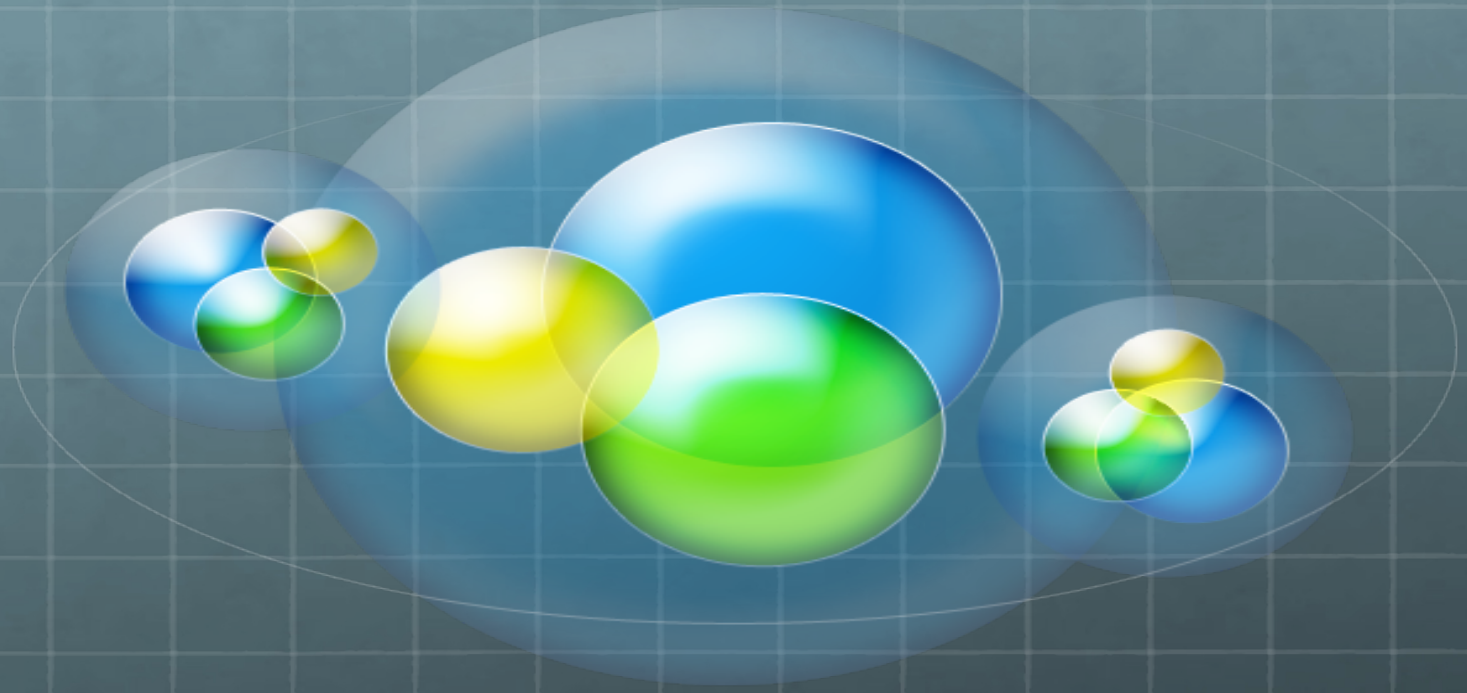

Models of Vocational Education and the Brazilian context

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Arguments for Vocational Education

- Fifty years ago, Sociologist Philip Foster wrote that all education is vocational—its design just depends for which vocation.
- It is argued that many students are either not interested in or not very good at academic subjects. By adolescence, they prefer to drop out of school rather than to continue to suffer.
- It is also argued that many technically trained workers are needed in the labor market, and that secondary schooling should prepare them for jobs.
- Vocational secondary schooling might engage such students to graduate and also to learn skills needed in the labor market.

Downsides of Vocational secondary Education

- Students who fall into the “disengaged” or “not academically oriented” categories are much more likely to come from lower than from higher SES families.
- Even if academically able, many lower SES students are seen by their families and school personnel as better “fitting into” vocational education-type careers, and so are pushed in that career direction. There is massive evidence that lower social class, lower academic-scoring youth are much more likely to attend VET schools or take VET credits than their higher social class, higher scoring counterparts.
- Vocational education becomes associated with “second class” education.
- Good vocational education can be expensive because of the expensive technology needed in labs to train students. Few vocational schools have these resources, so produce low-quality training.

The German Model versus the U.S. Model of Vocational education

- Many countries in Europe have vocational education options after the 9th grade of secondary education.
- The "dual system" German model, also used in Austria, Switzerland, and in modified form in Denmark, Holland, Czech Rep., Hungary, and Poland, combines vocational/academic education with apprenticeships in firms. The firm pays the student a low salary for several years while providing work experience. The student is then certified as skilled in a particular trade and seeks work in that trade.
- The dual system depends close formal relationships and trust between the State (the provider of vocational education and certifier of skills), private industry, which agree to hire vocational school students and give them training, and the labor unions, which agree to allow apprentices to work for much lower salaries than regular employees.

The German Model versus the U.S. Model of Vocational education

- At the other end of the spectrum, the U.S. and many other countries do not have a separate system of secondary vocational education that parallels academic education.
- In comprehensive secondary schools, vocational courses of study are possible, although they have declined as an ever higher proportion of students goes on to some form of post-secondary education.
- There has been a shift from vocational education (VE) to career technical education (CTE) in some U.S. high schools as a way to prepare students for post-secondary education and careers at the same time. Students take a number of practical courses while fulfilling the college entrance course requirements.
- This contributes to students' job readiness while also motivating them to complete secondary school and go on to college. The programs have been relatively successful.
- But most US high schools do not have such programs.

Comparing the Models

- The German model is rooted in the neo-corporatist framework of central and northern European society. The model is also consistent with Soviet centralized planning, in which students can be prepared for jobs and guaranteed to get those jobs. It also requires decisions by students at an early age in choosing lifetime careers.
- That model also is based on a “risk averse” labor market, in which individuals count on lifetime jobs, employees are protected by tight regulations, and unions are powerful actors in state economic decision-making.
- The US model is much more “risk preferring, “ both on the part of employers, who have greater flexibility in hiring and firing workers, and by workers, who may not decide what kind of work they want to do before working in several different jobs.
- Students therefore do not have to choose careers early, and they can be more flexible in choosing their career path as they become more familiar with the possibilities in the labor market and their own interests. This requires more risk-taking, but may result in greater job satisfaction--or maybe not.

Most countries provide VET in separate schools & the decision on VET/academic is in 8th or 9th grade

- For example, in Latin America, Chile and Mexico track a high percentage of lower-social class students into vocational secondary schools based on their lower academic performance at the end of middle school.
- About 10% of VET secondary students in Chile attend "select" VET schools—these students are in the upper 15% of national academic performance on the national 10th grade test, yet because of the VET course requirements in 11th and 12th grades, end up scoring much lower on the university entrance exam, and therefore are less likely to enter university than their 10th grade scores would predict.
- Thus, many young people's educational opportunities are defined before they are able to show academic or vocational talents that would alter their educational and work careers.

Comparing the Effectiveness of Achievement Outcomes for VET and Academic Schooling

- Assessing whether VET is more or less successful than traditional academic schooling in producing achievement gains for "similar" students faces the same methodological issues as any other evaluation of different educational treatments applied to students that are, on average, not the same—they are not randomly assigned to the two tracks.
- Hanushek/Woessmann (2006) and Jakubowski (2010) use a difference-in differences approach applied to 4th grade TIMSS 2003 and PIRLS 2001 data and 15 year-olds performance on PISA in 2000 and 2003 across countries, testing whether countries that separate students into VET and academic tracks before 15 years-old have higher or lower gains between their students' primary school performance (where students are not separated into different tracks) and the secondary school performance.
- Hanushek and Woessmann (2006) claimed that there was no gain in mean performance from tracking and that tracking increased the inequality of educational outcomes at the secondary level.
- Jakubowski (2010) confirmed that there was a negative correlation between tracking and mean performance at the secondary level controlling for earlier performance. Yet, he found that this negative effect came mainly from former communist countries in Eastern Europe, and that there was no evidence of a negative effect in other countries.

Causal analysis of gains in academic achievement in VET and Academic schools I

- One way to approach causal estimates of differences in gain scores between VET and academic secondary school students is Propensity Score Matching (Rosenbaum and Rubin, 1983), which compares students similarly likely to attend vocational and academic schools after 9th grade.
- Farias (2012) employed this method to estimate the effect of attending vocational secondary school versus academic secondary school in Chile.
- His results suggest that by the end of 12th grade, the average gap on the university entrance test is significantly negative for students who attended VET schools, and the gap increases greatly the higher the student's 8th grade test score—indeed, the gap is insignificant or even positive for the lowest 8th grade test scoring students.
- Further, similar students enrolled in VET schools are much less likely to enroll in bachelor's degree higher education, and this gap increases with a student's 8th grade test score.

Causal analysis of gains in academic achievement in VET and Academic schools II

- Loyalka et al (2016) drew a large sample of vocational schools that offered a computer major and large sample of non-elite academic high schools (which all teach some computer skills) in two Chinese provinces and a total of seven prefectures within those two provinces.
- Their outcome variables were whether the student dropped out in that period, and gains during an academic year on math and computer skills tests and they used an IV approach and a coarsened exact matching (CEM) analysis similar to PSM.
- The results of these two approaches show that VETstudents in China are somewhat more likely to drop out, that VET students decline in math skills relative to academic high school students by a statistically significant 0.3-0.4 SD, and that the VET students did not make significantly different gains in computer skills compared to academic high school students.
- For low ability students the outcomes are even worse on all three outcomes if they attend a vocational high school than for average ability students.

Causal analysis of gains in academic achievement in VET and Academic schools III

- In a final example, Kuzmina and Carnoy (2016) exploit the fact that in the PISA 2012 survey of 15 year-olds, not all students are in the same grade, so it is possible in several countries (Austria, Croatia, and Hungary) with early tracking systems (after 8th grade) to compare the gain scores between VET and academic school students.
- They use an instrumental variable strategy (IV) based on a "fuzzy" regression discontinuity—namely that each of the three countries in the study had a fairly strict age cutoff to determine when students were old enough to attend primary school. So they compared VET students on either side of the cut-off with general track students on either side of the cut-off.
- In only one country, Austria, do the IV results show consistently higher test score gains in the general track than in the vocational track—Austria is the country with the most work-based VET (dual system).

What about achievement gains for VET tracks in Comprehensive High schools

- Chmielewski (2014) correctly observes that U.S. course-by-course tracking within schools may not be any more flexible system as far as life chances are concerned than tracking students into separate VET and academic secondary schools.
- She also found that although course-by-course tracking is less social class segregated than tracking were VET students attend different schools, the math achievement gaps between tracks do not differ dramatically except between low and middle tracks, where the gap is larger for academic/vocational streaming.
- Nevertheless, Chmielewski's research does not control in any way for measures of earlier academic ability, so that her coefficients could be considerably biased.

Labor Market Outcomes of Vocational and Academic Education Graduates

- The main arguments concerning the relative benefits of vocational versus academic/general education are (1) that vocational skills enhance relative short-term employment earnings and (2) that general skills enhance relative long-term employment and earnings.
- A number of individual country and cross-country studies confirm that both the arguments are correct. For example Hanushek et al (2017) found consistent patterns for both employment and earnings supporting the argument that vocational education graduates had higher employment rates and earnings at earlier ages and that his advantage disappeared and turned negative as individuals reached middle age.
- Brunello and Rocco (2015) used PIAAC data and propensity score matching to reduce bias in the estimated effect of education type and found that for males with completed secondary education, there was no significant difference in earnings and that for females, those who attended academic schooling earned about 4-5% more. The differences were much larger in favor of academic education at the post-secondary level, with adults who had taken academic education earning about 20% more—both males and females.

Summing up

- VET students tend to be more male, lower SES, and have lower academic achievement levels than general secondary school students.
- There is mixed evidence whether such lower achieving students benefit from higher academic gains when they attend VET schools or tracks within comprehensive high schools, but there is evidence that higher-achieving students in VET schools may suffer from lower gains and reduced access to higher education.
- Attending VET does provide higher levels of employment and earnings in the short run, but has negative effects on both in the longer run. This is not the case if VET secondary education reduces the probability of going on to higher education.

Which is the most appropriate model for Brazil

- Our analysis suggests that career technical education as a track within comprehensive high schools may be a good option for the Brazilian context. mainly because Brazil does not have he proper governance/political structure to implement the dual system model, and because it would end up assigning many academically talented low-income young Brazilians to vocational schools and factory jobs, exacerbating already high income inequality.
- The CTE model would have the advantage of preparing less academically inclined young Brazilians for careers while motivating them to complete their academic requirements for university. They may choose to work immediately or to take the ENEM and continue on to university.
- It would reduce the risk of losing many young people from low-income background to early assignment in vocational schools or vocational tracks in schools.
- That model is also more consistent with the Brazilian labor market, which is more “flexible” than most European markets, and, given the opportunity to choose to take the ENEM and attend university, would favor longer-run earnings and employment levels for students who might initially think that they are VET-oriented but change their minds.