, the coefficients on the Above 80 Points indicator are not statistically different from zero for all the variables, fully consistent with the evidence that facility characteristics vary smoothly at the threshold, as shown in Figure A.5.

4.5 Managers Who Scored above the Threshold Enrolled in ESMWT

Finally, I check if the rules for enrolling into the ESMWT were strictly implemented. In particular, I investigate if managers who scored above the 80-point threshold enrolled in the ESMWT and managers who scored below did not.

To do so, in Figure A.4 I graphically examine the relationship between test scores and program enrollment. Each point represents the average enrollment in decimal-point entry

exam score bins. The figure shows that there is a sharp discontinuity in the probability of enrolling in the ESMWT around the threshold. Specifically, the probability of enrollment ranges between 97 and 100 percent for managers who scored about the 80-point threshold.[9] By contrast, no managers that scored below such threshold enrolled in the program.[10] Therefore the program followed its enrollment guidelines quite strictly.

Overall, the results presented in this section do not show evidence of violation of the identification assumptions and suggest that managers who scored below the 80-point threshold and could not enroll in the ESMWT are comparable to and therefore represent a reasonable counterfactual for managers who scored above the threshold and were admitted into the program.

5 The Effects of ESMWT on Manager Career Outcomes

In this section, I compare differences in promotion within firm and entrepreneurial activity between managers who scored right above and right below the 80-point ESMWT threshold in their entry exam. I then examine whether under-represented groups, such as female and nonwhite managers, gained larger benefits from the program attendance than their white male colleagues.

5.1 Effects on Promotions

Participating in the ESMWT had large and positive effects on the managers' probability of promotion, defined as an indicator for any advancement in the occupation rankings established by the Manpower Commissions over the entire manager career (Table B.1).[11]

A graphical comparison between managers above and below the threshold shows that the probability of promotion dramatically increased upon ESMWT participation (Figure 4, Panel A). More precisely, estimates of equation 1 indicate that managers who scored

[9] It is natural to wonder why the compliance with the program was so high. While ESMWT participants were automatically deferred from WWII draft because their occupation was "in support of national health, safety, or interest" (category II-A of the 1940 Selective Training and Service Act), this is unlikely to be the only reason. In fact, high-skilled workers of war facilities could ask for deferment in the same category, and all applicant managers with a score below 80 points who were drafted ended up being deferred. However, admitted managers who did not enroll in the ESMWT or who dropped out had to sustain the administrative costs of the program. By contrast, managers who were not admitted to the ESMWT did not have to sustain any costs (ESMWT Administration, 1941).

[10] While the compliance with the program is very high, it is not perfect. For this reason, in Tables A.20 and A.21, I estimate a fuzzy RD where the treatment assignment rule (Exam Score in equation 1) is used an instrument for ESMWT participation. The RD and the fuzzy RD results are almost identical.

[11] As explained in greater detail in Appendix B.2, I first establish managers job titles at the time of application to the ESMWT and in the reunion books based on the Manpower Commission Surveys, that categorized 18 job titles across 10 occupation rankings within the firm hierarchy. I then define promotion as any advancement across the 10 occupation rankings.

right above the ESMWT threshold were 25.6 percentage points more likely to be promoted relative to managers who scored right below (Table 2, Panel A, column 1). Compared to an average probability of promotion of 60.30 percent for managers whose score was right below the threshold, this corresponds to a 42.45 percent increase.

This increased probability involved both promotions to key middle management roles and to leading positions in top management, as shown by Figure 4, Panels B-E. Managers who scored right above the ESMWT threshold had a 20.1 percentage points higher probability of becoming plant managers and 16.8 percentage points higher probability of becoming general managers relative to managers right below, respectively a 49.14 and a 60.43 percent increase relative to the average probability of reaching such positions for managers who scored below the threshold (Table 2, Panel A, columns 2 and 3). Moreover, for such managers the probability of becoming a top executive or a CEO increased by 3.7 and 2.4 percentage points respectively (Table 2, Panel A, columns 4 and 5). While these estimates are small in magnitude, they represent a 127.58 and a 266.67 percent increase relative to the very low chances of hitting top management roles for managers below the threshold.

Next, I examine how the differential promotion patterns between admitted and non-admitted managers evolved over time, considering the promotions to higher positions 10, 20 and 30 years after ESMWT participation. The probability of overall promotions and promotions to plant and general management positions of admitted managers increased up to 20 years after ESMWT participation, and were still positive and sizable after 30 years (Table A.5, columns 1-3). By contrast, promotions to top management roles steadily increased during the 30 years after ESMWT (Table 2, columns 4-5). Considering an average age of 26 years at the time of enrollment, these results indicate that managers reached top positions when they were around 56 years old.

Did participation in ESMWT affect manager chances of moving to other, potentially better-performing, firms than war facilities? I first show that managers who scored right above the threshold were 20.7 percentage points more likely to move to another firm than managers who right scored below it (Table A.6, column 1), a 60.0 percent increase relative to the average probability for managers below the threshold. Such managers were also 16.1 percentage points more likely to move to other firms and being promoted as either plant or general managers and 5.9 percentage points more likely to move to other firms and being promoted as top executives (Table A.6, columns 2 and 3). These effects correspond to a 68.5 percent and a 2.6-fold increase, respectively, relative to the average probability for managers below the threshold. Moreover, managers who scored above the threshold tended to move to either listed firms or firms included in Fortune 500, therefore larger in size and revenues than war facilities, relative to managers who scored below the threshold. By contrast, managers who scored right above the threshold and continued to work in the war facilities were more

likely to get promoted to middle management positions, but did not necessarily receive more promotions to top management roles, relative to managers who scored below the threshold and continued to work in the war facilities (Table A.7, columns 1-5).

5.2 Effects on Entrepreneurial Activity

ESMWT attendance systematically increased managers' engagement in entrepreneurial activity. Figure 5, Panels A and B show that the chances of becoming business owners or (co)-founding a business were substantially larger for managers who scored above the threshold, relative to managers who scored below. The coefficients estimated from equation 1 indicate that the former was 10.9 percentage points more likely to become business owners and 9.8 percentage points more likely to (co)found their own business relative to the latter (Table 3, columns 1 and 2). These effects correspond to a 72.18 and a 78.40 percent increase relative to the average probabilities for the managers below the threshold.

On top of increasing self-employment, participation in the ESMWT boosted innovative entrepreneurship (Figure 5, Panels C and D). Managers who scored above the threshold were 8.3 percent more likely to found an innovative business, defined in the reunion books as the first in the county where managers were operating, a value twice as large as probability for managers below the threshold (Table 3, column 3). Moreover, they systematically engaged more in two nascent industries, consulting that provided management advices to other companies, and small business investment companies (SBIC), the first examples of privately owned and managed investment funds that financed small businesses in the form of debt and equity. Admitted managers were 5.5 percentage points more likely to offer consulting services and 2.9 percentage points more likely to found a SBIC, showing a 261.90 and 290.00 percent increase relative to managers below the threshold (Table 3, columns 4 and 5).

5.3 External Validity: RD Estimations Away from the Threshold

Although the RD design allows to estimate the causal effect of attending the ESMWT on manager career outcomes, this effect is a local one. Specifically, it measures the impact of ESMWT attendance only for managers whose entry-exam score lies in a small neighborhood around the threshold. If these individuals are substantially different from those whose scores are less close, the results presented so far may have a limited external validity. To alleviate this concern, I implement the procedure developed by Angrist and Rokkanen (2015) to estimate the RD treatment effects in a larger window around the threshold. This procedure relies on a testable conditional independence assumption (CIA): in a window around the threshold, potential outcomes are assumed to be mean-independent of the running variable

conditional on a set of controls. I focus on the window 15 points above and below the threshold, which covers 82% of the applicant managers.

The CIA holds in my setting. After conditioning on managers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP), the score does no longer predict the probability of promotion and engagement into entrepreneurship (Figures A.6 and A.7). More specifically, for all the outcome variables used in the main analysis I fail to reject the null hypothesis of a score coefficient equal to zero on both sides of the threshold. I next construct two CIA-based estimators: a linear re-weighting estimator, as proposed by Kline (2011), or an inverse propensity score weighting, discussed by Hirano et al. (2003).[12]

I find treatment effects which are all positive, statistically significant and consistent with the RD estimates, although smaller in magnitude. For instance, the probability of promotion moves from 25.6 to between 19.8 and 20.7 percentage points, while the probability of becoming business owner moves from 11.5 to between 8.4 and 9.5 percentage points (Tables A.8 and A.9, columns 1-3). Notably, for all outcomes I fail to reject the null hypothesis of equality between the RD and the CIA-based estimates.

Figures A.9 and A.10 plot counterfactual outcomes of managers who scored below they threshold had they attended the ESMWT, estimated using the parameters from the linear reweighting estimator proposed by Kline (2011).[13] Such outcomes are increasing in the distance from the ESMWT threshold, as higher-scoring managers are likely to reach better labor market outcomes both when they are treated and when they are untreated. However, they are fully consistent with the table results, as they indicate a remarkably stable gain in career outcomes even away from the cutoff. Moreover, actual and predicted outcome lines are approximately parallel, implying that average treatment effects are constant along the score.

Overall, these results indicate that the positive effects of attending the ESMWT are not limited to managers who scored very close to the threshold and that estimation results hold also away from the threshold.

[12] More specifically, Kline (2011) uses a propensity score re-weighting estimator based upon a linear model for the conditional odds of being treated using the classic regression-based estimator of counterfactual, as studied by Oaxaca (1973) and Blinder (1973). Hirano et al. (2003) weights observations by the inverse of nonparametric estimates of the propensity score, rather than the true propensity score.

[13] These estimates are obtained after controlling for workers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP). Figure A.8 displays considerable common support between the distribution of the propensity score for managers who scored above and below the ESMWT threshold.

5.4 Effects on Under-Represented Groups of Managers

The U.S. Office of Education prohibited any discrimination in the ESMWT admissions based on race and gender (Armsby, 1946). This feature of the program allowed traditionally under-represented groups, such as nonwhite and female managers, to participate for free in post-graduate education from which they had been historically excluded. An analysis of commencement books from the 25 business schools whose Deans created the ESMWT managerial component indicate that between 1930 and 1939 a total of 5,139 students earned an MBA. Out of them only 25 were nonwhite and a mere 39 were female.

I test if the ESMWT more beneficial for these under-represented groups of managers by estimating equation 1 on the sample of nonwhite and female applicant managers, respectively. The results indicate that the career outcomes of nonwhite and female managers substantially improved upon ESMWT participation, with larger effects than those estimated on the full sample. Nonwhite managers that scored right above the threshold were 40.3 percentage points more likely to receive a promotion relative to the nonwhite managers who scored right below, and 13.3 percentage points more likely to become business owners (Tables 4 and 5, Panel A, column 1). Similarly, upon taking the ESMWT classes, female managers that scored right above the 80-point threshold, relative to female managers that scored right below, experienced a 37.8 percentage points higher probability of promotion, and 11.5 percentage points higher chances of becoming a business owner (Tables 4 and 5, Panel B, column 1). These estimates range between a double and a triple probability increase, relative to comparable managers right below the threshold, while the percent increases estimated on the full sample for the same outcomes span between 40 and 60 percent (Tables 2 and 3).

Did the ESMWT help reduce the occupation gap between nonwhite and female managers and their white and male colleagues? In the interest of external validity, I perform this exercise on managers who scored between 65 and 95 points, using the same approach described in Section 5.3. First, I first show that the CIA holds for white, nonwhite, male and female managers (Figures A.11 and A.12, Panels A-D). Next, I estimate the treatment effects away from the threshold for each of these four groups of managers. The results indicate that white managers had a probability of promotions of 57.1 percent left at the threshold, while non-white managers of 32.1 percent, corresponding to a gap of 25 percentage points (Table A.10, Panel A, column 2). Upon the ESMWT participation, such probabilities increased to 77.7 percent (57.1+20.6) for white managers and to 69.8 percent (32.1+37.7) for nonwhite ones, resulting in a gap of 7.9 percentage points (Table A.10, Panel B, column 2). Therefore, the promotion gap between white and nonwhite managers was reduced by 17.1 percentage points. A similar calculation for male and female managers indicates that upon ESMWT participation their occupation gap dropped by 14 percentage points (Table A.10, Panels C

and D).[14] Focusing on entrepreneurial activity, the ESMWT contributed to a 3.3 percentage points drop in the racial gap and to a reduction of the gender gap (Table A.11, Panels A-D) in self-employment.[15]

While racial and gender gaps are usually calculated on the aggregate population, ESMWT applicants represented 33.7 percent of the production supervisors and middle managers according to the 1940 Census. Therefore, showing to what extent the ESMWT managed to reduce racial and gender labor market differences could be, at least in part, informative about the evolution of the occupation and self-employment gap of the most educated U.S. managers between 1945 and 1975.

5.5 Robustness Checks

In this section, I show that my results are robust to a variety of modifications of the baseline specification and of the sample.

Alternative specification of the RD polynomial. Equation 1 uses a local linear specification estimated separately on each side of the threshold, following Calonico et al. (2014a,b). Using alternative RD polynomials, such as a second- or a third-order polynomial lead to very close estimates to the baseline, confirming that my results are not driven by the choice of a specific RD polynomial (Tables A.12 and A.13, Panels A and B).

Different bandwidth. In the baseline specification, following Calonico et al. (2014b, 2017), I use the optimal bandwidth that minimizes the mean squared error of the point estimator. As these optimal bandwidths are between 2 and 3 points below and above the ESMWT threshold for all the outcomes in Tables 2 and 3, I repeat this analysis keeping the bandwidth fixed at either 3 or 2. The results are substantially identical to the baseline ones (Tables A.14 and A.15, Panels A and B). I get very similar results even with a smaller fixed bandwidth of one, despite it reduces substantially the sample size (Tables A.14 and A.15, Panel C).

Including control variables. I next analyze how my results change to adding different sets of control variables. First, I control for manager professional and personal characteristics, such as years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status. Not surprisingly, as all these variables vary smoothly at the threshold (Figure 3, Panels A-H), controlling for them leaves the estimates virtually

[14] The gender gap in occupation is 30.5 percentage points (61.3-30.8) to the left of the threshold and 16.5 percentage points to the right of the threshold ((61.3+20.5)-(30.8+34.5), Table A.10, Panels C and D, column 2).

[15] The racial gap in self-employment is 7.1 percentage points (11.2-4.1) to the left of the threshold and 3.8 percentage points to the right of the threshold (11.2+8.1)-(4.1+11.4), Table A.11, Panels A and B, column 2). The gender gap in self-employment is 11 percentage points (13.8-42.8) to the left of the threshold and 8.2 percentage points to the right of the threshold (13.8+7.5)-(2.8+10.3), Table A.11, Panels A and B, column 2).

unchanged, but improves the precision of the estimates (Tables A.16 and A.17, Panel A). Similarly, controlling for facility fixed effects or for university fixed effects does not change the results (Tables A.16 and A.17, Panels B and C).

Alternative level of standard errors clustering. To test that autocorrelation within managers from the same facility or that attended the same university within application windows and sections, does not invalidate inference, I cluster the standard errors at the facility, university-application window or university-section level. In all three cases, the significance of the estimates remains unchanged, often leading to smaller standard errors that in the baseline specification (Tables A.18 and A.19, Panels A-C).

Fuzzy RD. Figure A.4 shows that managers who scored below the 80-point threshold did not enroll into the ESMWT. Among managers who score above the threshold, more than 97 percent enrolled into the program, indicating a very high but not full compliance. To test if this is an issue for the validity of my results, I implement a fuzzy RD where I instrument the participation to the ESMWT with the entry exam score. The RD results and the fuzzy RD results are very similar, indicating that the non-perfect compliance to the ESMWT enrollment rule does not affect the baseline estimates (Tables A.20 and A.21).

Placebo test. To test whether the estimated effects are truly driven by the ESMWT participation, I check if the RD estimation produces effects of similar size in other points of the test score distribution. To do so, I estimate equation 1 using fake discontinuities at 70, 75, 85 and 90 points in the test score. The estimated coefficients are small in magnitude and statistically insignificant, which confirms that my findings are driven by the real discontinuity and therefore by the ESMWT participation (Tables A.22 and A.23).

Estimating sample. The baseline specification is estimated on the sample of managers whose entry exam score ranged from 10 points below to 10 points above the entry exam threshold and that did not re-apply to the program if not admitted. Using alternative ranges, such as 9, 7, 5, and 3 points above and below the threshold, leads to the exact same estimates (Tables A.24 and A.25).

Including Managers Who Re-Applied to the ESMWT. I test if my results are robust to the inclusion of the 24,509 managers who reapplied for the ESMWT after failing their first attempt. I assign to them either the first or the highest score they earned in the entry exam, obtaining results almost identical to the baseline (Tables A.26 and A.27).

Excluding Managers Below the Threshold Who Got an MBA after WWII. Managers who scored below the ESMWT threshold may have gotten an MBA privately after the end of WWII. If it was the case, my estimates would represent a lower bound for the effects of business school education on manager career outcomes. However, only 15,114 (3.22 percent) managers who scored below the ESMWT threshold reported in the reunion

books to have earned an MBA after the ESMWT.[16] This low percentage may be due to the fact that managers would have to paid for MBA out of pocket and may have considered the return of MBAs not high enough. Repeating the analysis excluding these managers lead to results very similar to the baseline ones (Tables A.28 and A.29).

Cross-Check of Reunion Book Entries. A potential issue in using reunion books to trace manager career outcomes is that they are self-reported. Sections 3.2 and 4.2 have already discussed that managers who scored above the ESMWT threshold are not more likely to be matched with reunion books than managers who scored below it, and that variables that predict the probability of matching are comparable between admitted and non-admitted managers 10 points above and below the threshold. However, it is possible that managers inflate their career outcomes in reunion books. To investigate this issue, I matched applicant managers with entries from Marquis' "Who's Who" and "Business Executives of America" that list and outline a short biography of the most famous living business leaders. While the matching rates between these entries and applicant managers are substantially lower than those obtained using the reunion books, occupations seem reported consistently across the three sources (see Appendix B.3 for more details). Moreover, estimating equation 1 using entries from these two sources as outcome variables leads to results comparable with the main findings (Tables B.5-B.8).

6 Mechanisms

In this section, I examine whether the increased managers' promotion upon ESMWT attendance may be driven by the program participation acting as a signal or if they are driven by better manager performance in the war facilities.

6.1 Did the ESMWT Act as a Signal or Did Its Content Matter?

A potential explanation for the positive effects of ESMWT participation on managers' promotion could be that the program acted as a signal. Enrolled managers may have been promoted upon the program completion and put on a higher career path, regardless of what they learnt or of any tangible improvements in their facilities performance. While this is a possibility, it is worth noting that all managers that attended the ESMWT were already working in the war facilities for on average 2.6 years at the time of the program. Therefore, it is likely that employers realized, at least in part, what the true quality of managers was before ESMWT, making the signaling channel less important than in a traditional hiring setting. Moreover, signaling could not explain the higher engagement of admitted man-

[16] Notably, these managers were not eligible for the G.I. bills since they were not veterans.

agers in self-employment and entrepreneurial activities. On the other hand, managers could have learned useful knowledge while taking the ESMWT classes and brought it back to their firms. In this case, promotions would follow improved managers' performance upon ESMWT attendance.

To investigate these competing mechanisms more in-depth, I compare the timing of manager promotions after ESMWT to that of changes in facilities performance, using data on the Manpower Commission Surveys. Between 1940 and 1947, such surveys monthly recorded both the occupational rankings of managers and war facility performance.[17] Promotions right after the end of the ESMWT would be consistent with a signaling mechanism. By contrast, promotions after an improvement of facility outcomes would be indicative that managers were promoted within the firm based on an increase in the observed output. Since on average 12.6 managers per facility applied to the ESMWT, to estimate the same RD specification as in equation 1 on both manager promotions and firm performance, I restrict the sample to managers whose plants had only one applicant.

I start this analysis by estimating the monthly probability of manager promotions within facility occupational rankings during and after the ESMWT. Managers who scored right above the 80-point threshold did not have a higher probability of being promoted neither during nor for almost a year after the ESMWT end, relative to managers who scored right below (Figure A.13). In the following months, promotion probability of managers who scored right above the threshold shows a positive trend that becomes statistically significant starting 16 months after the end of the program and is estimated to be 0.8 percentage points higher than that of managers who scored below the threshold at the end of the sample, a year and a half after ESMWT completion.

The fact that this analysis only compares managers from facilities with a single applicant excludes that the increased promotions of admitted managers happened at the expenses on non-admitted colleagues. This could have happened in facilities with multiple applicants who may have competed for a limited number of higher-ranked positions. Even if this case, however, in the longer term, admitted managers moved to different firms and turned into entrepreneurship activities, making such constraints less binding. Moreover, while it is possible that not being admitted to the program was perceived as a negative signal by the employers, the scarcity of high-skilled workers during the war makes unlikely that non-admitted employees were penalized because of that. For instance, none of non-admitted managers was either degraded or fired, at least until 1947.[18]

Focusing on firm performance, outcomes of facilities whose unique applicant manager

[17] It is worth noting that, over these years, manager movements across facilities or to other firms were virtually non-existent and all the facilities remained in operation, given their crucial role in the warfare.

[18] As explained in footnote 8, all applicant managers with a score below 80 points who were drafted ended up being deferred, given the importance of their occupation for national defense.

scored above the ESMWT threshold, relative to facilities whose unique applicant manager scored below it, differentially decreased during the ESMWT implementation.[19] Specifically, five months after the ESMWT start value added and productivity of admitted manager facilities was respectively 2.8 percent and 2.5 percent lower than to those of non-admitted managers plants (Figure A.14, Panels A and B). This is likely due to the fact that admitted managers only worked part-time, potentially harming the performance of their facilities. However, such plants steadily recovered and largely outperformed the non-admitted manager ones after the end of the ESMWT. Two months after the ESMWT completion, value added and productivity of admitted manager facilities were 2.9 percent and 2.1 percent higher than those of non-admitted manager plants, already compensating the largest loss experienced during the ESMWT months. At the end of the sample, one and a half year after the program, these values were respectively 8.0 and 7.7 percent higher than those of non-admitted manager facilities. By contrast, the number of employees remained comparable between admitted and non-admitted manager facility both during and after the ESMWT (Table A.14, Panel C), indicating the the government did not help admitted manager plants to grow big.

What drove the changes in war facility performance? To trace a more direct link between the ESMWT content and the changes in war facility performance, I test whether ESMWT attendance was related to an increased adoption of managerial practices. In fact, the ESMWT gave compulsory classes in factory operations, quality control, human resources management and production planning, whose implementation was monitored by the Manpower Utilization Surveys.

I estimate equation 1, using indicators for managerial practices implementation during and after the ESMWT as dependent variables. The results indicate that, during the ESMWT, industrial facilities of admitted managers - relative to firms of non-admitted managers - showed a higher probability of implementing any of the nine managerial practices surveyed by the War Manpower Administration, ranging from a 4.5 percent higher likelihood of introducing bonus for workers to a 14.9 percent increased probability of performing output quality control (Figure A.15, Panel A). Such probabilities increased, even if facility performance declined during the same months. This may be due to the fact that war facilities were not only having their managers working part-time, but also making changes in their organization that may have been beneficial over time, but created some disruptions in the first months of implementation. Managerial practices implementation further raised after the end of ESMWT. For instance, the probability of introducing bonus for workers was 21.1

[19] Given that the ESMWT organized management classes from August 1941 to January 1945 that lasted 18 months and war facility performance are monthly recorded between January 1940 and December 1947, I can follow all facilities from 18 months before to 36 months after the ESMWT. Months between 0 and 18 correspond to the ESMWT training period; months between 19 and 36 correspond to the post-ESMWT training period.

percent higher in industrial facilities of admitted managers relative to firms of non-admitted managers after then end of ESMWT, while the probability of performing output quality control was 55.8 percent larger (Figure A.15, Panel A).

The interpretation of these results should take into account the self-reported feature of the Manpower Utilization Surveys: admitted managers may have over-reported the adoption of practices upon completing the ESMWT courses. To validate this data, I also look at more tangible outputs of good management, such as machinery maintenance, workers injuries, scraped output, absenteeism, amount of inventory, and late delivered orders. Since these values were very important for the US war production, the Manpower Commission put a lot of effort to collect them very precisely (ESMWT TWI Bulletin, 1940). After the end of ESWMT, industrial facilities of admitted managers reported 29.3 percent fewer interventions of repairing machines and 18.4 percent fewer worker injuries than firms of non-admitted managers, indicating a substantial improvement in factory operations (Figure A.15, Panel B). Scraped output dropped by 29.5 percent, as a result of systematic quality control. Similarly, absenteeism was reduced by 13.5 percent, suggesting better human resource management. The ratio of inventory and current assets dropped by 25.1 percent, likely due to stock monitoring, while late delivered orders decreased by 19.2 percent thanks to production planning and order prioritization.

This section has shown that facility performance of admitted managers differentially raised since the first month after the ESMWT completion, paired to an increase of managerial practices implementation during and after the ESMWT. By contrast, admitted manager promotion probability started to increase more than a year after the end of the program, relative to non-admitted managers. This evidence does not suggest that the ESMWT acted as a signal, but instead that admitted managers were rewarded only after they had a sizable impact on production and productivity. However, it could still be the case that the ESMWT signal helped admitted managers to move to other, better firms after 1947. While this possibility cannot be tested, I assert two points. First, the importance of signal decreases over time, as the true value of workers emerges, while the ESMWT effects on manager career outcomes materialized over their entire career. Second, the impact of admitted managers on the performance of their facilities may, at least in part, explain why other companies became interested in hiring them.

6.2 Correlation between Share of Enrolled Managers and Facility Performance

The improvement of facilities performance upon the ESMWT completion suggests that the program taught managers useful content to bring back to their firms. Since managers that

applied or were admitted to the ESMWT ranged between 4 and 33 percent of total facility managers, it may be interesting to examine if the ESMWT effects on performance and managerial practices implementation depended on the facility share of managers admitted to the program.

To perform this analysis, it is not possible to use the RD design since multiple managers from the same firm applied to the ESMWT. Instead, I estimate the following DID model on the sample of the facilities whose managers scored between 65 and 95 points in the entry exam:[20]

$$\text{outcomes}_{it} = \sum_{n=1}^{5} \beta_n(\text{Treated}_i \cdot \text{Post}_{it} \cdot \text{Share of Managers}{=}n_i) + \gamma \cdot \text{Tot Managers}_i + \delta_t + \eta_{it} \quad (2)$$

where outcomes_{it} are logged value added and TFP of war facility i in month t; Treated_i is an indicator for war facilities with at least an applicant manager who scored above the ESMWT threshold in the entry exam; Share of Managers$=n_i$ are indicators for less than 5%, 5-10%, 10-20%, 20-30% and more than 30% managers admitted to the ESMWT; Post_{it} is an indicator for months after the last admitted manager completed the ESMWT; Tot Managers_i is firm total number of managers at the time of the first application. Such variable allows to control for managerial size, since the share of admitted managers may be mechanically higher in plants with a lower total number of managers; δ_t is year fixed effects. Standard errors are clustered at the facility level.

The results indicate that when less than ten percent of management was involved in the ESMWT, value added and productivity of their war facilities increased, but the impact is imprecisely estimated (Table A.30, columns 1 and 2). The effect of the ESMWT on facility outcomes became sizable and significant when between 10 and 20 percent of facility managers participated in it and monotonically increases for larger share of admitted managers. Conversely, employment doesn't show a differential change in response to ESMWT attendance. This result suggests that a critical mass of managers should be educated in order to affect overall firm performance. However, a caveat in interpreting these findings is that they do not provide causal estimates, as the number of applicant managers could be correlated with facility characteristics.

Similarly, adopting new managerial practices implies substantial changes in firm organization whose success may depend on the number of managers willing to implement them. I therefore analyze if the adoption of managerial practices depended on the share of facility managers admitted to the ESMWT. The results indicate that the adoption of practices,

[20] Section 5.3 shows that RD estimation results hold also away from the threshold for managers who scored between 65 and 95 points in the ESMWT entry exam. I therefore use the same estimation sample for this firm-level analysis.

such as factory operations and quality control, was fairly large even when a relatively small share of managers participated in the ESMWT (Table A.31, columns 1 and 2). By contrast, practices like human resources management, inventory control, and sales and order control had a significantly higher probability of being implemented in facilities where more than ten percent of managers enrolled in the ESMWT (Table A.32, columns 3-5). This difference could be explained by the fact that factory operations and quality control are simple practices that do not require major transformations in firm structure and can therefore be implemented even by a few managers. Conversely, changing personnel practices and reorganizing production are higher-level business decisions that could require the collection of information on different products or units within a firm, and may be changed only if a substantial share of managers is involved.

7 Network Effects

On top of acquiring state-of-the-art managerial knowledge via the ESMWT participation, admitted managers may have met colleagues from other facilities and built a network, which may have in turn affected their labor market perspectives. To quantity the extent of such effects, I exploit the fact that admitted managers could only enroll in the closest university to their industrial facility to be able to work part-time, and that within universities and application window they were *randomly* allocated to sections of roughly 40 students each. This random assignment happened at the beginning of the first year and students assigned to the same section attended all the courses together for the entire duration of the program.[21] In the rest of this section, I first check that the student assignment to sections was truly random; then I assess what role network effects played in shaping manager career outcomes.

7.1 Were Managers Randomly Assigned to ESWMT Sections?

I start this analysis by checking if manager section assignment was truly random. First, I test that section assignment does not predict admitted managers' characteristics to make sure that managers with different characteristics were not systematically assigned to particular sections (Braga et al., 2016; Feld and Ulf, 2017; Zanella, 2023). I estimate the following

[21] The random allocation of students to sections is a distinctive feature of most of today's MBA programs, which followed directly from ESMWT. For instance, in 1949 Harvard Business School began randomly assigning all entering MBA students to sections. However, the implementation of ESMWT random allocation of students presents two advantages in terms of identification compared to modern settings. First, sections were not balanced in terms of gender, marital status, undergraduate institution, and previous industry experience, unlike today (Shue, 2013). Second, the sections remained the same for the entire duration of the program, while today students can choose elective classes after the first year (Thomas, 2022).

specification, separately for each combination of sections s in university u and application window t:

$$y_{is} = \sum_{s=1}^{n_g} \alpha_s \cdot G_{i,s} + \epsilon_{is} \tag{3}$$

where the dependent variables are pre-determined characteristics of manager i admitted to university u in application window t and assigned to section s, such as years of education, years of tenure in the war facility, years of employment, indicator for college degree in Economics and Business, gender, race, marital status, and entry exam score. The explanatory variables $G_{i,s}$ are indicators for each section s in university u and in application window t , that equal one if manager i was assigned to section s and zero otherwise.

If managers who attended the same university in the same application window were assigned to sections independently from their characteristics, α_s coefficients should not be jointly significantly different from zero. More specifically, Murdoch et al. (2008) explains that, in case of random assignment, the p-values of this test should be uniformly distributed with a mean of 0.5. The distribution of the p-values obtained from the test of joint significance of the α_s coefficients appear largely consistent with the random assignment hypothesis. Figure A.16 indicates that for all manager pre-determined characteristics less than 5 percent of tests display a p-value smaller than 0.05 and less than 10 percent of tests a p-value smaller than 0.10. Moreover, the p-value means are always very close to 0.5, the expected value if students were randomly assigned to sections.

Second, I check that section assignment does not predict admitted managers' war facilities characteristics. I re-estimate equation 3, using as dependent variables number of plants, value added, sales, number of employees, productivity, indicators for facilities in manufacturing sector, number of applicant managers and of other employees that applied to the science and engineering component of ESMWT. Also in this case, for all the manager war facilities pre-determined characteristics less than 5 percent of tests display a p-value smaller than 0.05 and less than 10 percent of tests a p-value smaller than 0.10, with the p-value means always being very close to 0.5 (Figure A.17, Panels A-H).

Overall, these two tests are fully consistent with the idea that managers were truly randomly assigned to their sections and seems to confirm that the guidelines of ESMWT were followed on the ground.

7.2 Variation in Section Compositions

Despite the assignment of managers to sections seems truly random, to estimate network effects there must be sufficient variation in section composition in terms of both manager and facility pre-determined characteristics (Olivetti et al., 2020; Thomas, 2022; Zanella, 2023).

Testing for variation in section composition appears important in my context, since each university hosted on average 200 students per year, randomly assigned to only five sections (Table A.3).

However, the characteristics of managers and war facilities per section show a substantial deviation from the mean. Except for age, years of education and entry exam score, the standard deviation of manager characteristics, such as tenure, years of experience, type of college degree, gender, race and marital status, amounts to at least 30 percent of the mean (Table A.33, columns 1 and 2). After controlling for university and application window fixed effects, the level at which the randomization occurs, the residual variations still account for 59 to 76 percent of the overall raw variation in the sample (Table A.33, columns 3-5). These numbers suggest that a large portion of the variation across sections remains within universities and application window pairs, and can be therefore used for meaningful inference.

7.3 The Role of Network Effects

To examine the role of network effects, I estimate the following equation:

$$\text{outcome}_{is} = \sum_{n=1}^{5} \beta_n \cdot \text{Share Mates from Facilities } j = n_{is} + \epsilon_{is} \tag{4}$$

where the outcome variables are either the probability of manager i from section s of moving to firms where a section-mate was working, or of moving and being promoted in a section-mate firm, or of co-founding a business with section-mates. *Share Mates from Facilities j=n* with *n=1,...,5* are, respectively, the share of section-mates from different facilities than that of manager i, from larger facilities, from facilities with higher sales, higher TFP and listed facilities. While the share of section-mates from other facilities and from larger facilities measure how wide the manager i network from the ESMWT was, the share of section-mates from better-performing and listed facilities is informative about the quality of the network.

The results indicate that the quality rather than the width of the network affected manager career outcomes. A one-percentage point higher share of section-mates from different war facilities or from larger facilities is associated to higher but not statistically significant probability of moving or being promoted into section-mate firms or co-found businesses with them (Table 6, columns 1-3). These findings rule out that the estimated effects are purely mechanical, as the probability of becoming co-worker of a section-mate is higher, the larger the firm he/she is working in is. Similarly, a higher share of section-mates from facilities

operating in the same industry does not lead to significantly larger probability of moving, promotions or starting businesses with section-mates, indicating a limited role of learning from peers working in similar facilities. By contrast, one percentage point increase in the share of mates from better-performing facilities, such as with higher sales or more productive, or from listed facilities is associated with a 3.2 to 7.8 percentage points higher probability of moving and being promoted into section-mate firms and to 3.7 to 6.8 percentage points higher probability of co-founding businesses with them (Table 6, columns 1-3, significant at one percent). This result is consistent with the idea that network quality mattered the most in affecting manager career perspectives.

7.4 Network Effects for Nonwhite and Female Managers

In his work on the crisis of the American Dream, Putnam (2016) has underscored how an "opportunity gap" in the U.S. has risen since the late 1970s. Students who belong to under-represented groups or with a disadvantaged background reach lower labor market outcomes, also due to lack of a productive network. Promoting a more diverse background in classrooms may tremendously help such students in improving their socio-economic status. The ESMWT non-discriminatory policy in terms of gender and race may have helped nonwhite and female managers create social connections with white managers, likely to work in better firms or have a larger network, with potential gains in terms of career outcomes.

To investigate this hypothesis, I first check that admitted managers were not assigned to specific sections based on their gender and race. In fact, even if under-represented groups of managers were admitted to the program according to fair criteria, they still could have been segregated afterward. Specifically, I test if being a nonwhite or a female manager predicts respectively the share of female and nonwhite managers, controlling for the same shares computed at the university-application year pair. In fact, if the university-application year share of male admitted managers were higher than that of female admitted managers, the former would have a mechanically higher probability of being assigned to a section with more same-gender peers. None of the estimated coefficients is statistically significant, confirming that managers were not systematically assigned to sections based on their gender or race (Table A.34 columns 1-4). In terms of variation in the race and gender composition of the sections, Table A.35 shows that, after controlling for university and application window fixed effects, almost 70 percent of the initial variation in the raw sample remains. This indicates that there is a substantial variation in the share of nonwhite and female managers across sections within university-application year pairs. Based on these results, I estimate equation 4 on the sample of nonwhite and female managers, using as outcome variables the probability of moving, moving and being promoted into a *white*- or *male*-mate firm, or of co-founding a business with *white* or *male* mates respectively; and using as explanatory

variable indicators for the section share of white or male managers.

The results suggest that there is an optimal amount of diversity in section composition. In fact, for high shares of white or male managers, an increase in peers from the same group *raised* both nonwhite and female manager probability of joining and being promoted into white/male-mate firms, or co-founding a business with them, relative to sections with more than 90 percent of white or male managers (Table A.35, columns 1-6). However, for shares of white or male managers lower than 70 percent, an increase in peers from the same group substantially *reduced* such probabilities. An explanation for these findings could be that a critical mass of under-represented managers is needed to create across-group interactions, but, once it becomes fairly large, it may lead to the formation of homogeneous subgroups, reducing the across-group interactions. A comparable mechanism has been documented by Carrell et al. (2013): high- and low-ability students optimally assigned to US Air Force Academy squadrons ended up segregating themselves into separate social networks, with few social interactions among group members. Similarly, Hampole et al. (2023), using data from a top U.S. business school between 2000 and 2018, show that access to a larger share of female peers in business school helps women reach corporate leadership positions, especially in male-dominated industries, but has decreasing marginal returns.[22]

8 Conclusions and Discussion

This paper studies the effects of business school education on manager career outcomes and firm performance, using evidence from the Engineering, Science, and Management War Training (ESMWT). I collected and digitized data on the managers who applied to the ESMWT and I reconstructed their careers using university reunion books. I estimate the effects of the ESMWT by exploiting a regression discontinuity design (RD) around the ESMWT entry exam threshold. I find that managers who scored right above the ESWMT entry exam threshold had a substantially higher probability of being promoted to both middle and top management positions during their career, and engaged systematically more in self-employment and innovative entrepreneurship activities than similar managers who scored right below. Moreover, participation in the ESMWT had larger effects on the career outcomes of nonwhite and female managers, and boosted performance and managerial practices implementation of admitted managers war facilities. Finally, I find evidence that exposure to a network of classmates from better-performing firms resulted in higher chances of moving

[22] The proposed mechanism in Hampole et al. (2023) is that more female peers provide women with useful information, in particular about firms with more female-friendly labor policies. While a similar information transmission is unlikely to have happened in my setting, as there were no proper anti-discriminatory policies at the firm level back then, it could still be the case that peers from the same groups may have provided gender- or race-specific advices, that in may turn have helped under-represented managers to better interact with their white male peers.

into peer companies and co-founding a business with them.

On top of shedding new light on the largely unexplored effort of the US government to increase managerial capital during WWII, these findings are also informative about the importance of managerial education for middle manager career outcomes. While the content of business education may have changed over decades, this research shows that acquiring business school education can change manager career paths, not only through the direct impact of learning, but also thanks to network effects. Such effects appear stronger for under-represented categories of managers, a result that offers suggestions for more inclusive education policies in the field of management.

Moreover, the results of this research could offer policy implications for countries that are still in the process of designing business school education, by showing that a widespread diffusion of MBA-style programs can boost firm performance, but also spur innovative entrepreneurship, with potentially positive effects on economic development.

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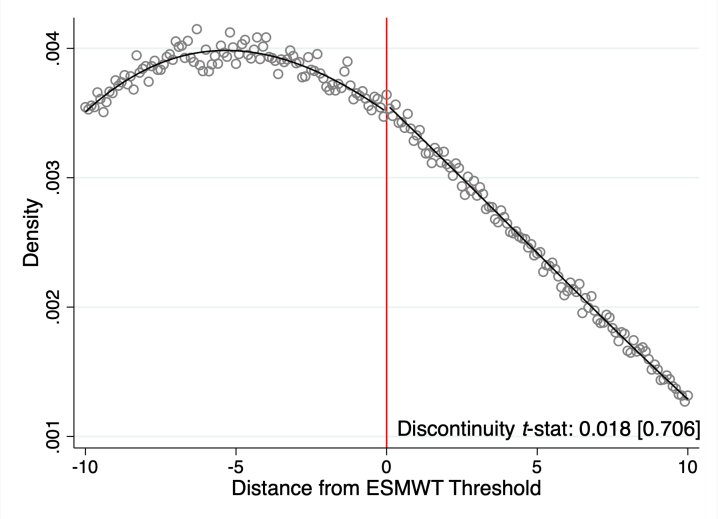
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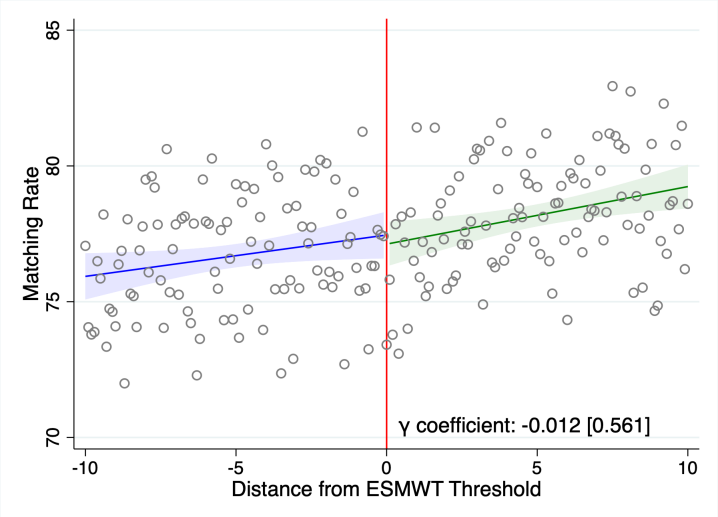
Figures and Tables

Figure 1: McCrary (2008) Sorting Test



Notes. Density of the ESMWT entry-exam score and implementation of the McCrary (2008) sorting test, using the number of observations in each cumulative decimal-point bin as the dependent variable on each side of the threshold to test if there is a discontinuity. The McCrary test t-statistics is reported, with p-value in parentheses. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 421,794 managers whose score in the entry exam was 10 points above or below the ESMWT threshold.

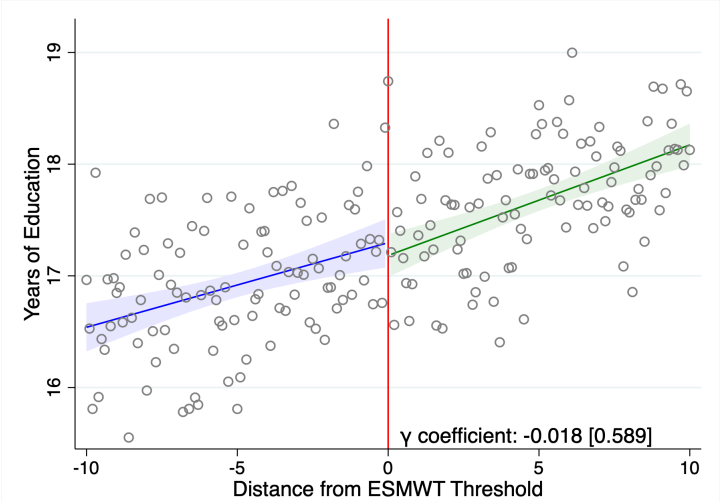
Figure 2: Continuity of Matching Rate around the Threshold



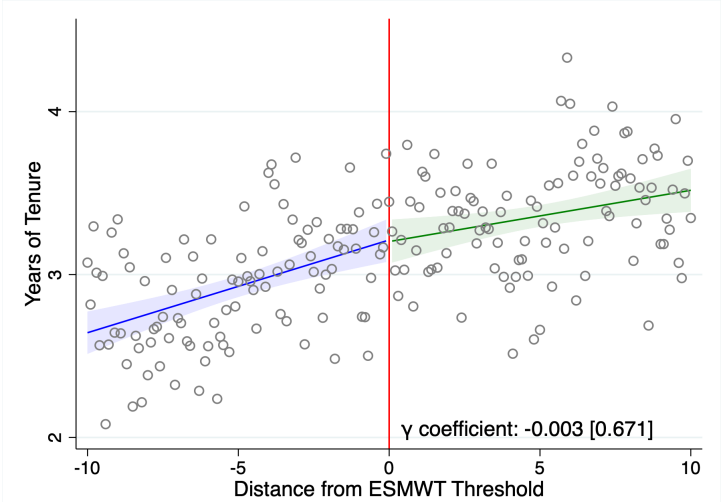
Notes. Average manager matching rate with reunion books by decimal-point entry exam score bins around the ESMWT threshold. γ coefficient from equation 1 using matching rate as dependent variable is reported, with p-value in parentheses. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 421,794 managers whose score in the entry exam was 10 points above or below the ESMWT threshold.

Figure 3: Continuity of Manager Characteristics around the Threshold – continues

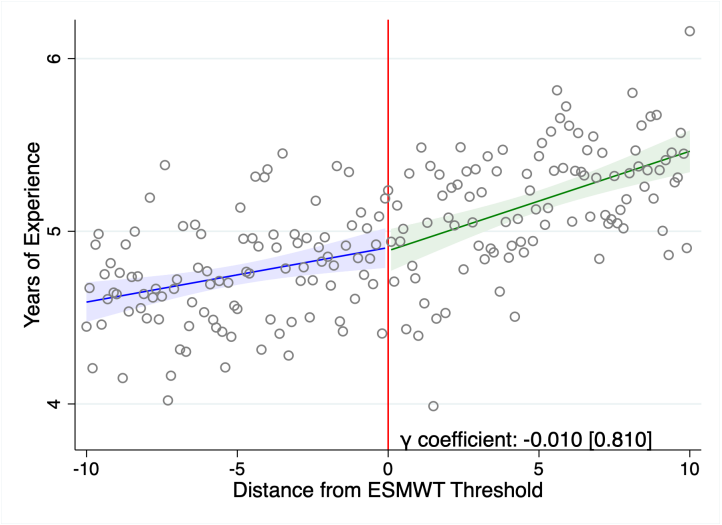
Panel A: Years of Education



Panel B: Years of Tenure in War Facility



Panel C: Years of Employment



Panel D: Economics and Business BA

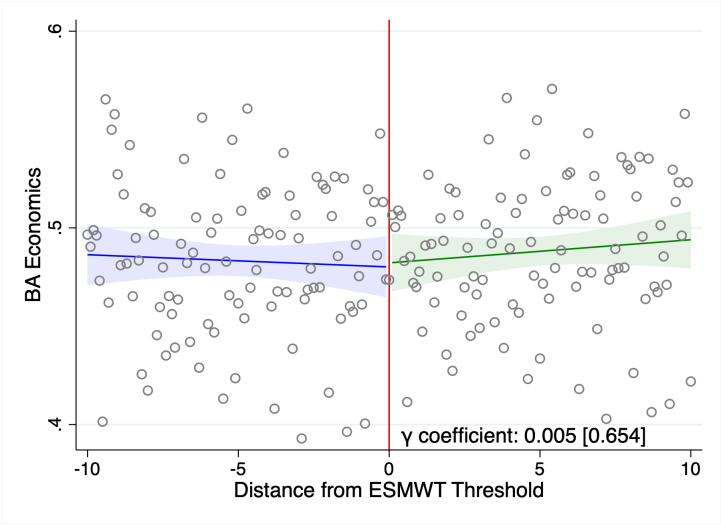
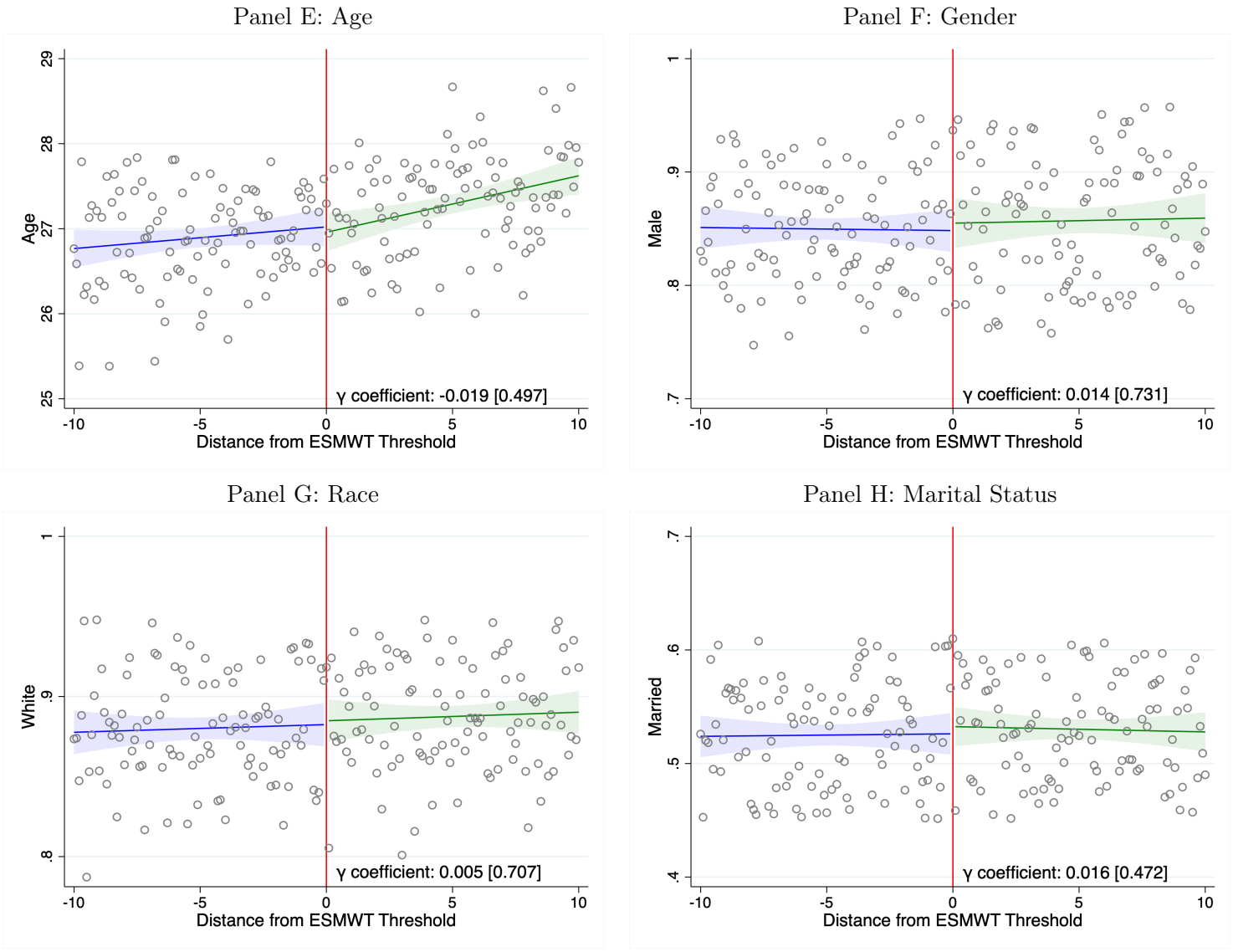
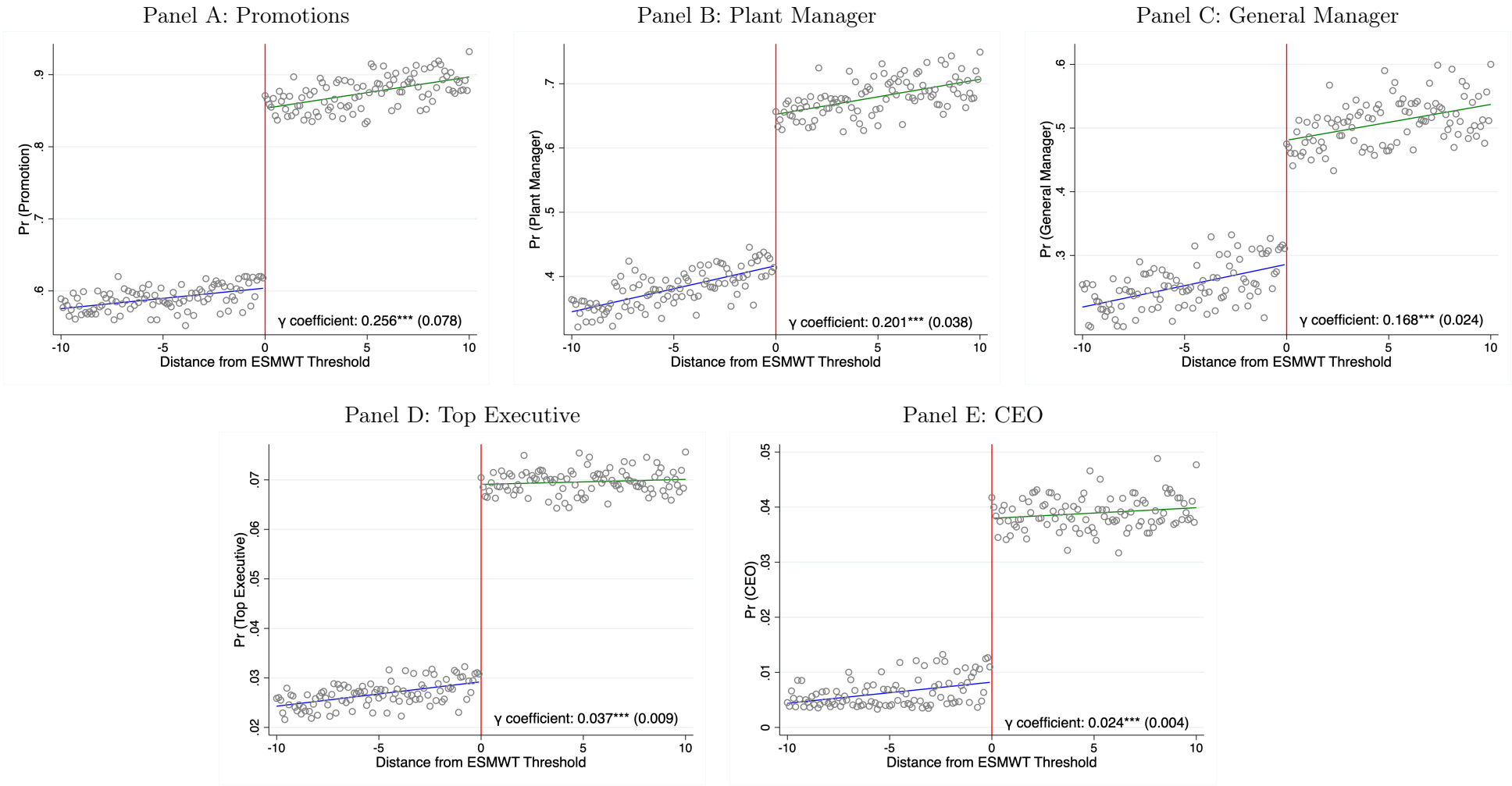


Figure 3: Continuity of Manager Characteristics around the Threshold – continued



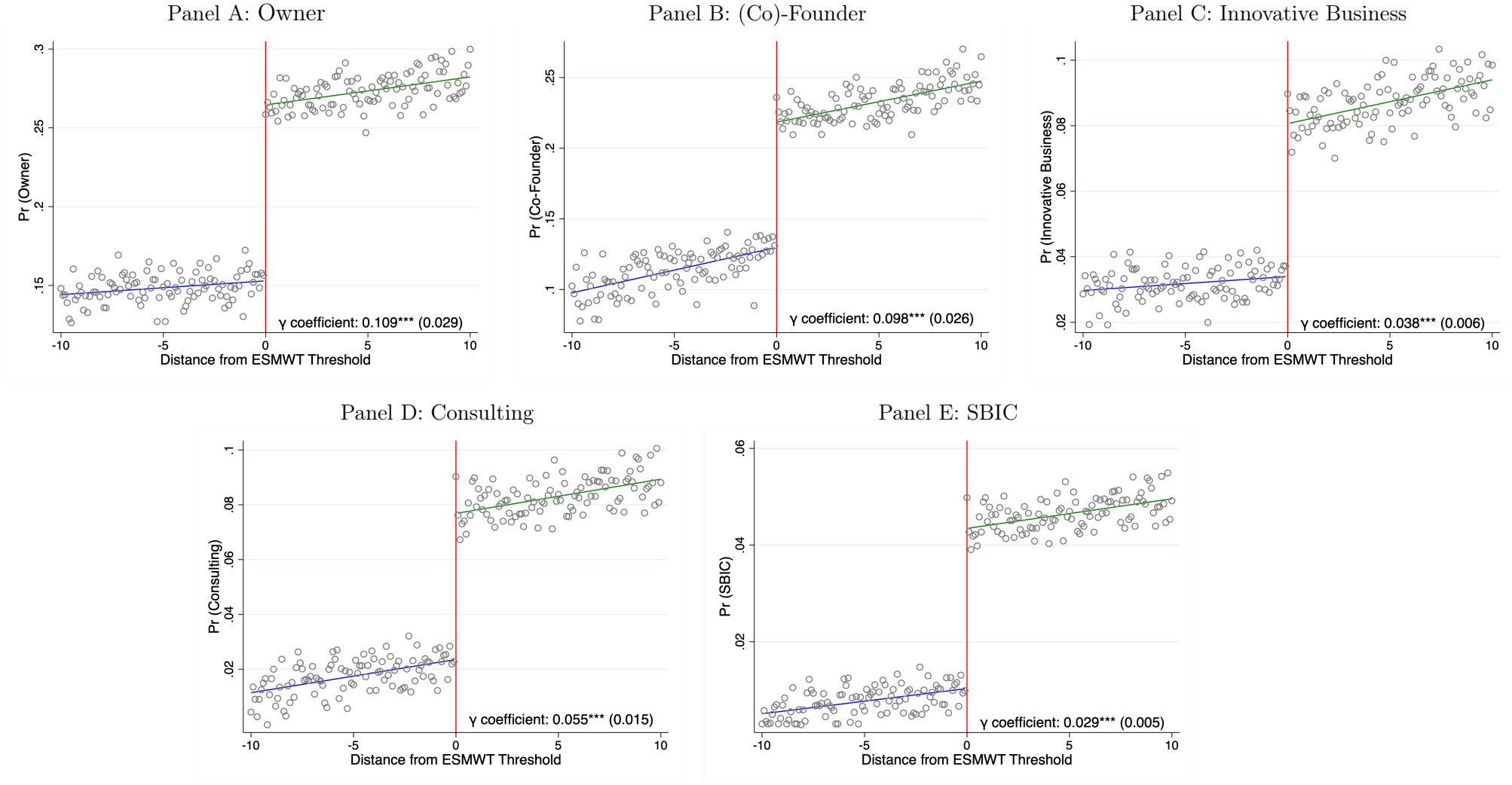
Notes. Average manager personal and professional characteristics by decimal-point entry exam score bins around the ESMWT threshold. *Years of Education*, *of Tenure in War Facility*, and *of Employment* are, respectively, the number of years of education, of work in the war industrial facility they were employed at when they applied for ESMWT, and total year of employment (Panels A-C). *Economics and Business* is an indicator for managers with a B.A. in either economics or business (Panel D). *Age* is manager age at time of ESMWT application (Panel E). *Male* is an indicator for male managers (Panel F). *White* is an indicator for white managers (Panel G). *Married* is an indicator for married managers (Panel H). γ coefficients from equation 1 using manager characteristics as dependent variable are reported in each panel, with p-values in parentheses. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 421,794 managers whose score in the entry exam was 10 points above or below the ESMWT threshold.

Figure 4: The Effects of ESMWT on Manager Promotions



Notes. Average manager career outcomes by decimal-point entry exam score bins around the ESMWT threshold. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. γ coefficients estimated from equation 1 are reported in each panel, with standard errors clustered at the decimal-point entry exam score bin level in parentheses. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books for 421,794 managers whose score in the entry exam was 10 points above or below the ESMWT threshold.

Figure 5: The Effects of ESMWT on Manager Self-Employment and Entrepreneurial Activities



Notes. Average manager career outcomes by decimal-point entry exam score bins around the ESMWT threshold. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). γ coefficients estimated from equation 1 are reported in each panel, with standard errors clustered at the decimal-point entry exam score bin level in parentheses. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books for 421,794 managers whose score in the entry exam was 10 points above or below the ESMWT threshold.

Table 1: Summary Statistics for 675,463 Applicant Managers

	All Applicant Managers				Above 80	Below 80	
	Mean	SD	Min.	Max.	Mean	Mean	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Manager Characteristics							
Age	26.54	1.88	22	31	27.29	26.21	0.000
Education (years)	17.03	0.61	16	20	17.69	16.74	0.000
Tenure (years)	2.61	0.53	1.50	5.00	3.36	2.28	0.000
Employment (years)	4.39	1.19	1.50	9.50	5.18	4.04	0.000
College Degree							
Econ and Business	0.47	0.50	0	1	0.48	0.47	0.351
STEM	0.45	0.49	0	1	0.46	0.45	0.298
Other	0.08	0.27	0	1	0.06	0.08	0.274
Gender	0.85	0.36	0	1	0.86	0.85	0.432
Race							
White	0.92	0.27	0	1	0.88	0.93	0.000
Afro-American	0.06	0.24	0	1	0.10	0.04	0.000
Other	0.02	0.14	0	1	0.02	0.02	0.453
Marital Status	0.54	0.49	0	1	0.53	0.54	0.509
Panel B: ESMWT Entry Exam							
Entry Exam Score	74.70	9.92	37	100	58.45	90.05	0.000
Above 80 Points (%)	30.49	0.46	0	1	1	0	0.000
Observations	675,463	675,463	675,463	675,463	205,933	469,530	675,463

Notes. Summary statistics for 675,463 managers who applied for the ESMWT between July 1941 and January 1945. Columns 1, 2, 3, and 4 present, respectively, mean, standard deviation, minimum, and maximum of manager personal and professional characteristics in Panel A and of the ESMWT entry exam in Panel B for all applicant managers. Columns 5 and 6 report the mean of the same characteristics for 205,933 applicant managers who scored above the 80-point threshold and were admitted to the ESMWT, and 468,530 applicant managers who scored below the 80-point threshold and were therefore not admitted to the program. Column 7 reports the p-value of testing for mean equality between admitted and non-admitted managers. *Age* is manager age at time of ESMWT application. *Education*, *Tenure*, and *Employment* are, respectively, the number of years of education, of work in the war industrial facility they were employed at when they applied for ESMWT, and total year of employment. *Econ and Business* is an indicator for managers with a B.A. in either economics or business, *STEM* is an indicator for managers with a B.A. is a STEM (Science, Technology, Engineering, and Math) major, *Other* is an indicator for any other B.A. type. *Gender* is an indicator for male managers. *White* is an indicator for white managers, *Afro-American* is an indicator for managers classified as 'negroes', *Other* is an indicator for any other race. *Marital Status* is an indicator for married managers. *Entry Exam Score* is the score managers earned in the entry exam. *Above 80 Points* is the percentage of managers who scored more than 80 points in the entry exam and were admitted to the ESMWT. Data are provided at the individual level from the U.S. Office of Education ESMWT registries.

Table 2: Effects of ESMWT on Managers' Promotion

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.078)	(0.038)	(0.024)	(0.009)	(0.004)
Observations	124,579	101,372	110,753	115,414	120,432
Mean dep. variable	0.603	0.409	0.278	0.029	0.009
% variation	42.45	49.14	60.43	127.58	266.67
Bandwidth	2.69	2.15	2.31	2.48	2.56

Notes. γ coefficients estimated from equation 1. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table 3: Effects of ESMWT on Managers' Entrepreneurial Activity

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.029)	(0.026)	(0.006)	(0.015)	(0.005)
Observations	127,362	124,579	115,887	118,143	117,222
Mean dep. variable	0.151	0.125	0.034	0.021	0.010
% variation	72.18	78.40	111.76	261.90	290.00
Bandwidth	2.71	2.65	2.46	2.51	2.49

Notes. γ coefficients estimated from equation 1. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table 4: Effects of ESMWT on Promotion by Race and Gender

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Nonwhite					
Enrollment	0.403***	0.367***	0.338***	0.043***	0.031***
	(0.061)	(0.031)	(0.026)	(0.005)	(0.005)
Observations	10,842	10,135	9,397	10,135	10,135
Mean dep. variable	0.387	0.249	0.181	0.008	0.004
% variation	104.13	147.39	186.74	537.50	775.00
Bandwidth	2.86	2.67	2.48	2.64	2.68
Panel B: Female					
Enrollment	0.378***	0.333***	0.281***	0.021***	0.017***
	(0.065)	(0.029)	(0.022)	(0.011)	(0.005)
Observations	18,524	19,258	19,951	17,833	18,524
Mean dep. variable	0.351	0.206	0.149	0.003	0.002
% variation	107.69	161.65	188.59	700.00	850.00
Bandwidth	2.61	2.73	2.82	2.59	2.68

Notes. γ coefficients estimated from equation 1 estimated on the sample of nonwhite managers in Panel A and of female managers in Panel B. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold for nonwhite managers in Panel A and female managers in Panel B. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table 5: Effects of ESMWT on Entrepreneurial Activity by Race and Gender

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Nonwhite					
Enrollment	0.133***	0.122***	0.027***	0.038***	0.019***
	(0.020)	(0.021)	(0.006)	(0.005)	(0.004)
Observations	10,508	10,135	10,135	9,771	9,397
Mean dep. variable	0.065	0.058	0.008	0.007	0.004
% variation	204.62	210.34	337.50	542.86	475.00
Bandwidth	2.71	2.65	2.62	2.51	2.49
Panel B: Female					
Enrollment	0.115***	0.091***	0.032***	0.039***	0.017***
	(0.022)	(0.023)	(0.007)	(0.004)	(0.003)
Observations	19,258	18,524	17,151	17,833	17,151
Mean dep. variable	0.051	0.043	0.007	0.006	0.004
% variation	225.49	211.63	457.14	650.00	425.00
Bandwidth	2.71	2.65	2.46	2.51	2.49

Notes. γ coefficients estimated from equation 1 estimated on the sample of nonwhite managers in Panel A and of female managers in Panel B. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold for nonwhite managers in Panel A and female managers in Panel B. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table 6: Effects of ESMWT Network on Manager Career Outcomes

	Pr Moving to Mate Firms (1)	Pr Promotion in Mate Firms (2)	Pr Co-Founding Business with Mates (3)
Share Mates Other Facilities	0.022	0.011	0.015
	(0.019)	(0.015)	(0.016)
Share Mates Larger Facilities	0.027	0.021	0.019
	(0.028)	(0.017)	(0.018)
Share Mates Same Industry	0.021	0.016	0.017
	(0.023)	(0.020)	(0.016)
Share Mates Higher Sales Facilities	0.038***	0.032***	0.037***
	(0.010)	(0.009)	(0.011)
Share Mates Higher TFP Facilities	0.041***	0.038***	0.045***
	(0.008)	(0.011)	(0.012)
Share Mates Listed Facilities	0.078***	0.059***	0.068***
	(0.013)	(0.015)	(0.020)
Observations	205,933	205,933	205,933

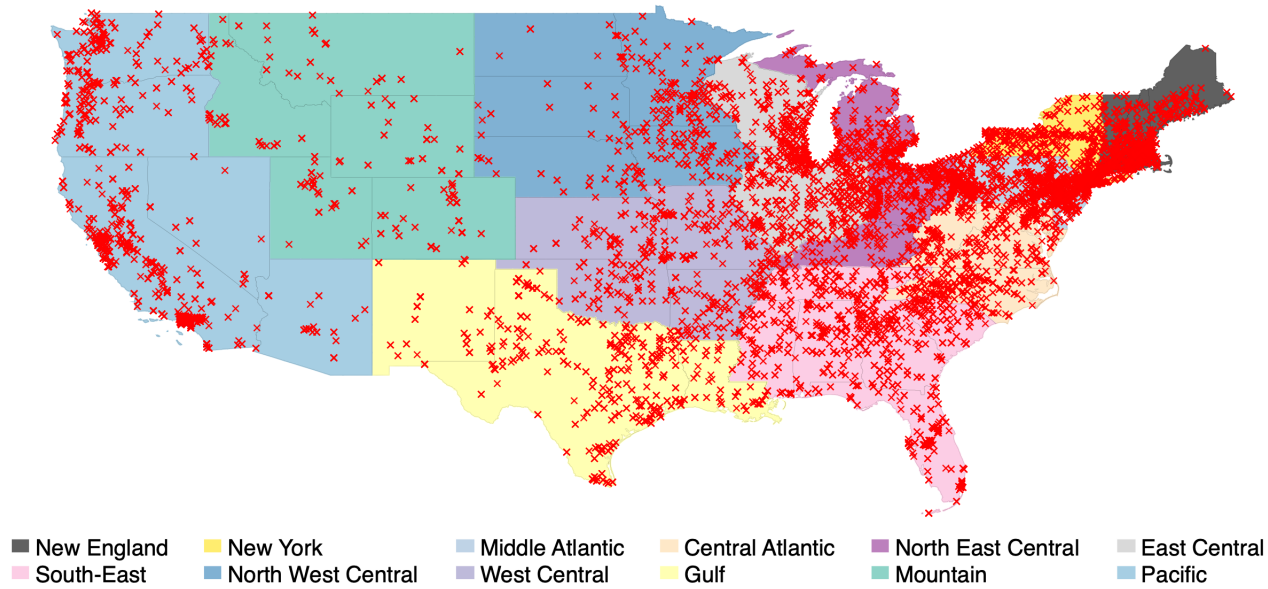
Notes. *Pr Moving to Mate Firms*, *Pr Promotion in Mate Firms*, and *Pr Co-Funding Business with Mates* are the probability of moving to a firm where a section-mate worked (Panel A), moving to a firm where a section-mate worked and being promoted (Panel B), and co-founding a business with a section-mate (Panel C). *Share Mates Other Facilities*, *Larger Facilities*, *Same Industry, Higher Sales Facilities*, *Higher TFP Facilities* and *Listed Facilities* are, respectively, the share of section mates from other facilities, from larger facilities, facilities from the same industry, facilities with higher revenues, higher TFP and listed facilities. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 205,933 managers whose score in the entry exam was above the ESMWT 80-point threshold. Standard errors are clustered at the section level.

Online Appendix — Not for Publication

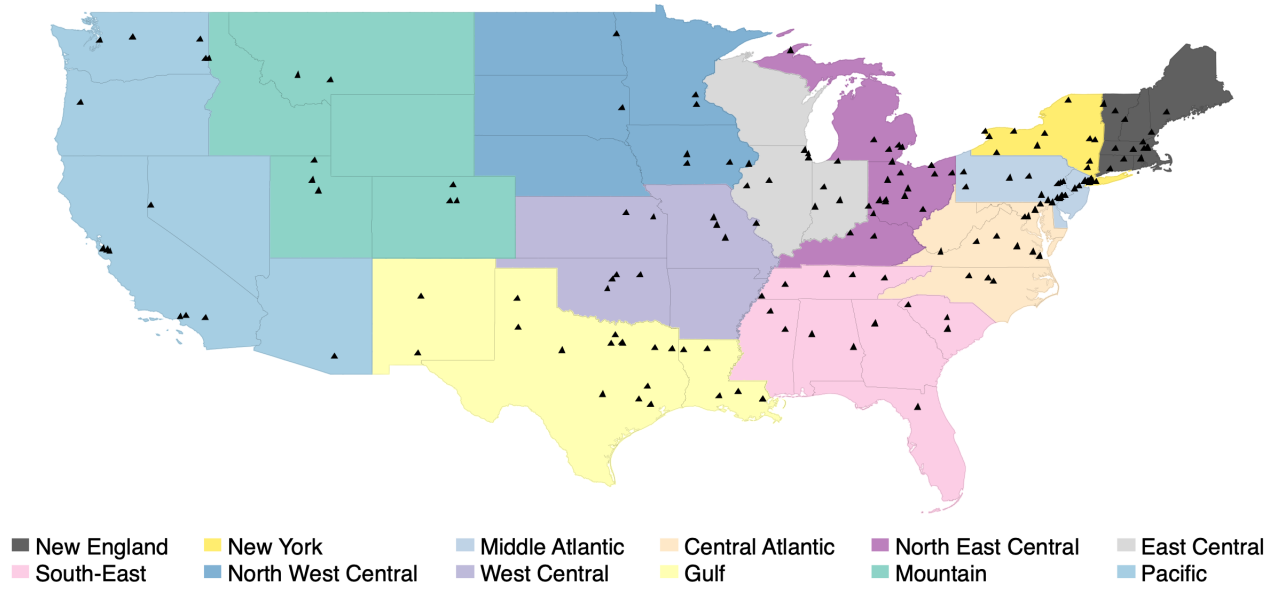
A Additional Figures and Tables

Figure A.1: Manpower Commission Regions and Location of War Industrial Facilities and ESMWT Universities and Colleges

Panel A: Location of U.S. War Industrial Facilities

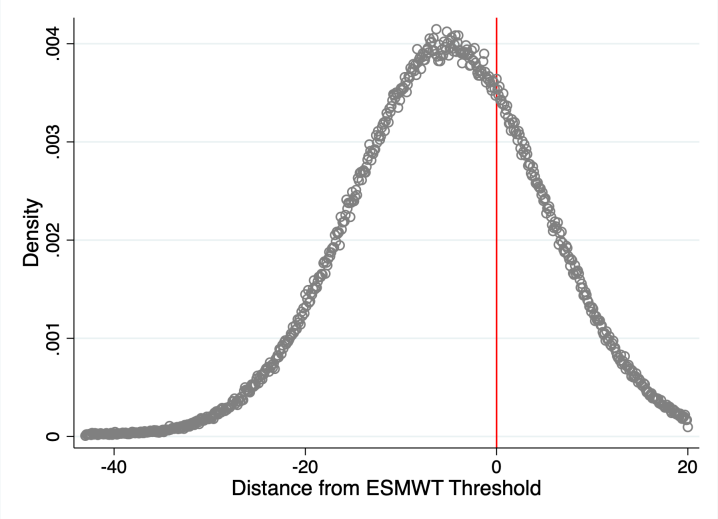


Panel B: Location of University and Colleges that Hosted the ESMWT Managerial Courses



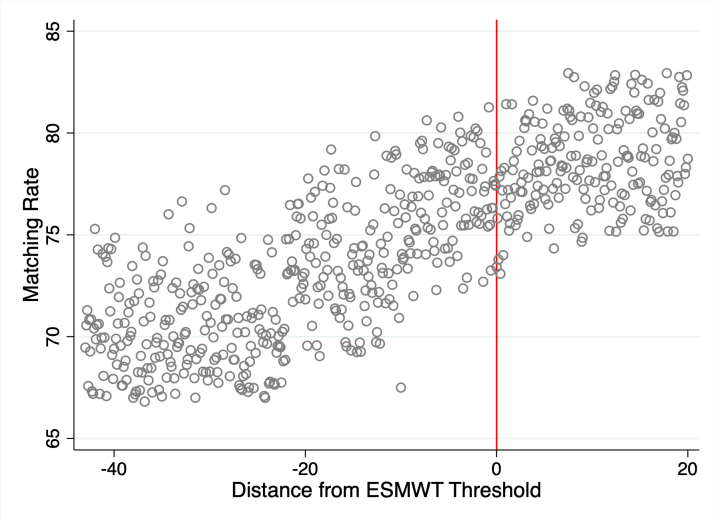
Notes. Map of the 12 Manpower Commission Regions. Panel A reports the location of 53,674 U.S. war industrial facilities whose managers applied for the ESMWT managerial courses. Panel B reports the location of the 218 U.S. universities and colleges that hosted at least an ESMWT managerial course. Data are provided at the facility level from the Manpower Commission Surveys in Panel A and at the university level from university library archives in Panel B.

Figure A.2: Density of ESMWT Entry-Exam Score



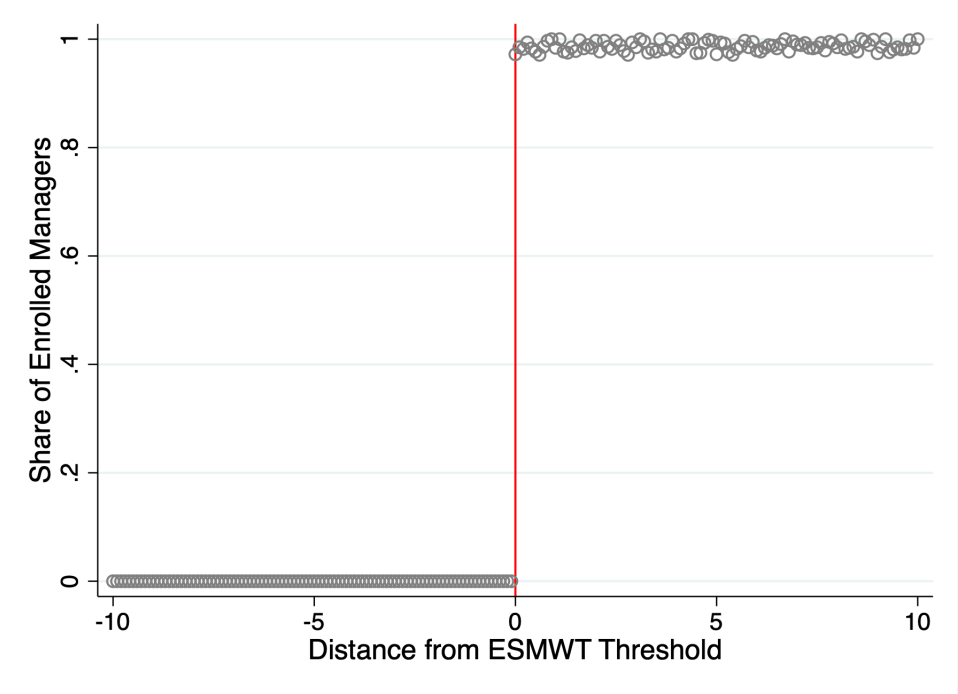
Notes. Density of the full distribution of ESMWT entry-exam scores, with data collapsed into cumulative decimal-point bins. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 675,463 applicant managers.

Figure A.3: Distribution of ESMWT Applicants' Matching Rate with Reunion Books



Notes. Matching rate is the probability for applicant managers to be matched with reunion books entries at least once between 1950 and 1975 by decimal-point entry exam score bins around the ESMWT threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 675,463 applicant managers.

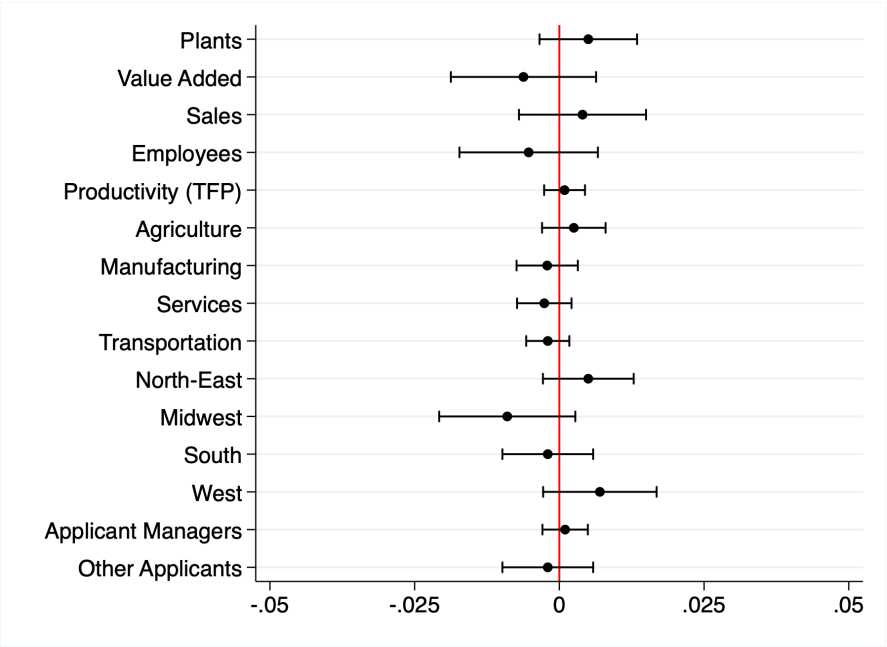
Figure A.4: Manager Enrollment in ESMWT



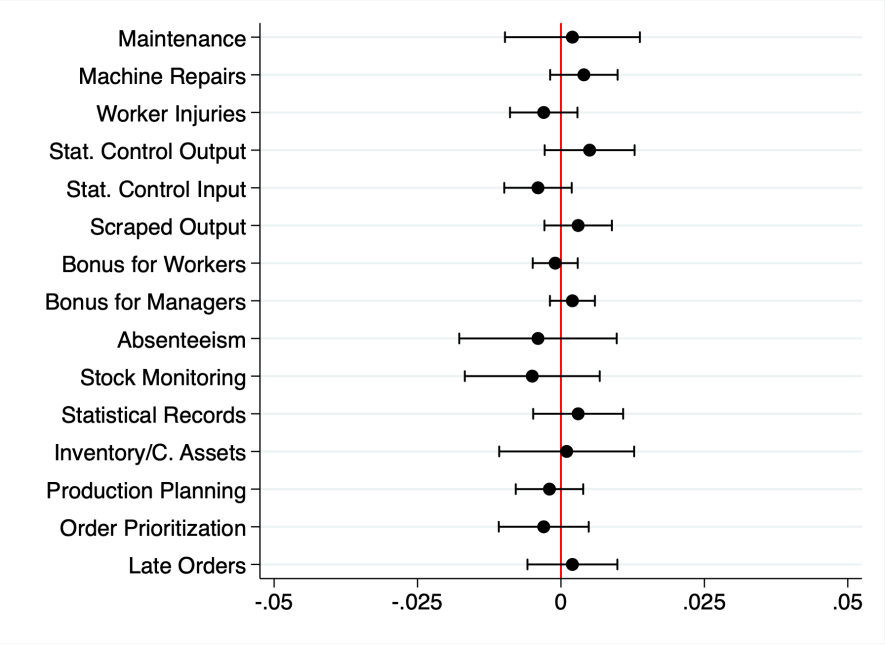
Notes. The figure examines the relationship between test scores and program enrollment. Each point represents the average enrollment in decimal-point entry exam score bins. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 675,463 applicant managers.

Figure A.5: Continuity of Facility Characteristics around the Threshold

Panel A: Facility Characteristics and Outcomes

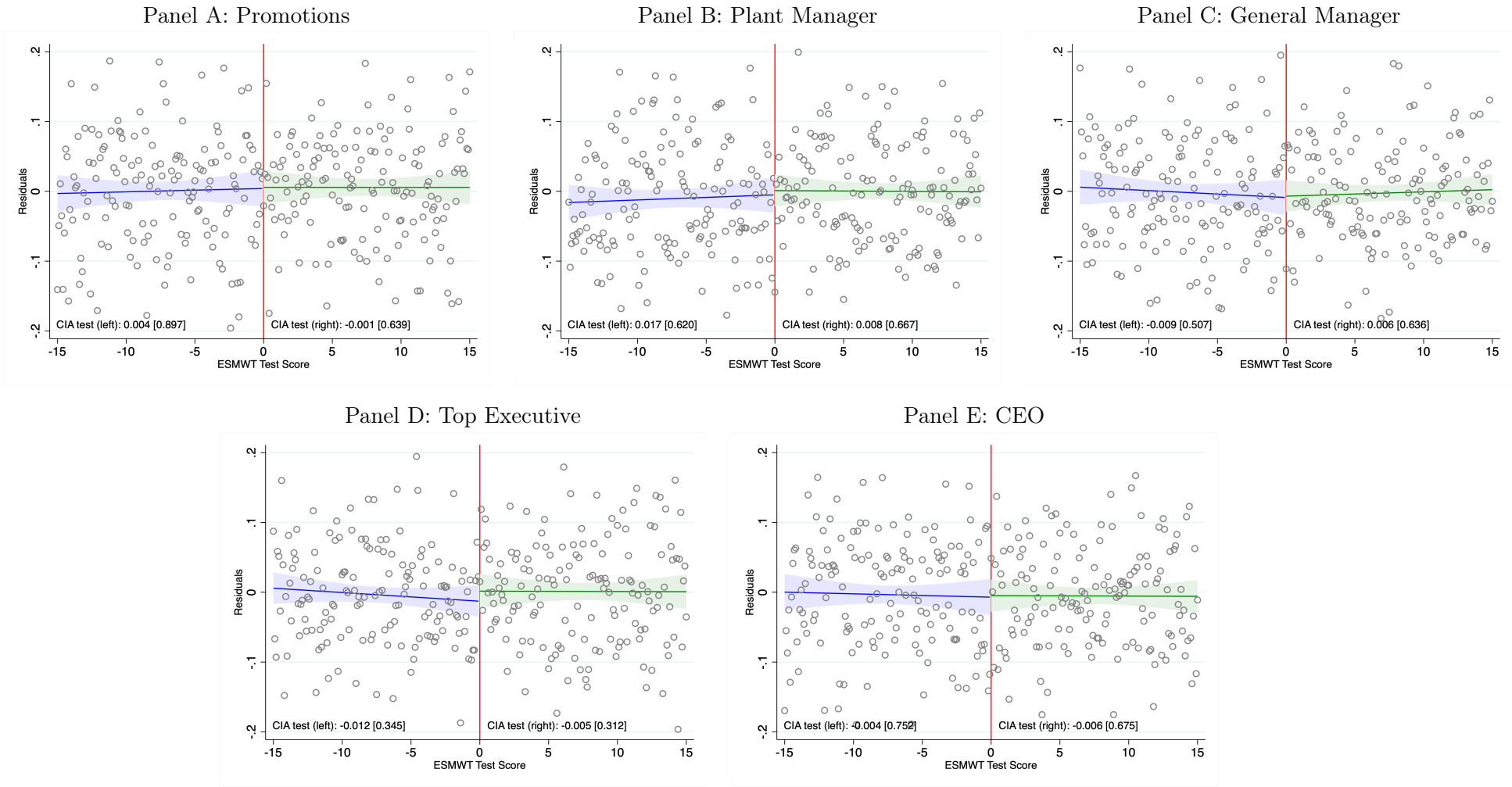


Panel B: Facility Implementation of Managerial Practices



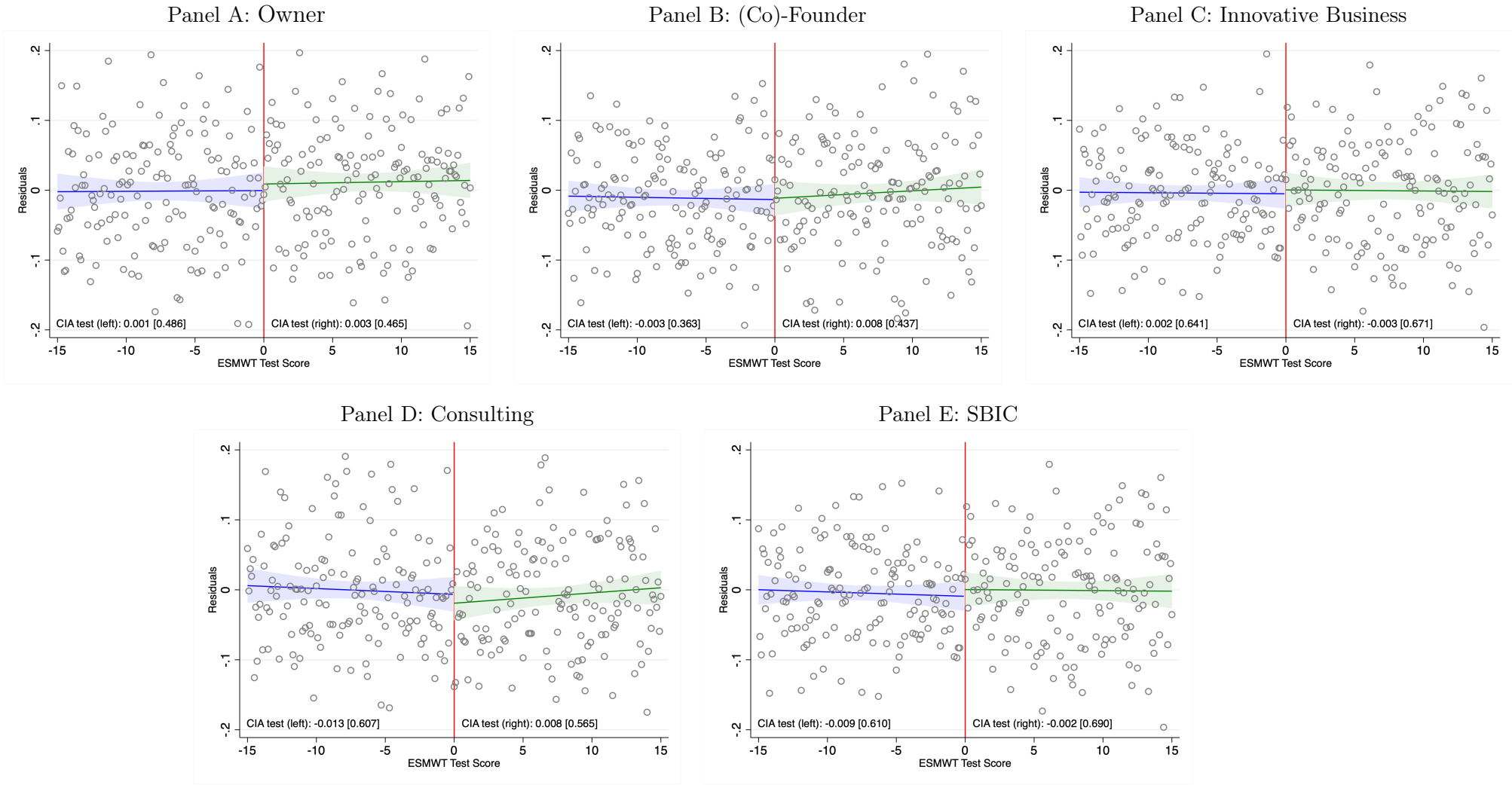
Notes. γ coefficients and 95% confidence intervals from equation 1. Standard errors are clustered at the decimal-point entry exam score bin level. Facilities are associated with their higher applicant manager score. *Plants* is logged number of plants. *Value Added* and *Sales* are logged 2020 millions USD. *Employees* is logged number of employees. *Productivity (TFP)* is logged total factor productivity revenue, estimated with the Gandhi et al. (2020)'s method. *Agriculture*, *Manufacturing*, *Transportation*, and *Services* are indicators for facilities that operate in the respective sector. *Applicant Managers* is logged number of applicant managers. *Other Applicants* is logged number of engineers and scientists that applied to ESMWT. *Maintenance*, *Stat. Control Output* and *Inputs*, *Bonus for Workers* and *Managers*, *Stock Monitoring*, *Statistical Records*, *Production Planning*, and *Order Prioritization* are indicators for facilities that perform regular maintenance of the machine and of safety conditions, systematically control production outputs and inputs, pay bonuses to workers and managers, monitor inventory, keep track of statistical records, plan production, and prioritize orders based on delivery deadlines. *Machine Repairs* and *Worker Injuries* are monthly logged interventions for repairing machines and number of injured workers. *Scraped Output* and *Late Orders* are monthly percentage of scraped output out of total output and of orders delivered past deadline. *Absenteeism* is the ratio between days of absence and total worked days. *Inventory/C. Assets* is the ratio between facility inventory and its current assets. Data are provided at the facility level from the Manpower Commission Surveys for 18,446 war facilities whose higher applicant manager score was 3 points above or below the ESMWT threshold.

Figure A.6: Angrist and Rokkanen (2015)'s Procedure: Test of CIA – Managers' Promotions



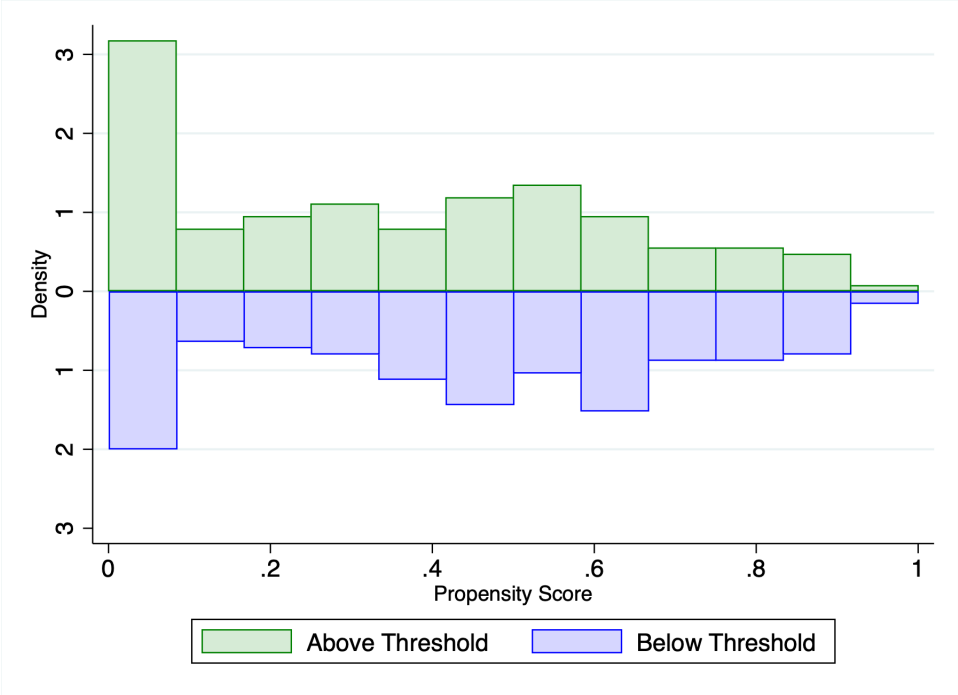
Notes. Regression-based tests of the conditional independence assumption (CIA). On both sides of the threshold, I residualize each outcome variable using workers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP). I plot on each side of the threshold a linear fit of these residuals which should be flat under the CIA. To test this assumption, I regress on both sides of the threshold each outcome variable on the running variable and the set of controls, and test the hypothesis of a zero coefficient on the running variable. Coefficients of these estimates and their p-values are reported in each graph. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Figure A.7: Angrist and Rokkanen (2015)'s Procedure: Test of CIA – Managers' Entrepreneurial Activity



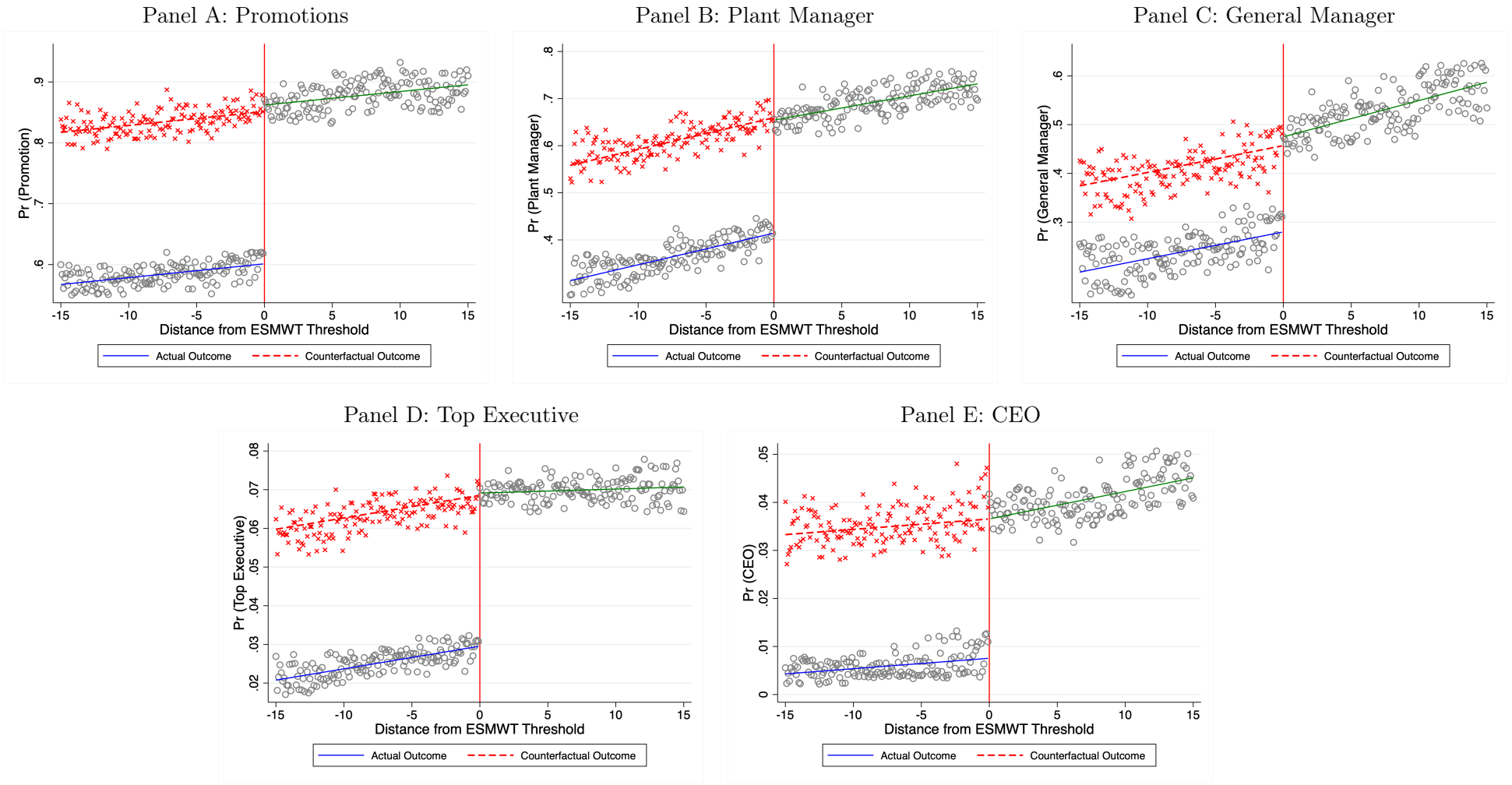
Notes. Regression-based tests of the conditional independence assumption (CIA). On both sides of the threshold, I residualize each outcome variable using workers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP). I plot on each side of the threshold a linear fit of these residuals which should be flat under the CIA. To test this assumption, I regress on both sides of the threshold each outcome variable on the running variable and the set of controls, and test the hypothesis of a zero coefficient on the running variable. Coefficients of these estimates and their p-values are reported in each graph. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Figure A.8: Angrist and Rokkanen (2015)'s Procedure: Test of Common Support between Propensity Scores of Managers Above and Below the Threshold



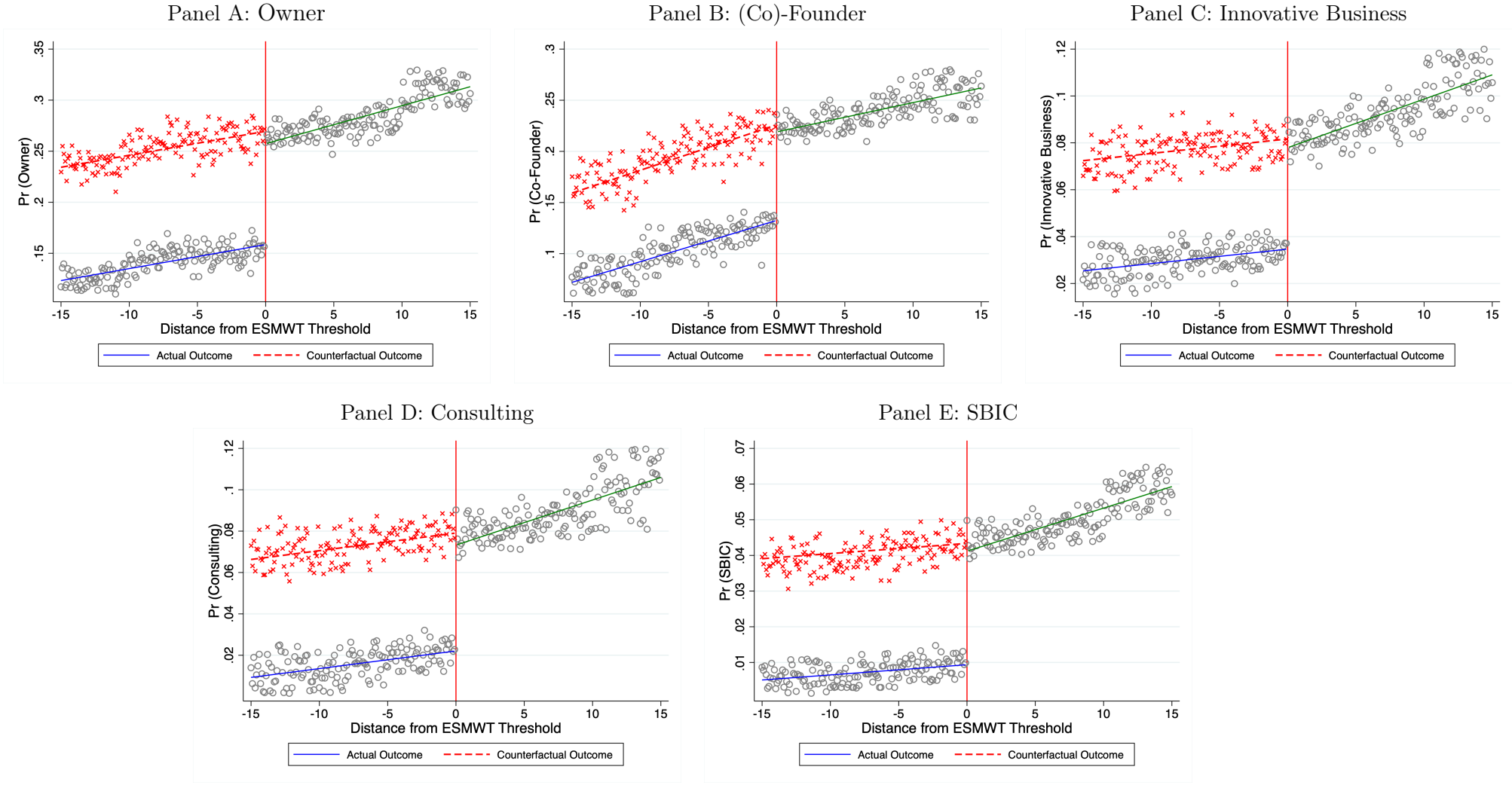
Notes. Histogram of the estimated propensity scores in the [-15pp, 15pp] window for managers who scored above and below the ESMWT 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Figure A.9: Angrist and Rokkanen (2015)'s Procedure: CIA-based Estimates of Expected Potential Outcomes around the Threshold Managers' Promotiom



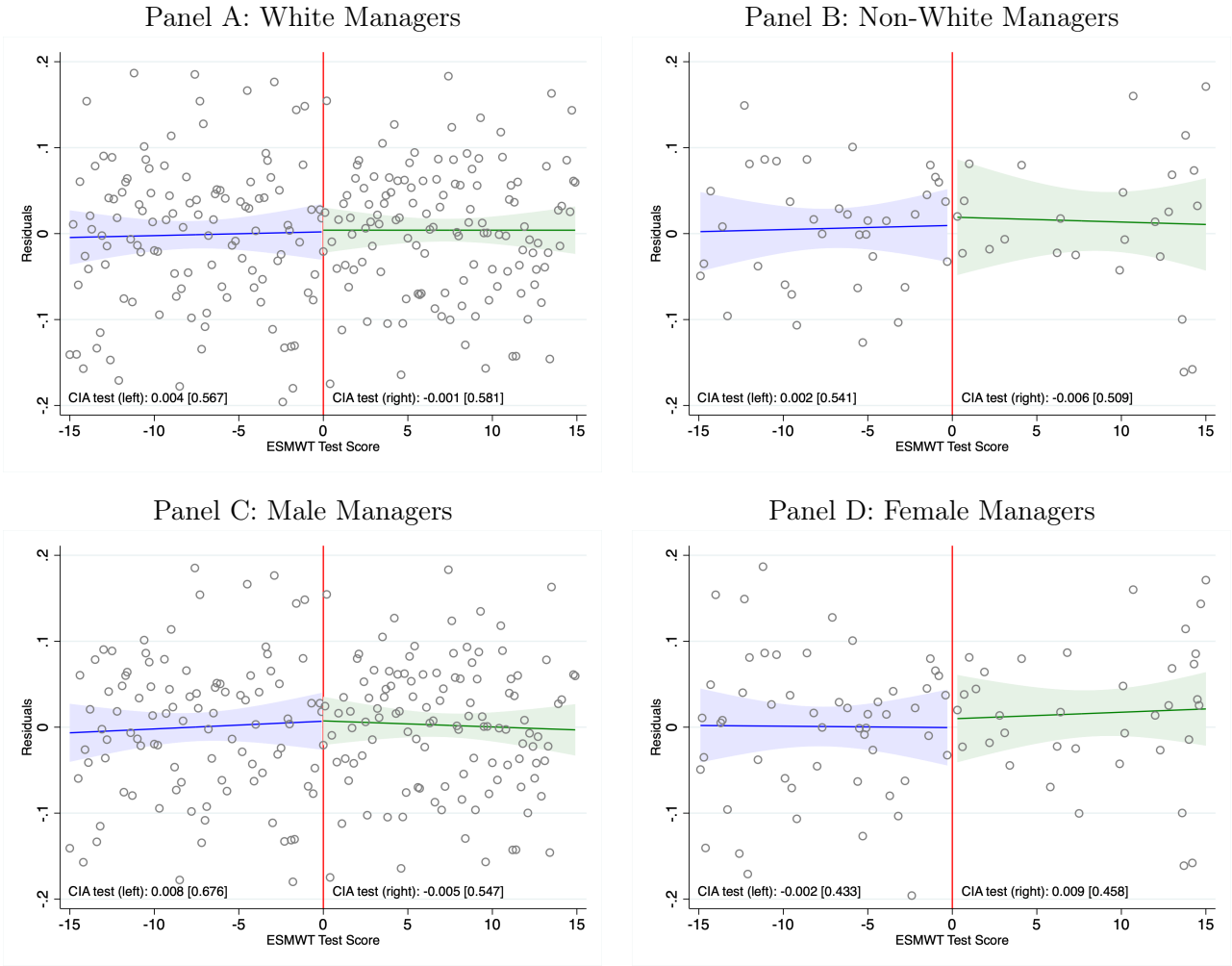
Notes. Actual and counterfactual potential outcomes under the CIA assumption in the [-15pp, 15pp] window. Counterfactual outcomes are estimated using the parameters from the linear reweighting estimator proposed by Kline (2011), controlling for workers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP), to predict the potential outcomes of managers who scored below they threshold had they attended the ESMWT. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Figure A.10: Angrist and Rokkanen (2015)'s Procedure: CIA-based Estimates of Expected Potential Outcomes around the Threshold
Managers' Entrepreneurial Activity



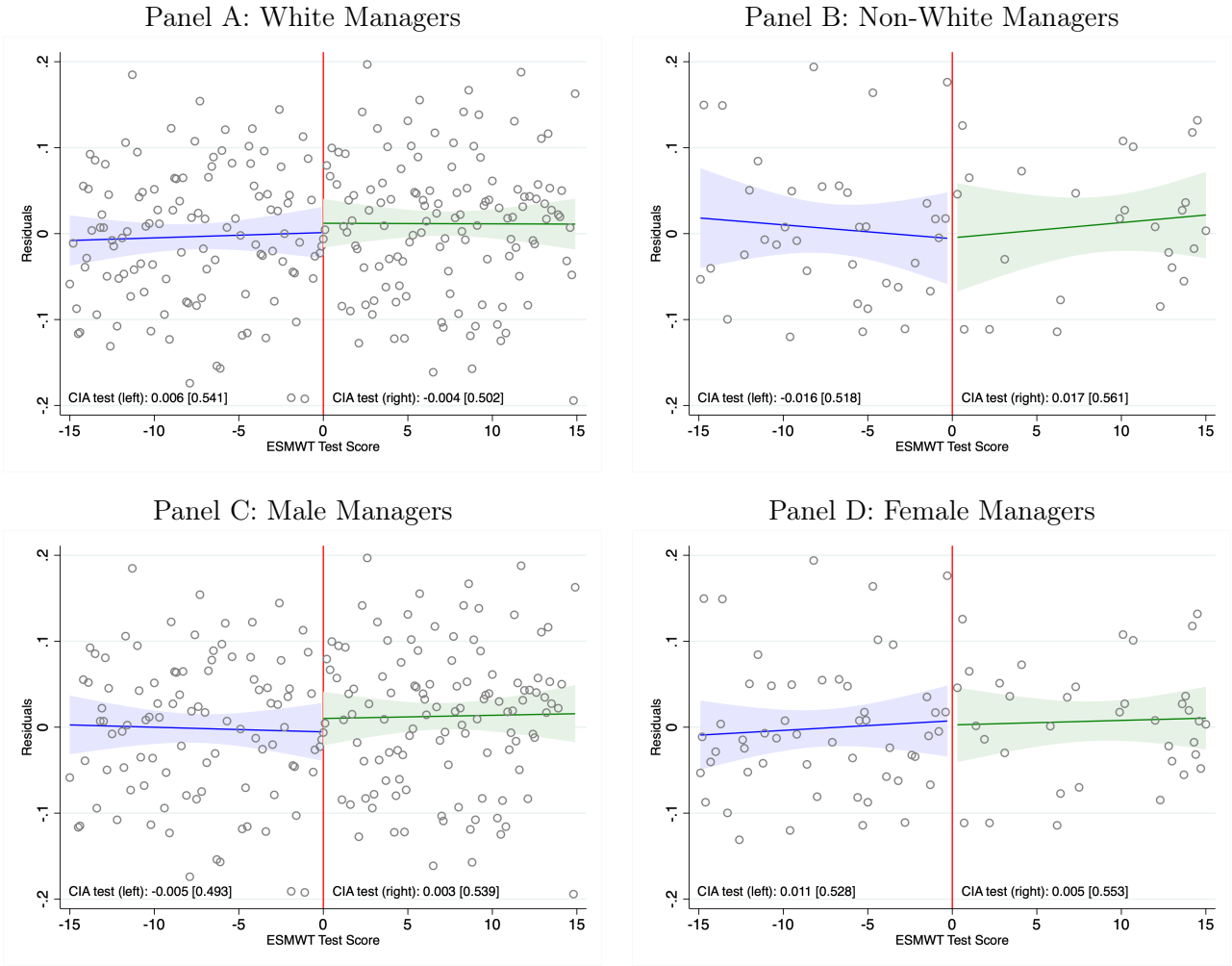
Notes. Actual and counterfactual potential outcomes under the CIA assumption in the [-15pp, 15pp] window. Counterfactual outcomes are estimated using the parameters from the linear reweighting estimator proposed by Kline (2011), controlling for workers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP), to predict the potential outcomes of managers who scored below they threshold had they attended the ESMWT. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Figure A.11: Angrist and Rokkanen (2015)'s Procedure: Test of CIA – Managers' Promotion by Race and Gender



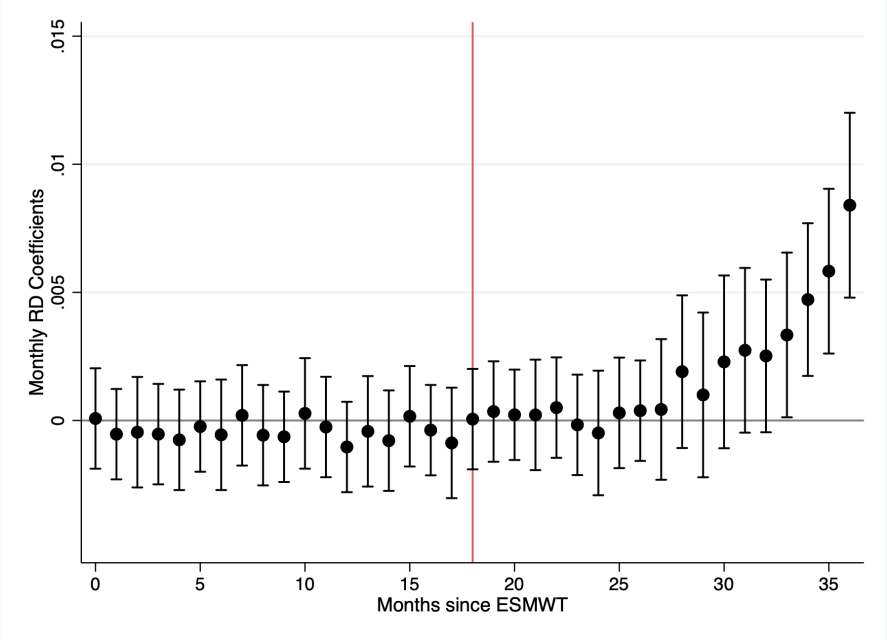
Notes. Regression-based tests of the conditional independence assumption (CIA) for white (Panel A), non-white (Panel B), male (Panel C), and female (Panel D) managers. On both sides of the threshold, I residualize the outcome variable using workers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP). I plot on each side of the threshold a linear fit of these residuals which should be flat under the CIA. To test this assumption, I regress on both sides of the threshold each outcome variable on the running variable and the set of controls, and test the hypothesis of a zero coefficient on the running variable. Coefficients of these estimates and their p-values are reported in each graph. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Figure A.12: Angrist and Rokkanen (2015)'s Procedure: Test of CIA – Managers' Entrepreneurial Activity by Race and Gender



Notes. Regression-based tests of the conditional independence assumption (CIA) for white (Panel A), non-white (Panel B), male (Panel C), and female (Panel D) managers. On both sides of the threshold, I residualize each outcome variable using workers professional and personal characteristics (years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status) and war facility performance (value added, employment, and TFP). I plot on each side of the threshold a linear fit of these residuals which should be flat under the CIA. To test this assumption, I regress on both sides of the threshold each outcome variable on the running variable and the set of controls, and test the hypothesis of a zero coefficient on the running variable. Coefficients of these estimates and their p-values are reported in each graph. *Owner* is an indicator for managers who became firm owners. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

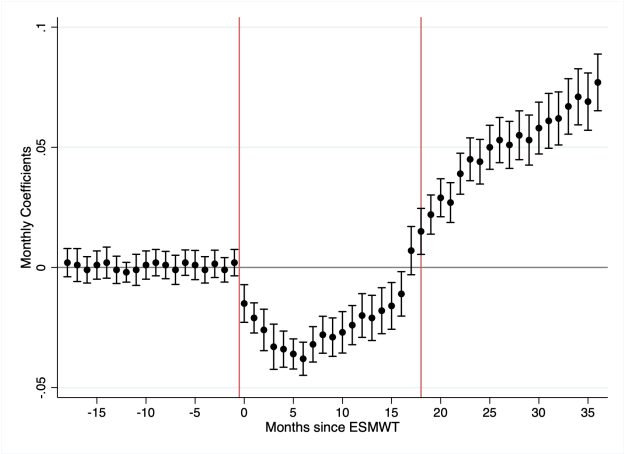
Figure A.13: The Effects of ESMWT on Promotions within War Facilities up to 1947



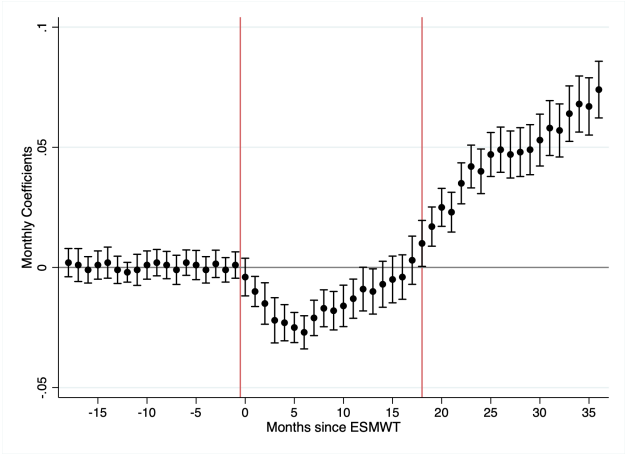
Notes. γ monthly coefficients and 95% confidence intervals from equation 1, using as dependent variables indicators for manager promotions within war facility occupational rankings up to December 1947. The red vertical line corresponds to the end of ESMWT that lasted 18 months. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the Manpower Commission Surveys for 8,908 managers whose facilities had a single applicant.

Figure A.14: The Effects of ESMWT on War Facility Performance

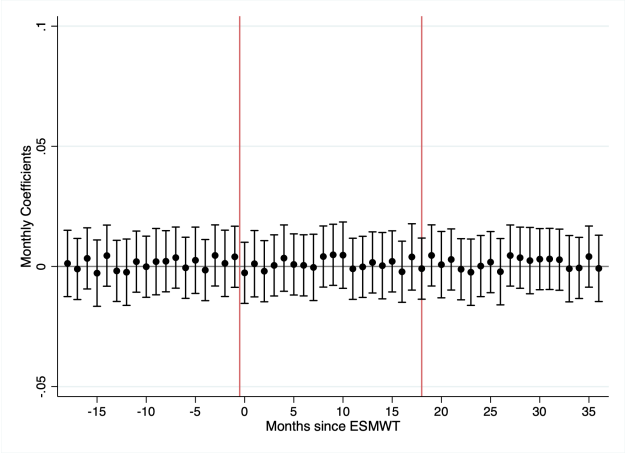
Panel A: Value Added



Panel B: TFP



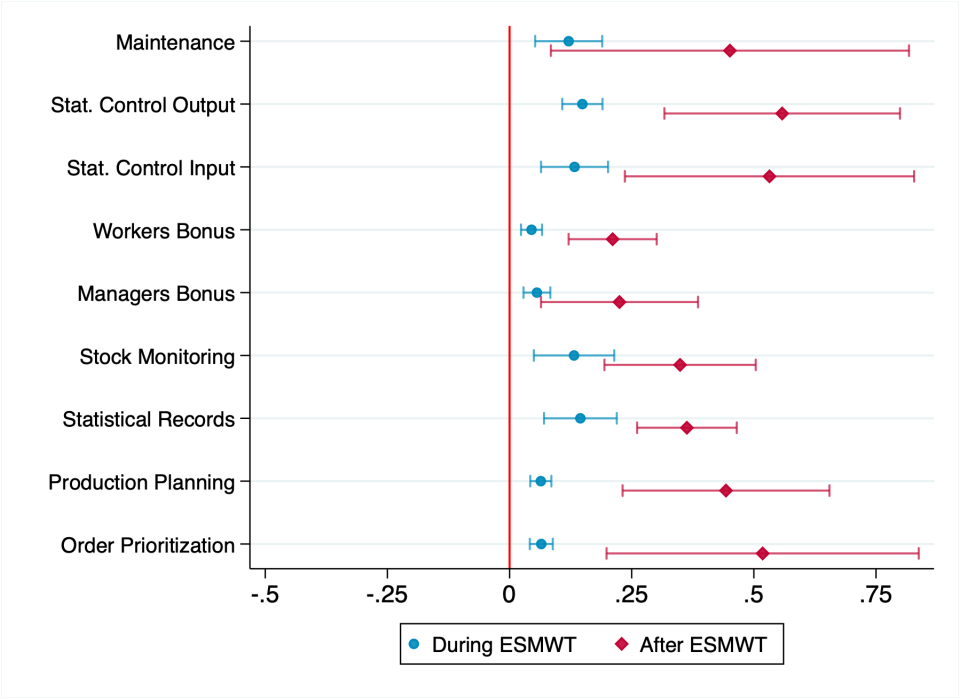
Panel C: Employment



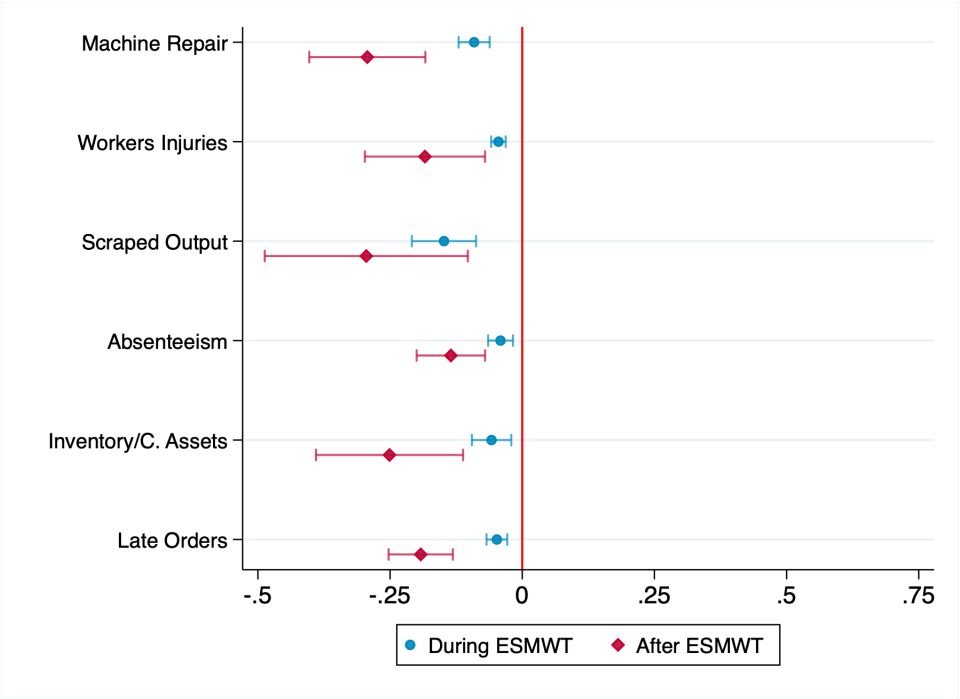
Notes. Monthly γ coefficients and 95% confidence intervals from equation 1. *Value Added* is expressed in millions of 2020 USD. *Productivity (TFP)* is logged total factor productivity revenue, estimated with the Gandhi et al. (2020)'s method. *Employees* is number of employees. Standard errors are clustered at the the decimal-point entry exam score bin level. Data are provided at the facility level from the Manpower Commission Surveys for 8,908 facilities with a single applicant manager.

Figure A.15: The Effects of ESMWT on Managerial Practices Implementation

Panel A: Managerial Practices



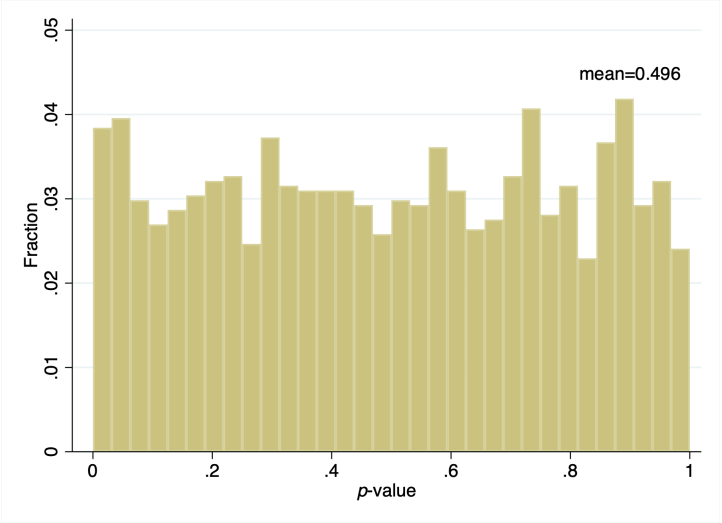
Panel B: Outputs of Managerial Practices



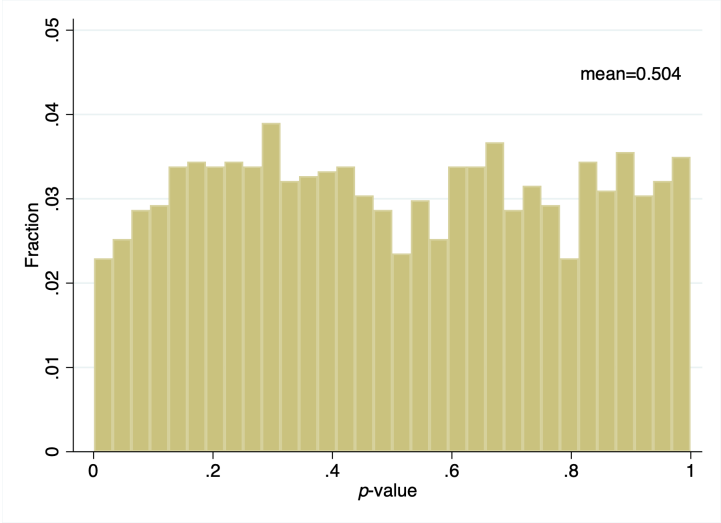
Notes. γ coefficients and 95% confidence intervals estimated from equation 1 during and after ESMWT implementation. Panel A reports the nine managerial practices surveyed by the Manpower Commission Surveys. Panel B reports the outputs of such practices implementation. *Maintenance of Machines and Safety*, *Statistical Control Output* and *Inputs*, *Bonus for Workers* and *Managers*, *Stock Monitoring*, *Statistical Records*, *Production Planning*, and *Order Prioritization* are, respectively, indicators for facilities that perform regular maintenance of the machine and of safety conditions, systematically control production outputs and inputs, pay bonuses to workers and managers, monitor inventory, keep track of statistical records, plan production, and prioritize orders based on delivery deadlines. *Interventions of Machine Repairs* and *Worker Injuries* are monthly interventions for repairing machines and number of injured workers. *Scraped Output* and *Late Delivered Orders* are monthly percentage of scraped output out of total output and of orders delivered past deadline. *Absenteeism* is the ratio between days of absence and total worked days. *Inventory/Current Assets* is the ratio between facility inventory and its current assets. Standard errors are clustered at the the decimal-point entry exam score bin level. Data are provided at the facility level from the Manpower Commission Surveys for 8,908 facilities with a single applicant manager.

Figure A.16: Distribution of p-values for Managers Characteristics – continues

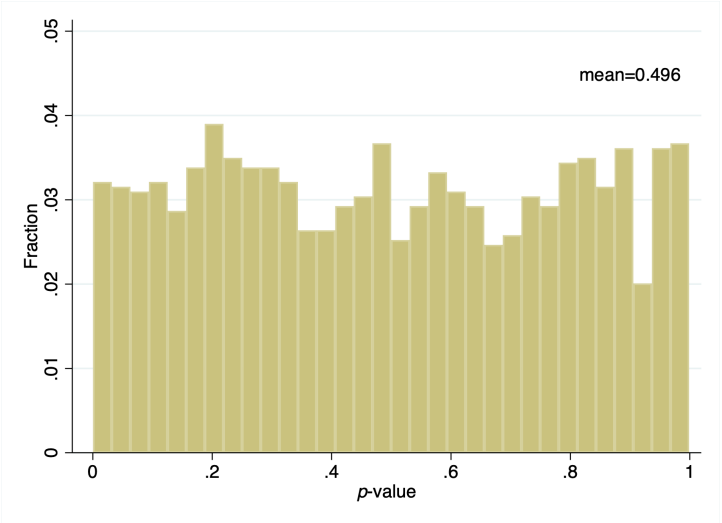
Panel A: Years of Education



Panel B: Years of Tenure in War Facility



Panel C: Years of Employment



Panel D: Economics and Business BA

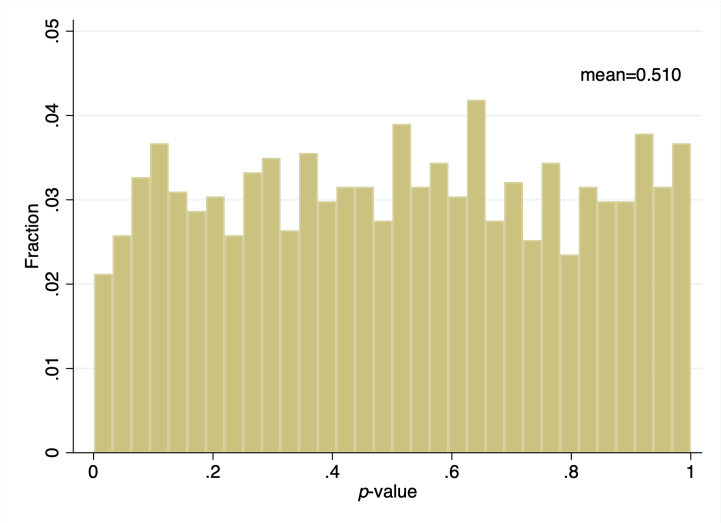
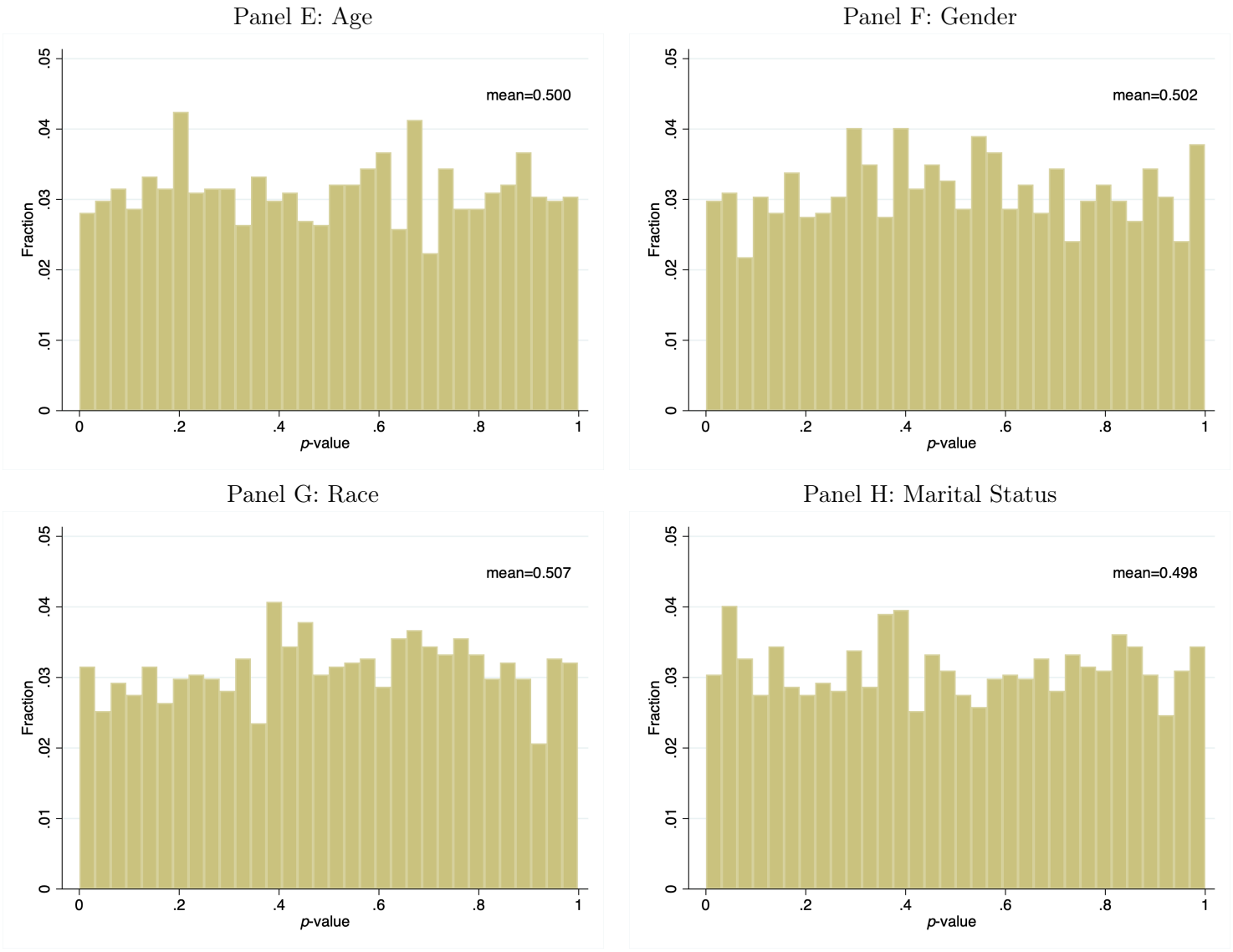


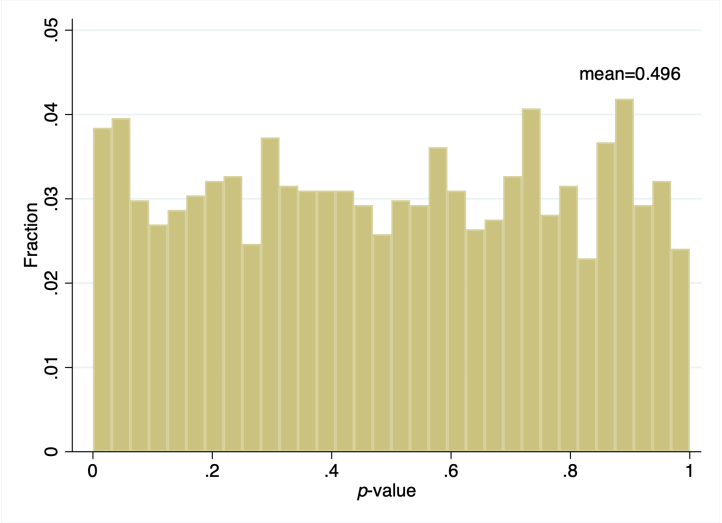
Figure A.16: Distribution of p-values for Managers Characteristics – continued



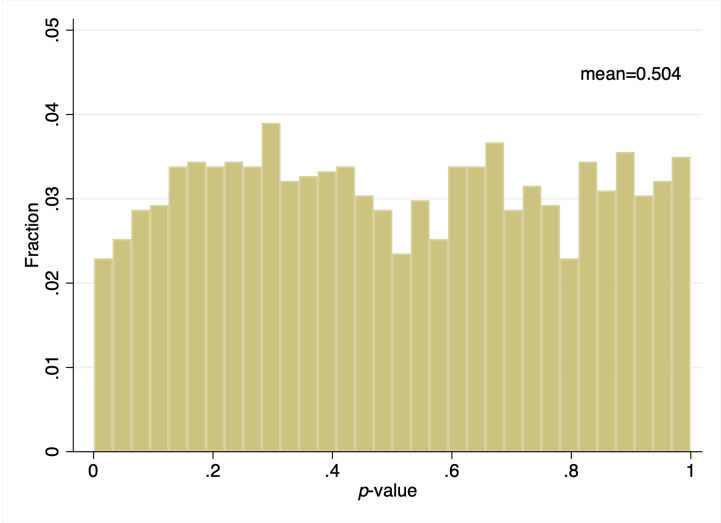
Notes. p-values obtained from testing joint significance of section indicators from regressing manager pre-determined characteristics on section indicators for each university and application window pair. A total of 1,744 regressions have been run. *Mean* is the mean of the p-values, expected to be 0.5 in case of random assignment of managers to sections. *Years of Education*, *of Tenure in War Facility*, and *of Employment* are, respectively, the number of years of education, of work in the war industrial facility they were employed at when they applied for ESMWT, and total year of employment (Panels A-C). *Economics and Business* is an indicator for managers with a B.A. in either economics or business (Panel D). *Age* is manager age at time of ESMWT application (Panel E). *Male* is an indicator for male managers (Panel F). *White* is an indicator for white managers (Panel G). *Married* is an indicator for married managers (Panel H). Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 205,933 managers whose score in the entry exam above the ESMWT 80-point threshold.

Figure A.17: Distribution of p-values for Manager War Facilities Characteristics – continues

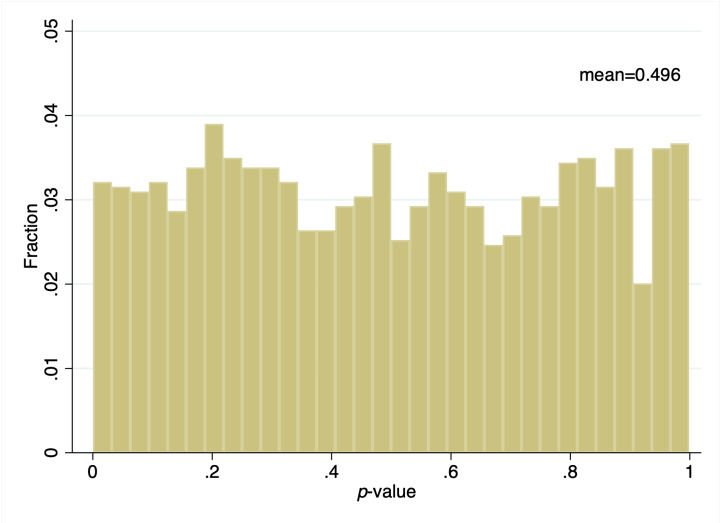
Panel A: Number of Plants



Panel B: Value Added



Panel C: Sales



Panel D: Employees

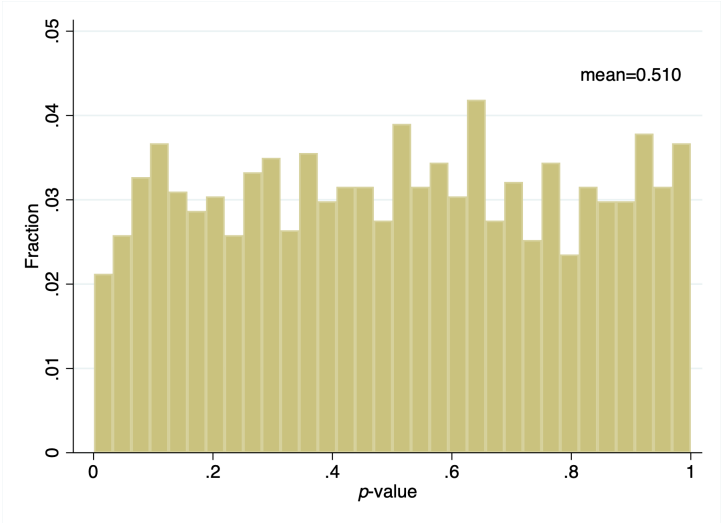
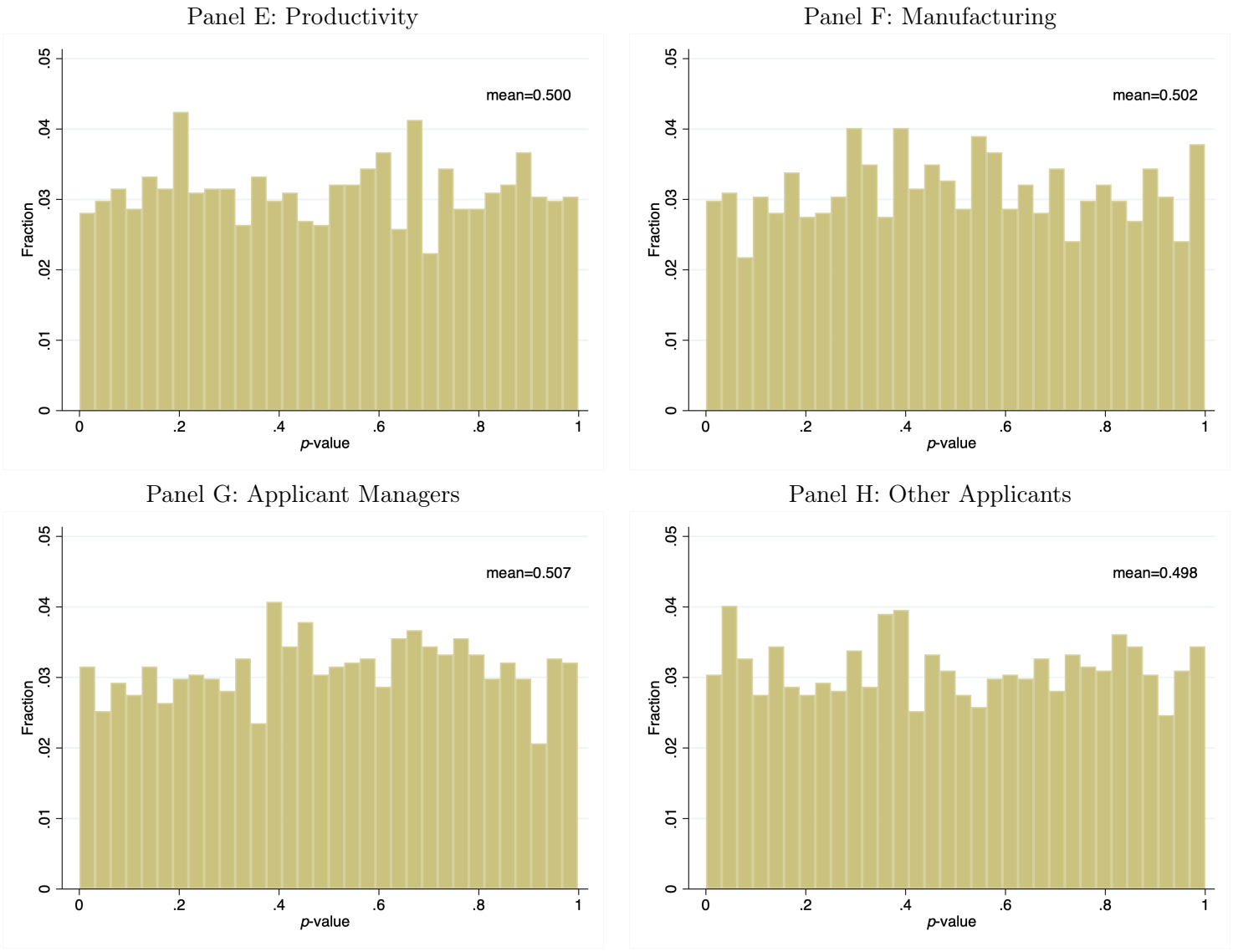


Figure A.17: Distribution of p-values for Manager War Facilities Characteristics – continued



Notes. p-values obtained from testing joint significance of section indicators from regressing war facilities pre-determined characteristics on section indicators for each university and application window pair. A total of 1,744 regressions have been run. *Mean* is the mean of the p-values, expected to be 0.5 in case of random assignment of managers to sections. *Plants* is total number of plants (Panel A). *Value Added* and *Sales* are expressed in millions of 2020 USD (Panels B and C). *Employees* is number of employees (Panel D). *Productivity (TFP)* is logged total factor productivity revenue, estimated with the Gandhi et al. (2020)'s method (Panel E). *Manufacturing* is an indicator for facilities that operate in the manufacturing sector (Panel F). *Applicant Managers* is number of applicant managers (Panel G). *Other Applicants* is number of other applicants to the science and engineering component of ESMWT (Panel H). Data are provided at the war facility level from the Manpower Commission Surveys for 37,654 war facilities whose higher applicant manager score was above the ESMWT 80-point threshold.

Table A.1: Probability of Matching Applicant Managers with Reunion Books Based on Their Observable Characteristics

	All			70-90 Points			77-83 Points		
	Admitted	Non-Admitted	p-value	Admitted	Non-Admitted	p-value	Admitted	Non-Admitted	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age	0.013	0.011	0.633	0.009	0.008	0.554	0.006	0.007	0.638
	(0.015)	(0.017)		(0.010)	(0.013)		(0.008)	(0.009)	
Middle Managers	0.033***	0.025***	0.000	0.029***	0.025***	0.657	0.025***	0.024***	0.713
	(0.003)	(0.002)		(0.003)	(0.005)		(0.004)	(0.005)	
Years of Education	0.025***	0.014***	0.000	0.021***	0.019***	0.573	0.018***	0.019***	0.672
	(0.004)	(0.003)		(0.003)	(0.004)		(0.004)	(0.004)	
Years of Tenure	0.035***	0.024***	0.000	0.032***	0.028***	0.549	0.030***	0.029***	0.549
	(0.002)	(0.003)		(0.004)	(0.003)		(0.005)	(0.004)	
Years of Employment	0.048***	0.031***	0.000	0.038***	0.035***	0.703	0.036***	0.034***	0.568
	(0.002)	(0.004)		(0.005)	(0.006)		(0.004)	(0.005)	
B.A. Economics and Business	0.009	0.008	0.628	0.009	0.008	0.512	0.007	0.007	0.738
	(0.007)	(0.006)		(0.013)	(0.014)		(0.011)	(0.012)	
Female	0.065***	0.043***	0.000	0.055***	0.049***	0.541	0.047***	0.046***	0.611
	(0.005)	(0.006)		(0.004)	(0.006)		(0.006)	(0.007)	
Non White	0.051***	0.036***	0.000	0.050***	0.044***	0.688	0.047***	0.046***	0.516
	(0.004)	(0.003)		(0.005)	(0.007)		(0.007)	(0.006)	
Marital Status	0.022	0.025	0.514	0.021	0.023	0.504	0.018	0.020	0.569
	(0.024)	(0.028)		(0.023)	(0.019)		(0.022)	(0.021)	
Entry Exam Score	0.016***	0.014***	0.587	0.010	0.009	0.615	0.007	0.008	0.764
	(0.003)	(0.004)		(0.011)	(0.015)		(0.010)	(0.012)	
Observations	205,933	469,530	675,463	163,560	258,234	421,794	75,371	65,568	140,939
Matching Rate	78.59%	72.78%	0.000	78.14%	76.59%	0.388	77.16%	77.23%	0.913

Notes. Prediction of matching across ESMWT records and reunion books between 1950 and 1975 for 675,463 managers who applied for the ESMWT between July 1941 and January 1945 (columns 1-3), for 421,794 managers who applied for the ESMWT and scored between 70 and 90 points in the entry exam (columns 4-6), and for 140,939 managers who applied for the ESMWT and scored between 77 and 83 points in the entry exam (columns 7-9). p-value for testing the mean difference between admitted and non-admitted managers is reported in columns 3, 6, and 9. *Age* is manager age at time of ESMWT application. *Years of Education*, *of Tenure in War Facility*, and *of Employment* are, respectively, the number of years of education, of work in the war industrial facility they were employed at when they applied for ESMWT, and total year of employment. *Economics and Business* is an indicator for managers with a B.A. in either economics or business, *Female* is an indicator for female managers. *Nonwhite* is an indicator for nonwhite managers. *Marital Status* is an indicator for married managers. *Entry Exam Score* is the score managers earned in the entry exam. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and reunion books.

Table A.2: Summary Statistics for 53,674 War Industrial Facilities

	Mean	Std. Dev.	Minimum	Maximum
	(1)	(2)	(3)	(4)
Panel A: Firm Characteristics				
Plants	2.55	0.67	1	6
Value Added (k USD)	2,190.13	938.64	1,478.49	2,890.67
Sales (k USD)	3,216.64	1,134.52	2,673.12	3,733.98
Employees	349.62	115.32	100	687
Productivity (TFP)	1.85	0.39	1.43	3.71
Agriculture	0.06	0.24	0	1
Manufacturing	0.75	0.43	0	1
Services	0.11	0.31	0	1
Transportation	0.08	0.27	0	1
Applicant Managers	12.58	1.44	1	25
Panel B: Management Practices				
Factory Operations				
Maintenance of Machines and Safety	0.05	0.22	0	1
Interventions for Machine Repairs	27.33	1.98	12	41
Worker Injuries	46.53	3.48	25	88
Quality Control				
Statistical Control Output	0.04	0.20	0	1
Statistical Control Inputs	0.05	0.22	0	1
Scraped Output (percent)	0.12	0.06	0.05	0.21
Human Resources				
Bonus for Workers	0.06	0.24	0	1
Bonus for Managers	0.04	0.20	0	1
Absenteeism (percent)	0.06	0.02	0.01	0.12
Inventory Control				
Stock Monitoring	0.07	0.26	0	1
Statistical Records	0.06	0.24	0	1
Inventory/Current Assets (percent)	0.75	0.06	0.63	0.824
Sales and Order Control				
Production Planning	0.06	0.24	0	1
Order Prioritization	0.08	0.27	0	1
Late Delivered Orders (percent)	0.22	0.09	0.15	0.35
Observations	53,674	53,674	53,674	53,674

Notes. Summary statistics for 53,674 war industrial facilities with at least an ESMWT applicant manager. Columns 1, 2, 3, and 4 present, respectively, mean, standard deviation, minimum, and maximum of facility characteristics and outcomes in Panel A and of implementation of managerial practices in Panel B, measured in the month the first facility manager applied to ESMWT. *Plants* is total number of plants. *Value Added* and *Sales* are expressed in millions of 2020 USD. *Employees* is number of employees. *Productivity (TFP)* is logged total factor productivity revenue, estimated with the Gandhi et al. (2020)'s method. *Agriculture*, *Manufacturing*, *Transportation*, and *Services* are indicators for facilities that operate in the respective sector. *Applicant Managers* is number of applicant managers. *Maintenance of Machines and Safety*, *Statistical Control Output* and *Inputs*, *Bonus for Workers* and *Managers*, *Stock Monitoring*, *Statistical Records*, *Production Planning*, and *Order Prioritization* are, respectively, indicators for facilities that perform regular maintenance of the machine and of safety conditions, systematically control production outputs and inputs, pay bonuses to workers and managers, monitor inventory, keep track of statistical records, plan production, and prioritize orders based on delivery deadlines. *Interventions of Machine Repairs* and *Worker Injuries* are monthly interventions for repairing machines and number of injured workers. *Scraped Output* and *Late Delivered Orders* are monthly percentage of scraped output out of total output and of orders delivered past deadline. *Absenteeism* is the ratio between days of absence and total worked days. *Inventory/Current Assets* is the ratio between facility inventory and its current assets. Data are provided at the facility level from the Manpower Commission Surveys.

Table A.3: Summary Statistics for 218 Participating Universities and Colleges

	Total	Mean	Standard Deviation	Min	Max
	(1)	(2)	(3)	(4)	(5)
Number of Students	205,933	944.65	102.21	202	10,120
Number of Students per Year	41,187	188.93	25.69	40	2,024
Number of Students per Section	40	39.88	2.33	37	42
Management Sections	5,148	23.61	12.45	5	253
Management Sections per Year	1,030	4.72	2.27	1	52
Teaching Faculty	1,716	7.88	16.71	3	175
Observations	218	218	218	218	218

Notes. Summary statistics for 218 universities and colleges that hosted at least one ESMWT managerial class. Column 1 reports the total number, column 2 the average number, column 3 the standard deviation, columns 4 and 5 the minimum and maximum value of each variable. *Number of Students* is the total number of students. *Number of Students per Year* is the number of students per year. *Number of Students per Section* is the number of students per ESMWT section. *Management Sections* is the total number of ESMWT management sections. *Management Sections per Year* is the number of ESMWT management sections per year. *Teaching Faculty* is the number of institution faculty that taught in the ESMWT managerial component. Data are provided at the university level from university library archives.

Table A.4: Pre-ESMWT Differences in Time Trends for War Facilities around Threshold

	Log Plants		Log Value Added		Log Sales		Log Employees		Log TFP	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Time trend	0.012	0.011	0.031	0.028	0.025	0.026	0.021	0.018	0.015	0.012
	(0.016)	(0.018)	(0.028)	(0.031)	(0.024)	(0.023)	(0.026)	(0.025)	(0.013)	(0.015)
Time trend · Above 80 Points	0.003	0.002	-0.002	-0.001	0.003	0.002	-0.001	-0.002	0.004	0.002
	(0.004)	(0.005)	(0.003)	(0.002)	(0.007)	(0.005)	(0.005)	(0.003)	(0.005)	(0.002)
Above 80 Points	0.003	0.002	-0.005	-0.003	-0.004	-0.002	0.005	0.004	0.003	0.002
	(0.005)	(0.004)	(0.006)	(0.004)	(0.004)	(0.006)	(0.006)	(0.009)	(0.006)	(0.002)
Observations	676,690	676,690	676,690	676,690	676,690	676,690	676,690	676,690	676,690	676,690
War Facility FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month-Year FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
County x month-year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes. Coefficients estimated from a constant linear time trend model that allows for an interaction of the constant linear trend with an Above 80 Points indicator, that equals one for facilities whose manager highest score in the ESMWT entry exam was above 80 points. The month in which the first manager per facility applied to ESMWT is normalized to -1 and serves as the excluded category. Facilities are associated with their higher applicant manager score for managers. *Plants* is logged number of plants. *Value Added* and *Sales* are logged millions of 2020 USD. *Employees* is logged number of employees. *Productivity (TFP)* is logged total factor productivity revenue, estimated with the Gandhi et al. (2020)'s method. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the facility level from the Manpower Commission Surveys for 18,446 war facilities whose higher applicant manager score was 3 points above or below the ESMWT threshold.

Table A.5: Effects of ESMWT on Manager Promotion Over Time

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Enroll.*10 Years	0.198***	0.095***	0.078***	0.021***	0.009***
	(0.047)	(0.022)	(0.015)	(0.006)	(0.002)
Enroll.*20 Years	0.355***	0.301***	0.274***	0.035***	0.023***
	(0.038)	(0.039)	(0.035)	(0.006)	(0.004)
Enroll.*30 Years	0.215***	0.207***	0.152***	0.055***	0.040***
	(0.033)	(0.031)	(0.024)	(0.020)	(0.011)
Observations	124,579	101,372	110,753	115,414	120,432
Mean dep. variable	0.603	0.409	0.278	0.029	0.009
% var. 10 years	32.84	23.23	28.06	72.414	100.00
% var. 20 years	58.87	73.59	98.56	120.69	255.56
% var. 30 years	35.66	50.61	54.68	189.66	444.44
Bandwidth	2.69	2.15	2.31	2.48	2.56

Notes. γ coefficients estimated from equation 1 interacted with indicators every ten years in reunion books. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.6: Effects of ESMWT on Manager Movements to Other Firms

	Moving	Moving Middle	Moving Top	Listed Firms	Fortune 500
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.207***	0.161***	0.059***	0.169***	0.185***
	(0.076)	(0.012)	(0.013)	(0.021)	(0.025)
Observations	133,675	124,579	115,414	124,172	124,579
Mean dep. variable	0.345	0.235	0.037	0.085	0.088
% variation	60.02	68.51	159.46	198.82	210.23
Bandwidth	2.86	2.67	2.48	2.64	2.68

Notes. γ coefficients estimated from equation 1. *Moving* is an indicator for managers that moved at least once in their career to another firm. *Moving Middle* is an indicator for managers that moved to another firm and became plant or general manager. *Moving Top* is an indicator for managers that moved to another firm and became top executives or CEOs. *Listed Firms* and *Fortune 500* are indicators for managers that moved to listed firms or to firms included in Fortune 500 at least once between two reunion books. *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.7: Effects of ESMWT on Managers' Promotion within War Facilities

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.305***	0.243***	0.158***	0.006	0.002
	(0.082)	(0.043)	(0.031)	(0.016)	(0.008)
Observations	119,986	114,485	115,414	129,166	133,675
Mean dep. variable	0.554	0.411	0.169	0.038	0.008
% variation	55.05	59.12	93.49	15.79	25.02
Bandwidth	2.52	2.43	2.49	2.71	2.87

Notes. γ coefficients estimated from equation 1. *Promotion* is an indicator for managers that remained in the war facility and were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that remained in the war facility and became plant or general managers. *Top Executive* and *CEO* are indicators for managers that remained in the war facility and became top executives or CEOs. *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.8: Angrist and Rokkanen (2015)'s Procedure: CIA-based Estimates – Managers' Promotion

	CCT	Linear Re-weighting	Propensity Score
	(1)	(2)	(3)
Promotion	0.256***	0.198***	0.207***
	(0.078)	(0.061)	(0.065)
Observations	124,579	552,625	552,625
p-value equality with CCT		0.567	0.544
Plant Manager	0.201***	0.172***	0.175***
	(0.038)	(0.028)	(0.040)
Observations	101,372	552,625	552,625
p-value equality with CCT		0.373	0.398
General Manager	0.168***	0.125***	0.132***
	(0.024)	(0.028)	(0.032)
Observations	110,753	552,625	552,625
p-value equality with CCT		0.298	0.329
Top Executive	0.037***	0.020***	0.021***
	(0.009)	(0.007)	(0.006)
Observations	115,414	552,625	552,625
p-value equality with CCT		0.144	0.156
CEO	0.024***	0.014***	0.016***
	(0.004)	(0.003)	(0.002)
Observations	120,432	552,625	552,625
p-value equality with CCT		0.136	0.112

Notes. This table compares baseline estimates from Calonico et al. (2017) (CCT in column 1) to the CIA-based estimates from Angrist and Rokkanen (2015): a linear re-weighting estimator as proposed by Kline (2011, column 2), and an inverse propensity score weighting, following Hirano et al. (2003, column 3). N is the number of observations using the Calonico et al. (2017)'s optimal bandwidth in column 1 and the number of observations in columns 2 and 3. *p-value equality with CCT* is the p-value of testing equality between the CCT and the CIA-based estimates, calculated following the method in Clogg et al. (1995) and Marx et al. (2022). *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.9: Angrist and Rokkanen (2015)'s Procedure: CIA-based Estimates – Managers' Entrepreneurial Activity

	CCT	Linear Re-weighting	Propensity Score
	(1)	(2)	(3)
Owner	0.109***	0.084***	0.095***
	(0.029)	(0.035)	(0.031)
Observations	127,362	552,625	552,625
p-value equality with CCT		0.671	0.539
(Co) Founder	0.098***	0.079***	0.081***
	(0.026)	(0.022)	(0.025)
Observations	124,579	552,625	552,625
p-value equality with CCT		0.608	0.677
Innovative Business	0.038***	0.024***	0.028***
	(0.006)	(0.008)	(0.06)
Observations	115,887	552,625	552,625
p-value equality with CCT		0.151	0.156
Consulting	0.055***	0.028***	0.033***
	(0.015)	(0.007)	(0.007)
Observations	118,143	552,625	552,625
p-value equality with CCT		0.173	0.148
SBIC	0.029***	0.011***	0.015***
	(0.005)	(0.003)	(0.004)
Observations	117,222	552,625	552,625
p-value equality with CCT		0.115	0.113

Notes. This table compares baseline estimates from Calonico et al. (2017) (CCT in column 1) to the CIA-based estimates from Angrist and Rokkanen (2015): a linear re-weighting estimator as proposed by Kline (2011, column 2), and an inverse propensity score weighting, following Hirano et al. (2003, column 3). N is the number of observations using the Calonico et al. (2017)'s optimal bandwidth in column 1 and the number of observations in columns 2 and 3. *p-value equality with CCT* is the p-value of testing equality between the CCT and the CIA-based estimates, calculated following the method in Clogg et al. (1995) and Marx et al. (2022). *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.10: Angrist and Rokkanen (2015)'s Procedure: CIA-based Estimates – Managers' Promotion by Race and Gender

	CCT	Linear Re-weighting	Propensity Score
	(1)	(2)	(3)
Panel A: White Managers			
Promotion	0.238***	0.206***	0.209***
	(0.054)	(0.048)	(0.046)
Observations	113,737	516,986	516,986
Mean Dep. Variable	0.623	0.571	0.571
p-value equality with CCT		0.541	0.528
Panel B: Non-White Managers			
Promotion	0.403***	0.377***	0.371***
	(0.061)	(0.053)	(0.059)
Observations	10,842	49,282	49,282
Mean Dep. Variable	0.387	0.321	0.321
p-value equality with CCT		0.509	0.497
Panel C: Male Managers			
Promotion	0.232***	0.205***	0.202***
	(0.041)	(0.048)	(0.042)
Observations	106,055	482,068	482,068
Mean Dep. Variable	0.648	0.613	0.613
p-value equality with CCT		0.478	0.491
Panel D: Female Managers			
Promotion	0.378***	0.345***	0.337***
	(0.065)	(0.057)	(0.063)
Observations	18,524	84,200	84,200
Mean Dep. Variable	0.351	0.308	0.308
p-value equality with CCT		0.506	0.511

Notes. This table compares baseline estimates from Calonico et al. (2017) (CCT in column 1) to the CIA-based estimates from Angrist and Rokkanen (2015): a linear re-weighting estimator as proposed by Kline (2011, column 2), and an inverse propensity score weighting, following Hirano et al. (2003, column 3) for white and nonwhite managers (Panels A and B) and male and female managers (Panels C and D). N is the number of observations using the Calonico et al. (2017)'s optimal bandwidth in column 1 and the number of observations in columns 2 and 3. *Mean dep. variable* is the mean of the dependent variable over the optimal bandwidth on the left side of the threshold in column 1 and between 65 and 80 points in the entry exam in columns 2 and 3. *p-value equality with CCT* is the p-value of testing equality between the CCT and the CIA-based estimates, calculated following the method in Clogg et al. (1995) and Marx et al. (2022). *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.11: Angrist and Rokkanen (2015)'s Procedure: CIA-based Estimates – Managers' Entrepreneurial Activity by Race and Gender

	CCT	Linear Re-weighting	Propensity Score
	(1)	(2)	(3)
Panel A: White Managers			
Owner	0.107***	0.081***	0.092***
	(0.028)	(0.031)	(0.030)
Observations	116,854	508,060	508,060
Mean Dep. Variable	0.159	0.112	0.112
p-value equality with CCT		0.528	0.541
Panel B: Non-White Managers			
Owner	0.133***	0.114***	0.108***
	(0.020)	(0.025)	(0.027)
Observations	10,508	45,686	45,686
Mean Dep. Variable	0.065	0.041	0.041
p-value equality with CCT		0.409	0.477
Panel C: Male Managers			
Owner	0.099***	0.075***	0.071***
	(0.031)	(0.026)	(0.026)
Observations	108,104	470,018	470,018
Mean Dep. Variable	0.156	0.138	0.138
p-value equality with CCT		0.603	0.598
Panel D: Female Managers			
Owner	0.115***	0.103***	0.099***
	(0.022)	(0.024)	(0.030)
Observations	19,258	83,730	83,730
Mean Dep. Variable	0.050	0.028	0.028
p-value equality with CCT		0.555	0.521

Notes. This table compares baseline estimates from Calonico et al. (2017) (CCT in column 1) to the CIA-based estimates from Angrist and Rokkanen (2015): a linear re-weighting estimator as proposed by Kline (2011, column 2), and an inverse propensity score weighting, following Hirano et al. (2003, column 3) for white and nonwhite managers (Panels A and B) and male and female managers (Panels C and D). N is the number of observations using the Calonico et al. (2017)'s optimal bandwidth in column 1 and the number of observations in columns 2 and 3. *Mean dep. variable* is the mean of the dependent variable over the optimal bandwidth on the left side of the threshold in column 1 and between 65 and 80 points in the entry exam in columns 2 and 3. *p-value equality with CCT* is the p-value of testing equality between the CCT and the CIA-based estimates, calculated following the method in Clogg et al. (1995) and Marx et al. (2022). *Owner* is an indicator for managers who became firm owners. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.12: Robustness Check on Managers' Promotion – RD Polynomial Specification

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Second-Order Polynomial					
Enrollment	0.258***	0.203***	0.165***	0.035***	0.026***
	(0.076)	(0.035)	(0.024)	(0.012)	(0.006)
Observations	125,510	102,737	107,924	115,414	121,392
Bandwidth	2.67	2.18	2.29	2.45	2.58
Panel B: Third-Order Polynomial					
Enrollment	0.255***	0.202***	0.172***	0.039***	0.023***
	(0.071)	(0.033)	(0.026)	(0.011)	(0.009)
Observations	118,589	100,960	109,844	113,088	123,712
Bandwidth	2.52	2.14	2.33	2.40	2.63

Notes. γ coefficients estimated from equation 1 using a second-order (Panel A) or a third-order polynomial (Panel B) polynomial. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.13: Robustness Check on Managers' Entrepreneurial Activity – RD Polynomial Specification

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Second-Order Polynomial					
Enrollment	0.112***	0.101***	0.040***	0.058***	0.033***
	(0.030)	(0.028)	(0.011)	(0.013)	(0.008)
Observations	131,008	123,712	113,578	118,589	114,485
Bandwidth	2.79	2.63	2.41	2.52	2.43
Panel B: Third-Order Polynomial					
Enrollment	0.107***	0.099***	0.041***	0.052***	0.026***
	(0.031)	(0.029)	(0.008)	(0.014)	(0.006)
Observations	129,166	125,045	116,789	120,876	113,578
Bandwidth	2.75	2.66	2.48	2.57	2.41

Notes. γ coefficients estimated from equation 1 using a second-order (Panel A) or a third-order polynomial (Panel B) polynomial. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.14: Robustness Check on Managers' Promotion – Different Bandwidths

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Bandwidth=3					
Enrollment	0.262***	0.205***	0.173***	0.040***	0.022***
	(0.077)	(0.032)	(0.023)	(0.011)	(0.005)
Observations	140,599	140,599	140,599	140,599	140,599
Panel B: Bandwidth=2					
Enrollment	0.251***	0.198***	0.164***	0.034***	0.020***
	(0.070)	(0.032)	(0.021)	(0.010)	(0.005)
Observations	94,403	94,403	94,403	94,403	94,403
Panel C: Bandwidth=1					
Enrollment	0.249***	0.195***	0.160***	0.032***	0.019***
	(0.066)	(0.027)	(0.012)	(0.008)	(0.003)
Observations	47,571	47,571	47,571	47,571	47,571

Notes. γ coefficients estimated from equation 1 imposing a bandwidth of three (Panel A), two (Panel B), and one (Panel C) point(s) in exam score distance from the 80-point threshold. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.15: Robustness Check on Managers' Entrepreneurial Activity – Different Bandwidths

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Bandwidth=3					
Enrollment	0.115***	0.103***	0.042***	0.059***	0.029***
	(0.031)	(0.028)	(0.012)	(0.017)	(0.010)
Observations	140,599	140,599	140,599	140,599	140,599
Panel B: Bandwidth=2					
Enrollment	0.107***	0.096***	0.035***	0.053***	0.027***
	(0.025)	(0.022)	(0.010)	(0.013)	(0.009)
Observations	94,403	94,403	94,403	94,403	94,403
Panel C: Bandwidth=1					
Enrollment	0.106***	0.095***	0.033***	0.050***	0.026***
	(0.023)	(0.021)	(0.009)	(0.012)	(0.005)
Observations	47,571	47,571	47,571	47,571	47,571

Notes. γ coefficients estimated from equation 1 imposing a bandwidth of three (Panel A), two (Panel B), and one (Panel C) point(s) in exam score distance from the 80-point threshold. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.16: Robustness Check on Managers' Promotion – Adding Controls

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Controlling for Managers Characteristics					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.069)	(0.031)	(0.020)	(0.010)	(0.004)
Observations	124,172	103,175	111,218	117,663	121,851
Bandwidth	2.64	2.19	2.36	2.50	2.59
Panel B: Controlling for Facility Fixed Effects					
Enrollment	0.254***	0.197***	0.166***	0.033***	0.021***
	(0.068)	(0.031)	(0.025)	(0.012)	(0.007)
Observations	122,762	101,842	112,596	119,986	118,589
Bandwidth	2.61	2.16	2.39	2.55	2.52
Panel C: Controlling for University Fixed Effects					
Enrollment	0.253***	0.202***	0.175***	0.042***	0.028***
	(0.072)	(0.030)	(0.021)	(0.012)	(0.006)
Observations	125,968	102,305	111,694	118,143	119,054
Bandwidth	2.68	2.17	2.37	2.51	2.53

Notes. γ coefficients estimated from equation 1 controlling for manager's years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status (Panel A), facility fixed effects (Panel B), and university fixed effects (Panel C). *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.17: Robustness Check on Managers' Entrepreneurial Activity – Adding Controls

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Controlling for Managers Characteristics					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.025)	(0.022)	(0.007)	(0.011)	(0.006)
Observations	126,425	118,589	113,578	121,392	115,887
Bandwidth	2.69	2.52	2.41	2.58	2.46
Panel B: Controlling for Facility Fixed Effects					
Enrollment	0.106***	0.095***	0.036***	0.051***	0.027***
	(0.021)	(0.021)	(0.006)	(0.010)	(0.005)
Observations	123,712	118,143	115,887	119,054	114,953
Bandwidth	2.63	2.51	2.46	2.53	2.44
Panel C: Controlling for University Fixed Effects					
Enrollment	0.105***	0.096***	0.034***	0.050***	0.030***
	(0.026)	(0.024)	(0.009)	(0.012)	(0.007)
Observations	125,510	117,222	114,953	121,392	118,589
Bandwidth	2.67	2.49	2.44	2.58	2.52

Notes. γ coefficients estimated from equation 1 controlling for manager's years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status (Panel A), facility fixed effects (Panel B), and university fixed effects (Panel C). *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.18: Robustness Check on Managers' Promotion – Clustering Level

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Clustering at the Facility Level					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.076)	(0.032)	(0.021)	(0.011)	(0.007)
Observations	124,579	101,372	110,753	115,414	120,432
Bandwidth	2.69	2.15	2.31	2.48	2.56
Panel B: Clustering at the University-Application Window Level					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.075)	(0.036)	(0.022)	(0.011)	(0.008)
Observations	124,579	101,372	110,753	115,414	120,432
Bandwidth	2.69	2.15	2.31	2.48	2.56
Panel C: Clustering at the University-Section Level					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.074)	(0.032)	(0.023)	(0.012)	(0.006)
Observations	124,579	101,372	110,753	115,414	120,432
Bandwidth	2.69	2.15	2.31	2.48	2.56

Notes. γ coefficients estimated from equation 1 controlling for manager's years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status (Panel A), facility fixed effects (Panel B), and university fixed effects (Panel C). *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.19: Robustness Check on Managers' Entrepreneurial Activity – Clustering Level

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Clustering at the Facility Level					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.028)	(0.025)	(0.008)	(0.013)	(0.008)
Observations	127,362	124,579	115,887	118,143	117,222
Bandwidth	2.71	2.65	2.46	2.51	2.49
Panel B: Clustering at the University-Application Window Level					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.025)	(0.026)	(0.009)	(0.013)	(0.008)
Observations	127,362	124,579	115,887	118,143	117,222
Bandwidth	2.71	2.65	2.46	2.51	2.49
Panel C: Clustering at the University-Section Level					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.027)	(0.025)	(0.008)	(0.012)	(0.007)
Observations	127,362	124,579	115,887	118,143	117,222
Bandwidth	2.71	2.65	2.46	2.51	2.49

Notes. γ coefficients estimated from equation 1 controlling for manager's years of education, tenure in war facilities, employment and type of B.A. major, age, gender, race, and marital status (Panel A), facility fixed effects (Panel B), and university fixed effects (Panel C). *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.20: Robustness Check on Managers' Promotion – Fuzzy RD Specification

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.257***	0.203***	0.165***	0.038***	0.022***
	(0.075)	(0.031)	(0.022)	(0.010)	(0.006)
Observations	128,267	121,851	110,753	114,485	122,304
Bandwidth	2.73	2.59	2.35	2.43	2.60

Notes. γ coefficients estimated from equation 1 estimated with a fuzzy RD that instruments ESMWT participation with the entry exams score. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.21: Robustness Check on Managers' Entrepreneurial Activity – Fuzzy RD Specification

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.029)	(0.026)	(0.010)	(0.015)	(0.009)
Observations	127,813	124,172	117,222	120,876	119,054
Bandwidth	2.72	2.64	2.49	2.57	2.53

Notes. *Notes*. γ coefficients estimated from equation 1 estimated with a fuzzy RD that instruments ESMWT participation with the entry exams score. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Pre-program mean refers to the mean of outcomes on the two sides of the cut-off the month before ESMWT enrollment. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.22: Robustness Check on Managers' Promotion – Placebo Tests

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Threshold=70					
Enrollment	0.010	0.006	0.005	0.002	0.002
	(0.011)	(0.009)	(0.009)	(0.006)	(0.005)
Observations	129,476	100,082	112,298	117,857	119,531
Bandwidth	2.74	2.11	2.37	2.49	2.52
Panel B: Threshold=75					
Enrollment	0.009	0.007	0.006	0.003	0.002
	(0.013)	(0.008)	(0.005)	(0.006)	(0.005)
Observations	140,956	115,941	126,927	129,044	134,764
Bandwidth	2.65	2.17	2.38	2.42	2.53
Panel C: Threshold=85					
Enrollment	0.011	0.009	0.006	0.004	0.002
	(0.010)	(0.012)	(0.008)	(0.009)	(0.004)
Observations	85,294	70,604	76,149	79,772	82,025
Bandwidth	2.61	2.16	2.33	2.44	2.51
Panel D: Threshold=90					
Enrollment	0.012	0.009	0.007	0.004	0.001
	(0.013)	(0.011)	(0.009)	(0.006)	(0.005)
Observations	45,777	37,186	42,304	43,232	44,333
Bandwidth	2.57	2.10	2.38	2.43	2.49

Notes. γ coefficients estimated from equation 1 using a fake discontinuity at 70 (Panel A), 75 (Panel B), 85 (Panel C), and 90 (Panel D) point threshold. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from each panel threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.23: Robustness Check on Managers' Entrepreneurial Activity – Placebo Tests

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Threshold=70					
Enrollment	0.010	0.008	0.005	0.003	0.001
	(0.014)	(0.012)	(0.006)	(0.004)	(0.003)
Observations	126,677	118,803	118,309	117,857	119,264
Bandwidth	2.68	2.51	2.50	2.49	2.52
Panel B: Threshold=75					
Enrollment	0.012	0.009	0.004	0.003	0.002
	(0.011)	(0.010)	(0.006)	(0.005)	(0.004)
Observations	144,655	135,782	133,730	131,124	135,259
Bandwidth	2.72	2.55	2.51	2.46	2.54
Panel C: Threshold=85					
Enrollment	0.014	0.010	0.005	0.004	0.002
	(0.013)	(0.011)	(0.006)	(0.005)	(0.005)
Observations	86,601	82,025	82,635	79,772	82,343
Bandwidth	2.65	2.51	2.53	2.44	2.52
Panel D: Threshold=90					
Enrollment	0.015	0.012	0.006	0.004	0.003
	(0.016)	(0.011)	(0.008)	(0.005)	(0.004)
Observations	46,349	45,966	44,891	42,703	45,432
Bandwidth	2.60	2.58	2.52	2.40	2.55

Notes. γ coefficients estimated from equation 1 using a fake discontinuity at 70 (Panel A), 75 (Panel B), 85 (Panel C), and 90 (Panel D) point threshold. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from each panel threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.24: Robustness Check on Managers' Promotion – Estimating Sample

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Points above/below threshold=9					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.079)	(0.040)	(0.027)	(0.010)	(0.004)
Observations	128,267	102,305	109,844	116,344	118,143
Bandwidth	2.73	2.17	2.33	2.47	2.51
Panel B: Points above/below threshold=7					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.081)	(0.042)	(0.030)	(0.011)	(0.006)
Observations	127,362	103,175	108,400	118,589	119,511
Bandwidth	2.71	2.19	2.30	2.52	2.54
Panel C: Points above/below threshold=5					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.082)	(0.045)	(0.033)	(0.012)	(0.007)
Observations	124,579	101,842	107,924	121,851	120,432
Bandwidth	2.65	2.16	2.29	2.59	2.56
Panel D: Points above/below threshold=3					
Enrollment	0.256***	0.201***	0.168***	0.037***	0.024***
	(0.085)	(0.048)	(0.036)	(0.013)	(0.008)
Observations	126,878	104,129	105,980	115,414	121,392
Bandwidth	2.70	2.21	2.25	2.45	2.58

Notes. γ coefficients estimated from equation 1 using as estimating sample managers whose entry exam score ranged from 9 (Panel A), 7 (Panel B), 5 (Panel C), and 3 (Panel D) points above and below the threshold. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from each panel threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.25: Robustness Check on Managers' Entrepreneurial Activity – Estimating Sample

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Points above/below threshold=9					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.030)	(0.027)	(0.007)	(0.016)	(0.006)
Observations	128,743	122,762	117,222	119,986	113,578
Bandwidth	2.74	2.61	2.49	2.55	2.41
Panel B: Points above/below threshold=7					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.031)	(0.029)	(0.009)	(0.017)	(0.008)
Observations	127,813	121,392	114,953	118,143	115,414
Bandwidth	2.72	2.58	2.44	2.51	2.45
Panel C: Points above/below threshold=5					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.033)	(0.030)	(0.011)	(0.018)	(0.009)
Observations	128,743	118,143	113,578	119,054	117,222
Bandwidth	2.74	2.51	2.41	2.53	2.49
Panel D: Points above/below threshold=3					
Enrollment	0.109***	0.098***	0.038***	0.055***	0.029***
	(0.035)	(0.033)	(0.013)	(0.020)	(0.010)
Observations	130,102	116,344	115,887	118,143	120,876
Bandwidth	2.77	2.47	2.46	2.51	2.57

Notes. γ coefficients estimated from equation 1 using as estimating sample managers whose entry exam score ranged from 9 (Panel A), 7 (Panel B), 5 (Panel C), and 3 (Panel D) points above and below the threshold. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from each panel threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.26: Robustness Check on Managers' Promotion – Including Re-Applicant Managers

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Panel A: Considering the first score in the entry exam					
Enrollment	0.255***	0.203***	0.162***	0.038***	0.027***
	(0.071)	(0.042)	(0.024)	(0.011)	(0.003)
Observations	130,421	103,908	110,871	118,002	119,334
Bandwidth	2.75	2.13	2.30	2.41	2.54
Panel B: Considering the highest score in the entry exam					
Enrollment	0.259***	0.205***	0.166***	0.041***	0.029***
	(0.073)	(0.040)	(0.023)	(0.010)	(0.004)
Observations	130,466	104,384	111,022	120,209	118,641
Bandwidth	2.76	2.20	2.32	2.55	2.51

Notes. γ coefficients estimated from equation 1 using as including 24,509 managers that scored below the threshold at their first attempt and reapplied to the ESMWT, assigning to them the first (Panel A) or the highest (Panel B) score earned in the entry exam. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from each panel threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.27: Robustness Check on Managers' Entrepreneurial Activity – Including Re-Applicant Managers

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Considering the first score in the entry exam					
Enrollment	0.106***	0.097***	0.039***	0.053***	0.030***
	(0.028)	(0.0257)	(0.006)	(0.012)	(0.005)
Observations	130,012	124,094	119,347	121,698	115,038
Bandwidth	2.76	2.64	2.52	2.58	2.47
Panel B: Considering the highest score in the entry exam					
Enrollment	0.112***	0.103***	0.040***	0.059***	0.034***
	(0.031)	(0.029)	(0.009)	(0.017)	(0.008)
Observations	129,244	123,571	116,785	119,879	117,415
Bandwidth	2.71	2.53	2.48	2.54	2.41

Notes. γ coefficients estimated from equation 1 using as including 24,509 managers that scored below the threshold at their first attempt and reapplied to the ESMWT, assigning to them the first (Panel A) or the highest (Panel B) score earned in the entry exam. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from each panel threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.28: Robustness Check on Managers' Promotion – Excluding Managers that Earned an MBA after ESMWT

	Promotion	Plant Manager	General Manager	Top Executive	CEO
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.254***	0.200***	0.163***	0.033***	0.028***
	(0.074)	(0.033)	(0.021)	(0.011)	(0.004)
Observations	121,948	100,404	107,598	1112,312	118,144
Bandwidth	2.65	2.16	2.28	2.41	2.53

Notes. γ coefficients estimated from equation 1 excluding 15,114 managers who earned an MBA after the ESMWT. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Plant* and *General Manager* are indicators for managers that became plant or general managers. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.29: Robustness Check on Managers' Entrepreneurial Activity – Excluding Managers that Earned an MBA after ESMWT

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.115***	0.102***	0.041***	0.057***	0.032***
	(0.028)	(0.025)	(0.010)	(0.011)	(0.005)
Observations	125,678	121,434	113,975	116,909	115,002
Bandwidth	2.76	2.61	2.44	2.57	2.40

Notes. γ coefficients estimated from equation 1 excluding 15,114 managers who earned an MBA after the ESMWT. *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and from university and college reunion books.

Table A.30: Effects of ESMWT on Firm Performance, by Share of Enrolled Managers

	Value Added	TFP	Employees
	(1)	(2)	(3)
Treated ·Post · Less 5%	0.021	0.018	0.004
	(0.020)	(0.019)	(0.005)
Treated · Post · 5-10%	0.028	0.025	0.003
	(0.022)	(0.021)	(0.006)
Treated · Post · 10-20%	0.071***	0.069***	0.005
	(0.018)	(0.013)	(0.008)
Treated · Post · 20-30%	0.093***	0.089***	0.004
	(0.027)	(0.021)	(0.006)
Treated · Post · More 30%	0.158***	0.151***	0.003
	(0.021)	(0.020)	(0.004)
Observations	2,406,264	2,406,264	2,406,264
Total Managers Control	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes. *Treated* is an indicator for war facilities with at least an applicant manager who scored above the ESMWT threshold in the entry exam; *Post* is an indicator for months after the last admitted manager completed the ESMWT; *Less 5*, *5-10%*, *10-20%*, *20-30%*, *More 30%* are indicators for less than 5, 5-10, 10-20, 20-30 and more than 30 percent of facility managers admitted to the ESMWT. *Value Added* is expressed in millions of 2020 USD. *Productivity (TFP)* is logged total factor productivity revenue, estimated with the Gandhi et al. (2020)'s method. *Employees* is number of employees. Each regression controls for total number of facility managers at the time of first application and year fixed effects. Standard errors are clustered at the facility level. Data are provided at the facility level from the Manpower Commission Surveys for 28,646 war facilities whose managers scored between 70 and 90 points in the ESMWT entry exam.

Table A.31: Effects of ESMWT on Managerial Practices Implementation by Share of Enrolled Managers

	Treated ·Post				
	· Less 5%	· 5-10%	·10-20%	·20-30%	·More 30%
	(1)	(2)	(3)	(4)	(5)
Regular Maintenance	0.368***	0.403***	0.444***	0.489***	0.551***
	(0.095)	(0.088)	(0.096)	(0.101)	(0.125)
Statistical Control Output	0.389***	0.451***	0.555***	0.669***	0.726***
	(0.071)	(0.077)	(0.181)	(0.109)	(0.123)
Statistical Control Inputs	0.377***	0.432***	0.543***	0.618***	0.690***
	(0.081)	(0.099)	(0.125)	(0.138)	(0.149)
Bonus for Workers	0.044	0.059	0.167***	0.369***	0.416***
	(0.051)	(0.065)	(0.063)	(0.103)	(0.111)
Bonus for Managers	0.041	0.062	0.178***	0.392***	0.452***
	(0.054)	(0.067)	(0.066)	(0.106)	(0.115)
Stock Monitoring	0.221	0.287**	0.398***	0.405***	0.434***
	(0.202)	(0.144)	(0.107)	(0.131)	(0.127)
Statistical Records	0.238	0.291**	0.401***	0.438***	0.447***
	(0.218)	(0.150)	(0.113)	(0.119)	(0.138)
Production Planning	0.231	0.309**	0.449***	0.479***	0.747***
	(0.216)	(0.155)	(0.102)	(0.109)	(0.169)
Order Prioritization	0.371	0.425**	0.540***	0.599***	0.655***
	(0.298)	(0.215)	(0.200)	(0.214)	(0.231)
Observations	2,406,264	2,406,264	2,406,264	2,406,264	2,406,264
Total Managers Control	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes. *Treated* is an indicator for war facilities with at least an applicant manager who scored above the ESMWT threshold in the entry exam; *Post* is an indicator for months after the last admitted manager completed the ESMWT; *Less 5*, *5-10%*, *10-20%*, *20-30%*, *More 30%* are indicators for less than 5, 5-10, 10-20, 20-30 and more than 30 percent of facility managers admitted to the ESMWT. *Regular Maintenance*, *Statistical Control Output* and *Inputs*, *Bonus for Workers* and *Managers*, *Stock Monitoring*, *Statistical Records*, *Production Planning*, and *Order Prioritization* are, respectively, indicators for facilities that perform regular maintenance of the machine and of safety conditions, systematically control production outputs and inputs, pay bonuses to workers and managers, monitor inventory, keep track of statistical records, plan production, and prioritize orders based on delivery deadlines. Each regression controls for total number of facility managers at the time of first application and year fixed effects. Standard errors are clustered at the facility level. Data are provided at the facility level from the Manpower Commission Surveys for 28,646 war facilities whose managers scored between 70 and 90 points in the ESMWT entry exam.

Table A.32: Effects of ESMWT on Managerial Practices Output by Share of Enrolled Managers

	Treated ·Post				
	· Less 5%	· 5-10%	·10-20%	·20-30%	·More 30%
	(1)	(2)	(3)	(4)	(5)
Interventions for Machine Repairs	-0.243***	-0.289***	-0.298***	-0.301***	-0.334***
	(0.068)	(0.071)	(0.089)	(0.104)	(0.120)
Worker Injuries	-0.155***	-0.168***	-0.171***	-0.198***	-0.228***
	(0.044)	(0.049)	(0.055)	(0.061)	(0.069)
Scraped Output (percent)	-0.201***	-0.222***	-0.298***	-0.329***	-0.425***
	(0.076)	(0.089)	(0.100)	(0.109)	(0.126)
Absenteeism (percent)	-0.033	-0.049	-0.139***	-0.203***	-0.251***
	(0.038)	(0.054)	(0.031)	(0.045)	(0.061)
Inventory/Current Assets (%)	-0.155	-0.189**	-0.271***	-0.309***	-0.331***
	(0.167)	(0.091)	(0.087)	(0.098)	(0.096)
Late Delivered Orders (%)	0.108	0.176*	0.204***	0.223***	0.249***
	(0.078)	(0.089)	(0.069)	(0.067)	(0.071)
Observations	2,406,264	2,406,264	2,406,264	2,406,264	2,406,264
Total Managers Control	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes. *Treated* is an indicator for war facilities with at least an applicant manager who scored above the ESMWT threshold in the entry exam; *Post* is an indicator for months after the last admitted manager completed the ESMWT; *Less 5*, *5-10%*, *10-20%*, *20-30%*, *More 30%* are indicators for less than 5, 5-10, 10-20, 20-30 and more than 30 percent of facility managers admitted to the ESMWT. *Interventions of Machine Repairs* and *Worker Injuries* are monthly interventions for repairing machines and number of injured workers. *Scraped Output* and *Late Delivered Orders* are monthly percentage of scraped output out of total output and of orders delivered past deadline. *Absenteeism* is the ratio between days of absence and total worked days. *Inventory/Current Assets* is the ratio between facility inventory and its current assets. Each regression controls for total number of facility managers at the time of first application and year fixed effects. Standard errors are clustered at the facility level. Data are provided at the facility level from the Manpower Commission Surveys for 28,646 war facilities whose managers scored between 70 and 90 points in the ESMWT entry exam.

Table A.33: Variation in Sections Composition

	Raw Mean (1)	Raw St. Dev. (2)	Residuals Mean (3)	Residuals St. Dev. (4)	Residuals Variation (%) (5)
Panel A: Manager Characteristics					
Age	27.61	1.59	0.00	0.95	59.75
Years of Education	18.34	0.51	0.00	0.36	70.55
Years of Tenure in War Facility	2.98	0.90	0.00	0.61	68.16
Years of Employment	4.87	1.90	0.00	1.19	62.59
Type of College Degree					
Economics and Business	0.49	0.51	0.00	0.30	59.41
STEM	0.46	0.47	0.00	0.32	68.18
Other	0.07	0.28	0.00	0.19	69.11
Gender	0.86	0.35	0.00	0.24	69.49
Race					
White	0.91	0.26	0.00	0.18	69.42
Afro-American	0.07	0.23	0.00	0.14	61.58
Other	0.02	0.15	0.00	0.10	64.63
Marital Status	0.53	0.48	0.00	0.33	67.72
Entry Exam Score	86.52	4.40	0.00	2.83	64.34
Observations	205,933	205,933	205,933	205,933	205,933
Panel B: Facility Characteristics					
Plants	2.68	0.78	0.00	0.49	62.82
Value Added	2,367.11	1,098.72	0.00	651.43	59.29
Sales	3,468.91	1,346.29	0.00	1,024.39	76.09
Employees	376.23	120.33	0.00	74.51	61.92
Productivity (TFP)	1.91	0.45	0.00	0.30	66.67
Manufacturing	0.74	0.41	0.00	0.31	75.61
Number of Facilities	23.46	4.38	0.00	3.08	70.32
Number of Listed Facilities	5.45	1.59	0.00	1.15	72.33
Observations	37,654	37,654	37,654	37,654	37,654

Notes. Columns 1 and 2 report the average section pre-determined manager (Panel A) and facility (Panel B) characteristics. Columns 3 and 4 report the residuals mean and standard deviation after controlling for university and application window fixed effects. Column 5 reports the residual variation in percentage terms (column 4/column 2). *Age* is manager age at time of ESMWT application. *Years of Education*, *of Tenure in War Facility*, and *of Employment* are, respectively, the number of years of education, of work in the war industrial facility they were employed at when they applied for ESMWT, and total year of employment. *Economics and Business* is an indicator for managers with a B.A. in either economics or business, *STEM* is an indicator for managers with a B.A. is a STEM (Science, Technology, Engineering, and Math) major, *Other* is an indicator for any other B.A. type. *Gender* is an indicator for male managers. *White* is an indicator for white managers, *Afro-American* is an indicator for managers classified as negroes, *Other* is an indicator for any other race. *Marital Status* is an indicator for married managers. *Entry Exam Score* is the score managers earned in the entry exam. *Plants* is total number of plants. *Value Added* and *Sales* are expressed in millions of 2020 USD . *Employees* is number of employees. *Productivity (TFP)* is logged total factor productivity revenue, estimated with the Gandhi et al. (2020)'s method. *Manufacturing* is an indicator for facilities that operate in the manufacturing sector. *Number of Facilities* and *Number of Listed Facilities* are the number of different manager facilities and listed facilities. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 205,933 managers whose score in the entry exam was above the ESMWT 80-point threshold in Panel A and at the war facility level from the Manpower Commission Surveys for 37,654 war facilities whose higher applicant manager score was above the ESMWT 80-point threshold in Panel B.

Table A.34: Probability of Assignment to Sections Based on Race and Gender

	Share of Nonwhite Managers		Share of Female Managers	
	(1)	(2)	(3)	(4)
Nonwhite	0.001	0.003		
	(0.002)	(0.004)		
Female			0.003	0.004
			(0.005)	(0.006)
Observations	205,933	205,933	205,933	205,933
University FE	No	Yes	No	Yes
Application Window FE	No	Yes	No	Yes

Notes. *Female* and *Nonwhite* are indicators for nonwhite and female admitted managers. *Share of Nonwhite* and *Female Managers* are the correspondent shares by ESMWT sections. Controls for university and application windows shares of the same variables are included in the regressions but not reported. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 205,933 managers whose score in the entry exam was above the ESMWT 80-point threshold. Standard errors are clustered at the section level.

Table A.35: Effects of ESMWT Network on Career Outcomes for Nonwhite and Female Managers

	Pr Moving to White-Mate Firms (1)	Pr Moving to Male-Mate Firms (2)	Pr Promotion in White-Mate Firms (3)	Pr Promotion in Male-Mate Firms (4)	Pr Co-Funding with White Mates (5)	Pr Co-Funding with Male Mates (6)
White Share 81-90%	0.032***		0.036***		0.035***	
	(0.006)		(0.004)		(0.005)	
White Share 71-80%	0.055***		0.059***		0.053***	
	(0.007)		(0.005)		(0.006)	
White Share 61-70%	-0.019***		-0.015***		-0.021***	
	(0.005)		(0.006)		(0.007)	
White Share <60%	-0.061***		-0.066***		-0.078***	
	(0.008)		(0.005)		(0.010)	
Male Share 81-90%		0.027***		0.031***		0.032***
		(0.004)		(0.006)		(0.006)
Male Share 71-80%		0.058***		0.050***		0.054***
		(0.005)		(0.008)		(0.011)
Male Share 61-70%		-0.022***		-0.025***		-0.029***
		(0.004)		(0.006)		(0.004)
Male Share <60%		-0.067***		-0.073***		-0.075***
		(0.006)		(0.011)		(0.012)
Observations	20,595	30,882	20,595	30,882	20,595	30,882

Notes. *Pr Moving to White/Male-Mate Firms*, *Pr Promotion in White/Male-Mate Firms*, and *Pr Co-Funding with White/Male Mates* are the probability of moving to a firm where a white/male section-mate worked, moving to a firm where a white/ale section-mate worked and being promoted, and co-founding a business with a white/male section-mate. *White/Male Share 81-90%, 71-80%, 61-70%, <60%* are, respectively, indicators for a share of white/male managers per section between 81 and 90%, between 71 and 80%, between 61 and 70% and lower than 60%. The excluded categories are indicators for sections with a white/male manager share greater than 90%. Data are provided at the individual level from the U.S. Office of Education ESMWT registries for 20,595 nonwhite managers and 30,882 female managers whose score in the entry exam was above the ESMWT 80-point threshold. Standard errors are clustered at the section level.

B Data Collection and Dataset Construction

In this Appendix, I provide a detailed description of the data collection process and how the datasets used in the main analysis have been constructed. I also list, describe and define all the variables mentioned in the paper (Tables B.2 and B.3).

B.1 Data Collection and Description of Primary Sources

Records of Managers that Applied to the ESMWT. The first step of the data collection targeted the universe of managers who applied for the managerial component of the ESMWT. I collected and digitized these data from the registries of the U.S. Office of Education, stored at National Archives and Record Administration (Record Group 12.5.8, "Records of the Engineering, Science, and Management War Training (ESMWT) Program" 1940-1945, College Park, MD). For each applicant manager, the registries contain the candidate full name, date and place of birth, a curriculum with information on education (type of B.A. and university attended) and employment (war facility in which the candidate was working, position, number of years spent there, and previous employment), as well as personal characteristics, such as gender, race and marital status, and the score in the ESMWT entry-exam. For managers who scored above the 80-point threshold information on courses taken, grades received and program completion are also available.

Career Outcomes of Applicant Managers. The second step of the data collection involved the reconstruction of the career outcomes of applicant managers. To do so, I collected information on professional attainments reported in the reunion books. Since one condition for applying to the ESMWT was holding a college degree, both admitted and non-admitted managers had the opportunity to appear in the reunion books edited by the universities and colleges where they got their B.A. In order to appear in the reunion book, former students had to mail to their B.A. institutions a short piece of around 1,000 words with a description of life and family events, career achievements, hobbies, volunteer activities, and a picture, regardless the effective attendance of the reunion events. Slightly more than half institutions applicant managers graduated from organized reunions every five years, with the others doing so every ten years. While the content included in the books varies across students, universities and years, almost all entries contain student first and last name, date and place of birth, B.A. type, as well as information on current and past occupations, the main outcome variables used in my analysis. In some instances additional details such as family status, volunteering activities, hobbies, short biographies or anecdotes about college years are available. I accessed reunion books either five or ten years since applicant manager's graduation year from the university and college archives, either directly

or through several interlibrary borrowings at UCLA and Harvard University.

Linking with U.S. Office of Education Records. In the reunion books I searched for applicant manager's first and last name. Once an entry with the same first and last name and in the same B.A. institution of an applicant manager was found, I checked whether information on date and place of birth, and type of B.A. were consistent between reunion books and U.S. Office of Education. Only if *all* the data were consistently recorded across the two sources of data, I considered the manager matched and I recorded the career outcomes provided in the reunion books in that specific year. Using the same method, I linked managers *across* reunion books between 1945 and 1975. I did not find any records about reunions only for ESMWT participants.

I matched 74.6 percent of applicant managers at least once between 1950 and 1970. While data on reunion attendance are not available on a large scale, anecdotical evidence collected from the university reunion summary suggests that in the 1950s and 1960s between 60 and 70 percent former students participated in reunions, while today this percentage is lower than 30 percent. The higher participation rate of applicant managers may be driven by two factors. First, appearing in a reunion book does not necessarily imply attending the in-person events. Second, most applicant managers worked fairly close to their B.A. institutions. Specifically, 71 percent of applicant managers worked within 50 miles of their B.A. institutions, and 85 percent in the same state at the time of ESMWT. This may have kept the monetary and time costs of attending reunions low.

Among the matched managers at their first appearance in the reunion books ten years after the program, 93.41 percent also within 20 years, and 85.7 percent also within 30 years. The fact that the percentages remain fairly constant over years indicates that managers committed to reunion events tended to systematically attend them, a pattern still observed today, based on anecdotical evidence from the university reunion summary. Moreover, 4.5 and 8.3 percent of missing managers after 20 and 30 years are reported as dead by the reunion books. I do not observe managers not matched 10 years after the ESMWT being matched in later periods.

It is worth noting that these matching rates are substantially higher than those obtained through historical Census linking, that are below 30 percent (Bailey et al., 2020). This difference is due to several reasons. First, I match over type-written and not hand-written names, that dramatically reduces spelling mistakes, also kept low by the high education of applicant managers (Shen et al., 2021). Second, I rely on a much border set of matching variables, that includes date of birth, instead of age often misreported in Census data (Abramitzky et al., 2021). Third, applicant managers are a small positively selected sample of the entire Census population, that substantially cancels the probability of observing individuals with the exact same matching variables. Specifically, I do not find two or more individuals with

the same first and last name, born in the same place in the same date that had graduated from the same institutions with the same major in the same year and that applied to the ESMWT in the same application window. Finally, as the reunion books report both the maiden and the married last names for women, I can also link female managers. To the best of my knowledge, the only paper that links also women across Census data is Althoff et al. (2022), obtaining a matching rate up to 50 percent.

While the matching rate on the full sample is higher for admitted than non-admitted managers (78.59 vs 72.78%, Table A.1, columns 1 and 2), it becomes more comparable for observations 10 points above and below the threshold (78.14 vs 76.59%, Table A.1, columns 4 and 5, with a p-value on the estimated difference of 0.388). Notably, 3 points above and below the threshold the matching rate is substantially identical on the two sides of the threshold (77.16 vs 77.23%, Table A.1, columns 7 and 8, with a p-value on the estimated difference of 0.913). This is the most important margin to consider, since 3 is the maximum bandwidth that the Stata command `rdrobust` selects across all the outcome variables used in the analysis.

In terms of which observable characteristics predict the matching rate, middle managers, more educated managers and managers with longer pre-ESMWT employment are more likely to be matched. This seems to indicate a positive correlation between managers' success and their probability of submitting a reunion books entry. I also find higher probability of matching for female and nonwhite managers. Appearing in reunion books may have been more important to get visibility for under-represented groups of managers than for their white male counterpart. The ESMWT entry-exam score is positively associated to the matching rate (Figure A.2). However, it does not predict a higher matching rate for observations 10 and 3 points above and below the threshold (Table A.1, columns 4, 5, 7 and 8). In other words, the entry-exam score is not affecting the probability of matching in the sample used for obtaining the paper empirical results. Finally, it worth noting that predictors of the matching rates are not statistically different between admitted and non-admitted managers who scored 10 and 3 points above and below the threshold.

U.S. War Industrial Facilities. In order to apply to the ESMWT, managers had to be employed in war industrial facilities, civilian plants that, while did not receive war contracts from the U.S. government, were considered essential for war production, and therefore placed under the control of the War Production Boards (WPB). For this reason, such plants were surveyed by the regional Manpower Commissions that collected data on their performance and managerial practices implementation, monthly between January 1940 and December 1947. I collected and digitized this data from the National Archives and Record Administration (Record Group 179, "Records of the War Production Board [WPB]" 1940-1947, College Park, MD) for the 53,674 war industrial facilities where applicant managers were

employed at the time of ESMWT application. The data contain detailed data on location and sector, as well as number of plants, value added, sales, number of employees, implementation of managerial practices in the areas of factory operations, quality control, human resources management, inventory control, and sales and order control. Moreover, they contain information on conditions of workers, such as injuries and absenteeism, and production, such as intervention for repairing machines, scrapped output, inventory, and late delivered orders.

Universities and Colleges that Hosted the ESMWT. I collected and digitized the list of the 218 institutions that hosted the managerial component of the ESMWT form the National Archives and Record Administration (Record Group 12.5.8, "Records of the Engineering, Science, and Management War Training (ESMWT) Program" 1940-1945, College Park, MD). I next accessed the ESMWT material stored at the university and college archives, either directly or through scanned copies or interlibrary borrowings at UCLA and Harvard University. Such material indicates which courses the university offered, the name and curricula of faculty who taught them, when they were trained to teach and where, enrollment reports, correspondence with ESMWT instructors in D.C. regarding courses, and the yearly budget, and the overall cost of the program.

B.2 Definition of Manager Career Outcomes

Manager career outcomes are recorded from university and college reunion books. Since joining a reunion book was voluntary and the guidelines for the submitting a piece are fairly general, the information available shows a substantial heterogeneity. To define manager career outcomes consistently across individuals, institutions and years, I proceeded as follows. First, I establish managers job titles at the time of application to the ESMWT from the Manpower Commission Surveys, that categorized 18 job titles across 10 occupation rankings within the firm hierarchy, as shown in Table B.1. I then associate the occupations reported in the reunion books with the job titles defined by the Manpower Commission surveys.

Regarding the outcomes used in Section 5.1, I define the *probability of promotion* as an indicator for any advancement in the occupation ranking over the entire manager career. The choice of not looking at promotions within job titles is motivated by the fact that almost all applicants got such type of advancement at least once in their career, but also by the fact that small promotions may not be accurately reported in the reunion books, especially for low occupation ranking and over a five to ten year span. I define *probability of becoming plant* and *general managers* as indicators for promotions to plant and general manager levels, to measure career advancements to medium and high-ranking positions within firm middle management. Finally, I define the *probability of becoming top executive and CEOs* as indicators for any promotion to job titles within executive management, and promotions to

CEO role. I do not use indicators for the probability of becoming vice-president or president, because the applicants who reached those roles are too few to make meaningful inference.

Regarding the outcomes used in Section 5.2, I define *probability of becoming business owner* and *co-founder* as indicators for applicants reporting to own and having co-founded their business. The *probability of co-found an innovative business* is defined as an indicator for having co-founded a business reported to be the first in the county or in the state of where applicants were operating. Finally, *probability of co-found consulting firms* and *SBICs* are indicators for reporting to having co-founded a consulting firm or a small business investment company (SBIC). SBICs, infant forms of venture capital companies formally recognized in 1958, relied on private investment fund managers to helping small U.S. businesses access long-term capital for growth and job creation (Zeidman, 1966).

Table B.1: Job Titles and Occupation Ranking by Manpower Commission Surveys

Job Title	Occupation Ranking	Category
Foreman Level I	I	Production Supervision
Foreman Level II	I	Production Supervision
Assembly Supervisor	I	Production Supervision
Line Supervisor	II	Production Supervision
Manufacturing Supervisor	II	Production Supervision
Department Head	III	Production Supervision
Operation Manager	IV	Middle Management
Division Manager	IV	Middle Management
Department Manager	V	Middle Management
Plant Manager	V	Middle Management
Regional Manager	VI	Middle Management
Operation Manager	VI	Middle Management
General Manager	VII	Middle Management
Chief Financial Officer (CFO)	VIII	Executive Management
Chief Operating Officer (COO)	VIII	Executive Management
Chief Executive Officer (CEO)	IX	Executive Management
Vice President	X	Executive Management
President	X	Executive Management

Notes. Job titles and occupation rankings recorded by the Manpower Commission Surveys for workers at war industrial facilities, collected from the National Archives and Record Administration (Record Group 179, "Records of the War Production Board [WPB]" 1940-1947, College Park, MD) for the 53,674 war industrial facilities where applicant managers were employed at the time of ESMWT application.

Table B.2: List of Variables, With Their Definitions, Sources and Years of Coverage – Applicant Managers (continues)

Variable	Definition	Sources and Years of Coverage
Age	Applicant age computed from date of birth at time of ESMWT application	ESMWT registries, 1941-1945
Years of Education	Applicant years of education computed from CV submitted at time of ESMWT application	ESMWT registries, 1941-1945
Years of Tenure in War Facility	Applicant years of work at war industrial facility computed from CV submitted at time of ESMWT application	ESMWT registries, 1941-1945
Years of Employment	Applicant total years of employment computed from CV submitted at time of ESMWT application	ESMWT registries, 1941-1945
Type of College Degree	Indicators for B.A. in either Economics and Business, STEM or other majors from CV submitted at time of ESMWT application	ESMWT registries, 1941-1945
Gender	Indicators for male and female applicants as declared in the ESMWT application	ESMWT registries, 1941-1945
Race	Indicators for white and nonwhite applicants as declared in the ESMWT application	ESMWT registries, 1941-1945
Marital Status	Indicators for married applicants as declared in the ESMWT application	ESMWT registries, 1941-1945
Entry-Exam Score	Scrore applicants received in entry-exam out of 100 points available	ESMWT registries, 1941-1945
Enrollment	Indicator for admitted managers that enrolled in the ESMWT	ESMWT registries, 1941-1945
Promotions	Indicator for any advancement in the occupation ranking over the entire manager career (see Table B.1)	Reunion Books, 1945-1975
Plant Managers	Indicator for promotions to plant manager role (see Table B.1)	Reunion Books, 1945-1975
General Managers	Indicator for promotions to general manager role (see Table B.1)	Reunion Books, 1945-1975
Top Executive	Indicator for any promotion with executive management roles (see Table B.1)	Reunion Books, 1945-1975
CEO	Indicator for any promotion to CEO role (see Table B.1)	Reunion Books, 1945-1975
Moving	Indicator for applicants that moved to another firm relative to the war industrial facility at time of ESMWT application	Reunion Books, 1945-1975
Middle Managers	Indicator for applicants that reached any middle management role conditional on moving to another firm	Reunion Books, 1945-1975
Top Managers	Indicator for applicants that reached any executive management role conditional on moving to another firm	Reunion Books, 1945-1975
Listed Firms	Indicator for applicants that moved to a listed firm	Reunion Books, 1945-1975
Fortune 500	Indicator for applicants that moved to a firm included in the Fortune 500 list	Reunion Books, 1945-1975
Owner	Indicators for applicants reporting to own their business	Reunion Books, 1945-1975
Co-Founder	Indicators for applicants reporting to have co-founded their business	Reunion Books, 1945-1975
Innovative Business	Indicators for applicants reporting to have co-founded the first type of business in county or state where they operated	Reunion Books, 1945-1975
Consulting	Indicators for applicants reporting to have co-founded a consulting company	Reunion Books, 1945-1975
SBIC	Indicators for applicants reporting to have co-founded a small business investment company (SBIC)	Reunion Books, 1945-1975

Table B.2: List of Variables, With Their Definitions, Sources and Years of Coverage – Applicant Managers (continued)

Variable	Definition	Source, Frequency and Years of Coverage
Moving to Mate Firms	Indicator for admitted managers who moved to a section-mate firm	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Promotion in Mate Firms	Indicator for admitted managers who moved to a section-mate firm and was promoted	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Co-Founding Business with Mates	Indicator for admitted managers who co-founded a business with section-mate	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Share Mates Other Facilities	Share of section-mates working in a different war facility	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Share Mates Larger Facilities	Share of section-mates working in a different and larger war facility	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Share Mates Higher Sales Facilities	Share of section-mates working in a different war facility with higher sales	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Share Mates Higher TFP Facilities	Share of section-mates working in a different war facility with higher TFP	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Share Mates Listed Facilities	Share of section-mates working in a different war facility that is listed	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Share of Nonwhite Managers	Share of nonwhite section-mates	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975
Share of Female Managers	Share of female section-mates	ESMWT registries, 1941-1945 and Reunion Books, 1945-1975

Table B.3: List of Variables, With Their Definitions, Sources and Years of Coverage – War Industrial Facilities

Variable	Definition	Source, Frequency and Years of Coverage
Plants	Number of firm plants	Manpower Commission Surveys, 1940-1947
Value Added (k USD)	Difference between firm gross income and intermediate inputs	Manpower Commission Surveys, 1940-1947
Sales (k USD)	Annual revenues from sales	Manpower Commission Surveys, 1940-1947
Employees	Number of employees	Manpower Commission Surveys, 1940-1947
Productivity (TFP)	Total factor productivity, computed with the Gandhi et al. (2020)'s methodology	Manpower Commission Surveys, 1940-1947
Sector	Sector in which firm operated (agriculture, manufacturing, transportation or services)	Manpower Commission Surveys, 1940-1947
Maintenance of Machines and Safety	Indicator for firms reporting regular maintenance of machines and of safety conditions	Manpower Commission Surveys, 1940-1947
Interventions for Machine Repairs	Number of interventions for Machine Repairs	Manpower Commission Surveys, 1940-1947
Worker Injuries	Number of worker injuries	Manpower Commission Surveys, 1940-1947
Statistical Control Output	Indicator for firms reporting use of statistical techniques to control production outputs	Manpower Commission Surveys, 1940-1947
Statistical Control Inputs	Indicator for firms reporting use of statistical techniques to control production inputs	Manpower Commission Surveys, 1940-1947
Scraped Output (percent)	Percentage of scrapped output out of total production	Manpower Commission Surveys, 1940-1947
Bonus for Workers	Indicator for firms reporting to pay bonuses to workers	Manpower Commission Surveys, 1940-1947
Bonus for Managers	Indicator for firms reporting to pay bonuses to managers	Manpower Commission Surveys, 1940-1947
Absenteeism (percent)	Percentage of absent days out of available work days in a month	Manpower Commission Surveys, 1940-1947
Stock Monitoring	Indicator for firms reporting periodic control of stocks	Manpower Commission Surveys, 1940-1947
Statistical Records	Indicator for firms reporting systematic records of statistics on production	Manpower Commission Surveys, 1940-1947
Inventory/Current Assets (percent)	Value of inventory at cost out of firm current assets	Manpower Commission Surveys, 1940-1947
Production Planning	Indicator for firms reporting to plan production based on order delivery dates	Manpower Commission Surveys, 1940-1947
Order Prioritization	Indicator for firms reporting to prioritize orders based on delivery dates	Manpower Commission Surveys, 1940-1947
Late Delivered Orders (percent)	Percentage of late delivered orders out of total order s delivered in a month	Manpower Commission Surveys, 1940-1947

B.3 Data Validation

A potential problem of measuring manager career outcomes with the reunion book entries is that this information is self-reported. In Table A.1 I showed that managers who scored above the ESMWT threshold are not more likely to compile a reunion book than managers who scored below it if they earned between 70 and 90 points in the entry exam. Moreover, the observable characteristics that predict the probability of compiling a reunion book are similar between admitted and non-admitted managers. However, managers may have misreported some information in the reunion book, for instance over-claiming their labor market attainments. Under the assumption that low-achieving managers had more incentive to inflate their reunion book entries, over-reporting should affect more managers who scored below the ESMWT threshold, potentially downward biasing my results.

Beyond these considerations, I cross-checked reunion books data against two different sources, as follows. First, I searched for applicant managers in the 1950 and 1960 editions of Marquis' "Who's Who: A Biographical Dictionary of Notable Living Men and Women," a biographical dictionary that provides brief information about prominent living persons in the United States. While most of the material is self-reported also in this source, it is necessary to be nominated to submit an entry and publisher questionnaires ensure systematic records of key information. Primary selection criteria are holding leadership positions at significant organizations and educational attainments, in addition to notable achievements in creative works. Second, I looked for applicant managers in the book "Business Executives of America" that in 1970 collected biographies of approximately 10,000 living business executives. Executives covered in the book were "selected on the basis of their importance in business and trade" and their inclusion was "not associated to charges of any kind".

Given that success in business is a key factor for inclusion in these sources and the number of entries is very small relative to the ESMWT population, I was able to match only 11% of applicant managers who scored between 70 and 90 points in the entry exam to Marquis' "Who's Who" and roughly 6% to "Business Executives of America" (Appendix Table B.4). However, these matching rates are not statistically different between managers who scored right above and right below the threshold. Age, years of education and years of employment are predictors of the matching probability, while the ESMWT entry exam score is not. Unlikely the case with reunion books, female and nonwhite managers are less likely to be matched.

Comparing the occupations reported in reunion books with those in the two other sources shows a substantial degree of overlapping. Regarding firm employment, 78% of managers' entries matched across all the three sources report the exact same job title as defined in Appendix Table B.1. 15% report comparable occupations, falling in the same ranking reported

in Appendix Table B.1. For instance, I consider comparable occupations listed as CFO and COO. The remaining 7% entries are too vague to be compared with the occupation ranking. For instance, a description of occupation as "leadership position" in the firm clearly fits a top management position but cannot be associated to a specific occupation ranking. Regarding firm ownership and foundation, 89% of managers' entries matched across all the three sources are substantially identical to what reported in the reunion books. The remaining 11% of the entries have some discrepancies on whether the manager is the owner or the (co)-founder of the company.

Repeating the main analysis using the occupation ranking from either Marquis' "Who's Who" or "Business Executives of America" as outcome variables leads to similar findings, despite a dramatic reduction of the sample size. The coefficients estimated on the probability of being promoted at least once are larger than those estimated on the sample using the reunion books. The probabilities of promotions to top executive or CEO roles are, although smaller in magnitude, remain positive and significant at 1% (Appendix Table B.5). As neither Marquis' "Who's Who" nor "Business Executives of America" include middle managers, the analysis that looks at promotions to middle management positions cannot be replicated. The coefficients estimated on the probability of owning or (co)-founding a business are smaller, but of an order of magnitude comparable to the main findings (Appendix Table B.5).

Finally, I repeat the main analysis excluding managers whose entries are not fully consistent between reunion books and Marquis' "Who's Who" and "Business Executives of America". The results remain quantitative comparable with the main findings (Appendix Tables B.7 and B.8).

Table B.4: Probability of Matching Applicant Managers
Based on Their Observable Characteristics

	Marquis' "Who's Who"			"Business Executives of America"		
	Admitted	Non-Admitted	p-value	Admitted	Non-Admitted	p-value
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.035***	0.038***	0.633	0.049***	0.055***	0.321
	(0.011)	(0.013)		(0.011)	(0.015)	
Middle Managers	0.004	0.006	0.444	0.004	0.005	0.659
	(0.008)	(0.007)		(0.006)	(0.008)	
Years of Education	0.051***	0.044***	0.055	0.033***	0.037***	0.476
	(0.014)	(0.011)		(0.005)	(0.006)	
Years of Tenure	0.011	0.013	0.576	0.010	0.009	0.765
	(0.016)	(0.015)		(0.011)	(0.009)	
Years of Employment	0.025***	0.028***	0.642	0.034***	0.030***	0.278
	(0.005)	(0.005)		(0.004)	(0.005)	
B.A. Economics and Business	0.004	0.003	0.598	0.007	0.004	0.451
	(0.008)	(0.006)		(0.015)	(0.010)	
Female	-0.019***	-0.015***	0.031	-0.016***	-0.019***	0.198
	(0.003)	(0.004)		(0.004)	(0.005)	
Non White	-0.026***	-0.032***	0.043	-0.030***	-0.034***	0.546
	(0.003)	(0.004)		(0.006)	(0.006)	
Marital Status	0.015	0.017	0.501	0.008	0.009	0.438
	(0.029)	(0.027)		(0.013)	(0.010)	
Entry Exam Score	0.007	0.006	0.488	0.006	0.010	0.549
	(0.011)	(0.010)		(0.011)	(0.013)	
Observations	163,560	258,234	421,794	163,560	258,234	421,794
Matching Rate	11.15%	10.51%	0.547	6.57%	5.98%	0.471

Notes. Prediction of matching between ESMWT records and Marquis' "Who's Who" (columns 1-3) or "Business Executives of America" (columns 4-6) for 421,794 managers who applied for the ESMWT and scored between 70 and 90 points in the entry exam. p-value for testing the mean difference between admitted and non-admitted managers is reported in columns 3 and 6. *Age* is manager age at time of ESMWT application. *Years of Education*, *of Tenure in War Facility*, and *of Employment* are, respectively, the number of years of education, of work in the war industrial facility they were employed at when they applied for ESMWT, and total year of employment. *Economics and Business* is an indicator for managers with a B.A. in either economics or business, *Female* is an indicator for female managers. *Nonwhite* is an indicator for nonwhite managers. *Marital Status* is an indicator for married managers. *Entry Exam Score* is the score managers earned in the entry exam. Data are provided at the individual level from the U.S. Office of Education ESMWT registries and reunion books.

Table B.5: Effects of ESMWT on Managers' Promotion Using Alternative Sources

	Promotion	Top Executive	CEO
	(1)	(2)	(3)
Panel A: Marquis' "Who's Who"			
Enrollment	0.308***	0.030***	0.018***
	(0.133)	(0.012)	(0.003)
Observations	22,816	21,563	24,021
Bandwidth	3.47	3.21	3.64
Panel B: "Business Executives of America"			
Enrollment	0.285***	0.026***	0.015***
	(0.055)	(0.006)	(0.003)
Observations	12,101	13,426	11,762
Bandwidth	3.35	3.72	3.28

Notes. γ coefficients estimated from equation 1 using data from Marquis' "Who's Who" (Panel A) or "Business Executives of America" (Panel B). *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries.

Table B.6: Effects of ESMWT on Managers' Entrepreneurial Activity Using Alternative Sources

	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Panel A: Marquis' "Who's Who"					
Enrollment	0.097***	0.087***	0.033***	0.051***	0.025***
	(0.033)	(0.020)	(0.005)	(0.013)	(0.004)
Observations	127,362	124,579	115,887	118,143	117,222
Bandwidth	3.56	3.81	3.44	3.09	3.41
Panel B: "Business Executives of America"					
Enrollment	0.094***	0.085***	0.030***	0.044***	0.020***
	(0.026)	(0.021)	(0.006)	(0.010)	(0.004)
Observations	127,362	124,579	115,887	118,143	117,222
Bandwidth	3.56	3.81	3.44	3.09	3.41

Notes. γ coefficients estimated from equation 1 using data from Marquis' "Who's Who" (Panel A) or "Business Executives of America" (Panel B). *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries.

Table B.7: Effects of ESMWT on Managers' Promotion
Excluding Managers Whose Career Outcomes Do Not Match across Different Data Sources

	Promotion	Top Executive	CEO
	(1)	(2)	(3)
Enrollment	0.241***	0.033***	0.021***
	(0.080)	(0.011)	(0.004)
Observations	124,644	124,403	122,732
Bandwidth	2.55	2.61	2.49

Notes. γ coefficients estimated from equation 1 excluding managers whose reunion book entries are not fully consistent with Marquis' "Who's Who" (Panel A) or "Business Executives of America" (Panel B). *Promotion* is an indicator for managers that were promoted at least one in their career, relative to the position held at the time of ESMWT application. *Top Executive* and *CEO* are indicators for managers that became top executives or CEOs. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries.

Table B.8: Effects of ESMWT on Managers' Entrepreneurial Activity
Excluding Managers Whose Career Outcomes Do Not Match across Different Data Sources

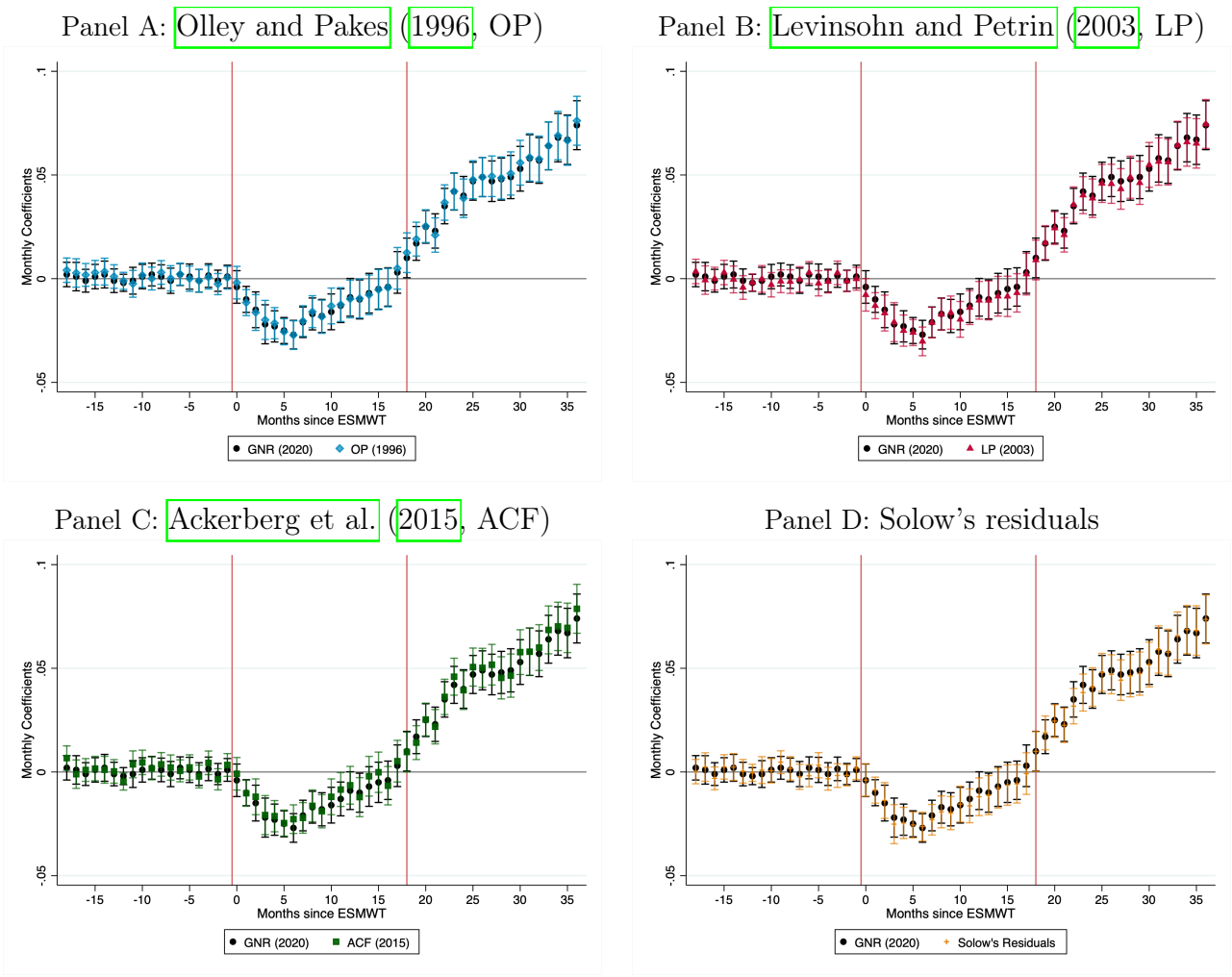
	Owner	(Co) Founder	Innovative Business	Consulting	SBIC
	(1)	(2)	(3)	(4)	(5)
Enrollment	0.101***	0.094***	0.035***	0.049***	0.021***
	(0.030)	(0.025)	(0.007)	(0.010)	(0.003)
Observations	125,403	123,609	113,554	114,101	113,221
Bandwidth	2.66	2.56	2.38	2.45	2.35

Notes. γ coefficients estimated from equation 1 excluding managers whose reunion book entries are not fully consistent with Marquis' "Who's Who" or "Business Executives of America". *Owner*, *(Co) Founder*, *Innovative Business*, *Consulting*, *SBIC* are indicators for managers who became firm owners, were (co)founders of a new firm, founded a new business (defined as the first in the county), founded a consulting firm or a small business investment company (SBIC). *Mean dep. variable* is the mean of the dependent variable over the bandwidth on the left side of the threshold. Standard errors are clustered at the decimal-point entry exam score bin level. Bandwidths are chosen using the MSE optimal procedure suggested by Calonico et al. (2017) and are reported in exam score distance from the 80-point threshold. Data are provided at the individual level from the U.S. Office of Education ESMWT registries.

B.4 Estimation of TFP

To estimate total factor productivity (TFP), I use the methodology proposed by Gandhi et al. (2020, GNR), which develops a nonparametric estimation of gross-output production functions. For robustness, I show that my TFP results are robust to using different estimation methods, such Olley and Pakes (1996, OP), Levinsohn and Petrin (2003, LP), Ackerberg et al. (2015, ACF), and the Solow's residuals (Figure B.1).

Figure B.1: Robustness of TFP Estimation



Notes. γ monthly coefficients and 95% confidence intervals from equation 1. TFP is computed using methodologies by Olley and Pakes (1996, OP, Panel A), Levinsohn and Petrin (2003, LP, Panel B), Ackerberg et al. (2015, ACF, Panel C), and Solow's residuals (Panel D) and compared with baseline estimates that use Gandhi et al. (2020)'s method. Standard errors are clustered at the the decimal-point entry exam score bin level. Data are provided at the facility level from the Manpower Commission Surveys for 8,908 facilities with a single applicant manager.

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