

An Education Freedom Index: Why, Key Determinants, Component Weights, and Trade-offs

JOHN MERRIFIELD

University of Texas at San Antonio, San Antonio, Texas, USA

Freedom of any kind has intrinsic value, and education freedom is controversial, in need of empirical assessment of possible and likely trade-offs between freedom from state control and social goals such as equity and cohesion. Without a reasonable empirical measure of education freedom we can only cite the controversies and choose sides. The growing interest in likely effects of new school system governance structures, especially those that promise increased competition in school systems, would benefit from an objective, quantitative assessment of education freedom, a key element of competitiveness. The key institutional factors that this article measures and combines into an education freedom index are entry barriers, price control, opportunity to specialize (product differentiation), uncertainty about the future scope of the market, and availability of information. Quantification facilitates discussion of the key factors' relative importance, the main components of each, and potential factor interdependence. The formulation of a numerical index raises issues such as the conflicting objectives of index simplicity versus index reality, including proper sensitivity to all of the factors that would theoretically affect the level of freedom and competition, and the nature of market forces and other factors that would dictate schooling practices in the absence of regulation or direct state production. Likewise, the desire to maximize the empirical basis of index components, and to minimize the role

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Address correspondence to John Merrifield, University of Texas at San Antonio, 501 W. Durango Boulevard, San Antonio, TX 78207, USA. E-mail: john.merrifield@utsa.edu

of subjective judgment, weighs heavily in the creation of the index demonstrated with data for 2 Canadian provinces.

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“When you can measure what you are speaking about, and express it in numbers, you know something about it. But when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science, whatever the matter may be.”

—Lord Kelvin, 19th-century British physicist
(PLA, Vol. 1, “Electrical Units of Measurement,” 1883-05-03)

“In my youth it was said that what was too silly to be said may be sung. In modern economics it may be put into mathematics.”

—Ronald Coase (1988), Nobel Laureate

INTRODUCTION AND OVERVIEW

Professor Ronald Coase and Lord Kelvin are both correct, which exemplifies President Harry Truman’s famous ad for a one-handed economist. In this case, it means that measurement entails controversy, which President Truman didn’t want from his economic advisors. On the one hand, the measurement process highlights significant measurement and policy issues, including interdependence of some key factors and controversy about their relative importance. Discussion of how to measure and weight key factors can greatly elevate education reform debates, as well as the centuries-old philosophical debates about the potential costs and benefits of state intervention in decision making about schooling. Publication of credible freedom index numbers may help policymakers see the light and reform their policies or feel the heat from failure to do so. On the other hand, stretching underlying data and theories, or the resulting calculations, beyond the information they actually contain can yield things too silly to be said.

Education freedom is an important subject because liberty has intrinsic value, because deregulation is controversial, and because there is a significant historical correlation between an abstract sense of less state intervention and academic achievement (Coulson, 1999). Coulson (2006) and Greene (2002) found a positive correlation between test scores and their measures of market influence or increased autonomy in the production or purchase of schooling services. Moving from an abstract sense of freedom

from institutional constraints (state control) on what school operators can offer parents to a sound basis for measurement facilitates discussion and critical examination of the key aspects of freedom and thus a cost/benefit assessment of their absence/presence. Reduced state control does not mean reduced control. It means a change in the nature of constraints on what schools will do, for better or worse. The effects of changes in subcomponents of the education freedom index (EFI) can be analyzed separately to argue that some kinds of freedom are beneficial, whereas others cost more than their intrinsic and substantive worth.¹

Because *education freedom* means the absence of state influence or outright control of schooling choices,² and access to the choices (*freedom to*), greater freedom forces greater reliance on civil society and market accountability to influence schooling practices. Therefore, efforts to measure education freedom from state constraints are germane to school reform and economic development discussions in several countries. Plank and Sykes (2003) found that school system reform is a high priority in much of the world and that reduced central control and greater market accountability enjoy widespread interest. Thus, a basis for empirical assessment and optimization of the central control—market accountability mix is needed.

The proposed EFI quantifies absolute (0–100 scale) and relative (by rankings) private autonomy and market accountability in jurisdictions primarily responsible for primary and secondary education (K–12) policy. A multicountry EFI-based ranking would list a mix of states (e.g., the United States), provinces (e.g., Canada), and countries.

Note that this measurement exercise is just a first step in a collaborative intellectual journey. For example, statistical analysis-based differential factor weighting is beyond the scope of this effort to establish and measure the critical factors. Likewise, widespread estimation of the EFI is premature. Widespread estimation should follow discussion, ratification, and refinement of the foregoing assessment of the key EFI components.

Like the Fraser Institute's economic freedom index, the proposed EFI aims to “measure the degree to which the policies and institutions of countries are supportive” (Gwartney & Lawson, 2004, p. 3) of freedom (from and to) without judgment of the relative merits of sometimes competing effects of the policies and institutions that convey or deny freedom. So, for example, changes in the EFI can be used that would result from keeping campaign promises to assess the empirical significance of the promises. For example, a candidate may make sweeping promises about “opening up the system” or be condemned for proposing devastating restrictions, but the proposal might only slightly change the EFI.

Reality lags policy changes, so the EFI would reflect changed freedom to do things before the effects become fully evident. A market activity index (e.g., Coulson, 2006) should converge with the policy-based EFI. The rate of

convergence of reality and conditions expected from policy changes would be of considerable interest to researchers.

The next section provides context by examining the controversy surrounding freedom of choice in K–12 education and by discussing other prominent freedom indices. The third section describes the key elements of education freedom. The remaining sections discuss the specific EFI component determinants, outline key research issues, and offer some preliminary measurement approaches for the component weights. The equations and specific survey issues appear in Appendix A and B. Data from two Canadian provinces demonstrate the calculation of the EFI components and the EFI's sensitivity to the alternate weighting assumptions.

LITERATURE REVIEW, INCLUDING RELATED INDICES

Debate of what *education freedom* means, and its significance to the likely outcomes of primary and secondary (K–12) education, has a long history that dates in print at least as far back as Adam Smith's (1776/1976) famous *Wealth of Nations*. Numerous authors cited by Tooley (2008) argued for state funding, regulation, or direct provision of primary and secondary schooling. Scholars such as Mark Blaug (Blaug, 1970), Ben Levin (Levin, 2009; Levin & Young, 2000), Henry Levin (Levin, 1991), Mill (19th century cited by Tooley, 2008), and Burton Weisbrod (Weisbrod, 1962) have argued that societal objectives, such as equity and social cohesion (common values, commitment to democracy) and likely reductions in crime and improved economic growth, are sufficiently compelling to justify state intervention; that is, some sacrifice of freedom; that an EFI below 100 is optimal. Even classical liberal³ Milton Friedman (Friedman, 1962) agreed that there was a solid case for some intervention through funding and regulation, but not state production. Through the EFI, or its subcomponents, we can empirically test the hypotheses implied earlier.

The need for intervention was virtually “accepted wisdom” (Tooley, 2008, p. 240) until E. G. West and James Tooley examined the prointervention arguments and found ample basis to question some of the accepted wisdom, and to pursue evidence (Tooley, 2000; West, 1994). After reading West's (1994) attacks on the case for intervention, Friedman dropped his support for intervention (Tooley, 2008, p 242). The development of the proposed EFI was driven by those major controversies in order to help answer Professor West's call for evidence germane to the longstanding assertions about education freedom's virtues and dangers. Without a reasonable measure of education freedom, we can only cite the controversies and choose sides.

Already, several freedom indices have dealt with the measurement challenges to provide an empirical assessment of economic freedom, political freedom, and education freedom. There are four economic and political

freedom indices and four education freedom indices. The proposed EFI is a fifth EFI.

The Economic and Political Freedom Indices

Freedom House assigns the same weight to each component of the political rights' score, and it assigns a civil liberties' score that equally decide the label (free, partly free, not free) attached to each country. With one exception, the political rights' and civil liberties' scores are cumulative point totals earned from each of several elements. The exception is a deduction when the government tries to change the ethnic composition of the population.

None of the economic freedom indices offsets positives attributes with negatives, and the education freedom indices do it infrequently. The Fraser Institute's economic freedom of the world index assigns equal weight to five factors; size of government, legal structure, sound money, free trade, and regulation (Gwartney & Lawson, 2004). Each factor's 0–10 (best) scale “reflects the distribution of the underlying data” (p. 6) or judgment regarding survey data. Gwartney and Lawson's (2004) factor components also have equal weights.

Ten equal-weight factors derived from 50 variables underlie the Heritage Foundation–*Wall Street Journal* (Miles, Feulner, & O'Grady, 2005) economic freedom index. The factors overlap, and unlike the Fraser Institute's index, equal weights are not plausible for the Heritage Foundation–*Wall Street Journal* factors. For example, price controls, regulation, and trade barriers usually create black market activity, but they are four separate Heritage Foundation–*Wall Street Journal* factors. The Heritage Foundation–*Wall Street Journal* property rights factor deserves an above-average weight, and it is a reasonable sole basis for a low overall score. Many factors matter significantly if there is strong protection for private property rights, but without such protection many otherwise important factors matter little or not at all. Several of the indices heroically assume that the economic effects are equal for each one level change in any factor. For example, in the Heritage Foundation–*Wall Street Journal* index, a rise in past inflation from 12% to 20% moves the sound money score from 3 to 4. However, a more significant change from 20% to, say 100%, only moves the sound money score from 4 to 5. Both changes—from 12% to 20% and from 20% to 100%—change a country's economic freedom index value by the same amount.

The key lessons of the established indices include the role of subjectivity, trade-offs and synergies, aversion to estimating component weights, and the limitations of a metric focused on formal constraint or support. McQuillan, Huang, and McCormick (2004) used the “greatest statistical link to migration” to weight their economic freedom components. They argued that the direction of unimpeded migration was the best economic freedom indicator. The other indices duck weight estimation by assuming equal

component weights, which is heroic, but ducking weight estimation avoids the work of statistical approaches to weighting, and it avoids criticism for choosing weights to generate preferred results.

The Education Freedom Indices

The Manhattan Institute (Greene, 2002), the Fraser Institute (Hepburn & Van Belle, 2003), and the Friedman Foundation (Enlow, 2008) created education freedom indices. The Cato Institute (Coulson, 2006) developed an education market index. The Cato Institute, the Manhattan Institute, and the Friedman Foundation scored U.S. states, whereas the Fraser Institute assessed Canadian provinces. The Manhattan Institute's index is the average accessibility of the potential private, homeschool, and three types of public⁴ alternatives to the assigned public schools. Enrollment share and regulatory barriers are the key determinants of accessibility. Although the Manhattan Institute's factors are probably not equally important determinants of freedom, that approach is still informative for incremental policy change, but probably misleading for more transformative policies. For example, the Milton Friedman (1962) tuition voucher proposal—which would greatly increase freedom and market accountability—could end homeschooling and either displace or fundamentally transform public schools. In addition, homeschooling participation is an ambiguous indicator. It reflects permission and such severe disdain for the formal schooling alternatives that families substitute an amateur parent-educator for professional services available for no additional charge from public schools, and cheaply from church-subsidized private schools.

Even though regulation of schooling practices (e.g., Chile, Holland, Sweden) and price control often severely compromise education freedom, the Manhattan Institute's index looks at only one attribute of private schools: subsidies for private school users. However, despite the limitations of the Manhattan Institute's index, it was a statistically significant determinant of student achievement as measured by the Scholastic Aptitude Test (+24 points) and the National Assessment of Educational Progress (+5.5%) tests (Greene, 2002).

The Fraser Institute's index (Hepburn & Van Belle, 2003) counts private school, homeschool, and charter law factors—including regulatory issues such as curriculum and personnel—equally. Like the Manhattan Institute's index, it ignores potential price control and that major reforms like large, unrestricted universal vouchers (Merrifield, 2008) might invalidate the premise that freedom necessarily involves substantial homeschooling and chartered schools alongside private schools.

The Friedman Foundation (Enlow, 2008) graded U.S. voucher programs. Student eligibility, voucher purchasing power, and school eligibility factors carry equal weight for an A through F grade, with "A" at 80% or better. The

Friedman Foundation focus on private choice programs means that the grade does not reflect freedom in the public sector (e.g., through chartered schools or public school choice provisions). The key omissions with regard to private sector choice are as follows: (a) price control issues register only modestly as purchasing power restrictions—a 3.3 percentage-point penalty—not as the major factor that it is; something that undermines the traditional functions of price change to eliminate shortages and surpluses and to inform and motivate education entrepreneurs and parents; and (b) how uncertainty about the future scope of the market might influence school entrepreneurs. Significant uncertainty about the permanence, scope, or funding level of a voucher program would stifle the entrepreneurial incentive to diversify schooling options, which is a “freedom to” issue.

The Friedman Foundation grading criteria also highlight the importance of component weighting and potential factor interdependence. For example, the Illinois and Iowa tax credit programs score 69% and 67%, respectively, for having no student or school eligibility restrictions even though the tiny dollar amount of the credits makes them irrelevant for the majority of families.

The Cato Institute’s education market index (Coulson, 2006) is the product of the producer freedom index and the consumer freedom index. They reflect entry barriers, price control, and prescriptive regulations. The Cato Institute’s education market index multiplies the subcomponent values (0–1 range) because key constraints can negate much autonomy. For example, suppose consumers can easily choose from any school available (consumer freedom index = 100), but the authorities legislate school attributes in great detail (producer freedom index = 0). The Cato Institute’s education market index is 0. Consumer freedom is irrelevant in the face of a uniform, state-defined menu of schooling options. Consistent with the Cato Institute’s education market index’s focus on actual market activity, the weights attached to the features and rules of public schools, independent schools, and subsidized independent schools are a function of actual enrollment shares; that is, weighted by how available freedoms are being used, rather than just by the opportunity to make choices.

SOME MAJOR DETERMINANTS OF EDUCATION FREEDOM

Frederich Hayek (1944) concisely stated the key elements of unregulated, full-market accountability:

The parties in the market should be free to sell and buy at any price at which they can find a partner to the transaction, and that anybody should be free to produce, sell, and buy anything that may be produced at all. (p. 42)

In other words, for goods that are legal, no one should be barred from making or accepting an offer. *Free to produce* means few rules, and that rules and subsidies favor no one. *Find a partner* implies informed decision making, a degree of mobility, and the availability of genuine choices (product variety). For a school system, those factors translate into specific, controversial policy requirements (Merrifield, 2005):

1. Little regulation of private schools beyond what applies to all entities that serve the general public. Formally define school sufficiently to disburse subsidies and curb fraud, but:
 - Avoid creating formal entry barriers
 - Don't diminish opportunities to specialize
2. Low informal entry barriers:
 - Nondiscrimination; public funding per child does not depend on school ownership
 - Minimal uncertainty about the future scope of the market
 - Avoid price control; allow private tuition co-payments (private spending can supplement government funds)

An education freedom index must also reflect entry and product differentiation barriers in the public sector, which depend on the laws authorizing chartered public schools and magnet schools, open enrollment options within and between school districts, and the ability to choose by relocating to another school district. Open enrollment laws allow some specialization in traditional public schools unless stifled by content or pedagogy regulation.

The proposed new EFI addresses the shortcomings of the existing education freedom indices, including assessment of price control, uncertainty about market stability, information issues, and it improves the assessment of public sector choice and regulation of schooling practices. The EFI varies from 100 for a school system that “gives full play to entrepreneurial initiative” (Friedman, 2003)—all legal consumer preferences must be available to entrepreneurs as potential school choices to offer—to 0 for a system without any meaningful freedom to choose. The EFI equations avoid data for outcomes such as enrollment shares. Use of data for outcomes inappropriately makes the index sensitive to how people use their freedom.

THE SPECIFIC COMPONENTS OF THE PROPOSED EFI

Entry Barriers

Entry barriers are a key private school issue. Rules that stifle private school formation and subsidies that favor public school users narrow the scope of entrepreneurial initiative. For example, U.S. public schools' monopoly on

taxes levied to fund schooling puts private schools in the precarious position of charging for instruction when public schooling is no charge beyond taxes everyone must pay. So, one EFI component is an entry barrier significance (EBS) value that reflects the informal barriers—such as the one described earlier—and formal barriers; actual entry requirements. In particular, informal barriers result from (a) differences in subsidy levels for public and private schools and (b) limits on eligibility (e.g., low income) for private schooling subsidies. Informal barriers also exist to the extent that public schools include close substitutes for private schooling; for example, through charter or magnet schools. “Charter schools may be evolving as substitutes for [cheap] private schools” (Teske, Schneider, Buckley, & Clark, 2000), “like a free private school” (Diamond & D’Amico, 2000, p. 1). So, charter laws that foster little regulation and easy startup enhance education freedom by allowing public sector product differentiation (next EFI component), but such laws reduce freedom by strengthening informal entry barriers. Formal barrier significance is a function of private school registration requirements, regulations that increase costs, or reduce functionality (such as facility requirements), location restrictions, and limits on who can operate private schools; for example, churches and for-profit providers are often excluded.

To separate the issues of conceptualization of EFI components discussed here from the technical issues of computation and variable definition, the equations appear in Appendix A, and how I quantify subjective concepts such as the determinants of EBS is shown in Appendix B. So, for example, Appendix B explains how formal barrier factors such as registration requirements, school facility rules, and others determine the formal barrier score.

Opportunity to Specialize

The second EFI component is the ability of schools to differ. The product diversity index (PDI) measures schools’ ability to specialize thematically (e.g., science, arts, music, sports⁵) and/or pedagogically (e.g., hi-tech, low-tech, Montessori). Prescriptive regulation of schooling practices such as curriculum, textbooks, and personnel credentials⁶ reduce the significance of freedom to start a school and family access to affordable school choices. Attendance areas also severely curb product differentiation. Families won’t tolerate assignment of children to specialized schools. Charter school legislation varies in its effect on the ability to offer specialized instructional approaches. Appendix B explains how the EFI reflects regulation of public sector practice and regulation of private practice. The relative importance of private and public sector constraints on product diversity depend on the private sector entry barriers that directly influence the EFI’s EBS component. So, entry barrier measurement directly affects the EFI through the EBS score,

and it indirectly affects the EFI by influencing the relative importance of private and public sector factors such as the opportunity to specialize.

Absence of Price Control

A third component of the EFI is seller control of price (absence of price control [APC]). Government-set prices cannot signal buyers' priorities; for example, their preferences for some types of schooling over other types. Furthermore, without freedom to adjust price in accordance with shifting demand and resource costs, there are persistent shortages and surpluses. Laws specifying per-child funding levels and mandating free public schooling create public sector price control, often as price floors and price ceilings. Price ceilings constrain product differentiation to what costs less than the ceiling, and they curb innovation by cutting profit potential. At the same time, price floors force overpayment for schooling services that could cost less than the specified funding level. Simultaneous ceiling and floor effects are evident in most U.S. states⁷ with charter laws. Schools that differ widely in their approach to schooling, and thus likely differ in per-pupil cost, receive identical per-pupil payments. Because of the price ceilings implicit in the state-specified, formula-based per-child funding level, the instructional approaches that cost more than that level are unavailable or only available from chartered schools with long-term philanthropic support.

Laws that ban or tax shared financing of tuition create private sector price control. For example, the Milwaukee voucher law creates a price ceiling at the voucher amount by requiring private schools to accept vouchers as full payment. The ban on supplemental co-payments by parents is a much more serious matter than many people recognize. By, in effect, banning the more expensive options, price control short circuits the product development process that typically begins with an expensive innovation purchased only by the well off, which then falls in price through competition and experience with production until the innovation becomes widely available. In addition, unless a law provides for rebates, or credits against future schooling purchases (proposed by Walberg & Bast, 2003), a voucher amount is a price floor yielding wasteful public spending on the cheapest schooling options. Thus, price control stifles innovation and yields an inefficient, suboptimal product mix. Private sector entry barriers and restrictions on co-payment determine the significance of price controls.

Market Uncertainty

Business uncertainty about market share improves producer performance by curbing sloth and complacency. However, uncertainty about the scope

of the market undermines consumer freedom by deterring market entry and investment. So, market stability (MSTAB) is a fourth component of the EFI. The uncertainty-related survey questions in Appendix B aim to reflect credible efforts to repeal or significantly weaken key legislation (e.g., a voucher or tax credit program), and pending or possible credible court challenges.

Miscellaneous Regulation of Private Schools

Another product differentiation issue—a fifth component of the EFI—is miscellaneous regulation of private schools (MREG). The miscellaneous regulation index reflects compliance paperwork, minor facility rules such as library holdings, building specifications, minimum staffing levels, and mandatory credentials for nonteachers. The highly subjective nature of MSTAB and MREG raises the Coase concern about silly quantification. But the time to possibly ignore—pending improvement in ability to measure—is after acknowledgement, discussion, and assessment of subjectivity's significance to the index. Differential weighting and sensitivity analysis, discussed below, facilitates such assessments.

Freedom Through Mobility

A sixth EFI component reflects the public sector choices available through residential choice; that is, freedom through mobility (FTM). Schools' execution of district policies differs widely within some districts, but FTM reflects access to the likely larger differences between schools in different districts. FTM varies with the number of districts, and the distribution of the school children among the available districts. More districts—adjusted for relative size—also means better choices through greater rivalry between governmental units (the Tiebout competition [Tiebout, 1956]) for the extra tax base represented by new businesses and residents. Caroline Hoxby (2003) found that the Tiebout competition produced large achievement gains.

Out-of-Pocket Cost (OPC)

Because the greater parental scrutiny of schooling options that results from an OPC prompts increased efficiency and better product differentiation (Coulson, 1999), an OPC factor is a seventh component of the EFI. However, expanding the private share of tuition costs reduces lower income families' range of schooling options. Pending a definitive empirical analysis of those conflicting effects, the optimum OPC share is set at a consensus (several K–12 scholars) value of 50%. Because there is no OPC for public sector options, the importance of parents' minimum share of tuition depends on private sector entry barriers.⁸

Mandating a parent share does not necessarily prevent the price control effects reflected in the EFI's third component, APC. For example, Ohio law requires a co-payment from some Cleveland voucher users. Given that Ohio law states the maximum combined dollar amount, there is still a price ceiling at that level. Likewise, a larger OPC does not necessarily amount to the discrimination against private school users that underlies informal entry barriers. Financial discrimination exists only if the minimum parent share varies according to school ownership (e.g., public vs. private).

Access to Information

The final EFI component is parent access to an information system (PAIS). Inability to make informed school choices is often given as a reason to expect few academic gains from school choice programs. A likely low EFI share for PAIS (weights, discussed shortly) will reflect the availability of several information sources regardless of PAIS policy, and that it only takes a relatively few informed, demanding buyers to drive efficient producer behavior. The importance of official information also depends on the potential differences in the choices; the second EFI component, PDI. The PAIS value depends on whether the authorities provide insightful performance data and on how they foster private sector efforts to inform parental choice.

EFI COMPONENT WEIGHTS

The eight EFI components described earlier are not equally important, which raises the troublesome issue of how to weight them in the calculation of the EFI. The nearly universal practice is to sidestep this issue by assigning equal weights to each of the index components. However, a combination of judgment, and that the weights must sum to 100% ($\sum W_i = 100$), avoids the heroic equal weights assumption. Sensitivity analysis reveals the importance of different weighting strategies that additional research might facilitate.

There are four already viable weighting approaches. The first approach generates the original EFI (EFIORIG) on the basis of my a priori judgment about the relative significance of the different EFI components. $W_{EBS} = W_1 = 24$, $W_{PDI} = W_2 = 24$, $W_{APC} = W_3 = 20$, $W_{MSTAB} = W_4 = 16$, and $W_{MREG} = W_5 = W_{FTM} = W_6 = W_{OPC} = W_7 = W_{PAIS} = W_8 = 4$ satisfies the $\sum W_i = 100$ constraint, with weights that are internally plausible across all pairwise combinations of weights, which means, for example, that it is plausible for EBS to be six times as important as the Tiebout competition.

The second and third approaches examine all of the possible combinations that result from a plausible range of weight ratios. $W_2/W_1 = (0.75, 1, 1.25)$, $W_3/W_1 = (0.67, 0.83, 1)$, $W_4/W_1 = (0.33, 0.67, 1)$, $W_5/W_1 = (0.12, 0.16, 0.2)$, $W_6/W_1 = (0.12, 0.16, 0.2)$, $W_7/W_1 = (0.167, 0.25, 0.333)$, and $W_8/W_1 =$

(0.1, 0.125, 0.15). The second approach generates an EFI (EFIAVG) from the average generated from the 59,049 combinations of 2,187 possible weight values that satisfy the plausible ratio constraints above and sum to 100, and 27 combinations of parent share, price flexibility, and market power parameters. The third approach reports the maximum (EFIMAX) and minimum (EFIMIN) from among the 59,049 combinations.

Because equal factor weights is the dominant practice for existing economic and education indices, the fourth approach generates an EFI alternative (EFIALT) through a reconfiguration of the factor equations so that an equal weight for each factor is plausible. Table 1 summarizes the differences among the four versions of the EFI.

Grounds for Adjustments—Assessment of Trade-offs

Because of interdependencies, the simple weighted sum of the eight components discussed earlier and listed in Table 1 could be a misleading measure of education freedom. That is true of the existing indices, but few attempt to adjust for interdependencies, probably because the extra calculations make the index less transparent. The proper basis for a decision about simplicity-reality trade-offs is a subjective assessment of the complexity cost against a sensitivity analysis of the ultimate significance of the interdependencies. So, the interdependencies I subsequently discuss may prove unworthy of an optimal index, but they should be assessed at this initial stage of index development.

Two of the three potentially significant adjustments concern price flexibility (the APC component) issues. Certainly, flexibility is always better than rigidity, arguably even in the case of true, unregulated monopoly. But market power (insufficient competition) distorts the price signal. Therefore, one plausible EFI adjustment is a market power-based reduction of APC. The actual formula for the adjustment is in Appendix A. Since price flexibility has

TABLE 1 Direct EFI Component Weights

	#1 EBS	#2 PDI	#5 MREG	#6 FTM	#3 APC	#7 OPC	#4 MSTAB	#8 PAIS
EFIORIG	24	24	4	4	20	4	16	4
EFIAVG	24	18–30	3–4	3–4	16–24	4–8	8–24	2.4–3.6
EFIMIN/EFIMAX	24	18–30	3–4	3–4	16–24	4–8	8–24	2.4–3.6
EFIALT	25	25	25	25	25	25	25	25

Note. APC = absence of price control; EBS = entry barrier significance; EFI = education freedom index; EFIALT = education freedom index with equal weights for each component; EFIMAX = education freedom index maximum; EFIMIN = education freedom index minimum; EFIORIG = education freedom index with weights $W_1 \rightarrow W_8$ based on the author's judgment; FTM = freedom through mobility; MREG = miscellaneous regulation of private schools; MSTAB = market stability; OPC = out-of-pocket cost; PAIS = parent access to information; PDI = product differentiation index.

increased importance when public school subsidies greatly exceed the subsidy for private school users (high discrimination), a second APC adjustment is for when all subsidies are small.

The last EFI adjustment is a micromanagement penalty. When rules severely curb specialization, schools offer can only worse and better versions of a relatively uniform service.⁹ A micromanagement penalty reduces the component score for EBS, APC, MSTAB, and OPC to the extent that PDI is absent.

Demonstration Examples: Prince Edward Island and Saskatchewan

Complete data were available for only the two Canadian provinces, Prince Edward Island and Saskatchewan, surveyed during my summer with Canada's Fraser Institute. It is a coincidence, and unfortunate, that they are the provinces with the lowest scores on the Hepburn and Van Belle (2003) Canadian education freedom index. Those data illustrate the differences between the four approaches to factor weighting described earlier.

The Prince Edward Island Education Ministry tightly prescribes nearly all aspects of public and private schooling in that Atlantic Maritime province. All versions of the EFI confirm the subjective impression derived from examination of the raw data that there is little education freedom there. Formal entry barriers are modest, but the informal barriers are the maximum. Almost all of the schools are heavily regulated traditional public schools, and Prince Edward Island does not authorize chartered schools. There are only four small, lightly regulated private schools. Product differentiation opportunities are minimal, which also yields a micromanagement, downward adjustment of 8 to 10, depending on which EFI version is being calculated. The high informal barriers virtually negate low private sector regulation, including APC. Prince Edward Island scores most of its few points for low formal barriers, for Tiebout competition among public school providers, and for providing information. The four EFI estimates are between EFIMIN = 5.14 and EFIALT = 9.06 (see Table 2). The narrow range means weighting does not matter much, at least in a place with little freedom.

Saskatchewan is an overwhelmingly rural province in central Canada. In comparison with that of Prince Edward Island, the raw data for Saskatchewan suggest a greater degree of freedom, and the four versions of the EFI cluster between EFIMIN = 14.12 and EFIMAX = 23.51 (see Table 3). The largest positive contributors to Saskatchewan's EFI are public school choice, some limited room for schools to differ, and access to information about schools. Taking into account the component interdependency-based adjustments described in the previous section, Saskatchewan suffers a 5.5–7.9-point penalty for its high degree of central micromanagement.

With the additional freedom, the expected wider range is obtained—compared with Prince Edward Island—of plausible EFI estimates. However,

TABLE 2 EFI Estimates for Prince Edward Island

	#1 EBS	#2 PDI	#5 MREG	#6 FTM	#3 APC	#7 OPC	#4 MSTAB	#8 PAIS	UEFI	Adjust: -PFMP +PFLS -MMP	EFI
EFIORIG	0.38 × 24	0.14 × 24	0.075 × 24	0.51 × 4	0.1 × 20	0 × 4	0.1 × 16	0.05 × 4	18.62	11.04	7.58
EFIAVG	0.38 × range	0.14 × range	0.075 × range	0.51 × range	0.1 × range	0 × range	0.1 × range	0.05 × range	NA	NA	6.86
EFIMIN/ EFIMAX	0.38 × range	0.14 × range	0.075 × range	0.51 × range	0.1 × range	0 × range	0.1 × range	0.05 × range	NA	NA	5.14/8.81
EFIALT	0.38 × 25	0.25 × 25	0.25 × 25	0.25 × 25	0.25 × 25	0.25 × 25	0.25 × 25	0.25 × 25	17.07	8.01	9.06

Note. APC = absence of price control; EBS = entry barrier significance; EFI = education freedom index with equal weights for each component; EFIMAX = education freedom index maximum; EFIMIN = education freedom index minimum; EFIORIG = education freedom index with weights $W_1 \rightarrow W_8$ based on the author's judgment; FTM = freedom through mobility; MREG = miscellaneous regulation of private schools; MSTAB = market stability; OPC = out-of-pocket cost; PAIS = parent access to information; PDI = product differentiation index; PFLS = price flexibility—low subsidy bonus; PFMP = price flexibility market power; UEFI = unadjusted education freedom index.

TABLE 3 EFI Estimates for Saskatchewan

	#1 EBS	#2 PDI	#5 MREG	#6 FTM	#3 APC	#7 OPC	#4 MSTAB	#8 PAIS	UEFI	Adjust: -PFMP +PFLS -MMP	EFI
EFIORIG	0.44 × 24	0.39 × 24	0.1 × 4	0.95 × 4	0.1 × 20	0 × 4	0.1 × 16	0.26 × 4	28.73	7.85	20.88
EFIAVG	0.44 × range	0.39 × range	0.075 × range	0.95 × range	0.1 × range	0 × range	0.1 × range	0.26 × range	NA	NA	18.50
EFIMIN/ EFIMAX	0.44 × range	0.39 × range	0.075 × range	0.95 × range	0.1 × range	0 × range	0.1 × range	0.26 × range	NA	NA	14.21/ 23.51
EFIALT	0.44 × 25	0.57 × 25	0.57 × 25	0.57 × 25	0 × 25	0 × 25	0.07 × 25	0.07 × 25	27.0	5.46	21.54

Note. APC = absence of price control; EBS = entry barrier significance; EFI = education freedom index; EFIALT = education freedom index with equal weights for each component; EFIMAX = education freedom index maximum; EFIMIN = education freedom index minimum; EFIORIG = education freedom index with weights $W_1 \rightarrow W_8$ based on the author's judgment; FTM = freedom through mobility; MREG = miscellaneous regulation of private schools; MSTAB = market stability; OPC = out-of-pocket cost; PAIS = parent access to information; PDI = product differentiation index; PFLS = price flexibility—low subsidy bonus; PFMP = price flexibility market power; UEFI = unadjusted education freedom index.

the range is still small and given the seemingly low levels of education freedom that typify the countries, states, and provinces described by Glenn and de Groof (2002), an empirical basis for weighting is unlikely to produce a much smaller range of EFI uncertainty than the current sensitivity analysis basis. The small range of plausible values for both provinces suggests going public with the simpler, equal-factor-weight EFIALT, but a final verdict on that should await additional observations to include, especially, places with higher levels of education freedom such as the Canadian province of Alberta, which probably has the country's largest EFI.

KEY RESEARCH ISSUES

The market power, price flexibility, and optimal parent share coefficients are prime EFI refinement opportunities. A market power measure appropriate to schooling should reflect the relation between high rates of return on investment and low levels of competition in education. However, an alternative to the popular four-firm concentration ratio, if appropriate, may have to await more widespread market-based schooling to generate data from which to estimate it. In any event, the issue needs to enter policy discussions. For example, chartered public schools cannot select a price for their services. They must fund their schools just with subsidy payments and donations. Letting chartered public schools apply for permission to charge a tuition co-payment would amount to price control, but the benefits of doing so would differ from the maximum to the extent that entry barriers protect existing private and chartered school operators from new competitors. Insufficient competition would, as it always does anywhere in the economy, distort prices upward, above the actual opportunity costs of doing business.

Entry barriers affect almost every EFI component, so other ways to measure and score openness deserve attention. The EBS equation raises the EFI when formal and informal barriers aren't both prohibitive. EBS gives some EFI credit for fewer barriers, even if the formal or informal barriers stay prohibitive.

Appendix A describes an established alternative to my version of the Herfindahl index that is part of the FTM component. The FTM component of the proposed EFI implicitly assumes that public sector freedom depends on statewide data. That means it probably produces a better measure of freedom through relevant mobility in more densely populated, geographically small states. In large states with few people, or in widely scattered metropolitan areas, average local conditions are probably more meaningful; for example, perhaps the average Herfindahl index for the state's metro areas.

Another research issue is general entrepreneurial climate. The list of factors (see Appendix B) that determine the value of formal barrier measure

may have to be expanded to include factors hostile to business formation generally. Factors affecting business startup are in general as much an entry barrier as those that pertain specifically to K–12 education.

CONCLUDING REMARKS

The proposed EFI framework is a significant, but still crude leap in the direction of much improved discussion of increased freedom and market accountability as a school reform catalyst, for better or worse. Although efforts to measure abstract concepts such as education freedom necessarily suffer from disagreement on precisely what should be measured and the difficulty quantifying subjective judgments, we still learn a lot from just the measurement process. Calculation of the EFI enhances debate, informs policymaking, invites comparison, focuses attention on neglected factors, and it can increase political accountability. Sensitivity analysis establishes the significance of uncertainty about measurement practices and data gaps. The process of making EFI improvements can (a) energize discussion of the critical ingredients of education freedom and market accountability and (b) promote direct comparisons to political accountability-dominant school systems.

Eventually, the EFI can be the basis for a comprehensive ranking of education system policies, worldwide. However, the absolute freedom revealed by a jurisdiction's place on the 0–100 scale is probably a more important policy and research issue than is relative freedom. Note that the scale itself is value neutral. The consensus average optimal value of the EFI will vary as we learn more about how academic performance and social values vary with the overall EFI or its subcomponents, and the range around the consensus average will vary with personal tastes and collective values about the identified and measured trade-offs. Applied to policy proposals, a with- and without-policy EFI calculation can flag misleading claims about alleged competition and market-based reform, and indicate whether a proposal qualifies for the term *reform* or just amounts to tinkering.

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NOTES

1. For example, school choice advocacy has often raised the specter of radical schools teaching hate and intolerance. Although there are a host of nonstate barriers to such schooling, it still might be desirable to limit this area of freedom, with, for example, a rule that schools may not preach lawbreaking, or broader restrictions. Separate assessment of effects of this aspect of freedom may reveal the trade-offs in design of restrictions, or absence/presence of them.

2. The Chilean system, a supposed example of a system with considerable freedom, is tightly controlled by the Education Ministry (Gauri, 1998).

3. See http://en.wikipedia.org/wiki/Classical_liberalism for a discussion of this once common term for opinions that would now be seen as anything but the modern definition of liberal. Friedman called himself a “classical liberal.”

4. The three types of public alternatives are access to traditional public schools through residential choice, access to traditional public schools other than the assigned school, and access to chartered public schools.

5. Sports does not necessarily mean athletics. A New Zealand school uses sports issues to motivate children to read, write, and learn math and statistics.

6. Ibid, Note 1.

7. A few states with charter laws still have almost no chartered schools.

8. Because a small private school sector survives even the most unfriendly conditions, EB has a default minimum value of 0.1.

9. Plank and Sykes (2003, p. x) called it “standardized public educational provision.” Brown (1992, p. 287) called it “comprehensive uniformity.”

10. When formal barriers are not prohibitive, EB’s minimum value of 0.1 reflects that independent schools typically enroll up to 10% of schoolchildren.

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APPENDIX A

Equations

- 1.) The education freedom index (EFI)'s first component is private school entry barrier significance (EBS). The equations for several other components take account of entry barriers, so EBS's direct weight of W_1 understates entry barrier importance.

$$EBS = W_1 \times ((1 - FBI + (1 - IBI))/2) \quad (A1)$$

where: W_1 = EBS's score when there are no entry barriers; EBS's share of a perfect EFI score of 100; $\sum W_i = 100$, $i = 1, 2, \dots, 8$; FBI = subjectively assessed formal barrier index ($0 < FBI < 1$); IBI = informal barrier index ($0 < IBI < 1$).

Appendix B describes the numerous determinants of subcomponents such as the FBI. Informal barriers (IBI) result primarily from unequal subsidy of public and private schools.

$$IBI = 1 - (((NP\$\$/PUB\$\$) \times EC) \times (1 - (CHART \times ((PUB\$\$ - NP\$\$)/PUB\$\$)))) \quad (A2)$$

where: PUB\$\$ = the average subsidy per public school user; NP\$\$ = the average subsidy for users of other schools, for example, via philanthropy; EC = share of private school students eligible for subsidies; CHART = strong charter law index ($0 < CHART < 1$); again, see Appendix B for the specific determinants of CHART.

- 2.) The product differentiation index (PDI) component reflects schools' ability to differ.

$$PDI = ((1 - EB) \times ((CHART + (1 - PUBREG))/2)) + (EB \times (1 - PVREG)) \quad (A3)$$

where: PVREG = private sector micromanagement index ($0 < PVREG < 1$), PUBREG = public sector micromanagement index ($0 < PUBREG < 1$); EB = $(1 - FBI)$ if $FBI > IBI$, or $EB = (1 - IBI)$, or 0.1, whichever is greater¹⁰.

- 3.) The absence of price control component:

$$APC = (W_3 \times EB) \times ((SSU \times NCPS) + ((1 - SSU) \times (CPSZ \times NCPS))) \quad (A4)$$

where: APC = score for absence of price control; SSU = share of private school users unaffected by ceiling ($0 < SSU < 1$); CPSZ = co-payment limit size ratio; CPSZ = CPC \div median tuition, or CPSZ = 1 if CPC > median tuition (MEDTUIT); CPC = co-payment cap in \$\$/child/year; NCPS = net co-payment size factor = $(1 - (\text{co-pay tax rate}))$.

Regarding SSU, Sweden only allows co-payments in the upper secondary grades, so Sweden's SSU is those grades' share of the total number of grades.

4.) The market stability (MSTAB) component:

$$MSTAB = (W_4 \times EB) \times (1 - UI) \quad (A5)$$

where: UI = survey-based uncertainty about the scope of the market.

5.) The miscellaneous regulation component:

$$MREG = (W_s \times EB) \times (1 - MRI) \quad (A6)$$

where: MRI (miscellaneous regulation index) is a survey-based measure of compliance paperwork, minor facility rules such as library holdings, building specifications, minimum staffing levels and mandatory credentials for nonteachers.

6.) The freedom through mobility (FTM) component expressed as a Herfindahl index. A Herfindahl index (HERFS) is a common measure of rivalry potential based on the number and relative size of rivals. Merrifield's (1999) version is the basis for the HERFS. Equation (9) indicates that better prospects for district choice and rivalry through household mobility can offset some of the effects of high entry barriers.

$$FTM = HERFS = W_6 \times (EB + ((1 - EB) \times (1 - ((CVAR^2 + 1)/N)))) \quad (A7)$$

where: CVAR = coefficient of variation of district size; standard deviation divided by the mean district size in the "state"; N = number of school districts in the "state"; "state" means key governmental unit for education policy; states in the United States, but perhaps provinces, or entire countries elsewhere.

Suppose, for example, that entry barriers are prohibitive ($EB = 0$) and there are 100 identical districts, CVAR is zero. HERFS will equal 99% of its weight, W_6 . With $EB = 0$ and 10 identical districts, HERFS is still 90% of W_6 . With $EB = 0$ and 91% of the state's students in one district, and another nine districts enrolling 1% each, $HERFS = 0.09W_6$.

Hoxby's (2003, p. 307) version is an alternative. It quantified potential rivalry as the probability that two randomly selected students attend school in different school districts. That can be directly assessed statewide:

$$C = 1 - \sum_j S_j^2$$

where: S = district j 's share of state enrollment.

Or, calculated as the average "C" for the state's N metro areas:

$$C = \sum_N \left(1 - \sum_i S_{jN}^2 \right) / N$$

The process that led to the Equation (A7) version of HERFS is a good illustration of the simplicity-reality issue. My simpler Equation (A7) version of HERFS was chosen because the difference between maximum and minimum district rivalry effects is small; just a 3.06% difference in 10th-grade math scores (Hoxby, 2003).

7.) The out-of-pocket cost (OPC) component:

$$OPC = (W_7 \times EB) \times (1 - |(0.5 - PS)/0.5|) \quad (A8)$$

where: PS = parental share of cost.

Sensitivity analysis ($PS = [0.25, 0.5, 0.75]$) identifies the significance of the parent share of PS estimate to the EFI calculation.

8.) The parent access to an information system component:

$$PAIS = W_8 \times PDI/W_2 \times ISI \quad (A9)$$

where: ISI = survey-assessed information system index.

An unadjusted education freedom index (UEFI):

$$UEFI = EBS + PDI + APC + MSTAB + MREG + FTM + OPEC + PAIS \quad (A10)$$

9.) Adjustment for absence of price control (APC)–market power combinations. I deduct a price flexibility market power (PFMP) measure from the UEFI.

$$PFMP = APC \times d \quad (A11)$$

The coefficient d ($0 < d < 0.5$) reflects a maximum 50% market power attenuation of the price signal. Sensitivity analysis ($\max d = [0.3, 0.5, 0.7]$) will reveal the significance of the decision to cap d at 0.5. It is unfortunate that the likely unavailability of marginal cost and price elasticity of demand data for schooling that would allow the calculation of a Lerner index (Perloff,

2004, p. 361), will require a proxy for d like the popular four-firm concentration ratio (CR = the market share of the four largest private schools; AmosWeb, 2006), with $d = 0.5$ CR.

10.) Adjustment for high price flexibility–low subsidy combinations. I add a price flexibility market power–low subsidy measure to UEFI.

Equation (A12) estimates the price flexibility–low subsidy (PFLS) addition to UEFI:

$$PELS = ((PUB\$\$ - NP\$\$)/PUB\$\$) \times 0.5 \times W_1 \times IBI \times (APC/W_3) \quad (A12)$$

where: the first term reflects the level of discrimination. The last term reflects price flexibility. The product of those terms indicates what fraction of the informal barriers' effect on EBS ($0.5W_1IBI$) price flexibility will offset. Sensitivity analysis tests the importance of the 0.5 constant by varying it from 0.3 to 0.7.

11.) Adjustment for micromanagement. I assess a micromanagement penalty (MMP) of the following:

$$MMP = (1 - PDI/W_2) \times (EBS + APC + MSTAB + OPC) \quad (A13)$$

$$EFI = UEFI - PFMP + PFLS - MMP$$

12.) For EFIALT, the alternate EFI version with four equal-weighted components:

$$EBS = ((1 - FBI) + (1 - IBI))/2 \quad (A14)$$

$$PDI = ((1 - EB) \times ((HERFS + CHART + (1 - PUBREG))/3)) + (EB \times (1 - PVREG)) \quad (A15)$$

$$APC = EB \times ((1 - (|(0.5 - PS)/0.5|)) \times ((SSU \times NCPS) + (1 - SSU) \times (CPSZ \times NCPS))) \quad (A16)$$

$$INFO = EB \times (((1 - UI) + (PDI \times ISI))/2) \quad (A17)$$

where: INFO = producer and consumer information and uncertainty issues.

Before making the interdependency-based EFIALT adjustments, we get unadjusted:

$$UEFIALT = ((EBS + PDI + APC + INFO)/4 \times 100) \quad (A18)$$

The same adjustments applied to UEFI → EFI apply for UEFIALT → EFIALT.

Variable/Acronym Glossary

- APC = absence of price control EFI component
 CEMI = Cato Institute's education market index
 CHART = strong charter law index
 CPC = co-payment cap in \$\$/child/year
 CPSZ = co-payment limit size ratio. $CPSZ = CPC \div MEDTUIT$, or $CPSZ = 1$ if $CPC > MEDTUIT$
 CVAR = coefficient of variation of district size; standard deviation divided by the mean district size in the state
 EB = ease of private sector entry; an inverse function of the larger of FBI and IBI
 EBS = entry barrier significance, EFI component
 EC = NP\$\$ eligibility coefficient, $0 < EC < 1$
 EFIALT = the EFI with equal weights for each component
 EFI = education freedom index
 EFIORIG = the EFI with weights $W_1 \rightarrow W_8$ based on the author's judgment
 FBI = formal entry barrier index
 FTM = freedom through mobility, EFI component
 HERFS = Herfindahl index, a common measure of rivalry potential based on the number and relative size of rivals
 IBI = informal entry barrier index
 INFO = producer and consumer information and uncertainty issues for EFIALT
 ISI = information system index
 NAEP = National Assessment of Educational Progress
 NCPS = net parental tuition co-payment size factor = $(1 - (\text{co-pay tax rate}))$
 MEDTUIT = Median K–12 annual tuition
 MMP = micromanagement penalty
 MREG = miscellaneous regulation of private schools
 MRI = miscellaneous regulation index
 MSTAB = market stability EFI component
 NP\$\$ = average annual subsidy for users of nonpublic schools
 OPC = out-of-pocket payment by parents, EFI component
 PAIS = parent access to information, EFI component
 PDI = product differentiation index, EFI component
 PFLS = price flexibility–low subsidy bonus
 PFMP = price flexibility market power
 PS = parent share of tuition cost
 PUB\$\$ = average annual subsidy per public school user
 PUBREG = regulation of public sector practice, including availability of public school choice
 PVREG = regulation of private practice, including homeschooling

SSU = share of private school users unaffected by ceiling ($0 < \text{SSU} < 1$)

UEFI = unadjusted education freedom index

APPENDIX B

Subjective Measurements for EFI

Each component and subcomponent is subjectively assessed on a 0–1 scale. The determination of the uncertainty index (UI—no subcomponents) is a good example.

- Frequent, credible challenges to key determinants of demand such as authorizing legislation for vouchers or tax credits, proposal of rules that would make private schooling much less attractive; vague funding and authorization provisions = 1
- Infrequent, credible challenges to key determinants; some key issues subject to changing interpretations of key policies = 0.66
- Few challenges to key determinants of demand; most key issues settled and consistently applied over time = 0.33
- Relative certainty that demand for independent schooling is stable or growing = 0

Components with subcomponents get the average subcomponent score. For example, the financial issues component of formal barriers (FBI) has four subcomponents.

Likewise, the information system index (ISI—also no subcomponents) comes from the following:

- Only available informally (talking to people) = 0
- Some insightful published data = 0.33
- Substantial insightful published data = 0.66
- Extensive network of private and government providers of information about the schooling options = 1

FBI = F(registration process, financial issues, discrimination, for-profit allowed)

Financial issues include facility rules, tax code treatment of profit, assurance bond requirements, and whether proof of minimum demand is required.

Discrimination depends on location restrictions and whether churches may operate schools.

CHART = F(startup, price control, co-pay, finance discrimination, admission constraints, management autonomy, for-profit allowed)

Startup issues include who is authorized to have a charter, approved charter authorizers, authorization appeals process, whether proof of minimum demand, and planning funds.

Finance discrimination depends on the charter per-pupil subsidy compared to the traditional public school per-pupil subsidy, and separate facilities funding.

Management autonomy depends on the regulation of teacher credentialing, the principal's authority to hire and fire, and the principal's control of the budget.

PUBREG = F(degree of choice, regulation of teacher credentialing, principals' ability to hire and fire, principals' control of the budget, church exclusion)

PVREG = F(admissions mandates, regulation of teacher credentialing, principals' ability to hire and fire, curriculum mandates, textbook mandates, testing mandates, principals' control of the budget, church exclusion, home-schooling rules)

MRI = F(compliance paperwork, library holdings' rules, staffing level rules, mandatory credentials for nonteachers)

EFI Calculation Issues—In Detail

I. FBI = formal barrier index: A subjective measure of how hard it is to start a new private school on the basis of the following. Take the average of each bullet item below.

- Registration process (prohibitive = 1, onerous = 0.66, moderate = 0.33, none = 0)
- Financial
 - Facility rules (very expensive requirements = 1, moderately expensive = 0.66, inexpensive requirements = 0.33, no specific rules = 0)
 - Tax code discriminates against for-profit schools (significant = 1, moderate = 0.5, no = 0), postbond or other significant financial insurance (yes = 1, no = 0)
 - Burden of proof of consumer demand (more than 50 preenrolled = 1, up to 50 = 0.75, more than 50 expressing interest = 0.5, up to 50 expressing interest = 0.25, no proof of demand required = 0)
- Who/where
 - Location restrictions (yes = 1, no = 0)
 - Can churches run schools? (one religion or none = 1, select a few religions = 0.66, all major religions = 0.33, all religions = 0)

- Allow for-profit (not permitted = 1, permitted with intermediary = 0.25, permitted = 0)
- II. CHART (strong charter law index) Data issues = 0 for no charter law. Take the average of each bullet item below.
- Startup
 - Authorization to found (anyone = 1, all but churches = 0.66, conversions only = 0.33, government [district typically] only = 0)
 - Approved authorizers (many, including at least universities, state board of education, and school districts = 1, few = 0.5, school districts only = 0)
 - Binding appeals for rejected authorizations (yes = 1, no = 0)
 - Burden of proof of consumer demand (more than 50 preenrolled = 1, up to 50 = 0.75, more than 50 expressing interest = 0.5, up to 50 expressing interest = 0.25, no proof of demand required = 0)
 - Planning funds (none = 0, modest = 0.5, significant = 1)
 - Price control: co-pay penalties (yes, prohibited = 0; yes, low cap [$<20\%$ of per-child subsidy]; and/or high tax [$>20\%$] = 0.33; yes, high cap [$>20\%$ of per-child subsidy]; and/or high tax [$<20\%$] = 0.66, no cap or penalty = 1)
 - Parents' tuition share ($< 5\%$ = 0, 5% – 20% = 0.33, 20.1% – 40% = 0.66, $> 40\%$ = 1)
 - Finance
 - Per-pupil subsidy compared to PUB\$\$ (< 0.5 PUB\$\$ = 0, 51% – 70% of PUB\$\$ = 0.33, 71% – 85% of PUB\$\$ = 0.66, $> 85\%$ of PUB\$\$ = 1.0)
 - Separate facilities funding (none = 0, very limited = 0.33, significant = 0.66, same as traditional public school = 1)
 - Admissions constraints (extensive constraints = 0, limited constraints = 0.5, complete admissions freedom = 1)
 - Management autonomy
 - Regulation of teacher credential (multiyear government-mandated training = 0, up to 1 year government-mandated training = 0.33, any college degree plus background check = 0.8, anyone can teach = 1)
 - Charter school principals can hire/fire (principal has virtually no say = 0, constrained by collective bargaining = 0.33, hires and fires within policy guidelines = 0.66, hires and fires at will = 1.0)
 - Budgetary discretion (budget is totally centralized = 0, heavy allocation limits = 0.33, some allocation constraints = 0.66, complete budget freedom = 1)
 - For-profit allowed (not allowed = 0, permitted with intermediary = 0.75, allowed = 1)
- III. Other public schools' issues (PUBREG):
- Degree of choice [DEGCHC] (only by choice of residence = 1, yes, but just between districts, needing permission of sending and receiving district, and local \$\$ do not follow = 0.9, yes, but just between or within districts, needing permission of sending and receiving district/school,

and local \$\$ do follow = 0.8, yes, but just between districts, needing permission of just the receiving district, and local \$\$ do not follow = 0.6, yes, but just between districts, needing permission of just the receiving district, full per-pupil funding follows = 0.4, yes, but just open enrollment within the district, and full per-pupil funding follows = 0.25, yes jurisdictionwide = 0; all funds follow) ECPUBCHC = % eligible for whatever public school choice is available

- CHOICE = $1 - ((1 - \text{DEGCHC}) * \text{ECPUBCHC})$
- Regulation of teacher credential (education degree, plus multiyear government-mandated training = 1, education degree, plus 1 year of government-mandated training = 0.75, education degree or any 4-year degree, plus 1 year of government-mandated training = 0.5, any college degree plus background check = 0.25, anyone can teach = 0)
- Public school principals can hire/fire (principal has virtually no say = 1, constrained by collective bargaining = 0.66, hires and fires within policy guidelines = 0.33, hires and fires at will = 0)
- Budgetary discretion by school principals (budget is totally centralized = 1, heavy allocation constraints = 0.66, some allocation constraints = 0.33, complete budget freedom = 0)
- Can churches run schools (one religion or none = 1, select a few religions = 0.7, all major religions = 0.4, all religions = 0)

IV. PVREG depends on the following:

- Admissions mandates for private schools (extensive constraints = 1, some limited constraints = 0.5, complete freedom = 0)
- Regulation of private school teacher credentials (multiyear government-mandated training = 1, up to 1 year government-mandated training = 0.66, any college degree plus background check = 0.33, anyone can teach = 0)
- Private school principals can hire/fire (principal has virtually no say = 1, constrained by collective bargains = 0.66, hires and fires within policy guidelines = 0.33, hires and fires at will = 0)
- Curriculum mandates for private schools (extensive curriculum mandate = 1, extensive and detailed framework = 0.75, extensive or detailed framework = 0.5, limited general framework = 0.25, complete curriculum freedom = 0)
- Textbook mandates for private schools (all textbooks assigned = 1, some from list and some assigned = 0.75, choose all from approved list = 0.5, choose some from approved list = 0.25, complete textbook freedom = 0)
- Testing mandates for private schools (extensive, high stakes government tests = 1, some government imposed tests = 0.66, some but schools chose tests = 0.33, complete testing freedom = 0)
- Budgetary discretion for private schools (budget is totally centralized = 1, heavy allocation constraints = 0.66, some allocation constraints = 0.33, complete budget freedom = 0)

- Can churches run schools (one religion or none = 1, select a few religions = 0.66, all major religions = 0.33, all religions = 0)
 - Homeschooling allowed (extensive constraints = 1, some limited constraints = 0.5, complete freedom = 0)
- V. Uncertainty issues (UI = uncertainty index):
 Frequency/credibility of legislative and judicial challenges to key legislation [how many are occurring and how credible they are measured by legislator votes and pending credible litigation] (frequent, credible challenges to key determinants of demand like authorizing legislation for vouchers or tax credits, proposal of rules that would make private schooling much less attractive; vague funding and authorization provisions = 1, infrequent, credible challenges to key determinants; some key issues subject to changing interpretations of key policies = 0.66, few challenges to key determinants of demand; most key issues settled and consistently applied over time = 0.33, relative certainty that total demand for independent schooling is stable or growing = 0)
- VI. The miscellaneous regulation index (MRI):
- Compliance paperwork (prohibitive = 1, onerous = 0.66, moderate = 0.33, none = 0)
 - Library holdings' rules (prohibitive = 1, onerous = 0.66, moderate = 0.33, none = 0)
 - Minimum staffing levels (prohibitive = 1, onerous = 0.66, moderate = 0.33, none = 0)
 - Mandatory credentials for nonteachers (prohibitive = 1, onerous = 0.66, moderate = 0.33, none = 0)
- VII. Information system index [ISI] (only available informally [talking to people] = 0, some insightful published data = 0.33, substantial insightful published data = 0.66, extensive network of private and government providers of information on the schooling options = 1)
- VIII. Nonsubjective data items:
 PUB\$\$: subsidy per public school user
 NP\$\$: the average subsidy for users of independent schools; include dollars provided by private sources (philanthropy, charity, scholarships)
 EC = NP\$\$ eligibility coefficient, $0 < EC < 1$. Is there a cap on eligibility for subsidies averaging NP\$\$?. It may be explicit, as in Milwaukee; 22,500/school-age population of the city. Or it may be implicit; funds available eligibility constraints on subsidies for users of independent schools
- Just low income (If so, what percentage of total students are low income; If yes, what share of just low income students are allowed?)
 - Fixed percentage of total?
 - Can only come from failing schools? (If yes, is there a limit on what percentage, number of years failing, typical (or recent) percentage failing)

ECPUBCHC = eligibility share for public school choice with and or between districts

N = number of school districts in the province

CVAR = coefficient of variation of district size; standard deviation divided by the mean district size (enrollment) in the province

SSU = share of students unaffected by a price ceiling ($0 < SSU < 1$)

A ban on co-paying—topping off or adding to government payments such as vouchers—is a price ceiling. Also, a mandatory, defined co-payment does not remove price ceilings. SSU = is the share not subject to whatever ceilings are present

CPC = co-payment cap in \$\$/child/year. Schools can charge up to CPC above the per-child government subsidy

Co-pay tax rate—government share of any allowed co-payment

PMSIST = Parents' mandatory minimum share of independent school tuition

CR = concentration ratio (private sector enrollment share) of the n largest private schools, $n = 1,4$