What Prevents Women from Reaching the Top?*

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Abstract

We use exceptionally rich data on all business, economics, and engineering graduates in Sweden to study women's career progression and its causes. A wide range of observables do not explain the lack of women in top executive positions. Instead, slow career progression in the five years after the first childbirth substantially contributes to the female disadvantage. During this period, women work on average shorter hours than men and are more often absent from work. Among the minority of graduates who eventually reach an executive position, women appear to be better qualified than men. Aspiring women may thus need to outperform men to overcome the barriers related to family life.

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1. Introduction

Women do not fare well in the executive labor market. For example, in S&P 500 companies, women account for 45% of the work force but hold only 27% of the executive and senior-level official and manager positions. The fraction of women is even smaller at the very top of the organization: women account for 5% of the CEO positions (Catalyst, 2019). This low representation of women at the top is often referred to as the glass ceiling.

What prevents female executives from reaching the top? We study this question by following the careers of ten cohorts of business, economics, and engineering graduates—the three most common fields of education for corporate executives—over two decades and ask how their qualifications, career progression, and family matters explain their career success. Our data cover the entire adult population of Sweden and all its employers, including private firms and the public sector, resulting in an exceptionally large sample of 40,000 graduates. We collect a comprehensive battery of characteristics of the graduates and their family and relatives, which allows us to analyze a host of gender differences, including those related to child rearing. We complement the data set with survey responses on the time use of executives. Almost all of our data come from official government registries and thus are likely more reliable than the biographical and self-reported data used by many studies on top executives.

Buttressed by our rich data on individual characteristics, we first study the extent to which the qualifications explain the lack of women in top executive positions. We find that a labor market that treats the basket of attributes of each graduate without regard to gender cannot account for the gender gap observed in the data. For example, women are more likely to receive a business or economics degree, tracks that are most predictive of making it to the top. They are more likely to live outside of their birth county, an indication of their willingness to move to opportunity. Their male siblings also attain higher cognitive- and non-cognitive-ability test scores in the military enlistment and are more likely to be promoted to officers. These gender differences in qualifications go against the idea that female graduates lack the necessary skills, training, and stamina to reach the top.

We next analyze the role of family matters in explaining the formation of gender gaps in top executive appointments by following the careers of the graduates and their partners over time, and in relation to childbirth. We find that the gender gaps arise primarily during the five years following the birth of the first child, when women work on average shorter hours than men and are more often absent from work. Women's career paths are similar to men's prior to childbirth, but they earn substantially less than men five years after childbirth. This gender gap persists over the remaining course of the career and substantially contributes to the lack of women in the executive suite.

These results indicate family life puts a disproportionate burden on the careers of women. To better understand their family dynamics, we analyze the role of their partners. Forward-looking couples should prioritize the career of the partner that has greater potential, regardless of the gender of that partner. This is not what we find: the career trajectories of women with less potential than their partners are similar to those of women with more potential, both before and after childbirth. The large differences in within-household career potential we observe in the data cast doubt on the idea that women favor their partners' careers for the concern of underperforming in the labor market. This evidence suggests child penalties do not arise from considerations of comparative advantage within households.

Our paper contributes to the literature on top executives in the following ways. First, our exceptionally large battery of variables allows us to document gender differences in characteristics in much greater detail than the previous literature and can directly address the assumption of no gender differences in qualifications. The degree of such differences is important for determining how much it matters that women are less represented in leadership. To the extent managers matter for the policies firms adopt (Bertrand and Schoar, 2003; Bennedsen, Pérez-González, and Wolfenzon, 2018; Jenter, Matveyev, and Roth, 2017), and women adopt policies different from men (Adams and Ferreira, 2009; Ahern and Dittmar, 2012; Huang and Kisgen, 2013; Matsa and Miller, 2013; Tate and Yang, 2015; Eckbo et al., 2016; Faccio, Marchica, and Mura, 2016; Bertrand et al., 2019; Ferreira et al., 2018), low female representation in the executive suite could affect how resources are allocated in the economy. Few women eventually enter the executive track, but those who do tend to have on average better observable qualifications than men. This result is consistent with the idea that professionals facing greater career obstacles may need to outperform their peers. In related work, Chuprinin and Sosyura (2018) find that mutual-fund managers originating from worse socioeconomic backgrounds deliver better performance than managers from better backgrounds.

Second, our sample contains a large number of graduates from varied backgrounds and it allows us to observe attainment of top executive positions at the end of an annual two-decade panel. The long time span combined with the exceptionally large battery of observable qualifications not only make it possible to better understand the nature of talent it takes to make it to the top, but also how and when executives are "made" (Kaplan, Klebanov and Sorenson, 2012; Kaplan and Sorenson, 2017; Adams, Keloharju, and Knüpfer, 2018). The long-run impact of early-career shocks we document suggests a great degree of persistence in executive careers. This finding lends credence to the idea that early-life shocks leave a lasting mark on executives and the companies they run (Custódio, Ferreira, and Matos, 2013; Schoar and Zuo, 2017; Duchin, Simutin, and Sosyura, 2018).

Third, our data that pinpoint the timing of childbirth exactly makes it possible to analyze short-run and long-run child penalties and their contribution to attainment of top executive positions. To our knowledge, we are the first to perform such an analysis on top executives.[1] Information on working hours, absence from work, and the role of the executives' partners in child rearing provide evidence on underlying mechanisms. The Swedish context suggests executive gender gaps and their early-career origins arise even in an institutional setting with a long egalitarian tradition and family-friendly policies.

Finally, the focus on business, economics, and engineering graduates, whose career aspirations and high pay may make them willing and able to outsource child rearing, speaks to understanding the origins of gender gaps in the population at large. That the child penalties are large both for high-skill graduates and for the population (Adda, Dustmann, and Stevens, 2017; Angelov, Johansson, and Lindahl, 2016; Kleven, Landais, and Søgaard, 2018) indicate they are unlikely to arise from lack of financial resources or career aspirations.

Our paper proceeds as follows. The next section describes the data and the institutional setting. Section 3 analyzes gender differences in graduates' qualifications and the extent to which these differences can explain differences in career outcomes. Section 4 studies gender differences in family life and their contribution to working hours, absence from work, early career development, and later career outcomes. Section 5 concludes.

[1] Smith, Smith, and Verner (2013) study gender differences in CEO appointments in Denmark, but do not follow executives' careers over time. Adams and Funk (2012) and Kim and Starks (2016) compare the values and skill sets of female and male directors but do not follow their careers. Bertrand, Goldin, and Katz (2010) and Azmat and Ferrer (2017) use career data on professionals but not on top executives.

2. Data and institutional setting

2.1. Data

2.1.1. Main sample

The sample consists of university graduates born between 1962 and 1971 with a degree in business, economics, or engineering. We further require that they do not have missing variables on the key variables and that we can follow them over 1990–2011. We ask how their qualifications, career progression, and family matters explain their career success in 2011, that is, when they are in their forties. For graduates with children, we require that the first child was born in 1992–2001, that is, 10–19 years (on average, 15 years) before the time when we assess their career success. Graduates that have no children enter the sample if their imputed childbirth, which we assign based on the observed distribution of age at first childbirth, is in 1992–2001. These criteria trade off the sample subjects having made significant progress in their careers against our ability to observe their first childbirth. The average 15-year follow-up period after the first childbirth further avoids mixing temporary career setbacks associated with small children with long-term career outcomes. Our data set combines information on individuals and firms from two sources.

Statistics Sweden. The bulk of these data come from the LISA database that covers the whole Swedish population of individuals who are at least 16 years old and reside in Sweden at the end of each year. This database integrates information from registers held by various government authorities and covers for most variables the years 1990–2011. We extract information on labor and total income, wealth, field and level of education, profession, career, and family relationships, complementing the LISA database with data from the Multigenerational Register and the Wealth Register. The family records allow us to map each individual to their partners, children, parents, and siblings. We use information on the brothers of the graduates to impute variables that are not observable for the graduates themselves or that may be contaminated by gender (e.g., school GPAs may reflect gender-biased grading). Except for the CEOs, whom Statistics Sweden separately classifies, we identify the executives based on their international ISCO-88 (COM) classification of occupations (codes 122 and 123). These codes are available for executives working for companies with at least ten employees.[2] The specialist managers further split into eight functions that include finance and administration, personnel and industrial relations, sales and marketing, advertising and public relations, supply and distribution, computing services, research and development, and specialists not classified into the above categories.

Firm-related data come from the FEK database at Statistics Sweden ("Företagens Ekonomi") and CEO information from the "Entrepreneurship Database" ("Entreprenörskapsdatabasen"). The underlying data Statistics Sweden uses for these databases primarily come from the Companies Registrations Office which keeps track of all companies, both public and private, and their CEOs and directors. The firm data are available for all corporate entities that have a limited liability structure ("aktiebolag"), excluding financial firms that operate as banks or insurance companies. These data record various financial-statement items, including sales and the number of employees. By law, each firm has to supply this information to the registration office within seven months from the end of the fiscal year. Financial penalties and the threat of forced liquidation discourage late filing.

Military Archives. The Military Archives stores information on the service record, the health status, and the cognitive, non-cognitive, and physical characteristics of all conscripts. The purpose of the data collection is to assess whether conscripts are physically and mentally fit to serve in the military and suitable for training for leadership or specialist positions. The examination spans two days and takes place at age 18. Lindqvist and Vestman (2011) offer a comprehensive description of the testing procedure. These data are available for Swedish males drafted in 1970–1996. Military service was mandatory in Sweden during this period, so the test pool includes virtually all Swedish men born between 1951 and 1978.

Our main sample encompasses over 40,000 graduates. Given the sample size, most of our results are highly significant. Therefore, our reporting generally focuses on coefficient values and patterns rather than on their statistical significance.

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[2] The ISCO-88 (COM) code 122 corresponds to "production and operations managers" and the code 123 to "other specialist managers." The occupation data available from the LISA database come mainly from the official wage-statistics survey (Lönestrukturstatistiken). Statistics Sweden also undertakes surveys of smaller firms with at least ten employees, but not included in the official wage survey. The sampling design in the supplementary surveys is a rolling panel and all eligible firms are surveyed at least once every five years. Occupation information is available for each year, but the information may not be accurate for each year. To ensure we have accurate occupation information for every year, we require that the information be collected in the relevant year or at maximum five years earlier. Andersson and Andersson (2012) describe how Statistics Sweden identifies operative CEOs of firms. If an individual holds multiple executive positions, we assign the individual to the executive position in the firm with the highest sales.

2.1.2. Additional and alternative samples

In addition to our main sample, we study the time use of 9,300 corporate executives as measured by the Labor Force Survey in 2000–15. The survey asks a randomly selected sample of respondents to report on the number of hours worked, contracted, and absent in the week preceding the survey. We merge the survey responses with administrative data from the LISA database on the number of days in which the respondent has claimed compensation for absence due to parental reasons, and on selected socioeconomic characteristics. Among these characteristics is information on the number of children in various age categories for each executive. Our Labor Force Survey sample does not link to the graduate sample, so we cannot track the Labor Force Survey executives before or after the survey.

2.2. Childcare system in Sweden

Sweden has a high-quality childcare system that has been in place since the mid-1960s. It guarantees each family 12 months of publicly paid parental leave amounting usually to 75% of prior income (before 1995, 90% of prior income), with an option of extending the leave with three months at a lower rate. Parents can use up to 90 days per year with publicly financed paid leave for care of a sick child, and they have the option to work shorter hours while keeping their full-time job. Since 1995, both parents need to take one month of parental leave to qualify for the maximum paid leave. Day care is available at highly subsidized rates, although its service hours make it less flexible than the day care in the United States (Henrekson and Stenkula, 2009).

3. How do female and male graduates differ from each other?

3.1. Gender gaps in top executive appointments

Table 1 Panel A characterizes the career progression of female and male graduates by focusing on top-executive roles. We define these roles in three different yet overlapping ways, utilizing information on the executives' formal roles and on their pay. The three leftmost columns report on those individuals who have become CEOs of large companies, defined here as companies with sales of at least SEK 500 million (SEK 1 ≈ USD 0.11). Just 0.17% of women make it this far, whereas the corresponding fraction among men is 0.47%. Despite a relatively small number of top-executive observations (of 143 large-company CEOs, 27 are women), the gender gap in the likelihood to attain a top position, −0.30 (= 0.17 – 0.47), is statistically highly significant with a *t*-value of –5.44. This gap reflects the fact women account for 19% large-firm CEOs as opposed to 39% of the graduates. The three middle columns represent a broader definition of large-firm top executives that adds the four highest-paid non-CEO executives. This group of people would typically coincide with the company's top management team. Women account for 24% of this group of executives; that is, the gender gap is relatively smaller among large-firm top executives than among CEOs. Finally, the three columns on the right report on an even broader definition of a top executive that does not explicitly factor in firm size but focuses on pay instead. The cutoff for a top executive here is having a labor income of at least SEK 1 million, which roughly corresponds to the top decile in pay among all executives in Sweden. The 27% fraction of women in this group is somewhat larger than among large-firm top executives.

Table 1 Panel B reports the mean and median executive labor income by gender and position. Our income measure includes all income taxed as labor income in a given year; base salaries, stock-option grants, bonus payments, and benefits received from the employer qualify as taxable labor income. The income measure does not include public benefits, providing a better proxy of the value of an executive's services to the company than a broader income measure. Tax authorities deem the taxable income to occur in the year when an employee or executive exercises her stock options or purchases her company's shares at a price that is less than their fair value.

The mean (median) large-firm CEO pay is SEK 2.2 million (1.8 million). On average, the graduates make about one quarter, and large-firm executives about two thirds, of what large-firm CEOs make.[3] The gender gaps in pay are not significantly different from zero except for large-firm executives, for whom the mean logged gap is –11% (*t*-value = –2.45).

Table IA1 in the Internet appendix reports descriptive statistics on the graduates' employers. About 81% of the graduates are employed on the private sector and 16% on the public sector. The vast majority of the private sector employers are privately held: only 4% are listed and 4% are government owned.

[3] The large firm executive-CEO pay ratio is smaller than in the U.S. but similar to that in a sample of 13 other countries (Burns, Minnick, and Starks, 2017).

3.2. Gender differences in family background, education, career, and traits

Table 2 reports the means of all individual-level variables, separately for large-firm CEOs, large-firm top-5 executives, highly paid executives, and all graduates. Of particular interest is the difference between graduate women and men and the *t*-statistic for their difference. We report on 44 variables, half of them dummy variables, divided into eight different groups. The variables for the first six groups—family background, risk tolerance, education, career, executive experience, and functional experience—are available for all sample subjects and are reported in Panels A, B, and C. Panel D reports on the remaining two groups of variables, parents' socioeconomic status and personal traits. They are available only for subsets of the sample and are reported as robustness checks (availability of parental variables depends on the parent being alive in 1990, and the personal traits can be imputed for graduates whose brothers were enlisted to the military in 1970–1996).

Panel A reports on gender differences in family backgrounds. Women tend to come from smaller families, and they are earlier in birth order. Birth order may have an effect on the development of personality and leadership traits: firstborns act as role models for the later-born children (Sulloway, 1996). Black, Grönqvist, and Öckert (2018) find that firstborns are more likely to end up in occupations requiring leadership ability. Women are also more likely to have been born in a large city, which may expose them to better opportunities and networks. Moreover, they are more likely to work outside of their birth county. This result is consistent with the idea that female graduates are, if anything, more prone than male graduates to move to opportunity.

Panel A further reports gender differences in risk tolerance, which we measure by using an indicator for whether the graduate is a stock-market participant. Jianakoplos and Bernasek (1998) and Sunden and Surette (1998) document that women typically hold lower proportions of risky assets than men.[4] Reviews by Eckel and Grossman (2008) and Croson and Gneezy (2009) of the experimental literature come to the same conclusion: women tend to be more risk averse than men. Our results support the findings in this literature: men are more likely to own stocks.

Panel B reports on gender differences in education. Different fields of education develop different skill sets, and the choice of field may inform of graduates' propensity to specialize and

[4] Cronqvist et al. (2015) finds that twin women whose co-twins also are women display less risky investment behavior than women whose co-twins are men.

remain specialists through their careers.[5] The field of education also correlates with competitiveness, in which large gender differences exist (Gneezy et al., 2003; Niederle and Westerlund, 2007).[6] We find women are more likely to have a business or economics degree than men, the fields most predictive of making it to the top. This gender difference remains statistically significant even among large-firm top executives (t-value = 5.46) and highly paid executives (t-value = 8.08).

Panel B shows women are less likely to select into the top-5 education tracks with the largest proportion of top executives or ones offering the highest income. Not attending these education tracks as frequently may deprive women of valuable networks, which may prove useful later in their careers.[7] In addition, attending these education tracks may reveal women's career orientation and inform of their competitiveness.

Panel B further studies gender differences in careers. Men have a longer tenure in the firm than women, which helps build their firm-specific human capital. The nature of work experience also differs. On average, women have about two years more experience from the public sector and non-profit institutions. Work experience from the public sector may accumulate a graduate's human capital in a different way than work experience from a company. In addition, working for the public sector or not-for-profit firms may be an indication of altruistic preferences (Benz, 2005; Delfgaauw and Dur, 2008), of which some evidence of gender differences exists.[8] Finally, Panel B studies gender differences in unemployment. Men have on average one month less unemployment experience than women. This difference may matter because unemployed individuals may lose some of the value of their human capital due to unemployment (Pissarides, 1992) or be scarred by the unemployment experience (Arulampalam, 2001).

Panel C reports on gender differences in past work experience in different executive functions. Men are more likely to have past experience as an executive. About one-half of the future top executives held an executive position (generally in a smaller company) in 2004, i.e. seven years before the time when we assess their top executive outcome.

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[5] The opposite of becoming a specialist is to become a generalist, a job description commonly associated with CEOs. Murphy and Zábojník (2004), Ferreira and Sah (2012), and Custódio, Ferreira, and Matos (2013) analyze generalist CEOs. Custódio and Metzger (2013) study the effect of CEO's industry expertise on value creation in acquisitions.

[6] Kamas and Preston (2018) find competitive individuals are more likely to specialize in engineering, natural sciences, and business as opposed to social sciences or humanities.

[7] Hwang and Kim (2009), Kramarz and Thesmar (2013), and Engelberg, Gao, and Parsons (2013) report evidence of the value of networks for executive careers.

[8] Women are sometimes assumed to be more altruistic and cooperative than men. Niederle (2016) reviews the evidence on altruism and cooperation and concludes it "is more mixed than what one might have expected."

Given that specialization in a given function is likely to require a considerable human capital investment, past functional experience is likely to affect future executive assignments (in anecdotal accounts of gender gaps in business, this explanation is referred to as the pipeline hypothesis). Men outnumber women in past CEO assignments and those in production and operations, sales and marketing, supply and distribution, as well as computing and R&D. Women figure more importantly in particular in personnel and industrial relations.

Panel D reports gender differences in variables that are not available for the entire sample. We first report on parents' socioeconomic status. Being born to a well-educated and affluent family can help a child in at least two ways. First, parents are likely to pass their human capital on to their children. Second, wealthy parents are also in a better position to offer the monetary resources needed to develop their children's human capital. We separately include both parents' socioeconomic status by including variables measuring whether they are (or were) university educated. We also measure their employment in 1990 (i.e., at the beginning of our sample period) and their position in the income distribution among individuals of the same gender and cohort. We find that women appear to come from higher socioeconomic strata than men. Women's parents have on average higher earnings and are more likely to be in the workforce.

Panel D also reports on personal traits. Swedish military measures all personal trait variables, except for GPA. Military service is mandatory only for men, so we have very few traits observations for women. Nevertheless, the family links in our data enable us to impute these variables for a graduate from the test scores of her randomly selected brother (we randomly chose just one brother to avoid biases arising from family size). This imputation assumes the traits have a large family component, an assumption backed up by the evidence in Beauchamp, Cesarini, Johannesson, Lindqvist, and Apicella (2011) in Swedish data. We also impute the traits for men even though their traits are available.[9] Given that graduates have done well in life, their traits likely are better than those of their brothers. Except for imputed officer rank, we express all trait variables as differences in terms of standard deviations relative to the test takers in the same cohort. Benchmarking each

[9] Table IA2 investigates the possibility the imputation picks up women and men from families of different socioeconomic status, perhaps because of cross-sectional differences in parents' desire to balance their family's sex composition. We find no significant differences in parents' socioeconomic status by imputation status and gender.

individual against the same cohort allows us to control for secular trends in measured cognitive ability and height (see, e.g., Flynn, 1984; Floud, Wachter, and Gregory, 1990).

We find that all trait variables except for the body-mass index are positive, which means the brothers of graduates have a higher cognitive and non-cognitive ability, have better school grades, are taller, slimmer, and in better physical condition than the population.[10] Consistent with Adams, Keloharju, and Knüpfer (2018), who review this literature, the differences relative to the population are comparatively small, at most 0.82 standard deviations. Four gender differences are statistically significant at the 10% level. Women's brothers have a higher cognitive and non-cognitive ability, are in better physical condition, and are more likely to have achieved an officer rank than men's brothers. Although women's brothers outperform men's brothers in all these traits, the differences are small, at most 0.04 standard deviations.

3.3. Contribution of graduate characteristics to gender gaps in top-executive appointments

Table 3 evaluates how much of the gender gap in large-firm top-executive appointments and pay can be attributed to gender differences in the graduates' characteristics. The three leftmost columns of Table 3 Panel A report results from linear probability model regressions of the large-firm CEO dummy on the female dummy and controls. The first row represents a regression that includes the female dummy as the sole regressor. This regression corresponds to Table 1, which finds a coefficient on the female dummy of –0.30. The second row reports regressions that also control for family background and risk tolerance. The gap remains at about the same level, –0.29, as it does when we further add controls for education and career on the third row. Here, we use all the variables listed in Table 2 Panel B except for age, which is highly correlated with the length of labor-market experience. The fourth row adds dummies for executive experience, which narrows the gap to –0.15. These results show only experience directly relevant to gaining a top executive position can explain a meaningful fraction of the gender gap, whereas the remaining battery of controls has little explanatory power. This pattern is suggestive of women dropping out of the executive track early on in their career for reasons unrelated to their observable qualifications, a point to which we return in the next section.

[10] We use imputed GPAs to account for potential gender differences in grading.

The three middle columns report on regressions where the left-hand-side variable is a dummy for becoming one of the top-5 executives. The unconditional probability of a graduate reaching this outcome is higher than that for being a large-firm CEO, 1.59% versus 0.36%. The unconditional gender gap is –0.97 (by construction the same as in Table 1). Unlike for CEOs, the gap widens to –1.05 once we control for family background, risk tolerance, education, and career. In the regression including executive experience, the gap continues to be over three quarters of the unconditional gap (–0.75). The three rightmost columns, which look at executives earning at least one million SEK, mirror the patterns we observe for the large-firm top executives.

Panel B includes additional controls available for subsets of the graduates, which affects the number of observations and the unconditional and conditional gender gaps. We consider three groups of variables: parents' socioeconomic status, personal traits, and imputed GPA, which we include in the regression one by one in addition to all the variables used in Panel A. We find the gender gap tends to stay the same or widen when we consider these variable groups.

Apart from the female dummy that informs us about the gender gaps, the regression coefficients on the predictors of top-executive appointments and pay are of interest. Table IA3 reports on the large-firm CEO, large-firm top executive, and high-earner coefficients for the specification that includes controls for individual characteristics.

The specifications on the three definitions of top executives largely agree on how the predictors are associated with graduates' labor-market success. Individuals who work outside of their birth county, a proxy of their willingness to move to opportunity, are more likely to have made it to the top. A degree in business or economics also positively associates with the likelihood of becoming a top executive, perhaps because these educational paths prepare future executives better to their jobs or because individuals choosing these paths are more interested in pursuing a career as a top executive. Longer labor market experience also positively relates to executive labor market success, whereas longer unemployment spells and longer experience from the public or non-profit sector correlate negatively. Functional experience from production and operations or sales and marketing has the strongest association with future CEO appointments.

Table IA4 performs a decomposition exercise that allows us to assess the joint contribution of all characteristics to executive gender gaps. This exercise offers identical estimates of unconditional and conditional gaps, as do the regression coefficients reported in Table 3, but it has the added benefit of providing information on the contribution of each variable subset to the gap. We report both the Blinder-Oaxaca (1973, 1973) and Fairlie (1999) decompositions. The former uses the linear probability model, whereas the latter embeds a logit model. The decompositions reveal that executive experience helps explain the gaps, whereas education and career variables tend to widen them. The gaps' similar decompositions into explained and unexplained parts in the two specifications suggests our results are robust to using a logit specification instead of a linear probability model.

4. Role of family life in explaining gender gaps in executive appointments

4.1. Gender differences in marital status and family formation

Table IA5 reports gender differences in family characteristics. Graduate women receive their first child when they are on average 30 years old. They are more likely to have children, have more children, and the first childbirth happens earlier than for male graduates. They are also more likely to be divorced. These factors may make it harder for female graduates to combine family life with work.

4.2. Contribution of children to early career development

Figure 1 depicts the labor-income development of graduates from age 19 to 49 by gender. Both genders start from about the same average annual income; at age 20, women even earn slightly more than men. The incomes start to diverge noticeably in the late 20s, and by age 33, the average pay difference reaches 163,000 SEK in favor of men. After that, the pay difference remains about the same up to age 49.

The divergence in female and male pay coincides with the time people typically form their families. This observation motivates an analysis that explicitly considers the impact of childbirth on career progression of women and men. Figure 2 reports results from an event study that tracks graduates' average annual labor income, labor-force participation, and the probability of attaining a new job relative to the birth year of the graduate's first child. For each of these outcome measures, we compare women with children against men with children. We regress the outcome variables on indicators for women, each calendar year, each of the 15 years surrounding childbirth, and the interactions of the female indicator and the years surrounding childbirth. The figure reports the coefficient estimates along with their 95% confidence intervals for the interaction coefficients for each of the event years except for year $t - 5$, which serves as the omitted category. The calendar-year dummies control for annual trends in the outcome variable. Kleven et al. (2018) and Lundborg, Plug, and Rasmussen (2017) use similar methods to estimate child penalties in the population of Danish workers.

Figure 2 Panel A shows that labor income of men and women develops very similarly until year $t - 1$. Then, in year 0, women's salary drops 160,000 SEK below that of men, likely because of reduced pay during maternity leave. The drop continues to 205,000 SEK in year $t + 1$ because of the uneven timing of childbirths throughout the calendar year. After picking up in year $t + 2$ up to SEK 167,000, another drop in pay occurs in year $t + 3$, to SEK 216,000. This drop appears to be driven by the birth of a second child, which tends to happen two years after the birth of the first child. Figure IA2 Panel A shows that women who only have one child do not experience a pay drop in year $t + 3$. Female pay starts to recover in year $t + 4$. Despite its continuing recovery, women's income in year $t + 10$ is still 167,000 SEK lower than that of male graduates.

Figure 2 Panel B shows that women's labor-market participation rate is, if anything, greater than that of their benchmarks before first childbirth. After a plunge in years 0 and $t + 1$, the participation rate recovers slowly and remains below the male participation rate in year $t + 10$.

Figure 2 Panel C studies the probability of attaining a new job around the first childbirth. Relative to their benchmark groups, women's probability of attaining a new job decreases significantly in year $t - 1$ (and further in year 0), suggesting they take the anticipated childbirth into account in their decision to search for a new job. The probability recovers after that time but does not reach the male benchmark by year $t + 10$.

To sum up, all panels in Figure 2 tell the same story: the careers of women tend to suffer at the time of childbirth, and recovering from this career shock takes several years. Table IA7 demonstrates this result in a regression table, whose specifications correspond to those of Figure 2 except for pooling the event years in four brackets (0–1, 2–5, and 6–10 years, and the omitted category of –5 – –1 years). All of the post-birth variables are significantly negative at the 5% level.

Figure IA1 replicates the results of Figure 2 in a setup that compares the career progression of women with children to women without children.[11] Here, we deviate from our main specification by replacing the female indicator with an indicator for whether the graduate has children. Because

[11] See Waldfogel (1998), Miller (2011), and Kleven et al. (2018) for analyses on the pay difference between women with and without children.

graduates who never have children do not experience their first childbirth, we assign them an imputed childbirth by randomly drawing from graduates' observed age distribution within gender at first childbirth. This approach enables us to isolate the impact of childbirth from other possible gender-related income shocks that coincide with the typical timing of childbirth.

The coefficient pattern is similar to that reported in Figure 2 Panel A, except that women with children appear to be on a higher salary trajectory both before the first childbirth and after year t + 4. Consistent with the better trajectory, Table IA6 finds a significantly higher probability of becoming a top executive for women with children than without children and that this difference is partly attributable to the better qualifications of women with children.[12] As a whole, these results suggest that, if anything, female graduates with children have higher qualifications than female graduates without children. This finding makes rejecting the null hypothesis of no outcome difference between these two groups after childbirth more difficult and explains why the long-run child penalty is smaller here than with the male benchmark.

4.3. Role of family dynamics

The importance of childbirth for gender gaps motivates us to study the role family dynamics play in female careers. By comparing the partners of female graduates to those of male graduates, Figure 3 shows that female partners assume a role very different from male partners.[13] Panel A suggests that, compared to the male partners, female partners experience a permanent career setback following childbirth. The magnitude of this penalty, SEK 174,000 in year t + 10, is about as large as the gender gap in pay for the graduates themselves in Figure 2. Panel B shows women's labor-market participation rates take years to return to pre-birth levels. Despite starting from a higher level, female partners' participation rate stays below that of male partners for four years after childbirth before reaching and exceeding the male participation rate. Female partners are thus more likely to work in term long term, but at a lower pay than male partners. Panel C shows the gender gaps in partners' probability of attaining a new job are large immediately after childbirth (and a year

[12] Because of the small number of observations, we drop the large-firm CEO specification from this table.

[13] Partners and the first childbirth are defined based on a couple's first joint biological child or, if not available, on the basis of being married and having a child aged 0–3 at home.

before it) and largely disappear by year $t + 4$. Collectively, these results are consistent with the idea that partners of female graduates invest less in child rearing than partners of male graduates.

Why do female partners respond to childbirth so differently from male partners? They might not be in a position to put their career first, because their partners have a comparative advantage in advancing their careers.[14] We study partners' attributes in Table IA8, which reports on the likelihood that partners are university educated, employed, work as a CEO or another executive, and on the partners' position in the income distribution. For each attribute, we also report the gender difference for graduates and each top executive category.

We find women are more likely to mate with a top executive than men, and their partners are more likely to be employed and are higher in the income distribution relative to other same-sex individuals in their cohort. At the same time, women's partners are much less likely to have a university degree. Taken as a whole, this evidence does not allow us to draw strong conclusions on the optimal division of responsibility of child rearing, so we proceed with an analysis that directly speaks to the drivers of partners' differential responses to childbirth by gender.

Comparative advantage suggests forward-looking couples would prioritize the career of the partner that has greater potential, regardless of the gender of that partner. Figure 4 investigates this issue by repeating Figure 2 for graduate women but now comparing the career trajectories of women with less career potential than their partners to the benchmark group of women with more potential. We measure career potential as the predicted probability of becoming a large-firm CEO, measured again two years prior to the first childbirth. Panel A reports on the difference in pay development of the two graduate categories, whereas Panels B and C report on the difference in labor-force participation and the probability of attaining a new job.

The pay of graduates with less potential than their partners is largely comparable to the benchmark group; only one of the 15 coefficients plotted in the figure rejects the null of no difference. Moreover, childbirth affects this difference in no discernible way, nor does any noticeable change occur in the difference in labor-force participation or in the probability of attaining a new job around childbirth.

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[14] Becker (1991) finds that even small differences in productive capacities within household imply very different allocations of time in equilibrium. Manser and Brown (1980), McElroy and Horney (1981), Lundberg and Pollak (1993), and others study intra-household bargaining.

The patterns we observe in Figure 4 are inconsistent with comparative advantage driving our results. However, our measurement of career potential relies on observable characteristics prior to childbirth and may thus fail to account for graduates' beliefs about their performance in the labor market. These beliefs would, however, need to generate substantial gender differences to account for our results, because the within-household differences in career potential in our sample are large. For example, when a graduate mates up, the partner's predicted probability of becoming a large-firm top executive is about 50% higher than when the graduate mates down. To further investigate this issue, Figure IA3 analyzes a sample of households where the graduate-partner differences in career potential are at least one standard deviation away from the mean. These results paint a picture similar to that in Figure 4.

Collectively, our results show that women's responses to childbirth are largely unaffected by their career potential relative to their partners. This evidence suggests within-household comparative advantage unlikely drives our results. Remaining explanations, which our data do not allow us to disentangle, include gender identity that necessitates women to assume a greater role in child rearing, and discrimination that prevents women with children from advancing in the labor market.

4.4. Gender differences in working hours and absence from work

To gain a better understanding of the drivers of child penalties, we next study gender differences in parental investment reflected in executives' absence from work and in their working hours. We study these differences by using a sample of executives surveyed by the Labor Force Survey in 2000–15.[15] We separately regress four absence and working-hour variables on indicators for years 0, 1–2, 3–6, 7–10, 11–16, and 17–18 years following childbirth (17–18 is the omitted category), a female indicator, and their interactions, along with survey-wave dummies. We report the coefficients for the interactions along with their 95% confidence intervals (*t*-values) in Figure 5 (Table IA10).

The first specification in Figure 5 Panel A (Table IA10) reports on gender differences in the annual number of days absent from work for parental reasons. In year 0, female executives are on average away from work for parental reasons 106 more days than male executives. This gap narrows

[15] Table IA9 shows these executives are broadly similar to our main-sample graduates in their characteristics. Our survey sample includes a set of characteristics narrower than the core sample.

as the children grow up, but it remains statistically significant at 6.6 days even 7–10 years after the first childbirth.

The second specification (Figure 5 Panel B) reports on gender differences in weekly hours absent from work. In year 0, female executives are on average absent from work 24 more hours than their male counterparts. The gap drops to three hours in years 3–6 after the first childbirth and disappears thereafter. The third specification (Panel C) shows the gap in the number of working hours follows a similar but reverse pattern. This gap stems from actual hours, not from contracted hours. The fourth and final specification (Panel D) shows the gender gap in contracted hours does not differ statistically significantly in any of the years from the benchmark category of 17–18 years after childbirth.

These results suggest female executives are more absent from work and work shorter hours than male executives for many years after the birth of their first child. However, this gap largely fades away by the time the first child reaches school age.

4.5. Impact of early career development on top-executive appointments

The burden of child rearing on female careers motivates us to analyze whether the child penalties are large enough to generate the executive gender gaps observed at the age of 40–49. Table 4 studies this question by investigating the extent to which labor income five years after the first childbirth—an approximation of the impact of children on career progression—explains the top-executive gender gaps. In this analysis, we separately account for labor income prior to childbirth, which captures other gender differences that do not coincide with the arrival of children. We measure childbirths in the 1991–2000 period, that is, on average 15 years before observing the top-executive positions.

The three leftmost columns report the specification that explains appointments to a large-firm CEO position. The first column serves as a benchmark and is identical to the specification with controls listed on the fourth row of Table 3 Panel A. The gender gap here is –0.16. Column 2 asks how the coefficient for the female dummy changes once we add income two years before the birth of the first child.[16] The gender gap decreases only slightly to –0.15, which is consistent with the results in Figure 2 that show men and women are on similar career trajectories prior to first

[16] We use income from year $t - 2$ in lieu of $t - 1$ to avoid any effects arising from pregnancy.

childbirth. The income variable attains a positive sign, which implies persistence in the career paths of aspiring graduates.

Column 3 further adds income five years after the first childbirth to the regression. The results in column 3 are strikingly different from those is column 2. Now the female dummy becomes insignificant, whereas the coefficient for income five years after the first childbirth takes a highly significant value. This result suggests that for large-firm CEO appointments, the career development in the five years following the first childbirth accounts for the majority of the gender gap.

We get qualitatively similar results also for the other top-executive definitions. In the three middle columns, where we regress appointment to one of the top-5 executive positions in large firms on the female dummy and controls, the gender gap is –0.85 in the baseline specification in column 4 and –0.83 in column 5, where we additionally control for income two years before the first childbirth. In column 6, where we further add income in year $t + 5$, the coefficient for the female dummy drops to –0.52, whereas the coefficient for income in $t + 5$ is highly significant. Here, 37% (1 – –0.52/–0.83) of the gender gap can be accounted for by the income development during the five years after first childbirth. This pattern repeats one more time in the three rightmost columns, where we regress a highly paid executive dummy on the female dummy and controls. In column 9, which includes both income controls, we can account for 53% of the gender gap by the early career development following first childbirth.

4.6. Generalizing the results to executive-only samples

Our exceptionally comprehensive longitudinal sample allows us to provide unbiased estimates of how qualifications and child rearing affect gender gaps in top executive appointments. How does our research inform inferences firms, policy makers, and other researchers can make from less comprehensive information than ours? We assess this question by approximating the selection mechanism that makes an individual appear in data sources such as ExecuComp and BoardEx by conditioning our sample on holding an executive position at the end of our sample period. To achieve large enough of a sample, we consider all graduate-executives working in firms with at least ten employees; in a robustness check, we relax this requirement by considering all graduate-executives in firms with at least 100 employees. These executive samples represent 14% and 9% of our core graduate sample, respectively.

Table 5 Panel A reports results from regressions that correspond to those in Table 3, whereas Panel B repeats the analyses in Table 4. Panel A reports sizable gender gaps in top-executive appointments in the executive sample. For example, the first row in the panel reports a gender gap in attaining a large-firm top-executive position of 3.9 percentage points, which translates into a 0.039/0.112 = 34% lower probability for women compared to men. The second row in the panel reports a 30% larger gender gap conditional on family background, risk tolerance, education, and career. This widening of the gender gap also applies to the two other definitions of top-executive positions. With the exception of large-firm CEOs, it also emerges in the third row that controls for executive experience. Panel B shows income measured five years after first childbirth explains 37%–81% of the remaining gap.

The widening of gender gaps in most specifications of Table 5 suggests women who have made it to an executive position are better qualified than corresponding men. Table IA11 shows that the gaps widen even more if, reminiscent to standard databases, we impose more selection into the executive sample by increasing the size threshold of the firm. This positive selection of women into entering an executive position is consistent with the view that professionals facing greater barriers may need to outperform their peers in other respects (Chuprinin and Sosyura, 2018). This finding has implications for employers, regulators, and researchers making inferences about the quality of the executive pool stratified by gender. For example, firms' efforts to pay more attention to potential women candidates and policies promoting women do not appear ill-guided. Researchers making inferences about the qualifications of women should also be careful about selection into commonly used datasets on characteristics that do not appear in such sources.

5. Conclusion

Exceptionally rich data from Sweden enables us to study the gender gap in career progression towards the executive suite and to investigate its causes. We follow the careers of ten cohorts of business, economics, and engineering graduates over two decades and ask how their qualifications and family matters explain their career success in their forties.

We find a battery of observable measures of abilities, skills, and experience do not explain the gender gaps in top-executive appointments. Instead, child rearing plays a crucial role in the formation of the gender gaps: most of them arise during the five years following the birth of the first child, a time when the gender gaps in working hours and absence from work are at their largest.

Women are on similar career paths prior to childbirth, but they earn substantially less than men five years after childbirth. This child penalty remains large over the remaining course of the graduates' careers and is invariant to women's career potential relative to their partners.

Only a minority of graduates eventually reach an executive position. Among those that do, women appear to be better qualified than men. This suggests aspiring women may need to outperform men to overcome the barriers related to family life.

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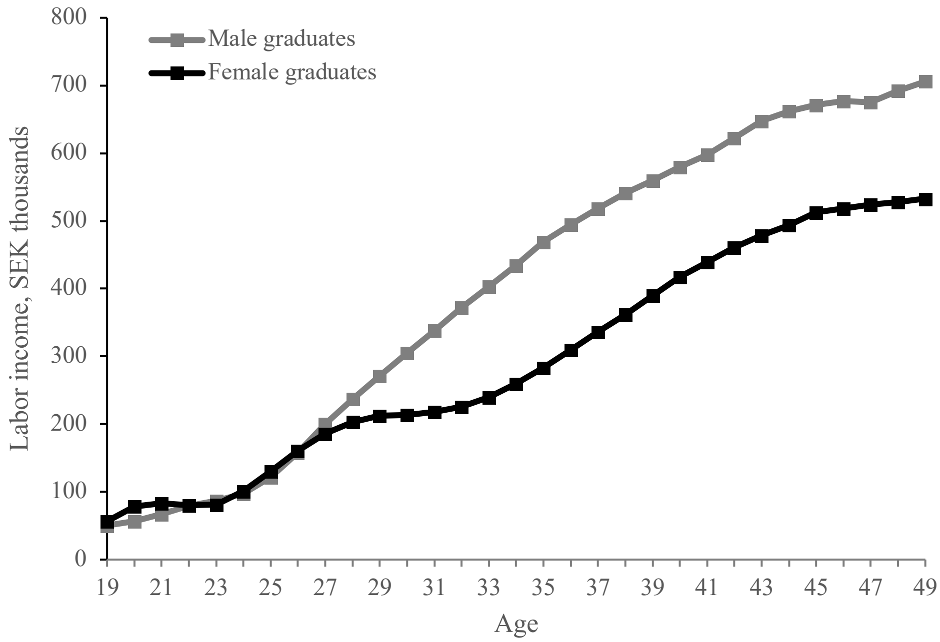

Figure 1. Female and male graduates' labor income as a function of age
This graph depicts annual labor income from age 19 to 49 stratified by gender. Each data point in the graph corresponds to the average annual labor income (in 1000 SEK, inflated to 2017, SEK 1 ≈ USD 0.11) at a particular age. The sample, observed in 1990–2011, consists of graduates who are born in 1962–71 and whose first childbirth (actual or imputed) is in 1992–2001.

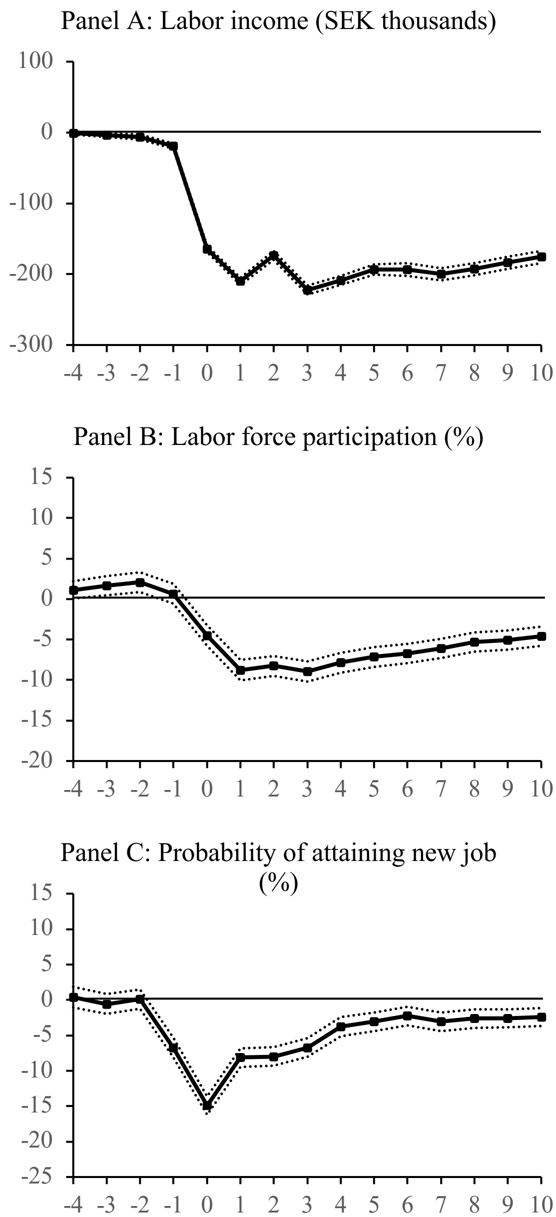

Figure 2. Impact of children on women's career progression
The panels in this graph plot annual labor income (Panel A), labor-force participation (B), and probability of attaining a new job (C) relative to the birth year of the graduate's first child. The estimates (solid lines) and their 95% confidence intervals (dotted lines) are for the coefficients on interactions of female indicator with indicators for the 15 years surrounding the event of childbirth (–5 omitted). In addition, the regressions include a female dummy, dummies for each of the years surrounding the event, and dummies for each calendar year. All panels compare women with men that have children. The sample consists of graduates who are born in 1962–71 and whose first childbirth is in 1992–2001. Confidence intervals are based on standard errors that assume clustering at the individual level.

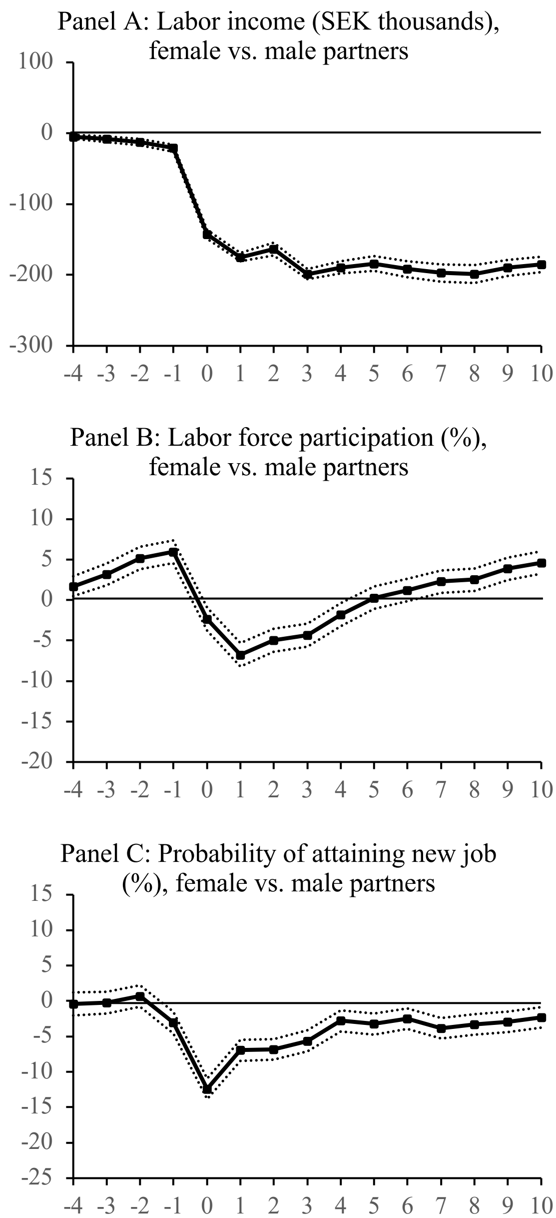

Figure 3. Career progression of partners around childbirth

This figure repeats analyses in Figure 2 for graduates' partners for labor income in Panel A, labor-force participation in Panel B, and probability of attaining a new job in Panel C. The estimates in each panel compare female partners of male graduates with male partners of female graduates. The sample consists of partners of graduates who are born in 1962–71 and whose first childbirth is in 1992–2001. Confidence intervals are based on standard errors that assume clustering at the individual level.

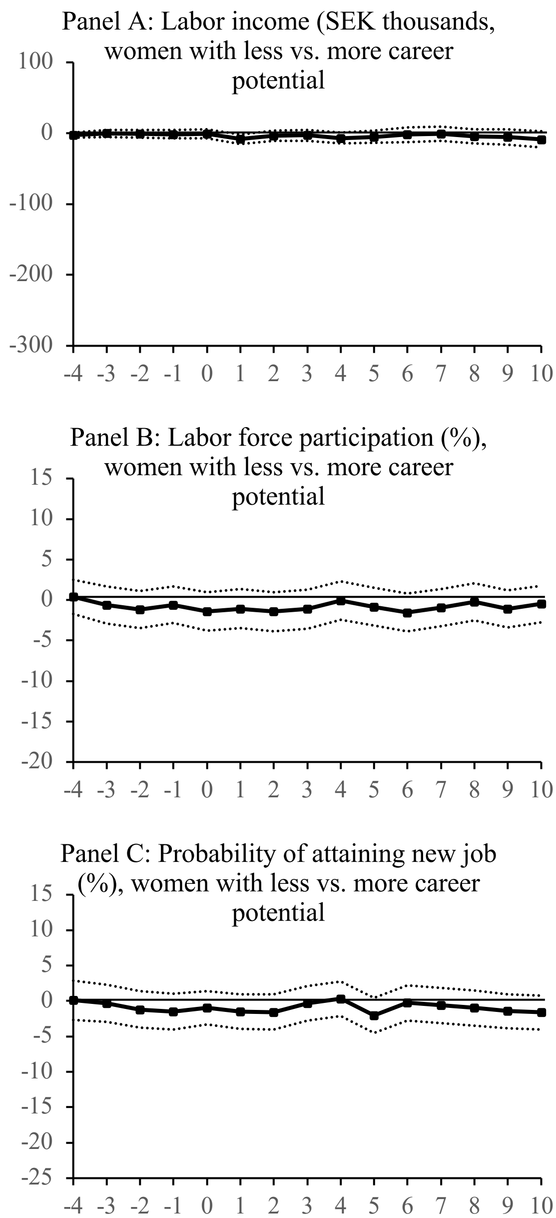

Figure 4. Womens' career progression by their relative within-household career potential
This figure repeats analyses in Figure 2 for female graduates as a function of their career potential relative to their partners. The benchmark group consists of graduates that have more career potential than their partner. Panel A reports on labor income, whereas Panels B and C depict labor-force participation and the probability of attaining a new job. The estimates in each panel measure career potential by the predicted probability of becoming a large-firm CEO, obtained from regressing the large-firm CEO indicator on variables measuring family background and education, as defined in Table 3. The sample consists of graduates who are born in 1962–71, whose first childbirth is in 1992–2001, and whose partner can be identified. Confidence intervals are based on standard errors that assume clustering at the individual level.

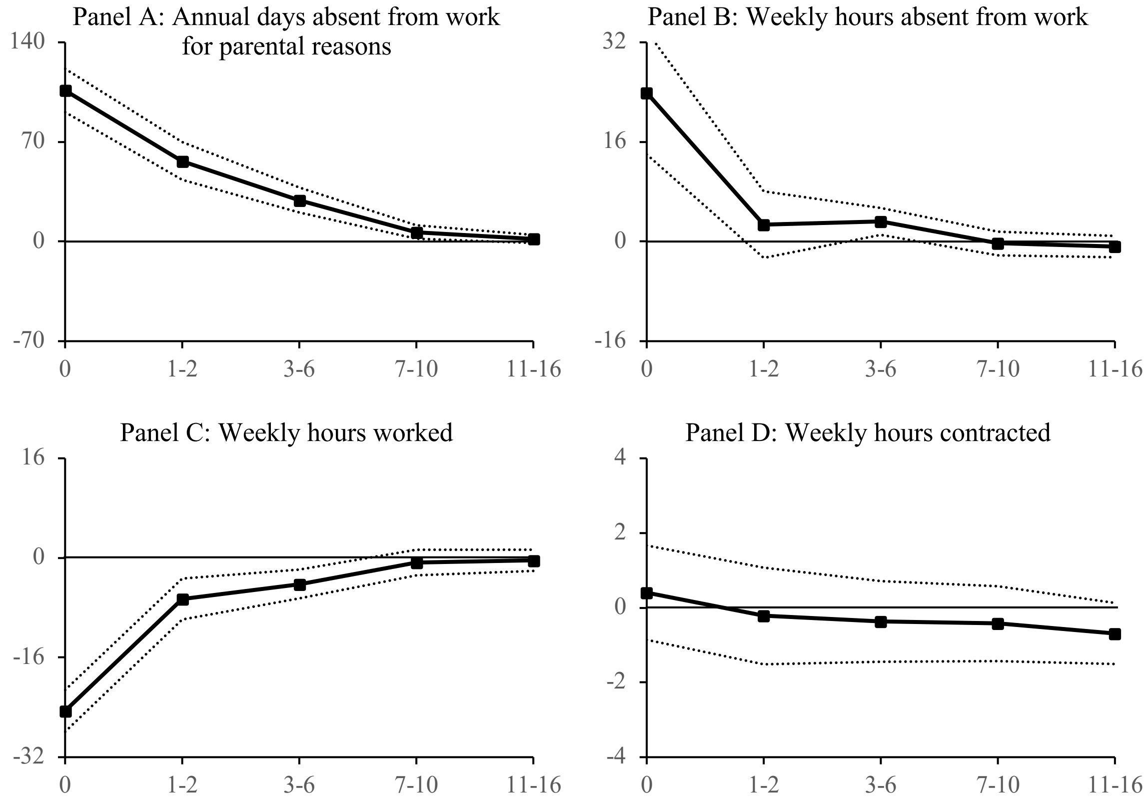

Figure 5. Impact of children on women's absence from work and working hours
The panels in this graph plot annual days absent from work for parental reasons (Panel A), weekly hours absent from work (B), weekly hours worked (C), and weekly hours contracted (D). The estimates (solid lines) and their 95% confidence intervals (dotted lines) are for the coefficients on interactions of female indicator with indicators for years 0, 1–2, 3–6, 7–10, 11–16, and 17–18 following childbirth (17–18 omitted). In addition, the regressions include a female dummy, dummies for each of the years surrounding the event, and dummies for each survey year. The sample consists of executives surveyed in the Labor Force Survey in 2000–15. The annual days absent from work records the total number of days in which the individual has claimed compensation for absence due to parental reasons. This variable comes from the LISA database. The absent and work hours are from the survey questions that report on the week preceding the survey. Confidence intervals are based on standard errors that assume clustering at the individual level.

Table 1
Gender gaps in top executive appointments and pay

The sample consists of business, economics, and engineering graduates who are born in 1962–71 and whose first childbirth (actual or imputed) is in 1992–2001. Panel A reports the gender gaps in the probability of attaining a top executive position. We define top executives in three different and partly overlapping ways. *Large-firm CEOs* hold the CEO position in firms with sales of at least SEK 500 million, whereas *large-firm top executives* are the CEO and the four highest-paid executives in these large firms. *Highly paid executives* have an annual labor income of at least SEK 1 million. The gender gap equals the female-male difference in the probability of attaining a top executive position and the robust *t*-statistic tests whether the gender gap differs from zero. Panel B reports mean and median pay for the graduates and the three definitions of top executives. The log gender gap is the female-male difference in logged labor income, and the robust *t*-statistic tests whether the gender gap differs from zero. Labor income includes all income taxed as labor income in a given year; base salaries, stock option grants, bonus payments, and benefits received from the employer qualify as taxable labor income. Tax authorities deem the taxable income to occur in the year when an employee or executive exercises her stock options or purchases her company's shares at a price that is less than their fair value. Income is deflated to 2017 value and is expressed in million SEK.

Panel A: Probability of attaining an executive position

	Large-firm CEOs			Large-firm top executives			Highly paid executives		
	Executives	Non-executives	Fraction executives, %	Executives	Non-executives	Fraction executives, %	Executives	Non-executives	Fraction executives, %
All	143	40,115	0.36	641	39,617	1.59	1,114	39,144	2.77
Women	27	15,596	0.17	156	15,467	1.00	303	15,320	1.94
Men	116	24,519	0.47	485	24,150	1.97	811	23,824	3.29
Frac. women, %	18.88	38.88		24.34	39.04		27.20	39.14	
Gender gap			−0.30			−0.97			−1.35
t-value			(−5.44)			(−8.15)			(−8.54)

Panel B: Mean pay in SEK millions

	All		Large-firm CEOs		Large-firm top executives		Highly paid executives	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
All	0.60	0.54	2.20	1.78	1.47	1.20	1.42	1.24
Women	0.51	0.47	2.21	1.73	1.33	1.09	1.40	1.22
Men	0.66	0.57	2.20	1.81	1.52	1.25	1.43	1.25
Log gender gap, %	−0.23		0.04		−0.11		−0.01	
t-value	(−15.95)		(0.38)		(−2.45)		(−0.63)	

Table 2

Gender differences in graduates' attributes

This table reports gender differences in graduates' attributes. Panel A reports on family background and risk tolerance. *Birth order* and *Number of siblings* have been calculated using data on all individuals of at least 16 years of age since 1990. *Born in top-3 county* takes the value of 1 if the individual was born in Stockholm, Skåne, or Västra Götaland. *Immigrant* takes the value of 1 if the individual was born outside of Sweden. *Lives outside birth county* indicates graduates who live in their county of birth. *Stock market participant* is a graduate who had direct stock holdings or indirect holdings via mutual funds in 1999–2007. Panel B reports on education and career. *Top executive (income) high school* takes the value of 1 if the high school is in the top-5 high schools in 2011 in terms of the fraction of graduates who become large-firm top executives (median total income) and if it has more than 100 graduates. All the career variables except for unemployment are calculated using data from 1990 to 2011; the unemployment data are available from 1992. Unemployment is measured using information on the days the individual has collected unemployment benefits. *Consulting or IB experience* measures work experience from the following industries: Business and management consultancy activities (SNI2002, SNI1992=74140), Business and other management consultancy (SNI2007=70220), Security broking and fund management (SNI2002, SNI1992=67120), or Investment fund management activities (SNI2007=66301). *Graduated in recession* takes the value of 1 if the individual graduated in a year when Sweden experienced negative GDP growth (1977, 1991, 1992, or 1993). Panel C reports the means of indicators for having gained executive experience from different executive functions in firms with at least 10 employees in 2004. Panel D reports on parents' socioeconomic status and personal traits. Parents' socioeconomic status is measured using data from year 1990. Parent's rank in income distribution refers to their labor-income rank among all individuals of the same gender in a given cohort. Labor income includes all income taxed as labor income in a given year; base salaries, stock-option grants, bonus payments, and benefits received from the employer qualify as taxable labor income. Tax authorities deem the taxable income to occur in the year an employee or executive exercises her stock options or purchases her company's shares at a price that is less than their fair value. Personal traits come from enlistment tests conducted on male conscripts around age 18. These data cover individuals born between 1951 and 1978. The traits are imputed using test scores of a graduate's randomly selected brother. Except for *Imputed officer rank*, a dummy for the reserve officer rank, a summary measure of aptitude and performance in the military, the variables are expressed as differences in standard deviations from the cohort mean. *Imputed cognitive ability* is based on four different subtests of inductive reasoning, verbal comprehension, spatial ability, and technical comprehension. The summary result of these tests is on a stanine scale. *Imputed non-cognitive ability* is assessed using psychological test results and semi-structured interviews. This test evaluates each conscript's social maturity, intensity, psychological energy, and emotional stability and its summary result is on a stanine scale. *Imputed physical fitness* comes from a cycle ergometry test, and *Imputed muscular strength* is a combination of knee extension, elbow flexion, and hand-grip tests. *Imputed body mass index* is the ratio of weight in kilograms and squared height in meters. *Imputed high school GPA* is the grade point average in the final year of high school.

Panel A: Family background and risk tolerance								
	All	Large-firm CEOs	Large-firm top executives	Highly paid executives	Gender difference			
					All	Large-firm CEOs	Large-firm top executives	Highly paid executives
Family background								
Birth order	1.68	1.59	1.68	1.66	−0.03	−0.08	0.04	0.02
					(−3.02)	(−0.48)	(0.48)	(0.36)
Family size	2.38	2.37	2.45	2.45	−0.04	0.05	0.10	0.06
					(−3.81)	(0.25)	(1.25)	(0.95)
# male siblings	0.71	0.59	0.72	0.75	−0.03	−0.05	0.04	0.07
					(−3.60)	(−0.33)	(0.56)	(1.38)
Born in top-3 county	0.49	0.56	0.42	0.52	0.02	0.04	0.01	0.06
					(3.23)	(0.39)	(0.29)	(1.87)
Immigrant	0.05	0.09	0.04	0.04	0.00	−0.07	−0.01	0.01
					(1.41)	(−1.43)	(−0.78)	(0.62)
Lives outside birth county	0.52	0.49	0.43	0.46	0.01	0.06	0.05	−0.03
					(2.72)	(0.52)	(1.11)	(−0.88)
Risk tolerance								
Stock market participant	0.86	0.96	0.90	0.90	−0.05	−0.04	−0.06	0.00
					(−12.69)	(−0.74)	(−1.91)	(−0.02)

Panel B: Education and career								
	All	Large-firm CEOs	Large-firm top executives	Highly paid executives	Gender difference			
					All	Large-firm CEOs	Large-firm top executives	Highly paid executives
Education								
Business and economics degree	0.47	0.48	0.53	0.49	0.34	0.09	0.24	0.26
					(71.62)	(0.84)	(5.46)	(8.08)
Top executive high school	0.09	0.13	0.11	0.09	−0.05	0.03	−0.02	−0.03
					(−19.74)	(0.36)	(−0.87)	(−1.89)
Top income high school	0.13	0.15	0.11	0.12	−0.10	−0.05	−0.05	−0.09
					(−32.84)	(−0.75)	(−1.87)	(−4.80)
Career								
Age (years)	44.75	45.52	45.21	45.40	−0.23	0.09	0.09	0.13
					(−8.65)	(0.18)	(0.42)	(0.82)
# years of labor market experience	16.85	19.38	18.92	19.15	−0.09	0.55	0.76	1.29
					(−1.62)	(0.75)	(1.94)	(5.04)
# years in firm	5.70	4.64	5.44	6.10	−0.22	−1.34	−1.02	−0.76
					(−4.03)	(−1.31)	(−2.20)	(−2.12)
# industries worked in	3.53	3.73	3.77	3.73	0.01	0.10	−0.0001	0.02
					(0.90)	(0.32)	(−0.001)	(0.15)
# firms worked at	4.82	5.53	5.23	5.00	−0.06	0.04	0.09	−0.01
					(−2.83)	(0.09)	(0.48)	(−0.10)

Panel B continued	All	Large-firm CEOs	Large-firm top executives	Highly paid executives	Gender difference: All	Gender difference: Large-firm CEOs	Gender difference: Large-firm top executives	Gender difference: Highly paid executives
# years of consulting or IB experience	0.64	0.71	0.53	0.90	−0.01	0.08	0.02	0.36
					(−0.29)	(0.22)	(0.16)	(2.03)
# years of non-profit experience	0.19	0.06	0.04	0.06	0.14	−0.07	−0.04	0.08
					(10.63)	(−1.80)	(−1.82)	(1.76)
# years of public sector experience	3.16	0.46	0.55	0.62	1.78	0.43	0.21	−0.09
					(28.73)	(1.07)	(1.20)	(−0.71)
# days unemployed	219.15	39.71	73.60	60.86	29.46	21.07	−1.69	−14.71
					(7.87)	(0.76)	(−0.13)	(−1.69)
Graduated in recession	0.51	0.45	0.49	0.49	−0.01	−0.10	−0.05	−0.10
					(−1.70)	(−0.99)	(−1.18)	(−2.91)

Panel C: Executive experience	All	Large-firm CEOs	Large-firm top executives	Highly paid executives	Gender difference: All	Gender difference: Large-firm CEOs	Gender difference: Large-firm top executives	Gender difference: Highly paid executives
Executive experience								
No executive experience	0.90	0.40	0.48	0.52	0.05	0.18	0.19	0.11
					(16.46)	(1.74)	(4.32)	(3.18)
Functional experience								
CEO	0.01	0.22	0.07	0.03	−0.02	−0.18	−0.06	−0.02
					(−17.05)	(−2.71)	(−3.79)	(−2.09)
Production and operations	0.02	0.18	0.14	0.12	−0.01	0.004	−0.07	−0.08
					(−10.00)	(0.05)	(−2.44)	(−4.51)
Finance and administration	0.02	0.04	0.13	0.11	0.003	−0.01	−0.004	−0.01
					(2.05)	(−0.15)	(−0.13)	(−0.75)
Personnel and industrial rel.	0.00	0	0.02	0.02	0.005	NA	0.02	0.05
					(7.10)	NA	(1.16)	(3.43)
Sales and marketing	0.01	0.10	0.07	0.05	−0.01	−0.08	−0.04	−0.02
					(−7.18)	(−1.60)	(−1.83)	(−1.43)
Advertising and public rel.	0.001	0	0.003	0.004	0.0002	NA	0.004	0.01
					(0.91)	NA	(0.65)	(1.49)
Supply and distribution	0.00	0.01	0.03	0.02	−0.002	0.03	−0.001	0.001
					(−4.19)	(0.76)	(−0.08)	(0.09)
Computing and R&D	0.01	0	0.02	0.03	−0.01	NA	−0.02	−0.03
					(−9.53)	NA	(−2.09)	(−2.98)
Other function	0.02	0.04	0.05	0.09	−0.01	0.04	−0.02	−0.001
					(−6.20)	(0.74)	(−1.35)	(−0.05)

Panel D: Additional characteristics								
	All	Large-firm CEOs	Large-firm top executives	Highly paid executives	Gender difference			
					All	Large-firm CEOs	Large-firm top executives	Highly paid executives
Parents' socioeconomic status								
Mother is university educated	0.36	0.45	0.40	0.44	0.01	0.01	−0.04	0.01
					(1.55)	(0.12)	(−0.73)	(0.41)
Mother is employed in 1990	0.91	0.92	0.91	0.91	0.01	0.10	−0.01	0.01
					(3.23)	(3.13)	(−0.40)	(0.46)
Mother in income distribution in 1990	0.59	0.63	0.61	0.64	0.01	0.12	0.02	0.01
					(4.47)	(1.86)	(0.72)	(0.25)
Father is university educated	0.31	0.35	0.30	0.39	0.01	0.08	0.05	0.04
					(1.69)	(0.63)	(1.04)	(0.98)
Father is employed in 1990	0.93	0.95	0.92	0.91	0.01	0.01	0.04	−0.01
					(2.21)	(0.15)	(1.35)	(−0.39)
Father in income distribution in 1990	0.67	0.78	0.72	0.73	0.00	0.06	0.01	−0.03
					(1.19)	(0.90)	(0.25)	(−1.30)
Personal traits								
Imputed cognitive ability	0.61	0.55	0.59	0.73	0.02	−0.13	−0.15	0.00
					(1.81)	(−0.52)	(−1.38)	(−0.03)
Imputed non-cognitive ability	0.41	0.82	0.63	0.70	0.04	−0.39	−0.16	−0.08
					(2.83)	(−1.25)	(−1.38)	(−0.95)
Imputed height	0.16	0.33	0.21	0.25	0.02	−0.30	0.09	0.08
					(1.63)	(−1.39)	(0.90)	(1.02)
Imputed physical fitness	0.32	0.57	0.42	0.45	0.03	0.10	−0.20	−0.18
					(1.93)	(0.34)	(−1.58)	(−1.96)
Imputed muscular strength	0.02	0.36	0.12	0.05	0.02	−0.08	−0.06	0.01
					(1.17)	(−0.24)	(−0.53)	(0.14)
Imputed body mass index	−0.12	0.05	−0.07	−0.09	−0.01	−0.28	−0.07	−0.11
					(−0.74)	(−0.95)	(−0.78)	(−1.54)
Imputed officer rank	0.22	0.31	0.25	0.27	0.02	0.03	−0.02	0.02
					(2.55)	(0.22)	(−0.30)	(0.38)
Imputed high school GPA	0.29	0.35	0.25	0.41	0.01	0.04	−0.13	0.01
					(0.39)	(0.10)	(−0.97)	(0.12)

Table 3

Gender gaps in top executive appointments

Panel A reports results from linear probability model regressions of top-executive dummies on female dummy and controls. Large-firm CEOs hold the CEO position in firms with sales of at least SEK 500 million, whereas large-firm top executives are the CEO and the four highest-paid executives in these large firms. Highly paid executives have an annual labor income of at least SEK 1 million. The first row reports the unconditional gender gap from regressions that include the female dummy as the sole regressor. The next three rows report conditional gender gaps from regressions that sequentially add the set of variables listed in each row. These sets of variables refer to variables listed in Table 2 Panels A, B, and C. Panel B reports the unconditional and conditional gender gaps in samples for which additional characteristics are available. The conditional gender gaps are based on regressions that include the controls in the last row of Panel A and the set of variables from Table 2 Panel D listed in each row. The *t*-values are based on robust standard errors. Coefficients and *R*-squareds are reported in percentage points.

Panel A: Gender gaps in top executive appointments

Dependent variable	Large-firm CEO			Large-firm top executive			Highly paid executive		
Independent variables	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %
Female dummy	−0.30	(−5.44)	0.06	−0.97	(-8.15)	0.14	-1.35	(-8.54)	0.16
+ Family back. and risk toler.	−0.29	(−5.34)	0.11	−0.95	(-7.99)	0.22	-1.33	(-8.38)	0.29
+ Education and career	−0.29	(−4.61)	0.31	−1.05	(-7.82)	1.06	-1.27	(-7.20)	1.57
+ Executive experience	−0.15	(−2.60)	2.01	−0.75	(-5.81)	3.99	-0.96	(-5.59)	5.77
Mean LHS, %		0.36			1.59			2.77	

Panel B: Including additional characteristics

Dependent variable	Large-firm CEO			Large-firm top executive			Highly paid executive		
Independent variables	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %
Female dummy (N = 21,943)	−0.23	(−3.17)	0.03	−0.95	(−5.98)	0.14	−1.43	(−6.56)	0.17
+ Family back. and risk toler.	−0.22	(−3.03)	0.08	−0.94	(−5.90)	0.19	−1.41	(−6.44)	0.28
+ Education and career	−0.22	(−2.67)	0.25	−1.02	(−5.74)	0.95	−1.41	(−5.81)	1.58
+ Parents' socioecon. status	−0.23	(−2.75)	0.27	−1.02	(−5.72)	1.01	−1.43	(−5.89)	1.73
+ Executive experience	−0.08	(−1.06)	1.90	−0.69	(−4.06)	3.65	−1.09	(−4.67)	5.63
Female dummy (N = 18,857)	−0.27	(−3.48)	0.05	−0.90	(−4.99)	0.11	−1.21	(−5.01)	0.12
+ Family back. and risk toler.	−0.27	(−3.46)	0.07	−0.89	(−4.93)	0.16	−1.20	(−4.92)	0.31
+ Education and career	−0.32	(−3.40)	0.29	−1.08	(−5.21)	1.03	−1.13	(−4.25)	1.61
+ Personal traits	−0.32	(−3.36)	0.33	−1.07	(−5.13)	1.06	−1.16	(−4.34)	1.74
+ Executive experience	−0.17	(−1.98)	2.08	−0.77	(−3.84)	3.92	−0.88	(−3.40)	5.95
Female dummy (N = 19,892)	−0.29	(−3.99)	0.06	−0.97	(−5.67)	0.14	−1.32	(−5.63)	0.14
+ Family back. and risk toler.	−0.30	(−4.00)	0.09	−0.96	(−5.59)	0.17	−1.31	(−5.57)	0.30
+ Education and career	−0.33	(−3.68)	0.26	−1.11	(−5.67)	1.01	−1.25	(−4.85)	1.62
+ High school GPA	−0.33	(−3.68)	0.26	−1.11	(−5.64)	1.01	−1.25	(−4.87)	1.62
+ Executive experience	−0.19	(−2.36)	1.92	−0.81	(−4.27)	4.23	−0.96	(−3.83)	5.73

Table 4

Role of children in explaining top executive gender gaps

This table reports results from linear probability model regressions of top-executive dummies on female dummy and controls. Large-firm CEOs hold the CEO position in firms with total assets of at least SEK 500 million, whereas large-firm top executives are the CEO and the four highest-paid executives in these large firms. Highly paid executives have an annual labor income of at least SEK 1 million. Columns (1), (4), and (7) repeat the specifications from the last row of Table 3 Panel A and the additional columns add controls for the graduate's logged labor income measured two years prior and five years after first childbirth. The results reported in this table differ slightly from the corresponding results in Table 3 Panel A because this table excludes graduates who do not have children. The *t*-values are based on robust standard errors. Coefficients, mean dependent variables, and *R*-squareds are reported in percentage points.

Dependent variable	Large-firm CEO			Large-firm top executive			Highly paid executive		
Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female dummy	−0.16	−0.15	−0.04	−0.85	−0.83	−0.52	−1.23	−1.18	−0.55
	(−2.30)	(−2.25)	(−0.56)	(−5.73)	(−5.58)	(−3.06)	(−6.26)	(−5.99)	(−2.16)
Income at child birth – 2		2.96	−1.66		17.60	4.70		41.90	16.00
		(1.24)	(−0.63)		(3.69)	(0.86)		(6.16)	(1.87)
Income at child birth + 5			6.13			17.10			34.30
			(3.05)			(3.43)			(3.52)
Mean LHS, %	0.41	0.41	0.41	1.78	1.78	1.78	3.11	3.11	3.11
Adjusted R^2, %	2.15	2.15	2.26	4.06	4.10	4.29	5.82	5.96	6.41
Number of observations	33,901	33,901	33,901	33,901	33,901	33,901	33,901	33,901	33,901

Table 5

Graduates who hold an executive position at end of sample period

Panel A (B) reports regressions that correspond to Table 3 (4), but conditional on a graduate holding an executive position in 2011. These positions include, but are not limited to, the three top executive positions we use throughout the paper. We consider executives who work for firms with at least ten employees. The number of observations is smaller in Panel B than in Panel A because it restricts the sample to graduates with children. The *t*-values are based on robust standard errors. Coefficients, mean dependent variables, and *R*-squareds are reported in percentage points.

Panel A: Controlling for qualifications									
Dependent variable	Large-firm CEO			Large-firm top executive			Highly paid executive		
Independent variables	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %
Female dummy	−1.49	(−3.79)	0.18	−3.85	(−4.57)	0.31	−4.12	(−3.79)	0.22
+ Family b., risk t., edu., career	−1.64	(−3.75)	1.34	−5.00	(−5.57)	2.48	−5.32	(−4.68)	3.38
+ Executive experience	−0.96	(−2.24)	3.02	−4.24	(−4.69)	3.62	−5.64	(−4.92)	5.20
Mean LHS, %	2.50			11.19			19.45		
Number of observations	5,728			5,728			5,728		

Panel B: Controlling for income around childbirth									
Dependent variable	Large-firm CEO			Large-firm top executive			Highly paid executive		
Independent variables	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %
Female dummy	−0.84	(−1.82)	3.17	−4.22	(−4.41)	3.54	−6.43	(−5.30)	5.34
+ Income at child birth - 2	−0.84	(−1.83)	3.16	−4.26	(−4.46)	3.65	−6.55	(−5.42)	5.90
+ Income at child birth + 5	−0.16	(−0.30)	3.65	−2.65	(−2.42)	4.37	−3.02	(−1.92)	8.11
Mean LHS, %	2.66			11.44			20.00		
Number of observations	5,270			5,270			5,270		

Internet Appendix for

What Prevents Women from Reaching the Top?

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February 27, 2019

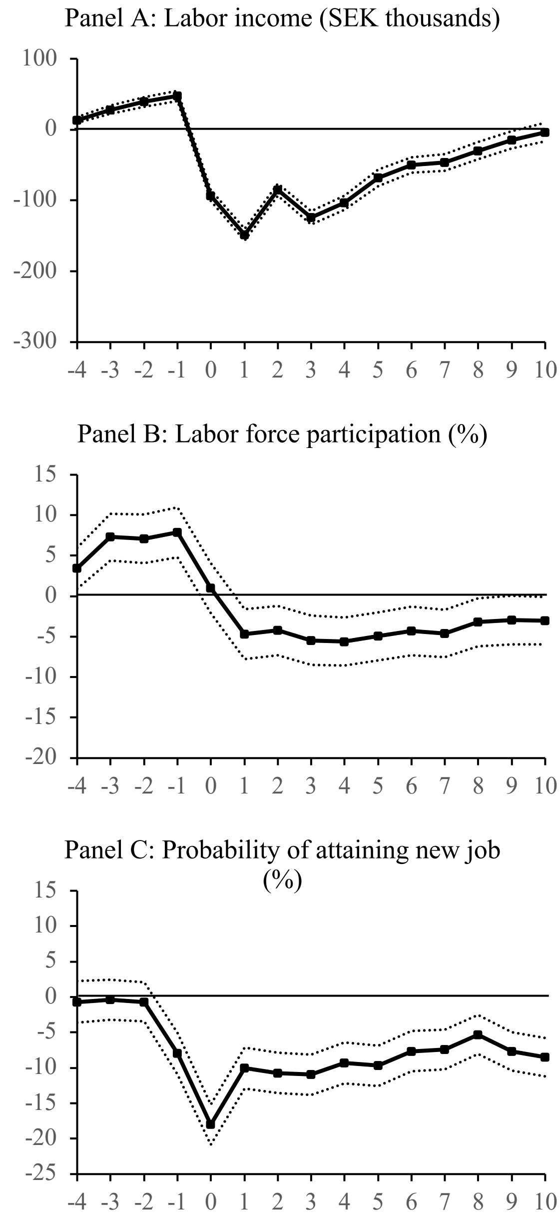

Figure IA1. Comparing women with children to women with no children
The panels in this graph plot annual labor income (Panel A), labor-force participation (B), and probability of attaining a new job (C) relative to the birth year of the woman's first child. The estimates (solid lines) and their 95% confidence intervals (dotted lines) are for the coefficients on interactions of parent indicator with indicators for the 15 years surrounding the event of childbirth (–5 omitted). In addition, the regressions include a parent dummy, dummies for each of the years surrounding the event, and dummies for each calendar year. All panels compare women that have children to women with no children. The imputed year of childbirth for women with no children is randomly drawn from the observed age distribution at first childbirth. The sample consists of graduates who are born in 1962–71 and whose first imputed childbirth is in 1992–2001. Confidence intervals are based on standard errors that assume clustering at the individual level.

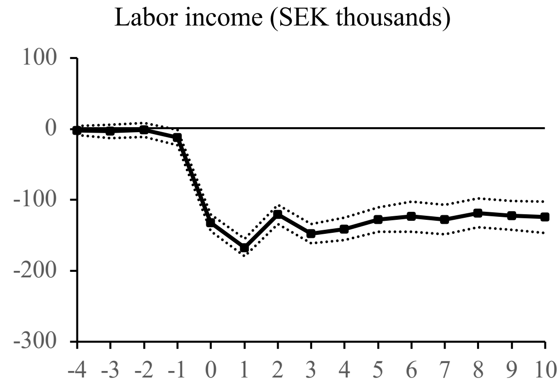

Figure IA2. Impact of children on women that have one child
This figure plots annual labor income relative to the birth year of the graduate's first child. The estimates (solid line) and their 95% confidence intervals (dotted lines) are for the coefficients on interactions of female indicator with indicators for the 15 years surrounding the event of childbirth (–5 omitted). The sample consists of graduates who are born in 1962–1971 and whose first and only childbirth is in 1992–2001.

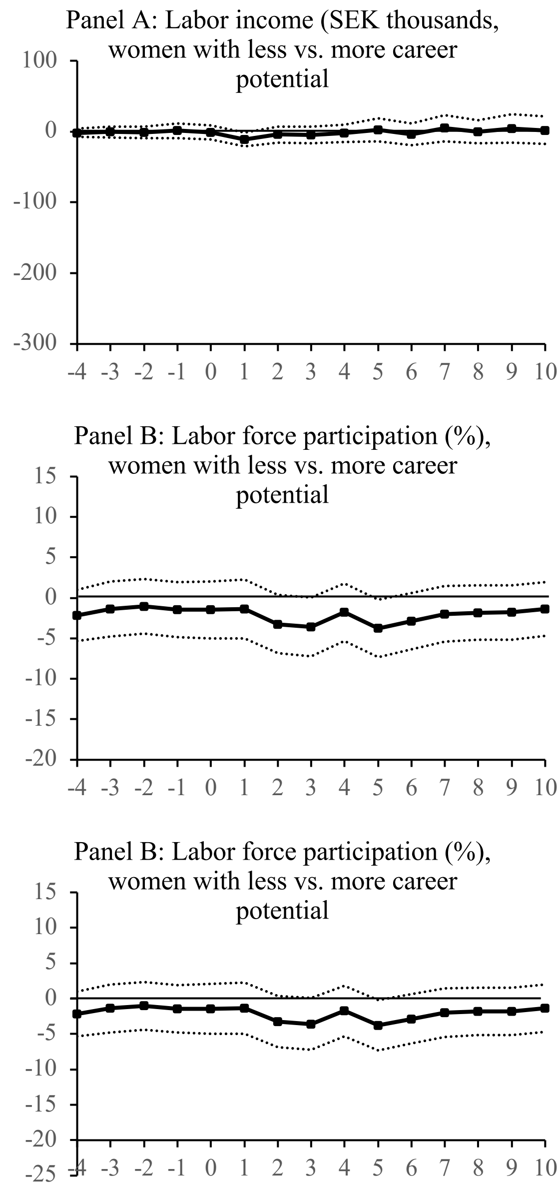

Figure IA3. Career progression of women by their relative within-household career potential using wider cutoffs

This figure repeats analyses in Figure 4 by widening the cutoff points that determine within-household career potential. The cutoff point for female graduates with less (more) career potential is based on the within-household difference in predicted probability of being at least one standard deviation larger (smaller) than the average difference. This definition puts the differences in partners' career potential roughly at the top and bottom quartiles of the career-potential-difference distribution. Confidence intervals are based on standard errors that assume clustering at the individual level.

Table IA1

Descriptive statistics on employers

This table reports descriptive statistics on graduates' employers in 2011. Panel A reports the fraction of graduates working for private or sectors, or having no employment. Panel B reports characteristics of the firms in the private sector. *Age* is computed by taking the difference between the current year of operation and the maximum of 1990 and the year of incorporation. *Return on assets* is the ratio of earnings before interest and taxes to total assets. *Sales growth* is calculated relative to the past fiscal year. Both of these variables are winsorized at the 5th and 95th percentiles. *Industries* follow the international NACE Rev.1.1 classification. *Government owned* is a dummy variable that takes the value of 1 if Statistics Sweden classifies the firm as government owned. *Family firm* is a company whose shareholders and board members include at least two members from the same family.

Panel A: Fraction of graduates working in private and public sector in 2011		
	Number of graduates	Fraction, %
Private sector	32,537	80.8
Public public	6,362	15.8
No employment	1,359	3.4

Panel B: Descriptive statistics on private sector firms in 2011 (N = 12,758)			
	Mean	Median	Sd
Size, age, and profitability			
Sales (mil. SEK)	374	24	2,415
Number of employees	203	17	1,183
Age (from 1990)	12.1	12.0	7.6
Return on assets	0.203	0.061	0.682
5-year sd of return on assets	0.128	0.063	0.284
Sales growth	0.104	0.039	0.340
Industry			
Agriculture and fishing	0.014		
Mining, manufacturing, and utilities	0.150		
Construction	0.029		
Wholesale, retail, and repair	0.136		
Hotels and restaurants	0.008		
Transport, telecommunications, and storage	0.031		
Information technology	0.106		
Engineering	0.087		
Business activities	0.219		
Financial intermediation	0.061		
Real estate and renting	0.047		
Education	0.087		
Public administration, health, and social services	0.106		
Community, social and personal activities	0.027		
Ownership structure			
Government owned	0.043		
Listed firm	0.041		
Family firm	0.084		

Table IA2

Parents' socioeconomic status as a function of trait imputation

This table reports socioeconomic status of a graduate's parents as a function of whether the graduate's traits are imputable from her brother's test scores. Parents' socioeconomic status is measured using data from year 1990. Parents' rank in income distribution refers to their labor income rank among all individuals of the same gender in a given cohort. The four rightmost rows report the gender differences in parents' socioeconomic status for imputed and non-imputed graduates. The *t*-statistics are for the double difference by imputation status and gender.

	Imputed			Not imputed			Imputed	Not imputed	Difference	*t*-value
	Women	Men	*N*	Women	Men	*N*	Women less men	Women less men		
Mother										
University educated	0.339	0.328	14,114	0.285	0.278	14,219	0.012	0.008	0.004	(0.37)
Employed	0.938	0.925	14,114	0.921	0.919	14,219	0.012	0.002	0.010	(1.62)
Rank in income distr.	0.682	0.670	12,942	0.655	0.659	12,926	0.013	−0.004	0.016	(2.21)
Father										
University educated	0.396	0.382	17,023	0.341	0.338	17,466	0.014	0.004	0.010	(0.94)
Employed	0.919	0.910	17,023	0.913	0.901	17,466	0.009	0.011	−0.002	(−0.33)
Rank in income distr.	0.604	0.584	15,664	0.595	0.585	15,974	0.020	0.010	0.009	(1.40)

Table IA3

Gender gaps in top executive appointments – detailed regression results

This table details the results from linear probability model regressions of top-executive dummies on female dummy and controls, reported in the last row of Table 3 Panel A. The variables are defined in Table 2. The *t*-values are based on robust standard errors. Coefficients and *R*-squareds are reported in percentage points.

Dependent variable	Large-firm CEO		Large-firm top executive		Highly paid executive	
Independent variable	Coeff., %	*t*	Coeff., %	*t*	Coeff., %	*t*
Female	−0.15	(−2.60)	−0.75	(−5.81)	−0.96	(−5.59)
Family background						
Birth order	−0.04	(−0.86)	−0.09	(−0.92)	−0.20	(−1.61)
Family size	0.06	(1.32)	0.21	(2.01)	0.32	(2.39)
# male siblings	−0.10	(−2.09)	−0.12	(−1.13)	−0.04	(−0.32)
Born in top-3 county	0.11	(1.81)	−0.24	(−1.92)	0.57	(3.47)
Immigrant	0.40	(2.05)	−0.10	(−0.34)	0.02	(0.06)
Lives outside birth county	0.05	(0.82)	0.49	(3.80)	0.80	(4.93)
Risk tolerance						
Stock market participant	0.14	(2.78)	0.03	(0.22)	0.00	(−0.01)
Education						
Business and economics	0.12	(1.64)	0.68	(4.81)	0.61	(3.38)
Top executive high school	0.13	(0.87)	0.63	(2.11)	0.16	(0.45)
Top income high school	−0.08	(−0.64)	−0.61	(−2.60)	−0.60	(−1.98)
Career						
# years of labor market experience	0.01	(2.70)	0.04	(4.08)	0.09	(7.48)
# years in firm	−0.01	(−1.67)	−0.01	(−0.46)	0.04	(2.15)
# industries worked in	−0.02	(−0.73)	0.04	(0.79)	0.25	(3.44)
# firms worked at	0.05	(2.15)	0.09	(2.28)	−0.01	(−0.22)
# years of consulting or IB experience	−0.03	(−2.10)	−0.13	(−4.93)	0.07	(1.51)
# years of non-profit experience	−0.01	(−1.85)	−0.11	(−5.25)	−0.14	(−4.79)
# years of public sector experience	−0.01	(−4.10)	−0.07	(−12.76)	−0.12	(−16.15)
# days unemployed	−0.0003	(−7.76)	−0.001	(−11.37)	−0.002	(−15.08)
Graduated in recession	−0.05	(−0.79)	−0.06	(−0.50)	−0.10	(−0.65)

Table IA3 continues						
Dependent variable	Large-firm CEO		Large-firm top executive		Highly paid executive	
Independent variable	Coeff., %	t	Coeff., %	t	Coeff., %	t
Functional experience						
CEO	5.44	(5.41)	6.45	(5.50)	2.65	(2.65)
Production and operations	2.65	(4.73)	8.30	(8.45)	11.90	(10.19)
Finance and administration	0.49	(1.53)	8.77	(8.05)	12.19	(9.56)
Personnel and industrial rel.	−0.25	(−5.22)	7.54	(3.10)	17.36	(5.10)
Sales and marketing	2.95	(3.42)	8.29	(5.75)	10.45	(6.38)
Advertising and public rel.	−0.25	(−4.12)	6.79	(1.27)	13.36	(1.82)
Supply and distribution	1.35	(1.19)	12.36	(3.97)	17.75	(4.90)
Computing and R&D	−0.25	(−6.72)	3.45	(2.81)	10.30	(5.32)
Other function	0.71	(1.83)	3.81	(4.38)	13.33	(9.21)
Adjusted R^2, %	0.86		3.89		6.70	
Number of observations	40,258		40,258		40,258	

Table IA4

Blinder-Oaxaca and Fairlie decompositions of gender gaps in top-executive appointments

This table reports results from Blinder-Oaxaca (1973, 1973) and Fairlie (1999) decompositions of the gender gap in top-executive appointments. Top executive appointment dummies are decomposed using the individual characteristics listed in Table 2 Panels A, B, and C. The test statistics, reported in parentheses, are based on robust standard errors.

Dependent variable	Large-firm CEO			Large-firm top executive			Highly paid executive		
Specification	(1)			(2)			(3)		
Men	0.47			1.97			3.29		
Women	0.17			1.00			1.94		
Difference	0.30	(5.44)		0.97	(8.15)		1.35	(8.54)	
Blinder-Oaxaca decomposition									
Total unexplained	0.15	(2.60)	51%	0.75	(5.82)	78%	0.96	(5.60)	71%
Total explained	0.15	(4.84)	49%	0.22	(3.58)	22%	0.40	(4.90)	29%
Family back. and risk toler.	0.001	(0.40)	0%	0.001	(0.13)	0%	−0.02	(−1.33)	−1%
Education and career	−0.01	(−0.51)	−4%	−0.08	(−1.82)	−9%	0.04	(0.60)	3%
Executive experience	0.16	(7.32)	52%	0.30	(7.82)	31%	0.37	(7.46)	28%
Fairlie decomposition									
Total unexplained	0.13			0.76			1.01		
Total explained	0.17	(5.61)		0.21	(2.81)		0.34	(3.72)	
Family back. and risk toler.	−0.09	(−3.19)		−0.07	(−3.09)		−0.15	(−4.51)	
Education and career	−0.16	(−3.03)		−0.40	(−4.34)		−0.29	(−2.89)	
Executive experience	0.41	(6.79)		0.67	(8.46)		0.78	(10.38)	
Number of observations	40,258			40,258			40,258		

Table IA5

Gender differences in family-related characteristics

This table reports gender differences in the graduates' attributes that relate to their family. The table reports the marital status, number of children, and number of children who live in the graduate's household in 2011. The married category includes both legal marriages and registered partnerships. The number of children uses data on all individuals who are at least 16 years since 1990.

	All	Large-firm CEOs	Large-firm top executive	Highly paid executives	Gender difference			
					All	Large-firm CEOs	Large-firm top executive	Highly paid executives
Married or cohabitor	0.65	0.85	0.81	0.79	0.01	−0.09	−0.10	−0.07
					(1.67)	(−1.07)	(−2.54)	(−2.31)
Divorced	0.09	0.06	0.07	0.10	0.02	−0.03	0.06	0.03
					(7.97)	(−0.73)	(2.26)	(1.34)
Single	0.27	0.08	0.12	0.12	−0.03	0.12	0.04	0.04
					(−7.11)	(1.59)	(1.13)	(1.67)
Has children	0.80	0.97	0.91	0.89	0.06	−0.01	−0.04	−0.05
					(14.53)	(−0.28)	(−1.28)	(−1.99)
# children at home	1.65	2.07	1.90	1.84	0.08	−0.09	−0.19	−0.17
					(7.79)	(−0.62)	(−2.38)	(−2.62)
First child born at age	30.6	30.7	30.7	30.8	−0.5	−0.03	−0.3	−0.2
					(−15.77)	(−0.08)	(−1.12)	(−1.21)

Table IA6

Attributes of women who have and have not children

This table reports the difference in the probability of attaining a top-executive position for women with and without children and decomposes it as in Table IA4 into the parts explained and unexplained by attributes.

Dependent variable	Large-firm top executive		Highly paid executive	
Specification	(1)		(2)	
Women with children	1.06		2.04	
Women with no children	0.58		1.22	
Difference	0.47	(2.43)	0.82	(2.95)
Blinder-Oaxaca decomposition				
Total unexplained	0.12	(0.62)	0.10	(0.36)
Total explained	0.35	(6.85)	0.72	(8.12)
Family back. and risk toler.	0.01	(0.54)	0.03	(1.57)
Education and career	0.16	(5.51)	0.31	(7.34)
Executive experience	0.19	(4.81)	0.38	(5.32)
Number of observations	15,623		15,623	

Table IA7

Impact of children on women' career progression

This table reports career development following the first childbirth in the short term (0–1 years post childbirth), medium term (2–5 years), and long term (6–10 years). An indicator for each of the three periods and their interactions return the estimates and their associated *t*-statistics reported in the table. In addition, the regressions include a female dummy, dummies for each of the years surrounding the event, and dummies for each calendar year. The pre-birth period (–5 to –1 years) serves as the omitted category. The sample consists of graduates who are born in 1962–71 and whose first childbirth is in 1992–2001. The *t*-statistics reported in parentheses are based on robust standard errors.

Dependent variable	Labor income	Labor force participation	Probability of obtaining a new job
Specification	(1)	(2)	(3)
0-1 years post childbirth	−185.16	−7.28	−10.10
	(−102.20)	(−21.04)	(−30.72)
2-5 years post childbirth	−198.21	−8.91	−3.97
	(−77.55)	(−26.24)	(−14.82)
6-10 years post childbirth	−187.79	−6.45	−1.18
	(−52.77)	(−20.08)	(−4.67)
Adjusted R^2	0.210	0.110	0.029
Number of observations	604,226	604,226	604,226

Table IA8

Gender differences in partner-related characteristics

This table reports gender differences in the graduates' partners' attributes. The table reports on the partner's university education, employment status, position as either a large-firm top executive or highly paid executive, and the partner's position in the income distribution for the same gender and cohort. The partner's attributes are measured in 2011.

	All	Large-firm CEOs	Large-firm top executive	Highly paid executives	Gender difference			
					All	Large-firm CEOs	Large-firm top executive	Highly paid executives
Partner is university educated	0.62	0.73	0.70	0.71	−0.12	−0.10	−0.06	−0.03
					(−19.51)	(−0.87)	(−1.20)	(−0.89)
Partner is employed	0.95	0.93	0.94	0.95	0.01	−0.12	0.00	0.01
					(3.31)	(−1.49)	(−0.10)	(0.52)
Partner is CEO or other executive	0.10	0.08	0.12	0.13	0.09	0.06	0.14	0.17
					(23.00)	(0.79)	(3.44)	(5.76)
Partner in income distribution	0.68	0.64	0.69	0.71	0.08	0.19	0.15	0.14
					(23.33)	(2.65)	(5.15)	(6.57)

Table IA9

Comparison of the graduates in the core sample to the executives in the Labor Force Survey

This table compares selected individual characteristics in the core sample and in the Labor Force Survey. It reports the means of each characteristic, their difference, and the difference's robust *t*-statistic. The table covers annual waves of the survey in 2000–15.

	Core sample	Labor Force Survey	Differ-ence	*t*-value	*N* Core sample	*N* Labor Force Survey
Labor income (SEK millions)	0.601	0.607	−0.006	(−1.18)	40,258	9,285
Business and economics degree	0.467	0.287	0.179	(33.74)	40,258	9,285
Engineering degree	0.533	0.376	0.157	(28.06)	40,258	9,285
Age (years)	44.75	42.31	2.43	(34.15)	40,258	9,285
Married	0.645	0.678	−0.033	(−6.04)	40,258	9,285
# children at home	1.72	1.48	0.24	(24.05)	40,258	9,285

Table IA10

Gender gaps in work absence and hours worked following childbirth

This table reports work absence and hours worked following childbirth in the short term (0–2 years post childbirth), medium term (3–10 years), and long term (11–16 years). The data source dictates the cutoffs of these periods and they thus differ from those in Table IA7. An indicator for each of the three periods and their interactions return the estimates and the associated *t*-statistics reported in the table. In addition, the regressions include a female dummy, dummies for each of the years surrounding the event, and dummies for each survey year. The period from 17 to 18 years serves as the omitted category. The sample consists of executives who are surveyed in the Labor Force Survey in 2000–15 and who have at least one child living at her household at the time of taking the survey. The annual days absent from work records the total number of days in which the individual has claimed compensation for absence due to parental reasons. This variable emanates from the LISA database. The absent and work hours are from the survey questions that report on the week preceding the survey. The standard errors used to calculate the *t*-values reported in parentheses assume clustering at the individual level.

Dependent variable	Annual days absent from work for parental reasons	Weekly hours absent from work	Weekly hours worked	Weekly hours contracted
Specification	(1)	(2)	(3)	(4)
0 years post childbirth	106.17	23.89	−24.56	0.40
	(13.67)	(4.73)	(−14.36)	(0.63)
1-2 years post childbirth	56.64	2.74	−6.60	−0.22
	(8.27)	(1.00)	(−3.91)	(−0.33)
3-6 years post childbirth	29.18	3.23	−4.18	−0.37
	(6.64)	(3.00)	(−3.57)	(−0.68)
7-10 years post childbirth	6.62	−0.28	−0.74	−0.43
	(2.76)	(−0.29)	(−0.71)	(−0.84)
11-16 years post childbirth	1.84	−0.80	−0.38	−0.69
	(1.27)	(−0.92)	(−0.44)	(−1.65)
Adjusted R^2	0.292	0.037	0.093	0.049
Number of observations	9,285	9,285	9,285	9,285

Table IA11

Graduates who hold an executive position at end of sample period – larger firm size cutoff

This table reports regressions that correspond to Table 3, but conditional on a graduate holding an executive position in 2011. These positions include, but are not limited to, the three top executive positions we use throughout the paper. The sample executives in this table work for firms with at least 100 employees, as opposed to Table 5 where the firm size cutoff is ten employees. The *t*-values are based on robust standard errors. Coefficients, mean dependent variables, and *R*-squareds are reported in percentage points.

Dependent variable	Large-firm CEO			Large-firm top executive			Highly paid executive		
Independent variables	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %	Coeff., %	t	R^2, %
Female dummy	−1.91	(−3.72)	0.27	−5.48	(−4.69)	0.51	−8.05	(−5.54)	0.75
+ Family b., risk t., edu., career	−2.37	(−4.05)	1.83	−8.24	(−6.65)	4.86	−10.18	(−6.76)	5.06
+ Executive experience	−1.60	(−2.84)	6.17	−6.64	(−5.41)	7.53	−9.24	(−6.12)	6.63
Mean LHS, %	2.78			14.31			24.34		
Number of observations	3,591			3,591			3,591		