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The Professors' Gender May Perpetuate the Gender Gap

Although objective measures suggest that when they enter college women and men are roughly equal in their aptitude and preparedness for careers in science, technology, engineering, and math (STEM), female college students are 37 percent less likely than male college students to obtain a bachelor's degree in one of those fields. Why is that the case, and could it change?

In **Sex and Science: How Professor Gender Perpetuates the Gender Gap** (NBER Working Paper No. 14959), co-authors **Scott Carrell, Marianne Page, and James West** exploit a unique dataset of 9,481 students who comprised the U.S. Air Force Academy's graduating classes of 2000 through 2008 to try to answer these questions. At the Academy, students are randomly assigned to course sections after taking placement exams. The students are all high achievers, with average SAT math and verbal scores at the 88th and 85th percentile respectively. Furthermore, the students have no ability to choose

required course professors: all students take the same course, are taught from the same syllabus, and take the same exams.

“For the top quartile of female students...having a higher proportion of female professors in introductory math and science courses significantly increases the likelihood [of]...choos[ing] a [science or technology] ... major.”

The researchers find that female students' course grades in math and science are improved when they have a female professor, and that for the top quartile of female students as measured by SAT math scores, having a higher proportion of female professors in introductory math and science courses significantly increases the likelihood that women will choose a STEM major. Overall, their estimates suggest that increasing the fraction of female professors from zero to 100 percent would completely eliminate the gender gap in math and science majors.

On the whole, men in this sample with the same entering math

ability perform substantially better than female students in introductory math and science courses. However, this gap is mitigated

when top performing female students have female professors in math and science classes. Professor gender appears to be irrelevant in the humanities, though, and does not appear to affect male performance.

When all female students are considered, rather than only those in the highest quartile, having a higher proportion of female professors does not effect a woman's likelihood of taking higher level math courses or her probability of graduating with a STEM major.

— Linda Gorman

Lifecycle Funds in 401(K) Plans

Recent lessons from behavioral economics on how to boost worker participation rates in individually-directed retirement plans—including “opt out” or “automatic enrollment” provisions—have stimulated interest in a broader role for such strategies in retirement plan design, and in other settings where the goal is to limit the impact of potential deficiencies in individual decisionmaking. To shed additional light on this topic, co-authors **Olivia S. Mitchell, Gary Mottola, Takeshi Yamaguchi, and Stephen Utkus** analyze a rich dataset of retirement portfolios in **Default, Framing, and Spillover Effects: The Case of Lifecycle Funds in 401(k) Plans** (NBER Working Paper No. 15108). They have data on approximately 252,000 active participants covered by 258 U.S. 401(k) pension plans with a variety of default and voluntary choice options. Between 2003 and 2005, these retirement plans introduced lifecycle funds, when the contributions of those participants who were either automatically enrolled in their company’s plan, or who enrolled on a voluntary basis but failed to submit an investment election upon enrollment, were placed by default into a lifecycle fund specified by the employer.

The researchers find that the default effect is strong: single lifecycle fund investment rates are nearly 60 percent higher when those funds are automatically designated as the investment of choice

by the employer, primarily because new hires are enrolled automatically and fail to make any other investment election upon enrollment. The lifecycle funds also appeal to less sophisticated investors in plans without a default. These employees

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actively choose a lifecycle fund, presumably to avoid having to make difficult portfolio management decisions. Even when a lifecycle fund is not the default choice, the authors find, new hires are still 6.6 percentage points more likely to adopt one as their investment choice than are employees who joined the firm before lifecycle funds were available as a menu option.

Typically, a lifecycle fund includes a mix of passively-managed stocks and high-quality U.S. bonds—structured to optimize portfolio appreciation—which are rebalanced regularly based on a target maturity date, the expected year of the plan member’s retirement. The fund’s investment mix usually shifts to more conservative investments, such as fixed income assets, as the pension holder gets closer to retirement. Because a lifecycle fund is designed to serve as the sole holding in a participant’s retirement portfolio, it generates an investment framing effect—that is, it consoli-

dates what is potentially a series of complex portfolio allocation decisions into a simple one.

One surprising finding is that the introduction of lifecycle funds produces a large, unexpected spillover effect: it creates a sizeable new

class of investors who use the funds in unanticipated ways, in this case as part of a more complex retirement portfolio that includes other investments offered by their plan. That group of mixed portfolio investors, primarily middle-income and middle-wealth investors with some knowledge of the investment process, is only slightly smaller than those who hold only a lifecycle fund, according to the study. Still, their impact can be sizeable and could result in plan managers having to make meaningful changes to the overall plan’s portfolio allocations.

While these results are an incomplete explanation of the impact of changing the decision environment, the researchers say, they suggest that when considering altering choice architecture, it is critical to consider the potential spillover effects and whether their impact will be detrimental or benign.

— Frank Byrt

Effects of Introducing Kindergartens into Public Schools

In the 1960s and 1970s, many states, particularly in the southern and western parts of the country, introduced grants for school districts to begin offering kindergarten programs. In **Do Investments in Universal Early Education Pay Off? Long-term Effects of Introducing Kindergartens into Public Schools** (NBER Working Paper No. 14951), author **Elizabeth Cascio** exploits the staggered timing of these initiatives to estimate the long-term effects of a large public investment in universal early education.

She finds that within only two years of this new state funding, school districts in the typical state were 21 percentage points more likely to offer kindergarten, and public school kindergarten enrollment rates rose by 33 percentage points. Using data from the four Decennial Censuses spanning 1970 to 2000, Cascio finds that white children who turned five after the typical reform took effect were 2.5 percent less likely to become high school dropouts and 22 percent less likely to be institutionalized as adults than those who turned five

before the reform. She does not find positive effects of the same magnitude for blacks, even though they experienced comparable increases in their enrollment in public kin-

“State funding for kindergartens crowded out participation in federally funded early education, such as Head Start, among the poorest five-year olds.”

dergartens after these initiatives. Nor does she find any evidence that the kindergarten funding initiatives had a significant impact on other outcomes targeted by state policymakers, including grade retention, receipt of public assistance, employment, and earnings.

According to Cascio, the general lack of a positive effect for universal kindergarten may be consistent with its low-intensity nature as an early intervention. She is particularly interested, however, in explaining the lack of any positive effect for blacks, for whom the funding initiatives had an effect on overall school enrollment at age five as large as that for whites. The explanation that receives the most support is that state funding for kindergartens crowded out participation in feder-

ally funded early education, such as Head Start, among the poorest five-year olds.

Cascio cautions that because of the unique historical context of

the 1960s and 1970s, we may not be able to generalize from her findings. However, the current body of knowledge on the long-term effects of early education comes from participation in programs of roughly the same vintage as those that she studies. The state funding initiatives she studies were passed after the federal government introduced Head Start — a program that continues to be a key alternative to universal preschool for disadvantaged children today. When viewed in this light, Cascio’s findings raise the possibility that state investments in universal education for children under age five may have some positive effects, but that the current availability of higher-quality alternatives for some groups may blunt the impact of such investments.

— Lester Picker

Poor Working Conditions Affect Long-Term Health

There is a cumulative negative effect of performing a physically

demanding or environmentally hazardous job on worker health, but

the effects vary substantially across age, race, and education groups.

Individuals who work in jobs with the “worst” conditions experience declines in their health. Job characteristics are more detrimental to the health of females and older workers than to men or younger workers, and the adverse health effects increase with the length of exposure to job conditions, according to co-authors **Jason Fletcher, Jody Sindelar, and Shintaro Yamaguchi** in **Cumulative Effects of Job Characteristics on Health** (NBER Working Paper No. 15121).

Among both men and women, non-white workers have worse job conditions, lower incomes, and work fewer hours than white workers. Men with more than a high school diploma work in jobs with substantially better working conditions, while women without high school diplomas experience fewer physical demands but harsher environmental conditions than their better-educated counterparts. Older workers in general encounter less strenuous physical demands

and less harsh environmental conditions than younger workers.

This research suggests that white working males generally report better health than other groups of workers, although their

“Job characteristics are more detrimental to the health of females and older workers than to men or younger workers.”

self-reported health status decreases with age. For non-white and older males, physical demands on the job are associated with poorer health. For non-white men, a single standard deviation increase in a job’s cumulative physical demands over a five year period will have an impact similar to two fewer years of schooling or four more years of aging. For women, a single standard deviation increase in a job’s physical demands over a five year period is similar in impact to a reduction in schooling of one half year, or aging by three years.

When the researchers disaggregate their sample by race, they find

that that the adverse effect of environmental conditions is particularly evident for non-white women. For white women, in contrast, physical demands have a more negative effect on health than changes

in environmental conditions. For women, unlike men, cumulative weekly work hours are negatively associated with health.

The sample used here takes job characteristics from the Dictionary of Occupational Titles and merges them with data from the Panel Study of Income Dynamics. The authors control for childhood and lagged health measures and a set of pre-determined characteristics in order to address concerns that the jobs individuals choose may in part reflect their underlying health characteristics.

— Sarah H. Wright

Why Do Skilled Immigrants Struggle in the Labor Market?

Ethnic discrimination may explain a significant part of why recent skilled immigrants have much poorer prospects than non-immigrants in the Canadian labor market. In **Why Do Skilled Immigrants Struggle in the Labor Market? A Field Experiment with Six Thousand Resumés** (NBER

Working Paper No. 15036), **Philip Oreopoulos** estimates the effect of various individual attributes on the likelihood that a job applicant will receive an interview request. He finds that interview request rates for English-named applicants with Canadian education and experience were more than three times higher

than for resumés with Chinese, Indian, or Pakistani names with foreign education and experience (5 percent versus 16 percent)—but they were no different than for foreign applicants from Britain. Employers also valued experience acquired in Canada much more than experience acquired in a for-

foreign country. Changing foreign resumés to include only experience from Canada raised callback rates to 11 percent. And, among resumés listing four to six years of Canadian experience, whether an applicant's degree was from Canada, or whether the applicant obtained additional Canadian education had no impact on the chances for an interview request.

Canadian applicants who differed only by name had substantially different callback rates: those with English-sounding names received interview requests 40 percent more often than applicants with Chinese, Indian, or Pakistani names (16 percent versus 11 percent). The "discrimination" was particularly pronounced in administrative, finance, and retail jobs.

Most immigrants come to Canada on a point system, which attempts to attract the most educated and experienced foreign employees, who are in demand by the industry. However, for a given

level of education, the earnings gap between recent immigrants and natives is more than 50 percent. To try to understand this, Oreopoulos

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sent out over 6000 mock resumés to job postings in Toronto, all of which required an undergraduate degree and several years of work experience. The job postings came from a range of industries, and the mock resumés were carefully designed to reflect actual resumés supplied by recent immigrant and Canadian native job hunters. Oreopoulos randomly assigned each applicant a common Chinese, English, Indian, or Pakistani name, as well as either foreign or Canadian education and work experience and other applicant characteristics. By doing so, he was able to investigate the effect of

particular attributes on an employer's decision to call an applicant back for an interview.

Oreopoulos further finds that

the evaluators' gender and ethnicity were not driving the differences in callback rates: in fact, evaluators with Asian or Indian accents and names were slightly more likely to call back an applicant with an English name. He concludes that, for resumés listing more than five years of experience, "an applicant's name matters considerably more than his additional education, multiple language skills, and extracurricular activities" in the Canadian labor market.

— Alex Teytelboym

When Are Analyst Recommendation Changes Influential?

Sometimes changes in analysts' recommendations appear to coincide with large changes in stock prices, while at other times seemingly analogous changes in recommendations appear to have no impact on market values. In **When Are Analyst Recommendation Changes Influential?** (NBER

Working Paper No. 14971), co-authors **Roger Loh** and **René Stulz** attempt to determine under what conditions the change in an analyst's recommendation on a firm will influence the stock price of that firm.

This research draws on data from Thomson Financial's I/B/E/S U.S.

Detail File, which contains stock recommendation ratings issued by individual analysts from 1993 to 2006. The authors find that 25 percent of the analysts never make a recommendation change that influences the price of the corresponding firm's stock. "Influence" for this purpose is defined as coinciding

with a statistically significant price movement, in the expected direction, in the underlying share price. Even among those analysts who do make recommendation changes that affect stock prices, not all of their changes are influential — only 20 percent are.

The authors ask what role analyst and firm characteristics play in determining whether recommendation changes have a statistically significant effect on share prices. They conclude that a recommendation away from the consensus is more likely to be influential. Analyst characteristics such as a high ranking, more overall experience, or more relative experience on a particular firm all increase the likelihood of the analyst being influential. In addition, when an analyst produces a recommendation change accompanied by an earnings forecast, there is more chance that the recommendation change will be influential.

If a firm is large, or a large number of analysts follow it, then a recommendation can more easily get lost in the crowd, and the probab-

ity of making an influential recommendation decreases. Similarly, if there is a strong consensus among

“A recommendation away from the consensus is more likely to be influential. Analyst characteristics such as a high ranking, more overall experience, or more experience on a particular firm all increase the likelihood of the analyst being influential.”

analysts on one firm, or a high number of previous earnings forecasts, then the likelihood that a recommendation change will be influential is reduced. An analyst will have more impact on firms with lower turnover of shares and lower volatility of returns. Because analysts’ reports are read mostly by an audience of institutional investors, analyst recommendations are more likely to be influential in firms with a higher institutional ownership.

When an analyst’s recommendation is influential, analyst activity increases, as other analysts quickly revise their own ratings. Moreover, revisions of earnings forecasts are more extensive after an influential recommendation. The authors also

observe an increase in share turnover and stock volatility in the aftermath of an influential recommendation.

Loh and Stulz are careful to select a sample of changes in analysts’ recommendations that are not contaminated by the coincident release of other firm-specific news. They also examine how changes in the regulatory environment may affect the degree to which recommendation changes are influential. In particular, they find that both Reg FD — the U.S. Securities and Exchange Commission’s Regulation Fair Disclosure which was implemented in 2000 — and the Global Analyst Settlement of 2003 increased the likelihood that a recommendation change would be influential.

— Claire Brunel

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