

# SPECIAL REPORT

## TD Economics



March 6, 2015

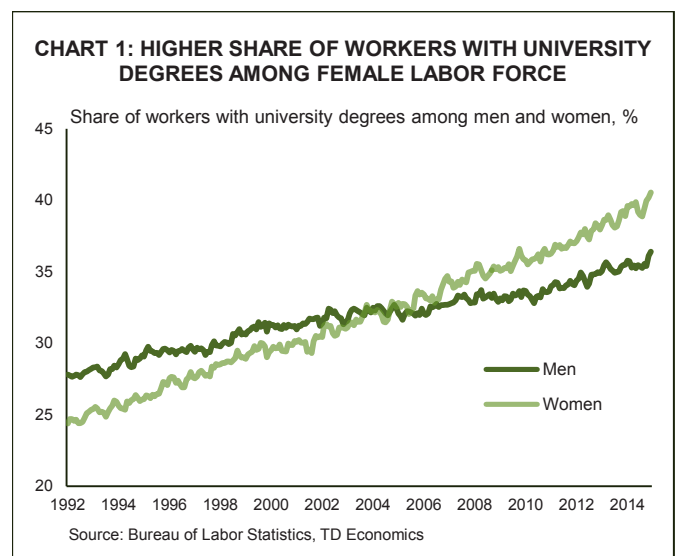
# U.S. WOMEN CUT A DEEPER PATH IN THE CLASSROOM AND THE JOB MARKET

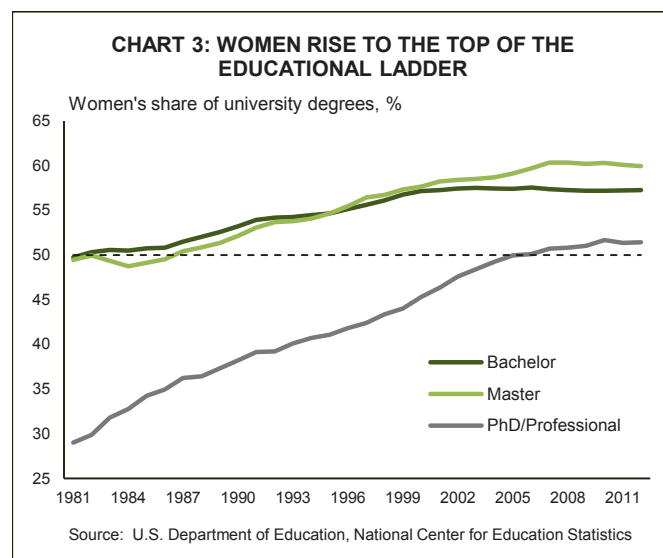
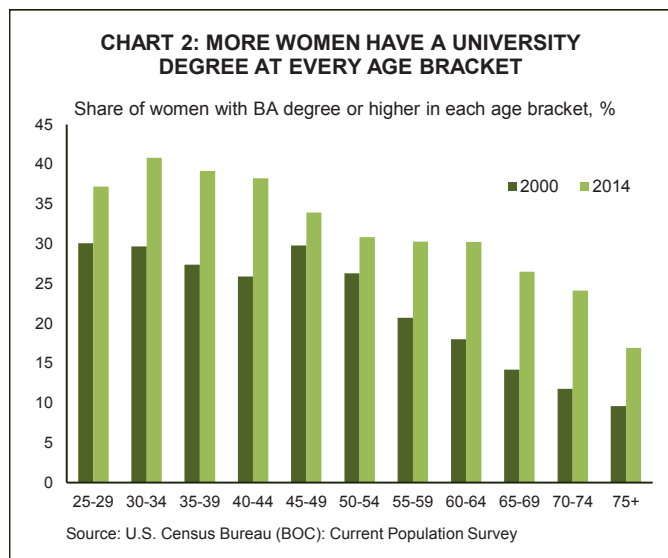
## Highlights

- The theme this year for International Women's Day is Make It Happen. And that is exactly what women are doing with steady gains in educational achievement and labor market outcomes.
- Women represent 58% of university graduates and are more likely than men to pursue graduate degrees.
- These educational shifts have been reflected in the labor market. The rising educational attainment among women has opened doors to higher-paying occupations and has allowed women to climb higher on the career ladder.
- There is room for further progress. While women have gained market share in STEM (science, technology, engineering and math) occupations, a lack of progress in computer-related jobs has weighed on their advancement.
- In the context of the ever-increasing educational requirement and the growing importance of high-skilled occupations, the trend of rising educational attainment among women will likely continue. This bodes well for women's career and earnings potential.

They may not have known it back then, but the graduating class of 1987 was special – the first class in U.S. history that had more women than men. Since then, women have held on to this achievement and further raised the bar. Today women account for the majority of university graduates at every level of educational attainment: associate, bachelor, masters and doctoral/professional. The biggest transformation has been in the ranks of doctoral, medical, dental and law degrees. In fact, women show a higher propensity than men to pursue graduate-level education. And, in fields where women have been traditionally under-represented, they are increasingly more likely to pursue master's and doctoral degrees than ever before.

Rising educational attainment among women has paved the road for their increased participation in the labor market. It has also opened doors to many higher paying careers, including management, business and finance, healthcare, legal services, as well as STEM (science, technology, engineering, and math) occupations. The landscape is certainly not perfect, particularly within the STEM fields. However, the broad educational and





occupational dynamics are working in favor of women and there is no denying that they are “making it happen”.

### Education: majority of university graduates are now women

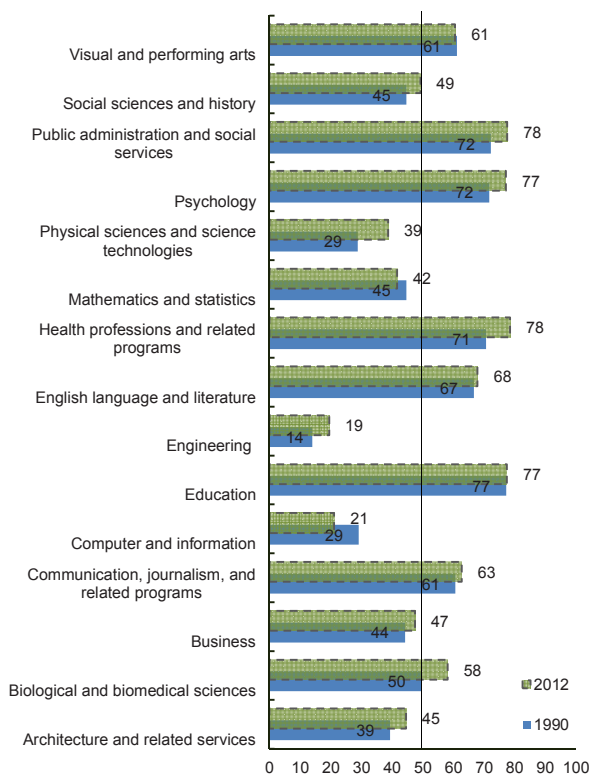
An employer looking to hire a university graduate now has a higher-than-ever chance of seeing a woman’s resume land on her desk. With every successive generation, women improve their educational attainment at every age bracket (see Chart 2). Progress has been so steadfast that women now account for 58% of all post-secondary degrees awarded by U.S. colleges and universities. Reinforcing this drive to higher education, once women attain a Bachelor’s degree, they are also more likely than men to pursue graduate degrees (MA, PhD and professional designations combined).

The gains at the very top of the educational ladder have been particularly impressive, with the share of PhD/professional degrees going to women rising fivefold from 10% in 1970 to 51.4% in 2012. Some of the largest swings in educational attainment have been in dental, medical and law degrees. In 1970, the share attributed to women stood at only 1.1%, 9.1% and 7.1%, respectively. Today, women represent nearly half of these graduates. The largest shifts occurred between the late seventies and nineties, mirroring the accelerating entry of women into the labor force. Nevertheless, the push into the top levels of academia is still evident even when the time frame is shortened to the past ten years. This is an interesting period because the share of women at the undergraduate and MA levels remained relatively stable at around 57% and 60%, and yet attainment of PhD and professional degrees continued to rise (see Chart 3).

### Women more likely than before to attain post-graduate degrees in science and engineering

There are some fields of study where women have maintained a stronghold, such as education, language studies, psychology, sociology, health programs and public administration & social services. With an already dominant presence on campus, their share of majors has crept even higher over the past decade, approaching 80% in psychology and public administration. This is a well-documented phenomenon and should come as little surprise. Less known are some of the shifts taking place within other fields of science, as well as engineering, where women traditionally maintain a small footprint (see Chart 4). It is this more narrow group that will be the focus for discussion below in the science and engineering (S&E) category.<sup>1</sup>

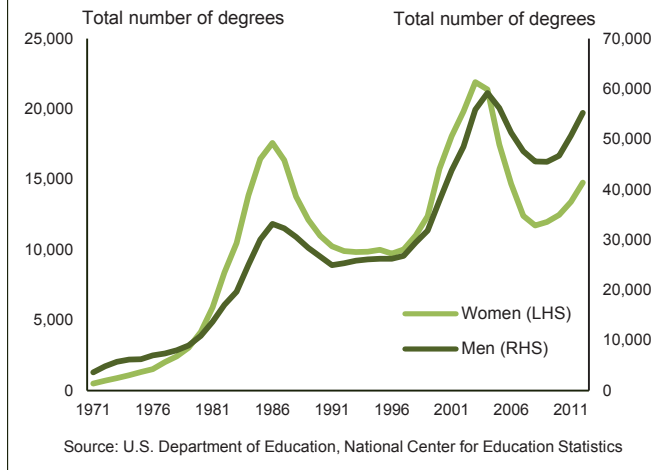
Looking at the statistics on the surface, it’s easy to get the impression that women have not made inroads in attaining S&E majors. That’s because the overall representation of women in S&E fields has been little changed at 37% relative to ten years ago. Even though the number of female graduates has risen by 40% over this period, men have kept pace, which is the reason why the overall representation is unchanged. But, this is only part of the story. Female degree representation is being specifically weighed down by the field of computer science, which accounts for roughly 17% of our more narrow definition of science degrees. In this regard, there are two interesting (and somewhat discouraging) trends. First, following the tech-bust in 2001, both, the number and the relative share of computer science degrees going to women fell steeply. The same phenomenon occurred with men, but the downward

**CHART 4: SHARE OF WOMEN IN SELECTED DISCIPLINES IN 1990 AND 2012, %**


Source: U.S. Department of Education, National Center for Education Statistics.

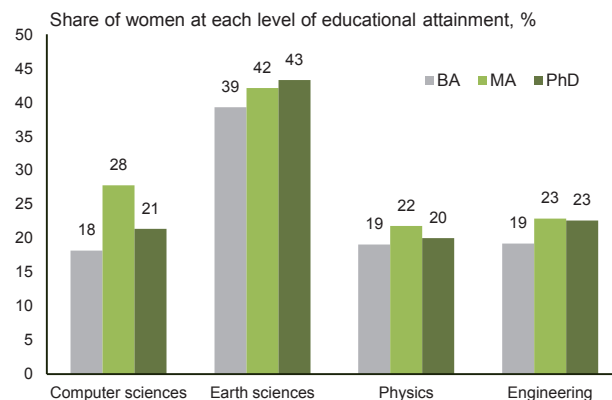
trend was more pronounced for women (see Chart 5). This brought women's share of computer science degrees down by a sizeable 8.2 percentage points to 21% in 2008. After bottoming out, female enrollment in computer science has gained a cumulative 26% – slightly more than the gain by men – but because women are coming from a deeper deficit position in degree holdings, their share relative to men rose only by 0.5 percentage points to 21.5%.

That takes us into the second observation, which is the more interesting one. Disaggregating the data further reveals that the stagnant representation of women in the computer science field is largely occurring at the undergraduate level. Slower entry into this field relative to men has caused female shares for BA's to fall outright from 28% in 2002 to 18% in 2012. By contrast, the female shares were relatively stable at the MA and PhD level. And, more importantly, they are higher. The share of women with an MA in computer science is roughly 10 percentage points higher than at the BA level. At the PhD level, the representation is about 4 percentage points higher than the BA level.

**CHART 5: WOMEN LOOSE GROUND IN COMPUTER SCIENCE DEGREES**


Source: U.S. Department of Education, National Center for Education Statistics

The declining share of women with BA's over the past decade is most pronounced within the computer science field, but the phenomenon is occurring quite broadly across the S&E field. However, similar to computer science, once a woman obtains a BA degree within an S&E discipline, they are showing a rising propensity to pursue post-graduate studies, notably at the PhD level (see Chart 6). Take engineering. The female share of undergraduate degrees has held steady at roughly 18% over the past decade, while the share of MA and PhD degrees is again higher, by five percentage points (pp) in each case. At the PhD level, this is a rather new phenomenon that first emerged in 2004/05 and has not reversed since then. Other fields where there have been notable swings in PhD representation over the past ten years include physics (+4.5pp to 20%), astronomy (+13.5pp to 33.5%), earth sciences (+13.6pp to 43.3%) and chemistry

**CHART 6: MORE WOMEN AT THE GRADUATE LEVEL IN SOME S&E MAJORS**


Source: National Science Foundation, National Center for Science and Engineering Statistics.

(+5.2pp to 39%). Altogether in the S&E field, the share of women at the doctoral level is 35% – a 5.7 percentage point improvement relative to ten years ago.

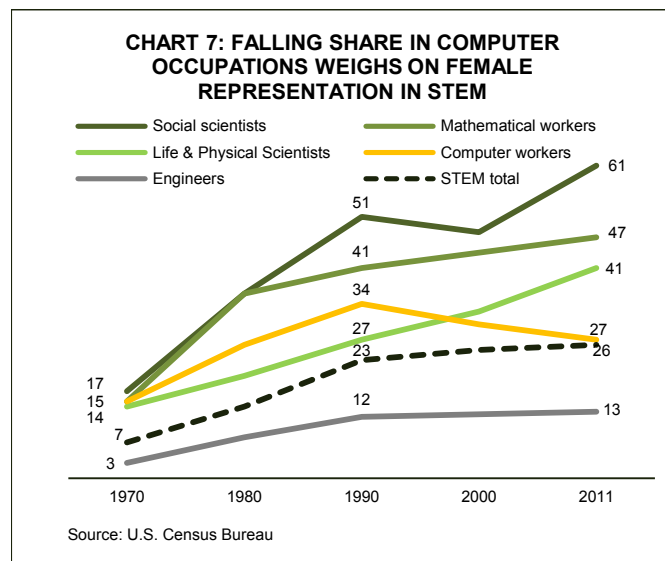
The implications of rising female representation in a number of S&E fields at the graduate level are two-fold. First, it indicates that once women enter these fields, on average, they are more likely than before to go on to graduate studies. This offers a stronger foundation for better employment outcomes down the road. Second, while the rising share of women pursuing post-graduate education is encouraging, the stagnant presence at the undergraduate level is concerning, as this ultimately encompasses the pipeline.

### Mind the STEM gap

The question now is: how have these educational shifts in S&E been reflected in the job market? The share of women working in STEM (science, technology, engineering and math) occupations rose briskly between 1970 and 1990 from 7% to 23%. However, improvement has been happening at a glacial pace since then.<sup>2</sup> It is important to note that the definition of STEM occupations contains a somewhat broader definition of science than we have been using relative to academia. The occupational definition includes certain social science jobs, such as economists, sociologists and psychologists, which demonstrate a higher presence of women. However, these occupations account for only 3.5% of all STEM jobs and, thus, do not significantly skew the aggregate results. In particular, computer-related occupations carry the largest influence, representing half of all STEM jobs. So, although the share of women rose substantially in the STEM fields of life & physical sciences, math, and social science, their overall share of total STEM occupations advanced only slightly (see Chart 7).

The numbers are telling. Since 2000, computer-related occupations have seen some of the strongest overall employment gains in the economy, with payrolls rising by 30%, considerably ahead of the 7% gain seen in national employment. However, men have benefited the most from this trend. Male employment in this field rose three-times the pace of women's. As a result, there were 2.4 men per woman working in this field in 2000, and this gender gap rose to nearly three-to-one in 2014. The bottom line is that even though more women have more education in computer sciences than ever before, their work colleagues and classmates are increasingly more likely to be men.

This deteriorating male-to-female ratio in computer sci-



ence occupations may make it even harder to entice more women to enter the field. Female graduates with degrees in STEM-related disciplines are already half as likely as male graduates to be working in STEM occupations.<sup>2</sup> Moreover, it may also lead to additional attrition in female ranks, as the lack of female role models, sponsors and networks are among some of the reasons why women in STEM fields are more likely to switch occupations than other professionals.<sup>3</sup> Glass & al. (2013) found that after 12 years, half of the women originally employed in STEM were employed in other occupations, compared to about 20% of women in other professional occupations.<sup>4</sup> The attrition seems to be particularly pronounced in engineering. In 2012, women accounted for 20% of all engineering degrees, but held only 13.7% of architecture and engineering jobs.

Developments that are occurring within academia offer additional insight. While women account for 48% of the overall faculty in U.S. postsecondary institutions, women make up only 17% of the faculty in computer science and 16% in engineering. Among the tenured faculty, women are even harder to come by. The rising female representation in post-graduate programs offers hope that, over time, a greater transition will be evident. Indeed, with the exception of computer science, the share of women who hold senior faculty positions (professors and assistant professors) has been rising steadily in all science and engineering fields. Despite this, studies suggest that women, and especially women with children, continue to face a unique set of challenges on their way to academic tenure. A report by the National Research Council found that women who receive a PhD in science were less likely than men to seek

academic research positions and were more likely to leave before attaining full tenure if they did take on a faculty post.<sup>5</sup> Among married parents in tenure-track positions, which are a gateway to full tenure, women were 27% less likely than men to achieve tenure.<sup>6</sup>

### Labor market: Women reaching for and rising to the top

Broadening out the focus from just STEM occupations, it's important to reinforce that the rising overall educational attainment among women has paved the road for their increased participation in the labor market. In turn, this is improving their labor market outcomes. While some differences naturally persist, the professional lives of American men and women have never looked more alike. Men continue to participate in the labor market at a higher rate; however, the gender gap in participation rates has been closing, falling from 20 percentage points in the late eighties to 12 percentage points in 2014. This convergence has occurred due to both the structural decline of male labor force participation, as well as gains in female participation. Likewise, median weekly earnings for women working full-time have also narrowed from 32% below men's in 1985, to 17% in 2014. These trends have had an impact on income dynamics within U.S. households. Over nine million women in dual-income households are now primary breadwinners. Looking at it another way, wives are out-earning husbands in nearly one out of three dual-income families, up from one in four in 2002.

The improving earnings profile among women also reflects the fact that they have been increasing their footprint

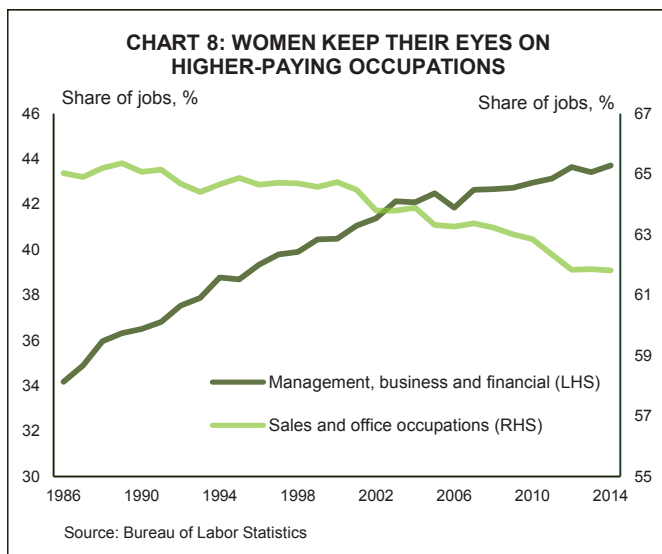
in higher-paying occupations, some of which have traditionally been more male-dominated. Management, business and financial occupations are a striking example of that. Since 2000/01 the number of graduate degrees in business awarded to women has nearly doubled to account for 46% of the total. Female employment in these two combined occupational groups also rose briskly, gaining 24%. This was more than twice the rate for men – with the share of jobs held by women increasing by 3.2 percentage points to 44%. At the same time women have been scaling down their presence in lower-paying sectors (see Chart 8). Since 2001, female employment in office and administrative positions declined by 15%, while male employment remained nearly flat.

Although it is well documented that women remain underrepresented in top executive roles, their ranks are certainly inching up. Currently, only 24 CEO positions in the Fortune 500 companies are held by women. This number stood at 15 in 2009, and there were a mere seven female CEOs in 2002. Faster advancement can be seen within the ranks of female chief information officers in Fortune 500 companies. Women are now 40% more likely to hold this top IT job than a few years back. Females make up 87 (17%) of the CIOs in Fortune 500 companies, up from 61 (12%) in 2012.<sup>7</sup>

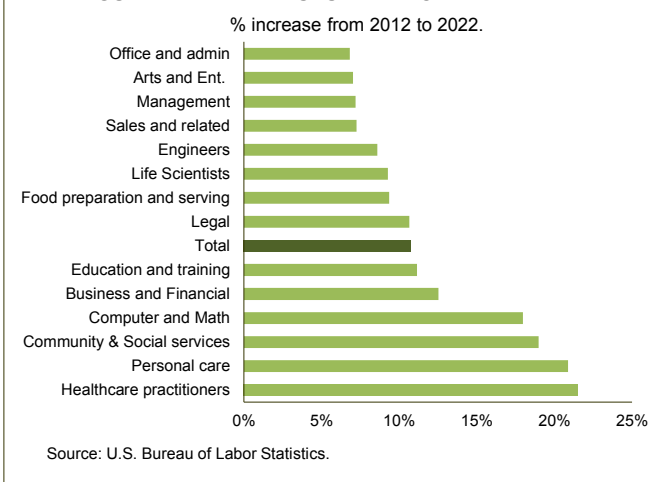
Of course, the figures above are not going to knock your socks off. Despite making strides in terms of their educational attainment, women remain significantly underrepresented in upper management ranks. Considering that women earn 46% of graduate degrees in business and 60% of all graduate and professional degrees, the pool of senior managerial talent is certainly deeper than the numbers suggest. For instance, within the accounting field, women make up 58% of all accountants and auditors. Yet, only one-fifth of partners at accounting firms are female.<sup>8</sup>

### The future economy and women: what lies ahead?

Labor market outcomes should continue to improve for women going forward. The fact that an increasing share of women are pursuing university degrees and other STEM occupations puts them on the right track to take advantage of future opportunities and wage gains in high-skilled jobs. Based on the Bureau of Labor Statistics occupational projections, jobs that typically require an MA degree for entry are expected to grow the fastest between now and 2022, followed by occupations with associate's and doctoral/professional educational requirement. Meanwhile, the slowest



**CHART 9: WOMEN ARE WELL-POSITIONED TO SUCCEED IN THE FUTURE LABOR MARKET**



pace of growth is expected to occur in occupations only requiring a high-school diploma.

Looking back, it is evident that this trend has already been in place over the last ten years. Employment among university graduates rose by 24% since 2004, with women accounting for 60% of the gain. Meanwhile employment increased by 20% among holders of associate degrees, and contracted outright for those who have below college-level education. Given these labor market and educational trends, the National Center for Educational Statistics projects that the share of college and university degrees conferred to women will rise another 1.5 percentage points over the next ten years to 60%.

In terms of occupational dynamics, the steady shift towards a service-oriented economy implies that the bulk of the future job creation will be happening within these industries. Already today, private service-sector industries account for 70% of the entire labor market, up nearly 10 percentage points from two decades ago. The ageing structure of the U.S. population will also contribute to greater demand for services. Unsurprisingly, healthcare practitioners and support workers will be some of the fastest growing occupations, contributing nearly one-fifth of all new jobs. Women already hold over 70% of all jobs in these two groups and are well positioned to take advantage of this expansion. More than half of these new positions will be high- and medium-paid occupations which require post-secondary education, such as physicians, medical specialists, and nurses. However, the rest will be relatively lower-paid health care support workers, such as healthcare aides and assistants. These too are overwhelmingly women. Nonetheless, given the rising

share of women pursuing medical and dental degrees, their share of employment in lower paying healthcare support occupations has been drifting lower as more men have entered the field. In fact, healthcare support occupations were one of only two occupational groups where male employment saw the fastest growth over the past ten years.

Healthcare is not the only sector where there will be significant opportunities for women. Over the past ten years, women have been gaining educational momentum in business disciplines, which makes them well-equipped to take advantage of new jobs in management, business and financial occupations. While, these will not be the fastest growing sectors overall, they will still churn out nearly 10% of all new jobs. Ditto for legal occupations and life & physical science occupations, where they've also gained significant ground over the past twenty years.

### Bottom line

Undoubtedly women have made great strides in terms of their educational achievement and labor market outcomes, and their advancement continues on both fronts. In terms of education, women are still flocking to campuses in increasing numbers. In addition to representing a majority of undergraduate students, women today are more likely than men to pursue degrees at graduate and professional schools. In the context of the ever-increasing educational requirement and the growing importance of high-skilled occupations, this trend of rising educational attainment among women is likely to continue going forward. This, in turn, bodes well for their career and earnings profiles – a change that is already evident in the labor market.

Of course, the advances on the job and education front have not been uniform. Women run the risk of missing out on some future opportunities in the STEM-related occupations, due to their under-representation in computer science and engineering, which together account for 80% of all STEM jobs. And, strides at the top of the educational and career ladder are certainly not fully captured in their ranks within senior and executive roles. All this goes to say, that while women are making it happen, their work is far from over.

*Beata Caranci*  
VP & Deputy Chief Economist

*Ksenia Bushmeneva*  
Economist

## References

1. The degrees included in our narrow definition of science and engineering are: Agriculture, Biological, Computer, Earth, Atmospheric and Ocean, Mathematics and Statistics, Physical Sciences (Physics, Astronomy, Chemistry, other), and all variants of engineering degrees
2. U.S. Census. "Disparities in STEM Employment by Sex, Race, and Hispanic Origin." <http://www.census.gov/prod/2013pubs/acs-24.pdf>
3. Survey results from the Center for Talent Innovation. [http://www.talentinnovation.org/\\_private/assets/Athena-2-PressRelease-CTI.pdf](http://www.talentinnovation.org/_private/assets/Athena-2-PressRelease-CTI.pdf)
4. Glass, Jennifer L., et al. "What's so special about STEM? A comparison of women's retention in STEM and professional occupations." *Social forces* 92.2 (2013): 723-756. <http://sf.oxfordjournals.org/content/92/2/723.short>
5. National Research Council. "Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty." (2010) [https://www.nap.edu/login.php?record\\_id=12062&page=http%3A%2F%2Fwww.nap.edu%2Fdownload.php%3Frecord\\_id%3D12062](https://www.nap.edu/login.php?record_id=12062&page=http%3A%2F%2Fwww.nap.edu%2Fdownload.php%3Frecord_id%3D12062)
6. Goulden, Marc et al. University of California, Berkeley and Center for American Progress. "Patching America's Leaky Pipeline in the Sciences" (2009). [http://www.law.berkeley.edu/files/Women\\_Sciences\\_Final\\_Copy.pdf](http://www.law.berkeley.edu/files/Women_Sciences_Final_Copy.pdf)
7. Wall Street Journal. "Good News for Women in Tech: Half of Fortune 10 CIOs are Women" (2014). <http://blogs.wsj.com/cio/2015/01/14/good-news-for-women-in-tech-half-of-fortune-10-cios-are-women/>
8. Moore, Scott et al. American Institute of CPAs. "Trends in the Supply of Accounting Graduates and the Demand for Public Accounting Recruits" (2011).

This report is provided by TD Economics. It is for informational and educational purposes only as of the date of writing, and may not be appropriate for other purposes. The views and opinions expressed may change at any time based on market or other conditions and may not come to pass. This material is not intended to be relied upon as investment advice or recommendations, does not constitute a solicitation to buy or sell securities and should not be considered specific legal, investment or tax advice. The report does not provide material information about the business and affairs of TD Bank Group and the members of TD Economics are not spokespersons for TD Bank Group with respect to its business and affairs. The information contained in this report has been drawn from sources believed to be reliable, but is not guaranteed to be accurate or complete. This report contains economic analysis and views, including about future economic and financial markets performance. These are based on certain assumptions and other factors, and are subject to inherent risks and uncertainties. The actual outcome may be materially different. The Toronto-Dominion Bank and its affiliates and related entities that comprise the TD Bank Group are not liable for any errors or omissions in the information, analysis or views contained in this report, or for any loss or damage suffered.