Expansion, Enrollment, and Inequality of Educational Opportunity

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Abstract

This article calls into question the view that educational expansion has a causal effect on class-based inequalities of educational opportunity. This view, the impetus for many studies, is flawed because the empirical literature is hampered by poor measures of expansion and because it rests on simplistic understandings of the causal structure that relates supply, demand, and inequality of educational opportunity (IEO). The literature arose as it did because the institutions that are actually expanding and allocating—schools, colleges and universities—are treated as black boxes in conventional macro-level theories of expansion. If the black box is opened, we see that educational institutions at once make decisions about expansion and allocation, thus undermining a simplistic model that has expansion affecting allocation. Drawing upon examples from college education in the United States, I argue that the field must develop new measures of educational expansion and supply in order to identify the true relationship between educational expansion and IEO.

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The remarkable growth in formal education has been the enduring backdrop against which discussions of changing inequality of educational opportunity (IEO) have taken place (e.g., Arum, Gamoran, and Shavit 2007; Breen and Goldthorpe 1997; Breen et al. 2009; Morgan 2005; Shavit and Blossfeld 1993). Because expansion is so prominent, it is perhaps understandable that it came to be understood as a fundamental cause of a variety of distributive outcomes, most notably the degree of inequality in educational opportunity. The purpose of this article is to call into question the view that educational expansion has a causal effect on class-based inequalities of educational opportunity. I argue that the conventional view is flawed because the empirical literature is hampered by poor measures of expansion and because it rests on poor assumptions regarding the causal structure that relates supply, demand, and IEO.

The discipline's taste for theories relating educational expansion to changes in IEO is both long-standing and unrelenting. The earliest class of theories had educational expansion leading to a straightforward reduction in the effect of class origin on educational attainment (Blau and Duncan 1967; Treiman 1970). Although these theories remained in sway for nearly two decades, they were ultimately supplanted by those suggesting that IEO would not be reduced unless and until some threshold level of expansion was achieved (Gerber and Hout 1995; Raftery and Hout 1993). In an influential alternative to this account, Lucas (2001) argued that educational expansion might indeed go hand in hand with a decrease in vertical (between-level) inequality, but it would also be accompanied by an increase in horizontal (within-level) inequality. Most recently, Alon (2009, 2014) proposed a synthesis of previous work, arguing that the effects of educational expansion operate through competition, with a decline in competition predicted to reduce IEO.

This rich body of theories about the relationship between educational expansion and educational inequality is based, it might seem, in good sociological common sense. It seems intuitive that as an educational system expands, and more slots are made available, those from less privileged backgrounds might have more access to educational opportunities than they had in the past. But it seems just as intuitive that as an educational system expands, those from more privileged backgrounds might be in prime position to take up the new slots, and that as a consequence, the level of educational inequality might remain the same or even increase. These countervailing intuitions have led to much testing of the opposing claims. But as intuitive as the arguments surrounding educational expansion and educational inequality might be and as attractive as a purported critical test might be,

the conventional causal rhetoric disguises a fundamental problem. Because the causal structure underlying the relationship between educational expansion and IEO is more complicated than sociologists generally assume, the task of predicting the *effect* of expansion on educational inequality is extremely challenging.

In this article, I lay out this claim in more detail. I begin by examining the causal structure that is implied by standard theories of educational expansion and educational inequality, and question common theoretical and methodological assumptions about the relationship between the supply of education, the demand for education, and IEO. Using examples drawn from college education in the United States, I then argue that any plausible model of educational expansion and educational inequality must take into account the causes of expansion. Unlike the standard approach, in which supply is assumed to straightforwardly increase "in response to demand," I argue that we need to consider where supply comes from and, in particular, the organizational conditions under which additional educational slots are supplied. Rather than treating the supply of education as exogenous to IEO, I argue that because expansion occurs only when educational institutions take steps to increase the supply of educational places, these institutions jointly determine the supply of places and the rules for their allocation. All else equal, if institutions lay down allocation rules for the increased supply of places that favor one socioeconomic group over another, the expansion will be accompanied by changes in IEO. If the increased supply is provided alongside the same rules as previously obtained, no change in educational inequality would be predicted. It is the allocation rules under expansion that are consequential for educational opportunity, and yet these rules have been ignored in previous work on expansion and educational inequality.

Basic Concepts and Measures

Sociologists of educational inequality frequently invoke the concept of supply, usually in reference to expansion—an increase in supply. In discussions of educational expansion and IEO, sociologists apparently have in mind a process in which an educational system increases the supply of educational "slots," and children of different class backgrounds enter into a contest for those slots. The end result of this competition is expressed as IEO—the extent to which children of different class backgrounds have equal chances of winning the available educational slots.

The idealized process can be expressed diagrammatically, as in the directed acyclic graph (DAG) shown in Figure 1, which is exceedingly
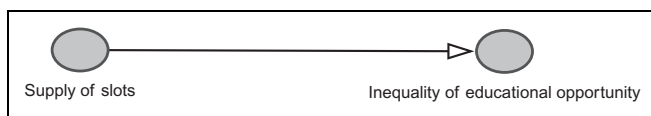
Figure 1. Directed acyclic graph expressing proposed causal relationships between the supply of educational slots and inequality of educational opportunity.

simple but still useful as a foundation for the more realistic models introduced in the following section (on DAGs, see Morgan and Winship 2014; Pearl 1995). The figure expresses the general theoretical claim that the supply of slots has a causal effect on IEO, usually described in this literature in terms of expansion (an increase in supply) having a causal effect on inequality of opportunity.[1] A standard approach to testing this model is to examine associations between measures of the capacity of the system and measures of IEO. The standard measure of the supply of educational slots is the enrollment rate at given levels, while the standard measure of IEO is the odds ratio expressing the chances of a child of advantaged background making a transition to a given educational level rather than not, relative to a child of disadvantaged background.

Whether implicitly or explicitly, then, the supply of education is conceptualized as the capacity of the educational system. But given this conceptual starting point, the conventional approach to understanding the relationship between expansion and educational inequality is problematic in two respects: It relies on a poor measure of supply, and it fails to properly represent the causal relationships linking the supply of education and IEO.

The Operationalization of Supply

Despite the clear characterization of supply as system capacity, the use of enrollment rates to measure supply is ubiquitous in the social science literature on education. This is puzzling given that most academic researchers are familiar with educational institutions in which there is a well-defined process for determining the number of slots that may be offered to prospective students and a (perhaps less-well-understood) process in which students decide whether or not to take up those offers (e.g., Bastedo et al. 2018; Mountford-Zimdars 2016; Posselt 2016). Institutions may aim to fill a certain number of slots, but in many cases, the number of students to enroll will differ from the number of "empty" slots (e.g., Alon 2009; Clotfelter 2017; Grawe 2017; Jaschik 2017).

For comparison, consider the labor market. Few would argue that the rate of employment was a reasonable measure of available jobs; social scientists understand that the employment rate results from a matching process between available jobs and those persons qualified to fill them. At times, there will be more vacant positions than there are persons qualified to fill them; at other times, these two features will be well-matched. It follows quite straightforwardly that the number of jobs available at any given time—the labor market counterpart to educational "slots"—is the sum of all of those persons currently employed *and* the number of vacant positions. When theories of the labor market invoke the concepts of supply and demand, there is no question that unfilled jobs must be taken into account, and the Bureau of Labor Statistics puts significant resources into providing monthly estimates both of the rates of unemployment/employment and of the number of unfilled jobs.[2] By contrast, in the education field, social scientists have been willing to settle for a measure of supply that reflects the equilibrium point at which the supply of educational slots meets student demand for those slots.

This conceptual confusion is made worse when we consider just what it is that we are using enrollment rates to predict: IEO. First, it is clearly problematic to use contemporaneously measured enrollment rates to *predict* the odds ratios describing inequality of opportunity: If supply is to cause IEO, it must at minimum be temporally prior to IEO.[3] But second, enrollment rates are statistically endogenous to the odds ratio measuring inequality of opportunity. All else equal, if the odds ratio changes, this will be mechanically reflected in the enrollment rate: An increasing odds ratio will be reflected in an increase in the enrollment rate, while a decreasing odds ratio will be reflected in a decrease in the enrollment rate. It is straightforward to demonstrate this point using the formal terminology of loglinear models.

Consider Table 1, where α represents a main effect, β is a row effect (the class marginal effect), γ is a column effect (the educational level marginal effect), and δ is an interaction between class and educational level. More formally, we can represent this model as follows:

$$\log\mu_{ij} = \alpha + \beta_{(\text{class dummy})} + \gamma_{(\text{educational level dummy})} + \delta_{(\text{class}*\text{educational level dummies})},$$

where μ_{ij} is the expected frequency, equal to the observed frequency in the case of a saturated model. The contents of the cells in Table 1 indicate the terms from the model equation that would be required to recover each of the cell frequencies (i.e., each class-by-educational-level combination). The δ term captures the association between class and educational level and is

Table 1. Parameters from a Saturated Loglinear Model, Dummy Variable Coding (Reference Categories Lower Class and Low Educational Level).

	High Education	Low Education
Upper class	$\alpha, \beta, \gamma, \delta$	α, β
Lower class	α, γ	α

commonly reported as an odds ratio. This odds ratio is our standard measure of IEO.

Next, consider the enrollment rate, our standard measure of the supply at a given educational level, and the foundation of our measure of expansion: If the enrollment rate increases, expansion has occurred; if the rate decreases, the educational system has contracted.[4] We can express the enrollment rate as a function of the same terms represented in Table 1, as follows:

$$\text{Enrollment rate} = \frac{\exp(\alpha + \beta + \gamma + \delta) + \exp(\alpha + \gamma)}{\exp(\alpha + \beta + \gamma + \delta) + \exp(\alpha + \gamma) + \exp(\alpha + \beta) + \exp\alpha}.$$

The enrollment rate at a given level of education is equivalent to the total number attending the high level divided by the total number eligible. When this is expressed in terms of the loglinear model parameters, as above, it is clear that the enrollment rate is, in part, a function of the δ term, our measure of inequality of opportunity.

The use of enrollment rates to measure supply in research on IEO is particularly curious, given how much of the field's history is defined by attempts to separate out over-time changes in inequality of opportunity from the marginal effects due to educational expansion (in particular, Mare 1980, 1981). Models that bundled together the marginal effects with the measure of inequality were rightly criticized for giving a misleading impression of the effects of expansion on inequality of opportunity, and this led to the development of models that would allow these features to be separated. These methodological developments brought forth a body of research that focused on using margin-free measures of association to investigate the relationship between educational expansion and IEO. But at the same time, enrollment rates came to be used as a standard indicator of expansion. The focus on obtaining a margin-free measure of inequality apparently drew the field's attention away from obtaining a measure of expansion that is not influenced by effects that are also captured in the odds ratio.

A Causal Literature (If Sometimes Obscured)

The causal model shown in Figure 1 makes a strong claim: that expansion has a causal effect on IEO, such that an increase in the capacity of the educational system will lead to changes in IEO. Further, because no common causes of expansion and IEO are proposed in this model, the association between expansion and IEO can be taken to capture the causal effect of expansion on IEO. Although the usual tactics for avoiding such an explicit assertion are sometimes used, the causal claim laid out above is in fact at the heart of the literature on educational expansion and IEO. As reviewed below, this causal argumentation may take the form of (a) explicit causal claims, (b) concealed or implied causal claims, or (c) predictive claims. I review each of these three forms in turn.

Explicit Causal Claims

The most prominent research within the field explicitly includes the claim that educational expansion or changes in enrollments cause changes in IEO. A standard assumption of modernization theories of stratification, for example, was that educational expansion would inevitably lead to a reduction in IEO (e.g., Treiman 1970), even if this assumption was soon questioned in both theoretical and empirical work (see especially Shavit and Blossfeld 1993). More recently, a consensus developed around Raftery and Hout's oft-cited 1993 paper, which characterized the relationship between educational expansion and IEO as arising from a process of *maximally maintained inequality* (MMI). Raftery and Hout (1993) propose a general axiom that "transition rates and odds ratios between social origins and educational transitions remain the same from cohort to cohort unless they are forced to change by increasing enrollments" (p. 56; cf. Gerber and Hout 1995; Hout, Raftery, and Bell 1993).[5] Hout (2006) summarizes a generalization of the theory as follows: "expanding educational facilities (or, equivalently, shrinking cohort size among school-aged or college-aged youth) reduce inequality of educational opportunity. Conversely, shrinking educational facilities (or, equivalently, rising cohort size among school-or college-aged youth) increase inequality of educational opportunity" (p. 238). In *Persistent Inequality*, Shavit and Blossfeld (1993) argue that, "the modernization theorists' hypothesis that educational expansion results in greater equality of educational opportunity must be turned on its head: expansion actually facilitates to a large extent the persistence of inequalities in educational opportunity" (p. 22). Even more recently, Alon (2009) argued for a causal effect of

supply on IEO; under Alon's model, "competition" generates increased IEO because in the context of a limited supply of educational places, privileged students are able to adapt more easily to stricter admission criteria when demand is high, thereby blocking the success of poorer students (p. 818). By extension, when supply increases, competition is reduced, and as a consequence, IEO declines. Although the competition narrative thus introduces a mediating variable (i.e., "competition"), supply is still given a causal role in determining IEO.

One telltale sign that a causal link between expansion and IEO is being proposed is that within this research field, there are attempts to estimate the effects of expansion on IEO. It would be impossible to summarize the findings of such studies in a systematic fashion because there is no standardized method for testing the theoretical propositions laid out above, but we see in the literature two main types of result.

The first type of result is the presentation of correlations between enrollment rates and the odds ratios capturing IEO. In some cases, these correlations are estimated directly: For example, Hout (2006:246) estimates for market economies a correlation of .79 between the proportion of the labor force with postsecondary education and the effect of family background on educational attainment. Arum et al. (2007:18) use correlation and regression analysis to show that, "saturation would seem to reduce inequality while expansion alone does not." But the dominant approach in the field is to present comparisons between expansion and IEO that are less formal in nature. In this second type of result, enrollment rates are compared to odds ratios—whether over time, or across countries—and the relationship is pronounced to be positive, negative, or stable. A representative example may be taken from Gerber and Hout (1995:650), who write, "[t]he rapid expansion of general secondary education led to greater equality of educational opportunity" (for similar, see Alon 2009, 2014; Haim and Shavit 2013; Reimer and Pollak 2009; Shavit, Arum, and Gamoran 2007; Shavit and Blossfeld 1993). Although this approach is less formal, it represents the main empirical foundation of current sociological thinking about the relationship between expansion and IEO.

At its best, empirical work highlights that educational expansion and IEO might have causes in common or that associations between expansion and IEO might provide misleading estimates of causal effects because important confounding factors are unmeasured (see particularly Arum et al. 2007; Torche 2005). Much of this work references the criticism of Walters (2000), who implored sociologists to consider the political and policy context within which educational expansion occurs. She argued that studies of the

effect of educational expansion on IEO are limited because they fail to consider the policies that lead to educational expansion alongside policies that are designed to reduce IEO. At the heart of Walters's argument is the observation that over the same period that reforms aimed at reducing educational inequality have been implemented, educational expansion has acted as a "counterreform." The disadvantaged classes may have gained improved access to education, but expansion ensured that the demand from advantaged classes could still be met and that any increase in slots for the disadvantaged would not come at the cost of those of advantaged background. Walters sees expansion as largely demand-driven, in that the unrelenting desire for higher levels of education from advantaged groups has to be satisfied even while political exigencies require disadvantaged groups to have access to education (2000, 2001). This means that policies aimed toward influencing IEO will be counteracted by policies that influence the capacity of the system.[6] Walters's argument cautions that the association between expansion and IEO might be more complicated than is commonly acknowledged. Her counsel to interpret changes in IEO only in full appreciation of the political context in which expansion occurs was well-taken, even if the field subsequently proceeded as if the association between expansion and IEO could be given a straightforward causal interpretation.

Implied Causal Claims

When researchers do resist the strong claim that "educational expansion causes IEO," they nonetheless typically fall back on explanations and language that at least suggest that a causal claim is being made. There is much talk, for example, about "IEO in the context of expansion," or changes in IEO being "driven" or "generated" by expansion, such that the constant conjunction of educational expansion/enrollment and IEO is striking. Almost all papers on overtime changes in IEO include a figure charting changing enrollment rates and describe the broader landscape of educational provision by focusing on the proportions of eligible students who participate in different levels and types of educational programs. The customary appearance of enrollment statistics to demonstrate expansion prior to analyses of educational inequality in work on IEO carries the strong implication that enrollment and IEO are causally linked; the emphasis on changing enrollment rates alongside the silence on other aspects (such as long-term trends in income inequality, or returns to schooling, or the amount of time that parents spend on childcare) suggests that it is enrollment that we should be attending to when we try to understand changes in IEO.
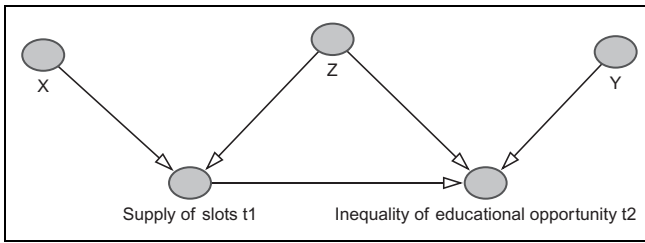
Figure 2. Directed acyclic graph expressing more complex causal relationships between the supply of educational slots and inequality of educational opportunity.

Predictive Claims

Insofar as research on IEO ventures into the realm of prediction, changes in expansion/enrollment are expected to lead to changes in IEO. The clearest example of prediction is to be found in the literature on MMI, but the expectation that expansion might have consequences for educational inequality is common in the literature on IEO (e.g., Alon 2014; Haim and Shavit 2013; Wu 2010). The foregoing thus makes it clear that the literature on the relationship between expansion and inequality is in the end a deeply causal one. Although sometimes the causal claims are obscured, they are always at the heart of the field.

Formalizing the Causal Claim

This then raises the obvious follow-up question: Does it make sense to focus, as the literature has, on a causal relationship between educational expansion and IEO? In Figure 2, I present an alternative account of the causal structure relating educational expansion and IEO. This figure outlines what might be coded as the most generous possible interpretation of accounts relating educational expansion to IEO. It is a fair representation of the existing literature in that it includes causal arrows where researchers have acknowledged a potential causal link between two variables, but it is too generous insofar as it portrays a level of complexity that is simply ignored in the empirical analyses of educational expansion and IEO. The supply of slots (capacity of the educational system) at time 1 is hypothesized to have a causal effect on educational inequality at time 2. Times 1 and 2 may perhaps be as little as a few months apart; for example, a college determines how many slots will be supplied before applications open, and these slots are then filled by available applicants less than a year later. The supply of slots is determined by a set of

variables labeled *X*, which are independent of factors causing IEO, and a set of variables labeled *Z*, which determine both the supply of slots and IEO. IEO is independently determined by a set of variables labeled *Y*, which are independent of factors influencing the supply of slots, and of the set of variables labeled *Z*.[7]

Figure 2 allows for a common cause of both the supply of slots and IEO. To state this is to undermine any analysis that purports to show a simple causal relationship between educational expansion and IEO. A more radical causal model would eliminate the arrow running from the supply of slots to IEO: In other words, this model would propose that the set of *Z* variables introduces an extreme case of common cause confounding bias, such that any relationship between the capacity of the system and IEO is spurious, that it exists *only* because these variables are causally related to the *Z* variables. Under the more radical model, educational expansion, in and of itself, would have no causal effect upon IEO. It is impossible to adjudicate between Figure 2 and the more radical model on the basis of existing empirical results. But whether a direct effect of supply on IEO is posited or not, any association between educational expansion and IEO is likely to provide a misleading estimate of the effects of expansion on IEO. Without measuring the capacity of the educational system alongside potential confounders, it is not possible to empirically assess whether or not a causal effect of expansion on IEO might exist.

In the light of Figure 2, a key task is to assess the extent to which there are confounding factors that would lead to both educational expansion and changes in IEO. In the next section, I argue that plausible narratives about how educational expansion occurs are ones in which confounders play a crucial role. Under these plausible narratives, confounding is likely to carry the bulk of the weight in "explaining" the resulting relationship between educational expansion and IEO, and the direct relationship between the capacity of the system and IEO is likely to be very weak indeed.

Narratives of Educational Expansion

To search for confounders that might have a causal effect on both educational system capacity and IEO, a reasonable place to start is to ask the question: Why does the educational system expand over time? Most of the empirical work relating educational expansion to IEO is unconcerned with the causes of educational expansion, with researchers largely treating the expansion of the system as a given before evaluating the "effects" of the increase in supply.

Although I have so far argued that the literature has ignored confounders (here labeled *Z*), this claim, in and of itself, is uninteresting unless it is possible to lay out more concretely what those confounders might be. It is not difficult to do so. In fact, it is surprising that the expansion account of IEO could become so popular when it is inconsistent with our widely accepted understandings of how educational systems develop. For illustrative purposes, I will discuss three classes of *Z* variables, all of which are widely discussed in the literature and which are inconsistent with an expansion account in its simple form (see Walters 2000 for a full discussion of the causes of expansion).

Z as Economic Organization

It is standard to regard shifts in the form of economic organization as consequential for (a) the amount of education that the labor force "requires" and (b) the way in which the labor force is allocated to jobs. This type of account has a long heritage in sociology. For example, shifts in the labor market from the production of goods to the production of services (especially professional and managerial services) have long been regarded as "skill biased," meaning they should encourage the development of extensive educational systems that can meet the increasing demand for a skilled labor force (Bell 1973). At the same time, the rise of skill-demanding jobs is also seen as bringing about a growing commitment to merit-based allocation, as it becomes increasingly costly in a high-skill economy to select on nonmerit characteristics. As Kerr et al. (1960:26) stress, "industrialization calls for flexibility and competition," while it is "against tradition and status based upon family, class, religion, race, or caste." Sectoral shifts in the economy will therefore entail both substantial educational expansion and merit-based selection procedures that reduce IEO. Although I have recounted here how sociologists have characterized such sectoral shifts, this rendition is closely related to other accounts stressing the powerful effects of economic and technological change on educational systems (e.g., Goldin and Katz 2008).

Z as Class Conflict

As a second category of *Z* variables, I turn to a long history of accounts and analyses showing that (a) the privileged classes have been behind the key educational expansion or suppression movements and (b) they have been instrumental in ensuring that schools served their class-reproductive ends (e.g., Bowles and Gintis 1976; Bourdieu and Passeron 1977; Collins 1971;

Tilly 1998; Walters 2000). As Schofer and Meyer (2005:900-901) highlight, within this theoretical tradition can be found two alternative positions on educational expansion, one that stresses how schools serve to control the working classes (especially Bowles and Gintis 1976) and another that stresses how, in some cases, the expansion of the educational system was suppressed to lock out children of the working classes. Under either of these accounts, educational expansion is caused by the same forces that determine IEO; hence, again a set of possible Z variables is in play.

Z as Culture

The final class of conventional Z variables is "cultural" in the sense that these variables refer to shared understandings of what constitutes modern educational forms (Meyer, Ramirez, and Soysal 1992). For example, Schofer and Meyer (2005) argue that exposure to world society encouraged the expansion of education because

> a new model of society became institutionalized globally—one in which schooled knowledge and personnel were seen as appropriate for a wide variety of social positions, and in which many more young people were seen as appropriate candidates for higher education. An older vision of education as contributing to a more closed society and occupational system . . . was replaced by an open-system picture of education as useful "human capital" for unlimited progress. (p. 898)

As the quote makes clear, within this type of account, educational expansion and IEO share a common cause. Although Schofer and Meyer (2005) focus on the cross-national diffusion of certain cultural commitments about the appropriate form of educational systems, this diffusion process is also playing out within countries, with certain groups (e.g., professionals) committing increasingly strongly to an inclusive vision of educational systems (even if their class situation might imply, as discussed above, a different set of interests).

This outline of macrotheories of educational expansion emphasizes the extent to which the causes of educational expansion are generally understood to be joint causes of IEO, even if each theory implies quite different predictions regarding the association between expansion and IEO. To be sure, theories of expansion also identify variables that will cause expansion but not IEO, variables that will be captured in the X arrow in Figure 2. But no prominent theory addressing just how it is that educational expansion occurs

claims that the X variables capture all drivers of expansion. Quite the contrary: *Every* prominent theory of educational expansion argues that educational expansion may be driven by the very same factors that are implicated in causing IEO. This is not to suggest that, just because our macrotheories routinely invoke Z variables, we must necessarily reject the simple expansion model of Figure 1. It is of course possible that all of our macrotheories are misguided. But, at the very least, the expansion account should no longer be allowed to develop wholly on its own without contact with other very plausible formulations of how educational systems develop.

A More Plausible Model: Institutions and Supply

Whatever the genesis of educational expansion may be, the proximate supplier of educational places is an institution (or set of institutions). An institution makes available to the world an educational slot, and it sets the rules determining how that slot will be allocated.[8] If the institution increases the number of educational slots to be made available, it determines whether the same allocation rules apply as before or whether new rules will be implemented. An institution is not bound to implement consistent rules for all educational slots: Some slots may be supplied, for example, on an open competition basis, while others will be reserved for specific types of students. Different types of educational institutions are likely to have different allocation rules: In the United States, elementary schools may be bound to offer all slots to local residents, while colleges are free to choose allocation rules (within the limits of the law.) In some countries, all allocation rules might be prescribed by state or local governments, while in others, individual educational institutions will have the flexibility to allocate at least some slots in the absence of government oversight. At some levels of education, allocation rules may be universal, with all institutions bound by the same set of rules, while at other levels of education, allocation rules may differ by institution. Sometimes the allocation rules are public, sometimes they are known only to those administering the allocation. Sometimes the allocation rules may receive wide public support, and sometimes the rules may be highly contested (e.g., the case of affirmative action in the United States). But whatever the allocation rules may be, every slot supplied is only supplied alongside a rule determining how it will be supplied. It is allocation rules that determine admissions practices: A school that wishes to increase the number of rich students might move away from "needs-blind" to "needs-sensitive" admissions, while a school that wishes to maintain a particular racial or ethnic composition might move away from achievement-based admissions

to admissions based on "character" (Karabel 2005; Stevens 2009). The ubiquity—and inevitability—of such allocation rules is somehow missed in the standard expansion account.

Educational institutions are organizations. They work in pursuit of organizational goals. These goals may include financial solvency (and sometimes profit), maintaining high educational standards, the creation of an institutional cultural identity, and the pursuit of legitimacy through a focus on meritocratic selection (Clotfelter 2017; Mountford-Zimdars 2016; Posselt 2016; Ruef and Nag 2015; Stevens, Armstrong, and Arum 2008; Stevens and Gebre-Medhin 2016; Warikoo 2016). It is educational institutions, acting in accordance with some or all of these organizational goals, that make available the supply of places to be taken up by students. One of the most troubling features of the literature on educational expansion and IEO is the lack of attention paid to *how* and *why* the supply of educational places increases. Sociologists are either silent on these points or they resort to quasi-functionalist narratives in which supply increases "in response" to demand, with no discussion of the microlevel processes that would lead to new places being added to an institution. This absence of intermediate mechanisms perpetuates the image of an expansion process in which, regardless of organizational priorities or which groups are demanding education, new places simply appear, to be taken by the next person in the educational queue.

Expansion happens when an educational institution moves to add additional places. Because educational institutions are the intermediaries through which educational expansion occurs, every new place to be supplied will be supplied for a reason. Some institutions will be attempting to raise additional funds, some will be attempting to increase diversity, and some will be using additional government funding to grow. The motivations behind increasing the number of educational places will be consequential because these will determine, at least in part, the allocation rule that will be attached. Expansion is a qualitatively different phenomenon from supply per se, in that while it is certainly possible for an educational institution to maintain its supply of slots by default, it is not possible to add slots without simultaneously making a decision about how the new slots should be distributed.

The comparison with the labor market is again instructive here. A firm attempting to fill a job "slot" made vacant by a departing employee may simply proceed to fill that slot with a new employee with equivalent skills and attributes. To be sure, a firm experiencing staff turnover may well take this opportunity to evaluate the type of person who would best fill the vacancy, but a reasonable default position is to go for a straight replacement.

In contrast, a firm adding a slot for a new employee must consider the type of role to be added, the functions of the new role, and the type of person that will best fill the subsequent vacancy.

In the education context, there are diverse institutional goals to be satisfied, and we therefore cannot assume that all expansions are equivalent, or that all expansions will have the same relationship with IEO. We can categorize allocation rules under expansion into valence-laden or valence-free rules.

Valence-laden allocation rules under expansion are of two types. First, valence-laden rules might speak directly to inequality of opportunity. For example, when an institution expresses concern about the number of enrollments of students from poor backgrounds and expands in order to accommodate more poor people, the supply of new places is attached to an allocation rule that determines that the new places will be given (in large part) to students from poor backgrounds. This change in allocation rule is likely to be loudly trumpeted by the educational institution concerned, but valence-laden allocation rules may also operate more quietly, and to the detriment of poorer students. For example, in the Great Recession, many public colleges in the United States suffered from declines in state funding, and it was necessary to look to rich, often out-of-state, students to compensate. The expansion of slots in this context was accompanied by allocation rules that took account of the need for high-paying students. A second type of valence-laden rule is one that has a valence that is not directly related to class origin (although such a rule might nevertheless have consequences for IEO). For example, a college might wish to increase its sporting prowess and expand in order to increase the number of strong athletes in the student body. The allocation rule for the new places would be valence-laden, but the valence would not be directly related to class.

Valence-free allocation rules are silent on equality of opportunity and other issues, but they will still be consequential for IEO. If a college expands the number of available slots without establishing new rules for the allocation of those slots, the old rules must be assumed to apply. The imagery here is that of, say, a college president deciding to increase admissions to raise revenues but not giving any new directive to the admissions office about associated changes in the allocation rules or admissions criteria. If the college previously operated under an admissions regimen in which officers were instructed to consider grades and SAT scores equally, the same criteria will—in the absence of any new instructions—continue to be used to allocate the additional places. For this reason, even a valence-free expansion is

imbued with "status quo valence," for the unchanging allocation rules simply establish that no change in IEO would be predicted from expansion alone.[9]

Allocation rules are consequential for IEO because they determine the admissions practices that are the conditions for accessing educational slots. If the allocation rule states that slots should go to the "smartest" students, colleges might put into place admissions practices that reward high grades or high scores on the SAT, whereas if the allocation rule states that slots should go to students who will pay high fees, colleges might institute "needs-sensitive" admissions practices. Most research in the IEO tradition discusses admissions practices only in passing. By contrast, Alon (2009) argues that the level of competition determines IEO in part because it determines admissions practices, or more specifically, the level of competition determines the *weight* placed on class-biased criteria when admitting students (on college admissions practices in the United States see also Alon and Tienda 2007; Karen 1991; Stevens 2009). In common with other work on expansion, Alon (2009) sees supply increasing to accommodate demand in an automatic fashion (p. 733), with the causal effect of expansion on IEO occurring through a weakening of class-biased admission requirements and a weakening in class-based adaptation to admissions practices.[10] In the context of the acyclic graph of Figure 2, the admission rules are thus reduced to an "intervening variable," with expansion presumed to lead to students being selected under weakened admissions requirements. There is accordingly no room in this model for valence. Under the competition narrative, even a valence-laden expansion that prioritized rich students would evidently be undermined, as an increase in supply would indicate reduced competition, and an assumption of Alon's model is that expansion and IEO share no common cause confounder.

The valence model proposed here instead recognizes that decisions to expand are intrinsically valenced in a wide variety of different ways. If expansion is the result of deliberate action, aimed toward achieving a goal of increased equality, or increased revenue, or improved alumni relations, the expanded supply of places will come along with associated allocation rules and admissions requirements. From this perspective, the policy decision to expand supply jointly determines allocation rules and IEO. This policy decision operates as a common cause (i.e., a Z variable) for expansion and IEO. Theories that fail to account for this will be misleading, models that fail to account for this will be misspecified, and subsequent estimates of the effect of expansion on IEO will be biased.

Which allocation rules are likely to be in place in the contemporary United States? A cursory survey of the current college landscape would

suggest that colleges are likely to be responding to three different types of incentive when determining allocation rules: financial, legitimacy, and prestige.

Financial incentives will operate quite differently for different types of institutions. State universities, for example, rely on student tuition and state monies to a greater extent than other types of institutions. Although out-of-state and international students are particularly desirable—because they pay high tuition relative to in-state students—state-funded universities are often limited in the extent to which these students can be admitted. In the case of the University of California, for example, an increase in out-of-state students during the Great Recession led to a backlash from the state of California, which threatened to withhold funding from the university unless Californian students were admitted in greater numbers (California State Auditor 2016). The university hit back against the criticism (University of California 2016), but the state-university conflict was resolved through an agreement that increased state monies would be tied to an increase in the number of in-state students and that the diversity of the student body would be a priority. The valenced allocation rules that resulted from the financial incentive were explicitly designed to improve the representation of Californian and racial/ethnic minority students in the undergraduate class.

Financial incentives are likely to have different effects on the allocation rules of private and for-profit colleges. Private colleges are under pressure to fill classes with the requisite number of tuition-paying students, in a highly competitive business environment that has seen many small colleges fall into bankruptcy. Different strategies have been adopted to respond to this financial pressure, including switching from needs-blind to needs-sensitive admissions, and increasing class sizes without increasing faculty numbers or infrastructure spending. Needs-sensitive admissions are likely to favor students with sufficient resources to cover tuition, and all else equal this would be expected to increase IEO. For-profit colleges are also in pursuit of students who will pay tuition, but on the whole, the business model of for-profit colleges is to pursue students who are eligible for federal and state aid monies (Cottom 2017). Expansion of for-profit colleges, therefore, largely depends upon encouraging greater numbers of socioeconomically disadvantaged students to apply, and the allocation rules will largely reflect this profit motive.

Legitimacy incentives might prompt colleges to reward students according to meritocratic criteria. Colleges susceptible to legitimacy incentives might therefore embrace admission criteria that rely upon widely recognized "meritocratic" measures of individual capacity, such as test scores and grades. But colleges are also likely to take direct steps to ensure that all

social groups are represented because extreme inequalities in access will raise difficult questions about whether or not the admission criteria are truly fair. Such direct steps include the use of quotas to guarantee a more equal representation of students from a range of socioeconomic backgrounds or the use of additional admission criteria that are designed to recognize the talent that test scores and grades fail to pick up. The overall effects of legitimacy incentives on allocation rules and admission criteria are therefore difficult to predict in the absence of an understanding of the particular context within which legitimacy is sought.

Prestige incentives similarly have the potential to have unpredictable effects on allocation rules. Prestige may derive directly from legitimacy (see above), but it may also derive from large endowments, research funding, and artistic or sporting excellence. The pursuit of endowments is likely to encourage colleges to prioritize alumni relations, and legacy admissions might increase: Implementing an increase in the admission rate for alumni children will almost certainly lead to changes in the composition of classes that will increase IEO. Prioritizing other indicators of prestige will lead to different allocation rules—both valenced and unvalenced with respect to social origin—and those rules will have consequences for access. Filling a class with a certain type of student requires deliberate action on the part of an educational institution, and whether colleges aim for large endowments, research funding, or artistic or sporting excellence, the allocation rules must deliver the types of students that will satisfy the institutional aims.

As this discussion indicates, even one small part of one country's educational system—four-year colleges in the United States—is characterized by a range of institutional incentives, and a wide range of allocation rules and admissions procedures is likely to result. So is there any case, one might ask, in which the simplistic expansion models of the sort represented in Figure 1 might be on the mark? Are there, in other words, scope conditions in which a valenced model holds but others in which simplistic expansion models hold? There are. However, the scope conditions necessary for the expansion model to hold turn out to be very narrow indeed: The simplistic model will hold only under the null condition in which all who apply are automatically admitted. In this case, there are no "admissions practices," hence there is no room for valenced gatekeeping rules about who will be admitted and who will not. It follows that the conventional theories, which have typically been advanced as general ones *without* scope conditions, are in fact only likely to hold in the very limited condition of free and automatic access. If educational institutions operate as gatekeepers, as they almost always do, then by definition valence matters.

Discussion

The main purpose of this article, then, is to encourage the development of a sociology of allocative rules. This requires, as a first and crucial step, that the field works with a defensible measure of educational expansion. As stressed above, the enrollment rate is not a measure of system capacity but a measure of the number of students who took up the educational opportunities that were made available. Even more troubling, the enrollment rate is statistically endogenous to the odds ratio describing IEO. If supply and demand are to be invoked in theories of educational inequality, it is essential to obtain direct measures of these concepts and particularly important not to forge ahead with a demand-contaminated and endogenous measure of the supply of educational places.

The more important conceptual point, however, is that evaluating the causal effects of educational expansion on IEO is impossible unless we take into account the confounding effects of the policies that lie behind expansion. Expansion policies are also IEO policies because decisions to increase the number of available slots come along with decisions about how these slots should be allocated. An increase in supply cannot straightforwardly occur "in response to" demand, without institutions and actors as intermediaries and gatekeepers. Decisions must be made about how to increase the supply of slots and to whom the slots should be allocated. These decisions are likely to differ in character across different types of institutions, across countries, and over time. These decisions may also differ within educational levels, such that even if access to a level is universal, decisions about the relative size of academic and vocational tracks, decisions about whether new majors should be introduced, and decisions about hiring new teaching staff will all have knock-on effects for (both horizontal and vertical) IEO. Conceiving of expansion as requiring deliberate action by educational institutions is to embrace a middle-range theory that links the macro-level forces underlying expansion to the individual decisions made by politicians, educational administrators, and potential students.

Although social stratification and inequality researchers long ago dispatched the ghosts of functionalism in theoretical work on IEO, a failure to consider the joint causes of expansion and IEO has meant that, in effect, the field has relied upon a notion of supply that is teleological and wrenched from societal context and intention. Those who manage educational institutions are unlikely to be indifferent to how a potential increase in the supply of slots will be allocated among different groups, particularly given that those different groups come along with different levels of resources. Colleges that

expand their way out of a financial crisis will ensure that the new places are disproportionately awarded to the rich students who will pay full freight, while colleges that expand in order to meet some political objective will allocate places in order to achieve the desired student body composition. To be sure, expansion may also occur in a valence-free fashion, as sometimes the number of slots is increased in the absence of underlying motivations to change the status quo. In these circumstances, we would expect the allocation rules to remain the same, and IEO will not change (save through associated class-related changes in the qualifications of applicants).

On the whole, sociologists have treated the concept of an educational system very differently from the concept of a labor market, probably because the market principle is well-established in the latter, but only partially established in the former. But conceiving of educational "slots" as a counterpart to job vacancies offers some advantages in understanding the relationship between expansion and IEO. Just as in the labor market, the supply of educational slots can be conceptually (and empirically) separated from the students taking up those slots. Further, just as in the labor market, slots are generated alongside the rules determining the allocation of those slots, and the allocation rules will determine inequality in access. But where the analogy breaks down is in the predictability of the allocation rules that will prevail in the distribution of vacant slots. In a labor market operating under pure competition, employers have the clear and simple aim of maximizing profits. The education system is for the most part not a market in pursuit of profit maximization. In contrast to the labor market, there is little consensus over the objective functions of individual educational institutions, and there is a relatively low risk that educational institutions will experience the equivalent of a corporate takeover should they fail to achieve their aims (see Constantinides, 1993, for a discussion of why these facts undermine the goal of profit maximization). We cannot therefore assume that all changes in supply occur under pursuit of the same aims. A simple prediction about the effects of supply on IEO is unwise precisely because we do not know, a priori, the aim that an institution is pursuing through an expansion.

If supply is under the control of educational institutions, the same cannot be said of the demand for educational places. Institutions may well have valence-laden expansion policies that are unsuccessful because of a lack of demand from the desired students. The U.S. news media periodically reports on colleges that build hotel-quality student accommodations, luxury gymnasia, and water parks of amusement park caliber, all because these colleges are competing to attract students who desire (and perhaps expect) such amenities. Such colleges are of course targeting a population of students with

the resources to compensate for the costs of building luxury amenities. In understanding the consequences of allocative rulemaking, it is not enough, then, to consider aims (e.g., maintaining student quality) and audiences (e.g., faculty) alone. Without necessary demand from the relevant groups of students, valence-laden expansion policies will fail to have the anticipated effect.

A shift in focus to allocative rules and new measures of supply is an important corrective to the long-established research agenda that examines the effects of abstract expansion on IEO. The resulting literature has accumulated hundreds of estimates of the association between "expansion" and IEO, and yet, as it stands, we may know very little about the true relationship between expansion and IEO. It is a literature that, at best, acknowledges potential confounding variables before proceeding as if those confounders do not exist. Without information about the allocation rules under which new places are offered and without a true measure of the supply of educational slots, it is impossible to offer a convincing causal interpretation of over-time and cross-country associations between expansion and IEO.

Notes

1. In the literature on directed acyclic graphs (DAGs), to exclude an arrow from a causal diagram is to make a strong claim, namely, that there is *no* causal effect present. Nevertheless, the convention is to exclude exogenous, noncommon causes from the DAG (e.g., Elwert 2013:249). I therefore exclude the conventionally proposed causes of the supply of slots and of inequality of educational opportunity (IEO; and here "demand" is treated as an exogenous cause of IEO).
2. The main source for estimates of job vacancies in the United States is the Job Openings and Labor Turnover Survey. As BLS writes, "The program involves

the monthly collection, processing, and dissemination of job openings and labor turnover data . . . The number of unfilled jobs—used to calculate the job openings rate—is an important measure of the unmet demand for labor. With that statistic, it is possible to paint a more complete picture of the U.S. labor market than by looking solely at the unemployment rate, a measure of the excess supply of labor" (from http://www.bls.gov/jlt/jltwhat.htm).

3. One odd feature of Figure 1 is that a causal arrow links two variables that are contemporaneously measured. Sociologists would likely reject this explicit proposal as absurd, even while their research contrasts contemporaneous enrollment rates with estimates of IEO.

4. Note that an alternative measure of the size of an educational level might be completion of a given level of education. The argument made here with respect to enrollment would similarly apply to completion rates.

5. Some may question the logic of including maximally maintained inequality (MMI) in the class of theories positing a causal effect of expansion on IEO, given that MMI famously states that most changes in supply will *not* generate changes in IEO. However, MMI is clear that changes in supply will, at some threshold level (i.e., saturation), lead to changes in IEO. A causal effect is therefore proposed by MMI, even if the proposed effect takes the form of a nonlinear step function.

6. By example, Walters (2000, p. 252) writes that, "Local, state and federal policy-makers made the myriad policy decisions that allowed public schools to absorb all comers, such as decisions about school funding, school construction, teacher preparation, hiring, educational content, licensing and certification, educational curriculum, and educational selectivity. In doing so, they either responded to public pressure to do so or they received sufficient public support for these decisions."

7. Note that for the purposes of clarity, I will throughout this article assume that the equations underlying Figure 2 are linear additive. In general, DAGs assume that all causal effects will vary across units (for a discussion, see Elwert 2013), but such an assumption would substantially complicate the theoretical discussion and I therefore focus on describing the linear additive case.

8. The term "allocation rules" has been used in previous literature, but there is no standardized use of the term across different contexts. Meyer (1977:62) uses the term "allocation rules" to describe the power of education to determine rewards (i.e., its selection function), such that "[a]llocation rules . . . reign over both the students and the nonstudents, the educated and uneducated, the graduates and those who never attended." Others use the language of "allocation" to refer to the distribution of "opportunity" within the educational system. Here, I propose a narrow use of the term, whereby "allocation rules" are simply the rules that regulate the allocation of educational slots.

9. It is in fact not quite correct to state that unchanging allocation rules under expansion would be associated with stability in IEO. A simple model might assume that a valence-free expansion would lead to educational institutions working their way down the established queue for slots to a lower cut point. (Indeed, this appears to be the model called upon in work on MMI.) If the queue is defined by SAT scores and grades, expansion would allow a college to accept students with lower SATs and grades than would have previously been possible. But assuming stability in IEO when moving to a lower cut point means assuming a stable queue across the distribution of SAT scores and grades with respect to social origin. Given that virtually no characteristic could be expected to create a stable ratio across the whole queue, it is highly likely that unchanging allocation rules *would* generate changes in IEO. However, given the relatively slow pace of expansion, changes in the composition of the queue between old and new cut points are likely to be very small indeed, and thus, movement in IEO will be indistinguishable from a "no change" result.

10. Alon (2014), in her reply to Tam and Jiang (2014), states that she makes no prediction about which of these mechanisms will dominate in a period of reduced competition and that the relative importance of "adaptation" and "exclusion" is an empirical issue (p. 822). However, it is clear from both the diagram in Alon (2009:738) and the accompanying narrative describing the model that the role of "exclusion" (i.e., admissions requirements) is expected to be substantially greater than zero. This is further emphasized in Alon (2014:819), in which Tam and Jiang (2014) are criticized for assuming that the "adaptation" mechanism is likely to be dominant in a period of low competition.

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