



Gender and racial differences in vocational education: an international perspective

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Abstract

Purpose – Seeks to examine the extent to which education systems around the world embrace vocational schooling and the degree to which exposure to vocational schooling differs by gender and race.

Design/methodology/approach – Uses distributional analysis applied to cross-country data from Unesco to examine shares of secondary school students enrolled in the vocational track, by gender. Also uses descriptive statistics based on US Department of Education data to examine fields of study within the vocational track.

Findings – The emphasis on vocational education and access to different types of training across demographic groups varies considerably around the world. European countries in particular, long known for their heavy emphasis on specialized vocational schooling, have relatively high vocational school shares in secondary school. At the other end of the distribution, almost 30 countries in the sample, most of them low-income, have vocational school shares below 4 percent. In the majority of countries, a higher share of male secondary school students enroll in the vocational track compared with female students. Latin American countries stand out for having a high female representation among vocational school students. In the USA, male students cluster in trade and industrial courses, while female students cluster in business preparation courses. Also, white students are relatively concentrated in the trades, black and Hispanic students cluster in business courses, and Asian students are concentrated in technical courses.

Originality/value – These stylized facts set the stage for new research on vocational education and for new policy initiatives that create new opportunities for specialization in vocational training.

Keywords Training, Further education, Apprenticeships, Technical training, Vocational training

Paper type Research paper

I. Introduction

Countries exhibit a wide variation in their emphasis on vocational education, vocational school models, and participation in vocational education across demographic groups. Factors such as the age at which vocational tracking begins, how students or trainees enroll in programs, the extent to which employers provide work-site training, and government influence and oversight all contribute to cross-country variation in vocational school outcomes. Vocational education and training can be defined rather broadly to include apprenticeships, on-the-job training, sectoral training institutions, vocational secondary schools, and vocational tracks within comprehensive secondary schools (Middleton *et al.*, 1993). Our objective is to show, using both descriptive analysis of cross-country education statistics as well as an overview of current debates in the literature, that gender and racial imbalances are



inherent features in the access to vocational training, areas of specialization within vocational education, and relative benefits from vocational schooling.

Unlike general academic schooling, vocational education is specifically geared toward entrance into the labor market, and as a result, demographic trends in vocational education tend to reflect those in the market. From the policy perspective, this objective of workforce preparation makes vocational training an apt vehicle for affecting change in the labor market (Carnoy, 1994). Policies that succeed in changing the gender and racial imbalances that exist in vocational training may carry over their effects as those trainees enter the workforce. This special issue covers major topics regarding gender and racial differences in vocational training, and provides perspective for researchers, educators, and policymakers.

The remaining articles in this special issue make important contributions to the literature on vocational education. While the body of research on vocational education is voluminous, topics related to gender and racial differences in vocational training have received less attention. For example, Lewis (1999) has pinpointed questions related to gender as an important area for further research in technical education, with special attention to gender-inclusive practices and incentives to make technology-related coursework and career tracks more appealing to women. Improved documentation on imbalances in access to training and types of training would help to inform more appropriate policies, as would more evidence on how the relative benefits for vocational schooling differ across demographic groups. This special issue addresses both of these questions in a global context and also evaluates policy reforms that aim to rectify inequitable access to vocational and technical training.

II. Distributional issues in vocational education globally

Even within developed and developing regions, countries demonstrate a wide variation in the extent to which education systems embrace vocational schooling and the degree to which men and women differ in their exposure to vocational schooling. To evaluate how much countries emphasize vocational school tracks in their secondary school systems, we constructed a cross-country sample of enrollment figures for total secondary schools (public and private together) and technical/vocational programs within secondary schools. Data are from the Unesco (2005) database for the academic year 2003-2004, or the closest year possible. For selection criteria, we included only those countries that reported both total secondary school enrollment and vocational track enrollment in secondary school. We dropped countries that did not report gender-disaggregated enrollments, and we dropped small countries with total secondary school enrollments less than 300,000 students[1]. For each country, we calculated the share of women in vocational tracks relative to the total number of women enrolled in secondary school, and similarly for men.

Results, found in Figures 1 and 2, indicate that vocational school shares vary considerably around the world. European countries in particular, long known for their heavy emphasis on specialized vocational schooling, tend to cluster at the tail of the distribution with higher vocational education shares. In Belgium and the UK, more than half of all students in secondary school are enrolled in the vocational track, with Australia and the Czech Republic not far behind. Reasons that these countries have such a high emphasis on vocational schooling include the large number of jobs that

Panel A: Women's Share Less than Men's Share

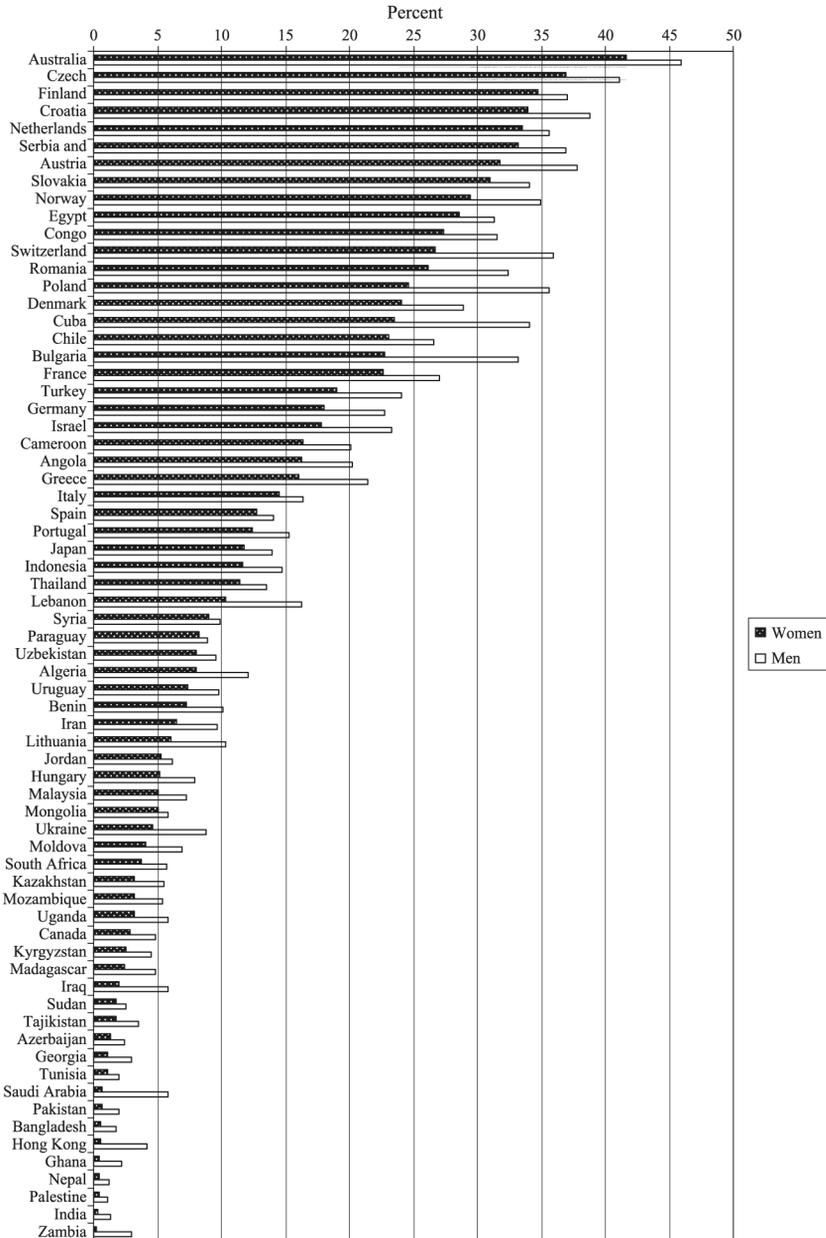
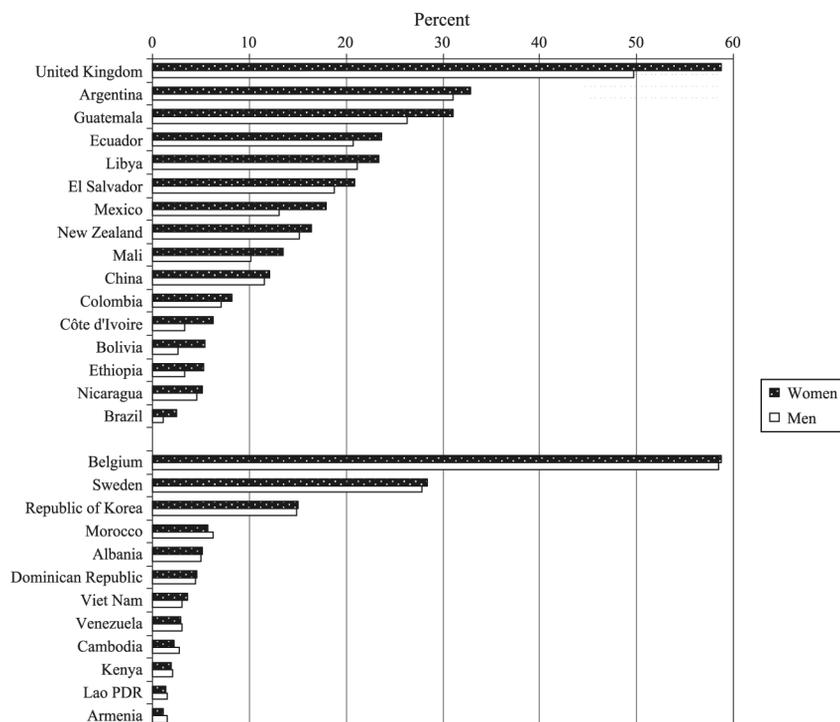


Figure 1.
Share of Vocational School
Enrollment in Secondary
School Enrollment, by
Gender

still do not require higher degrees, and the difficulty of students with lower class ranks to gain access to higher education (e.g. Keep and Mayhew, 2004). Transition to a market economy in the case of the Czech Republic has involved higher unemployment

Panel B: Women's Share Greater than or Similar to Men's Share



Note: For each gender, shares are calculated as the enrollment in technical/vocational programs in secondary schools relative to the enrollment in total secondary schools (public and private)

Source: UNESCO (2005)

Figure 2. Share of Vocational School Enrollment in Secondary School Enrollment, by Gender

and the use of vocational education as a cost-effective means of temporarily keeping students out of the labor market (Gill *et al.*, 1999).

Other economies with fairly high vocational school shares, including South Korea, Taiwan, and Japan, have had strong government intervention in education in order to address pressures caused by a lack of skilled workers (Gill *et al.*, 1999). Strict quotas and entrance exams have limited university spots, and governments have invested heavily in the vocational school system (Tilak, 2003). At the other end of the distribution, almost 30 countries in the sample have vocational school shares below four percent. With the exception of Canada, this group consists of less developed countries; and most of them, including Nepal, Bangladesh, Zambia, and Sudan, are quite poor. This clustering of poorer countries among those with low vocational school shares is consistent with arguments in Bertocchi and Spagat (2004) that countries in the early stages of development have a small vocational sector, but as their education systems evolve and respond to sociopolitical factors, the vocational education system grows and serves a growing share of the population.

Another interesting point from Figure 1 and Figure 2 is that in the majority of countries, a higher share of male secondary school students are enrolled in vocational school tracks compared to the share for female students. Gender differences in the vocational school shares can be quite large, with some of the highest spreads in Europe. Poland, Bulgaria, and Switzerland all have male vocational school shares that exceed those of females by at least nine percentage points, and Romania and Austria come close behind with male shares exceeding female shares by six percentage shares. In a smaller group of countries, women's vocational school shares exceed those of men, by as much as nine percentage points in the UK and five percentage points in Guatemala and Mexico.

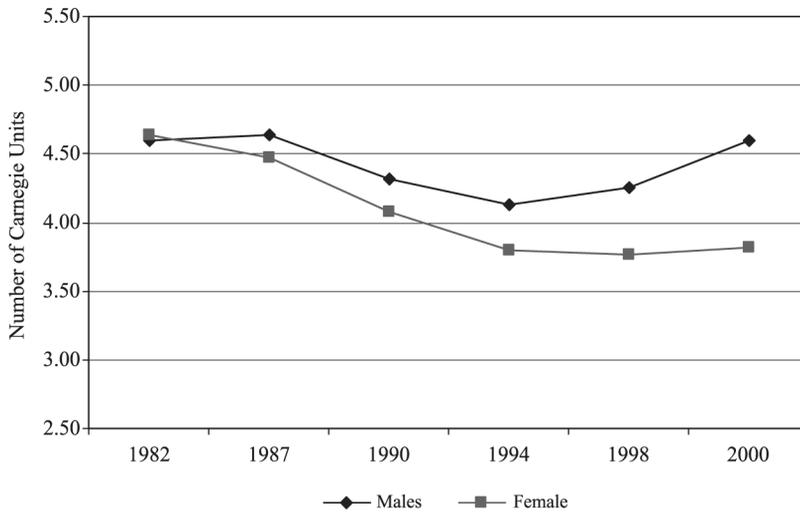
Closely related to these distributional patterns by gender, countries in which women's education distributions favor vocational education, compared to men also exhibit a disproportionately high female composition among vocational school enrollees. In Brazil, almost 70 percent of vocational track students are female, followed closely by Bolivia with 66 percent of vocational school students who are female. Interestingly, Latin American countries make up seven of the top ten countries in a ranking of the percent female of vocational school students. Mexico, Nicaragua, Dominican Republic, Colombia, and Ecuador also rank among the top ten countries with the highest female composition in vocational school.

Information about the USA is not included in the Unesco database, but information on vocational education patterns by gender, race, and ethnicity can be found in the US Department of Education (2004). Using this data, Figure 3 presents trends in the average number of Carnegie units earned by public high schools students from 1982 to 2000 in vocational education, including students from both academic and vocational high schools. A Carnegie unit is a measurement standard representing one credit for the completion of a one-year course. As shown in Panel A, the gap between male and female students in vocational education credits earned has increased considerably over time. In 1982, male and female students earned roughly the same number of vocational education credits (4.60 for males and 4.64 for females). Yet by the year 2000, male graduates earned an average of 4.60 Carnegie Units while females earned 3.82. Although both sexes exhibited declining participation in vocational education from the mid-1980s to the mid-1990s, by 2000 only the average male credits had returned to levels seen in the early 1980s.

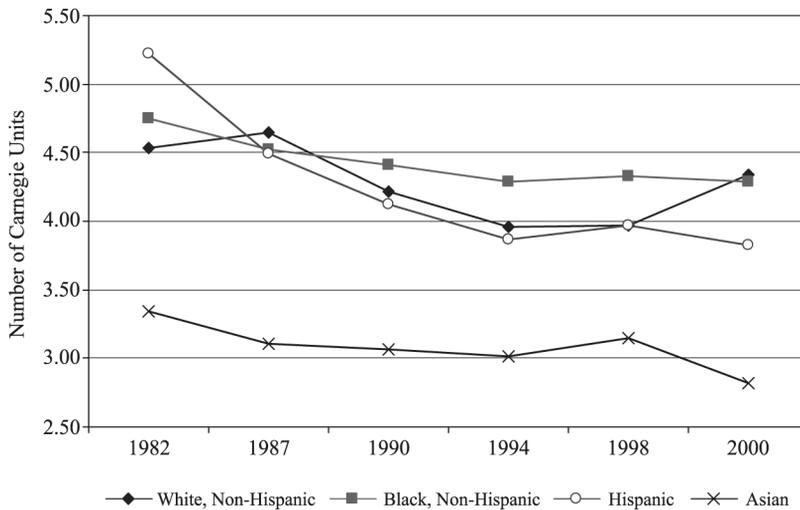
As reported in Panel B, the most pronounced difference across racial and ethnic groups is observed between Asian students and other groups. In all years, students of Asian backgrounds report considerably lower average Carnegie units for vocational school courses compared to other students, with a particularly sharp dip toward the end of the period. In the 1990s, black non-Hispanic students reported the largest average number of vocational education credits, but the differences between black and white students disappeared by the year 2000.

Gender differences in vocational education are pronounced not only in terms of participation, but also in terms of the distribution of types of study within vocational education. Figure 4 illustrates different categories of fields of study and reports, for high school graduates in the year 2000, the share of Carnegie credits taken in each field relative to total Carnegie credits for each demographic group. Panel A clearly shows that the biggest gender differences occur for the trades and industrial courses, which are clearly dominated by male students, and for business preparation courses, which are

Panel A: Average Number of Credits by Gender



Panel B: Average Number of Credits by Race/Ethnicity



Note: The Carnegie unit is a measurement standard representing one credit for the completion of a one-year course

Source: U.S. Department of Education (2004)

Figure 3.
Credits Earned by US High School Graduates in Vocational Education Courses

predominantly female. Racial and ethnic patterns also prevail, as shown in Panel B. White students tend to cluster in the trades, while black and Hispanic students are concentrated in business courses, and Asian students are clustered in technical courses.

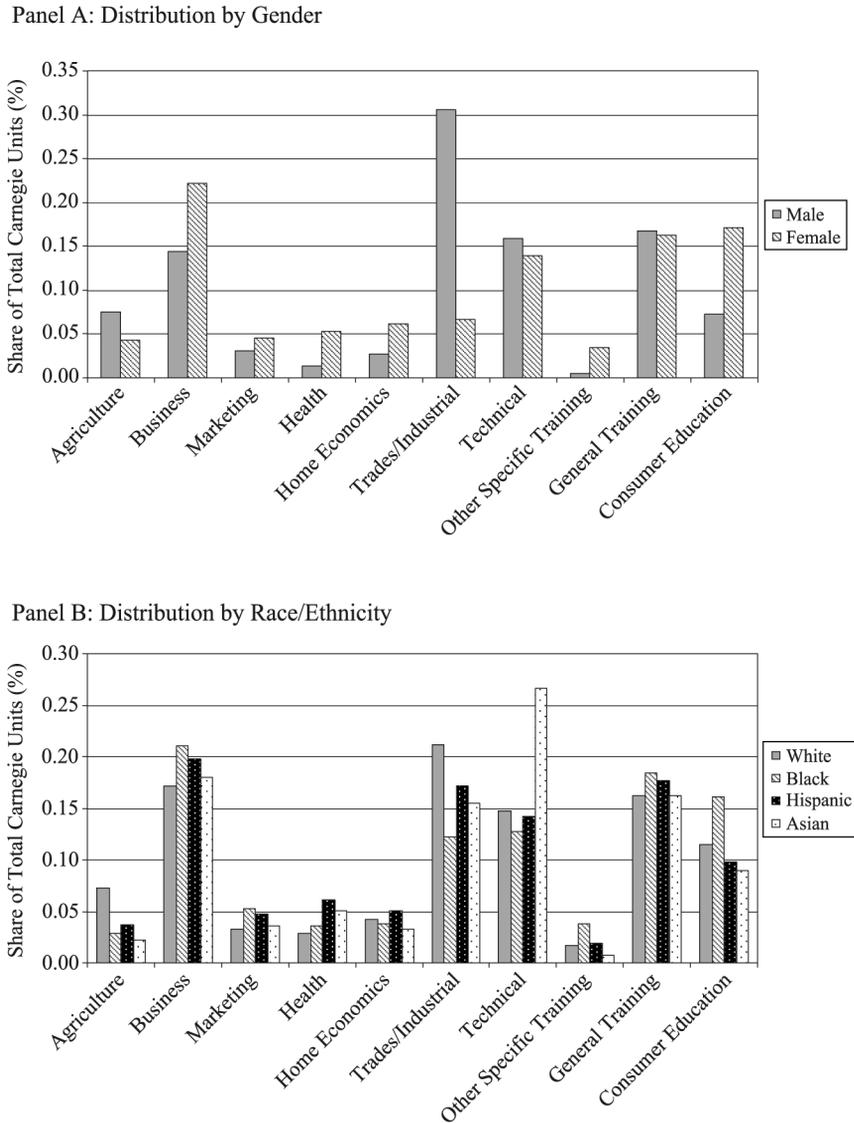


Figure 4.
Distribution of Vocational
Education Credits by
Discipline in the USA,
2000

Source: U.S. Department of Education (2004)

International evidence on racial, ethnic, and class differences in vocational education is quite limited. What evidence there is suggests that access to vocational education and training is unevenly distributed across race, ethnicity, and class, with public sector involvement in the provision of vocational education resulting in unequal and inefficient outcomes (Carnoy, 1994). For example, in countries such as Germany where the educational track in secondary school is determined when students are still fairly

young, parental influence can play an important role in the education direction of a new secondary school enrollee. Research in Dustmann (2004) for Germany suggests that parents of working class background are more likely to direct their children toward lower tracks in secondary school and earlier entry into the labor market. Further, Ordovensky and Hagy (1998) find ethnic differences access to vocational schooling in the USA, with first-generation black immigrants more likely to enroll in private vocational schools and Asian immigrants more likely to enroll in community colleges compared to the native-born population. Although a neoclassical framework would posit free choice as the reason for these gender and racial/ethnic differences, this explanation ignores continued obstacles that women and minorities face, including social norms, discrimination, and structural barriers, as they enter the vocational track (Neuman and Ziderman, 2003).

Workforce development and technical training in the USA take place not only in the vocational track of high school, but also in the form of apprenticeships. Apprenticeships in the trades show a particularly high degree of segregation by gender. In this issue, Berik and Bilginsoy examine women apprentices in the USA, overall, and by race and ethnic groups, in the male-dominated field of construction trades. This field is an example of one where several decades of policy initiatives have failed to make significant changes in women's participation. Using individual-level data from the Registered Apprenticeship Information System, the authors examine the importance of the structured apprenticeship for completion of training, particularly for White, Black and Latina women. The research demonstrates that while women's completion rates were relatively low, enrollment in union-contractor joint programs is associated with greater representation among new trainees, the odds are higher for completing the apprenticeship program, and better chances of obtaining a high-skill construction job. This union impact on women's representation is greatest for black women and lowest for white women.

Contributing to more understanding on the distribution of vocational training across ethnicity and gender, Colding in this issue takes a broad look at Denmark's vocational upper secondary schooling. The study focuses on differences between the experiences of natives and children of immigrants in Denmark and finds that family background characteristics cannot explain the relatively higher dropout rate for children of immigrants compared to natives. The author also finds that children of immigrants often chose vocational fields with higher overall dropout rates. A key policy recommendation centers on providing better information to both immigrant parents and their children.

III. Relative benefits for vocational school by gender and race

The debate on whether or not the benefits of specialized vocational schooling exceed those of general academic schooling has gone on for several decades. In cost benefit analyses, social rates of return to vocational schooling are generally lower than rates of return to general schooling. In a frequently cited review of this work, Psacharopoulos (1994) calculates an average return to public investment in general secondary schooling of 15.5 percent for a sample of 25 countries. This average exceeds the average for vocational schooling of 10.9 percent. These results lend weight to the argument that the social gains from workers with vocational education may be too low to justify the considerable costs to governments of such investments. Critics argue that the training students receive at vocational school is specific to a certain occupation,

while the more general skills that students gain from academic secondary schooling can be transferred across occupations.

Another drawback is that students with a vocational school background often have more difficulty getting accepted into a four-year college or university. Hence, critics of vocational education call for a generalization of vocational school curricula, with vocational training provided by employers directly in the workplace. A broader range of academic options available to students who graduate from the vocational track in secondary school would also help to alleviate problems with the vocational school system (e.g. Gill *et al.*, 1999). An alternative is for countries to develop their apprenticeship systems, with the argument that apprenticeships help to speed the transition from graduation to finding a job and help to boost training in the workplace (e.g. Bonnal *et al.*, 2002).

On the other side of the fence, those in favor of vocational school argue that vocational school graduates with job-specific skills are potentially more productive in their new jobs and ready to perform the tasks for which they have received training. Vocational education can serve as a feasible and effective means for upgrading the skill-set of a workforce and raising the earnings potential of younger cohorts. The conventional wisdom on social rates of return is also disputed. In particular, Bennell (1996) shows that the majority of cost-benefit analyses underlying the conventional wisdom find social rates of return for general secondary schooling that are not significantly higher than rates for vocational education. Further, a number of researchers in this area argue that conventional cost-benefit analyses of in-school vocational training are conducted in too narrow a framework. Widening the lens to examine, for instance, the earnings of vocational school graduates who work in occupations that are matched to their training, yields results showing favorable earnings premiums for vocational school compared to general academic schooling (Neuman and Ziderman, 1991).

Relative earnings premiums for vocational and general schooling are also disputed. A common approach is to estimate an earnings function that includes dummy variables for different levels of schooling among the right-hand side variables[2]. The coefficient on the dummy for vocational school represents the earnings premium relative to the schooling level represented by the excluded dummy variable. Some studies have found relatively high premiums for vocational schooling compared to general schooling[3]. Yet others find either higher premiums for academic backgrounds or no significant differences[4].

Although numerous studies have found that women's earnings premiums for higher education exceed those of men, the evidence on gender differences in the benefits from vocational education relative to general academic schooling is more limited and inconclusive[5]. For example, Horowitz and Schenzler (1999) find that both women and men in Suriname benefit from higher wage premiums for general schooling compared to vocational and technical education. While Deolalikar (1993) finds that wage premiums for vocational secondary education in Indonesia are higher for women than men, results in Rodgers *et al.* (2006) for Taiwan indicate that only men have earned significantly higher premiums from vocational school compared to general secondary school. Furthermore, women cluster in a set of vocational tracks (secretarial and clerical) that yield an earnings penalty compared to general secondary school, while men are concentrated in technical vocational tracks that yield a relative earnings premium. These differential rates of return by major area of study are consistent with

previous evidence for the USA that differences in earnings premiums for the area of study contribute to subsequent wage disparities across gender (Blau and Kahn, 2000; Eide, 1994; Gill and Leigh, 2000).

Contributing to this debate, Sakellariou in this issue uses quantile analysis to examine the gender differences in earnings premiums from vocational education. Singapore's well-developed system of vocational education makes it an ideal country for a comparative study. While the standard ordinary least squares regression approach yields estimates that are performed at the mean of the conditional earnings distribution, quantile regression techniques can produce estimates of the returns to education across the full distribution of earnings. The results indicate that women who have completed vocational education at the secondary level have done well compared to women with general academic schooling in terms of higher employment rates and a smaller gender earnings gap. Quantile regression results indicate that unlike general academic education, rates of return for vocational education are fairly flat across quantiles, suggesting that vocational education is associated with less inequality in the income distribution compared to general schooling.

IV. Policy reform initiatives

Although "manpower planning" types of policies that encourage investment in vocational schooling are fairly common, especially in developing countries, policies to correct gender and racial imbalances in vocational education are less prevalent. Several notable exceptions in the USA and Europe involve the creation of new policies seeking to remedy inequitable access to vocational training and imbalances in majors within vocational schools. For example, research for France points to the importance of nontraditional training programs, which involves training for males or females in areas where they have been traditionally underrepresented. These programs have documented benefits for women as they transition from school to work (Couppie and Epiphane, 2001). In the UK, a nontraditional training initiative was created in the form of the "Modern Apprenticeship," with the stated priority of raising men's and women's representation in nontraditional occupations. This program has also come under scrutiny for its lack of effectiveness. Miller (2005) points to a number of barriers faced by organizations that are trying to encourage young women and men to choose nontraditional fields for their apprenticeships. Similarly, Fuller, Beck and Unwin (2005) argue that the Modern Apprenticeship program has failed because of engrained attitudes and social norms about what constitutes male and female occupations. The findings support the idea of a more holistic approach to reducing sex segregation in apprenticeships, vocational training, and occupations.

Two articles in this issue contribute to a better understanding of effective policy initiatives in the USA. Work by Hebbbar examines the impact of vocational training on women enrolled in two nontraditional areas: engineering and computer programming. The data come from New Jersey's unique Individual Training Grant Program, which uses a voucher-based system to let individuals who are eligible for Unemployment Insurance choose from training programs offered by 250 state-approved schools. Results based on a quasi-experimental approach point to positive impacts of training on re-employment chances as well as wage recovery. Favorable results suggest that other states and countries may be served well by experimenting with a similarly cutting-edge program.

Also covering the USA, the Eardley and Manvell article uses enrollment data in secondary schools to document a high degree of sex segregation in career and technical education courses. The authors argue that sex discrimination has had a major influence on the low enrollment of female students in nontraditional courses. Enactment and enforcement of state-level laws can help to reduce such discrimination and improve the participation of female students in nontraditional training. At the national level, an important policy initiative involves reauthorization of the Carl D. Perkins Vocational and Applied Technical Education Act. The 1998 iteration of this act includes a component requiring schools to report the number of students enrolled in nontraditional courses. However, the success of this policy is subject to criticism, especially since it does not provide students in nontraditional courses with enforceable standards on the elimination of sex discrimination. In addition, Eardley and Manvell argue that the Department of Education has not stringently enforced the reporting requirements on enrollments in nontraditional courses.

In closing, this special issue seeks to spark new ideas for scholars and practitioners as they consider how to measure and remedy differences across gender, race, and ethnicity in vocational education. With increasing economic integration globally, economic transition can entail adjustment and hardships for those whose jobs are at risk and those seeking jobs. Workforce development, technical training, and skills acquisitions have taken center stage in policy discussions surrounding these adjustments and the impact on workers. The growing body of evidence discussed in this review, combined with the evidence of substantial differences by race and gender within and across countries, make clear a number of policy priorities that contribute to a more inclusive and effective approach to vocational education. In particular, the increasing participation of women and minorities in vocational education tracks that prepare them for rewarding careers requires substantial changes in the enforcement of equal opportunity types of legislation, improved guidance counseling at the secondary school level, the end of sexual harassment in vocational schools and training sites, greater choice in countries with education systems based heavily on quotas and standardized tests, and greater incentives for enrollment and retention in nontraditional fields in the vocational track.

Notes

1. We also dropped Peru, Yemen, and Belarus, which had vocational school shares that were less than 1 percent for both men and women.
2. Since students in the vocational track can have the same years of education as students in the general secondary school track who do not go to college, dummy variables for different levels of schooling offer a more accurate estimate of the earnings premiums for vocational school.
3. See, for example, Moenjok and Worswick (2003) for Thailand.
4. See, for example, Gindling *et al.*(1995) for Taiwan, and Dearden *et al.*(2002) for the UK
5. Studies showing greater female earnings premiums for higher education compared to those of males include Psacharopoulos (1994), Trostel *et al.* (2002), Dougherty (2003), and Psacharopoulos and Patrinos (2004).

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