MODELING EDUCATIONAL ENTREPRENEURSHIP AND ITS SOCIAL CONSEQUENCES: A 'SKIN-IN-THE-GAME' APPROACH TO EXPLORING THE RELATIONSHIP BETWEEN FREE ENTERPRISE AND SOCIAL POLICY

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ABSTRACT

This paper discusses how a simulation game modeling the effects of self-interested entrepreneurial effort in the educational market can help students understand current issues relating to public policy, traditional versus non-traditional educational programs, and societal well-being. The model posits a system in which educational entrepreneurs face a market of students possessing differing levels of educational preparation. Self-interested managers can trade off specialization and scale educational strategies to maximize the value of their outcomes, in the process, determining the amount and distribution of educational achievement in the social system. The debriefing process enables an instructor to draw on students' personal experience with the simulation ("skin in the game"), giving students an appreciation of how their decisions as educational managers impact social welfare. The game also provides an opportunity for students to apply the principles of marketing and managerial accounting as they relate to educational enterprises, thus developing their ability to transfer generalizable knowledge from one application to another.

INTRODUCTION

One of the major concerns of modern educational policy is how educational managers deploy societal resources for optimal educational achievement. Looking specifically at the United States, efforts have largely fallen short. For instance, the "no child left behind" initiative was plagued by unintended consequences, such as the systematic exclusion of disadvantaged students from educational institutions that have the flexibility of selecting applicants by their level of educational preparation (Lacireno-Paquet, Holyoke, Moser, & Henig, 2002). Disadvantaged students—those who, generally for socioeconomic reasons, are poorly prepared for educational performance—consume more educational resources per unit of learning than highly-prepared students because their schools must compensate for their lack of preparation. This puts educational institutions who serve them at a financial disadvantage (Ladd, 2002; Ladd & Walsch, 2002). If the mandate is to educate all people within a given population group, institutions that do not have the ability to select students are left with a disproportionately large number of disadvantaged students, who are not prepared for educational achievement.

Traditional public schools' (TPS) enrollment criteria are typically defined by geographic area, leaving their educational managers without control over student admissions. Their budgets also tend to be funded, in part, through local property taxes. This creates a particularly difficult problem for students from low socioeconomic status (SES) neighborhoods. Given local funding, their schools tend to have lower budgets, thus putting students at an educational disadvantage (Ladd, 2002; Sirin, 2005). Disadvantaged students increase the cost of education, putting additional strain on already low budgets, thus creating a downward educational spiral.

Given the reasoning outlined above, we should not be surprised that much of the policy dialog has centered around whether education ought to be relegated to geographically based TPS and/or non-traditional public schools (NPS) with more flexible enrollment criteria

(Lacireno-Paquet, et al., 2002; Garcia, McIlroy, & Barber 2008; Dee & Fu, 2004; Harvey, 2012; Ni, 2012). Nor should we be surprised that the controversy is intense, since both alternatives have significant advantages and disadvantages. On one hand, the TPS concept ensures that opportunistic educational managers do not exclude disadvantaged students in an effort to increase overall school performance, thus preserving disadvantaged students' opportunity for education (Darling-Hammond, 1994). On the other hand, institutions with more flexible enrollment criteria have opportunities to increase educational efficiency by specializing in addressing the needs of particular student groups, thus delivering greater educational achievement than TPSs for the resources they have expended (Levin, 2012).

Flexibility should harness the power of competition to make optimal use of budgeted resources if educational institutions are rewarded for the efficiency with which they educate the students they are serving. For instance, a school might specialize in addressing the needs of poorly prepared students, developing a program that addresses the issues in prior preparation as well as those relating to the educational material itself. Unfortunately, given the fact that disadvantaged students cost more to educate, the same competition may motivate institutions to pursue strategies that exclude these students, thus subverting public objectives (Ladd, 2002). Even in the absence of discriminatory enrollment criteria, evidence suggests that disadvantaged students who are given the choice of charter school enrollment tend to prefer low-performance TPS. Presumably, one of the major motivations is that students are more comfortable working with other students who possess similar backgrounds (Ni, 2012). This de-facto exclusion of disadvantaged students is not difficult to understand. If these students cost more to educate, and a school maintains high educational standards, but does not invest in the remedial programs or instruction from which these costs arise, it follows that disadvantaged students will tend to drop out due to sheer frustration. In contrast, institutions with inflexible enrollment criteria do not exclude disadvantaged students, but their inability to specialize tends to decrease their educational efficiency, potentially discouraging managers whose compensation is based on efficiency.

The principle underlying the discussion of TPS and NPS centers on rewards, not organizational structure and administration. The purpose of enrollment flexibility is to facilitate specialization, and hence, the development of programs that are more effective in addressing the needs of a particular type of student (Bidwell & Kasarda, 1975) without excluding disadvantaged students. This, in turn, suggests educational managers should be rewarded whose innovations create greater educational achievement per level of resources consumed (Ladd, 2002). If this can be done, it opens the door to competition through which managers are motivated to ever more productive innovations. The resolution of the TPS-NPS conflict, then, would be to create incentives that promote innovation without biasing the system against disadvantaged students. While this is no mean task, it is not impossible. Its accomplishment depends on both the political understanding needed to design appropriate incentives and the management expertise needed to exploit them through innovative educational programs.

The purpose of this paper will be to explore the impact of educational structure (TPS versus NPS) and incentives by informing the discussion of educational policy with personal experience. The experience is delivered through participation in a simulation game in which players take the role of educational managers who create schools, compete for students, and deliver education to their students through the expenditure of scarce resources. Players will receive feedback on their educational efficiency and effectiveness, both at the school level (where it provides a basis for financial rewards) and the contribution of their educational effectiveness at the societal level (where it provides a basis for societal welfare). The post-game debriefing will link the school and societal perspectives, helping players understand the public dialog regarding educational policy and structure. This casts our institutional level simulation in the larger context of the societal objectives the educational managers are intended to serve.

Equation 1

$$SW_t = f\left(\sum_{j=1}^{J} E_{j,t}\right) \quad (1)$$

Where

SW_t	=	Societal welfare at time t
$E_{j,t}$	=	The magnitude of education achieved by individual j at time t
J_t	=	The total population of individuals at time t within society who are candidates for education.
$f(\ldots)$	=	A functional form that generates a positive societal welfare value for individuals j who receive a particular level of education E, and that generates a negative social welfare value for individuals j who receive a particular level of education E_i that falls below the threshold required for them to economically sustain themselves.

SOCIETY'S PERSPECTIVE

As a first step, let us consider the educational problem from society's perspective. Societal welfare increases with both the number of people who are educated and magnitude of education received. Both are important. If the system raises the average education level by focusing solely on high-performance students, the average will overstate societal welfare by discounting the importance of low-performance students who will be left without the economic or social advantages of education.

Conversely, if the distribution excludes additional education for high-performance students in favor of a more uniform distribution of basic education, the average will understate potential welfare by failing to exploit the contributions available from highly gifted individuals who, given the requisite level of education, might make transformative contributions from which everyone would receive disproportionate benefits.

While we might argue that a distribution containing individuals with particularly high levels of education might benefit the overall student population, the opposite is true for a distribution containing individuals with particularly low levels. Low levels of education create social costs that go beyond the lower standard of living experienced by the educationally disadvantaged themselves. These are reflected in the cost to society as a whole of welfare and other social programs designed to assist (among other people) those who do not have sufficient education to secure employment by which they can support themselves in our society.

We can model these societal factors through the following steps. For simplicity, we will assume that the function that converts individuals' level of education into societal welfare is constant across individuals. That is, individuals with identical levels of education contribute to or detract from society at an identical rate. This of course, is not the case. However, it is true in the statistical sense when our units of analysis are relatively large groups of people. Equation (1) will use individuals to represent all individuals in the population with the same level of education. It begins by positing a *societal welfare function*, stating societal welfare as a function of education.

Consistent with our earlier reasoning, we are assuming that there is a level of education above which the *societal welfare function* yields positive societal welfare and below which there exists a negative level of societal welfare. We assume that all education has a positive effect. However, when it fails to reach the educational threshold, the deficient population creates costs for society as a whole This is represented in Equation (2), where the *societal welfare function* takes two separate forms, depending on whether the level of education is above or below the educational threshold.

Note that societal welfare might be defined any number of different ways, including everything from issues relating to crime, the deterioration of neighborhoods and infrastructure, health-related costs, and governmental declining tax base to economic well-being. The primary connection to education appears to be indirect: Education creates human capital; human capital increases income; and income increases societal well-being (Lochner, 2004). However, rather than grapple with the problems associated with the various definitions of societal welfare, our model will avoid them by using income as a proxy. It will focus solely on the economic social welfare contributed by educated individuals. The break that signals the educational threshold, where $E_{j,t} > E^*$ in Equation (2), occurs when the educational level is high enough that individuals are able to find sufficient employment to economically support themselves. When individuals fall below this threshold, society steps in with welfare and other support programs that consume societal resources. For simplicity, we assume that all individuals who fall below the threshold reduce societal welfare at a constant rate per individual. Intuitively, the constant level of social welfare consumption can be interpreted as a level of societal resources required to enable an individual to subsist. This is expressed in Equation (3).

EDUCATION OPERATIONS

Now, let us shift our perspective from society to the individual educational institution, whose educational activities ultimately determine how effective the society

Equation 2

$$SW_t = \sum_{j=1}^{J_t} \begin{cases} f_H\left(E_{j,t}\right) & \text{for all } E_{j,t} > E^* \\ f_L\left(E_{j,t}\right) & \text{for all } E_{j,t} \le E^* \end{cases} \qquad (2)$$

Where

E^* = A level of education (threshold) above which an individual yields positive societal welfare, below or equal to which yields negative societal welfare.

$f_H(\ldots)$ = A functional form that generates positive societal welfare based on the level of education received.

$f_L(\ldots)$ = A functional form that generates negative societal welfare (social drain) based on the level of education received.

will be in educating its citizens. We assume that even traditional public schools (TPS) are subject to entrepreneurial activities. Educational managers respond to performance criteria and other incentives in the same manner as other managers, seeking rewards through innovation and superior performance (achievement and efficiency). The linkage between social policy and actual education is vested in the educational managers and the incentive systems (performance criteria and other incentives) society establishes for them.

We assume that educational achievement, $E_{j,t}$ in Equation (1), will ultimately be a product of the incentive systems driving the educational process managers are tasked with implementing. Educating an individual requires resources provided by society to educational managers. The level of education an individual achieves through a given quantity of resources is positively associated with the individual's intelligence, the individual's ability to apply, or leverage, one's intelligence in the educational process (social grooming), and the nature of the educational process itself. While intelligence clearly varies by individual, we assume that it is randomly distributed across population groups. That is, we will treat it as an exogenous endowment that cannot be changed through education. In contrast, social grooming is exogenous to the individual, but it is endogenous with respect to educational managers, who may develop programs that will change it over time.

Social grooming grows out of concept of social capital, as it has been applied in education. Social capital can be broadly defined in the educational context as the value added to educational transactions by the social influences that facilitate the educational process (Dika & Singh, 2002). These grow out of the work by Coleman (1988), who posited three forms of social capital: (1) obligations and expectations, (2) information channels, and (3) social norms. Of these, the first and third help ensure that students will understand and comply with the behaviors necessary to leverage their intelligence—behaviors such as organizing their time, attending class, doing homework, meeting deadlines, learning the material, thinking critically, and in the most advanced applications, learning to teach themselves. The second form of social capital, information channels, involves the utilization of social networks to gather information necessary to educational success.

We introduce the term "social grooming" to address the fact that, while the forces guiding educational success may be social in nature, the learning itself ultimately occurs within the individual. That is, an individual is "groomed" to think, feel, and ultimately, respond to educational stimuli in ways that improve intellectual and social ability, thus increasing his/her ability to learn. The term "social grooming" is adopted to differentiate learning that occurs through social capital activities from social capital itself. In the words of Coleman (1988), "unlike other forms of capital, social capital inheres in the structure of the relations between actors and among actors. It is not lodged … in the actors themselves …" (p. S98). In contrast, "social grooming" is what lodges in the individual learner.

As we have suggested, educational managers can improve social grooming by dedicating a portion of society's resources to remediating social grooming deficiencies, providing social capital to improve an individual's ability to apply intelligence in the learning process through mentoring programs, parent engagement, and so forth. Specifically, we assume that educational managers can increase social grooming at a *decreasing rate* by investing societal resources into such programs. In other words, we assume that grooming students for application of the most basic elements of the learning process (organizing one's time, attending class, doing homework, meeting deadlines, etc.) is less expensive than grooming students for higher-level processes (learning the material, thinking critically, and in the most advanced applications, learning to teach oneself).

The functional form that describes the conversion of levels of intelligence, social grooming, and societal resources into education is determined by educational managers through their decisions regarding the design and implementation of an educational process. The efficiency of a process in converting society's resources into education is negatively correlated with the standard deviation of social grooming within each program's student body. Intuitively, this implies that a manager can create economies of scope by customizing a learning environment to cater to a particular level of social grooming. For instance, we have noted that students from disadvantaged backgrounds often transfer from charter schools back to neighborhood TPS, even though the TPS offer an inferior education (Ni, 2012). Presumably, this reflects a tendency of the superior schools to address their better-prepared

EQUATION 3

$$SW_t = \sum_{j=1}^{J_t} \left\{ f_H \left[E_{j,t} \cdot \left(1 - ED_{j,t}\right) \right] + \left(w \cdot ED_{j,t} \right) \right\} \tag{3}$$

Where

ED_j = An indicator variable equal to 1 when the education level of individual j is sufficiently high that individual j yields positive social welfare at time t, and equal to 0 otherwise.

w = A constant rate of social welfare consumed by individuals whose education level falls below the educational threshold above which the individual contributes to social welfare.

students, leaving less-prepared students confused and uncomfortable. This problem could be addressed by a school that focused on the specific problems of students with similar types and levels of educational deficiency.

Furthermore, the efficiency of an educational program is also a function of the size of the manager's student body. That is, there exist economies of scale through costs that increase at a decreasing rate relative to the number of students. Examples may include costs of physical facilities, education equipment, and administrative staff. There are also diseconomies of scale in individual class size and teacher class load. As such, we assume that the efficiency of education gained per societal resource investment in education increases at a *decreasing rate* in the number of students enrolled in an educational program.

Assume that the quantity of resources required to educate an individual varies from zero to infinity. We can represent the effect of an educational program, including resource investments in social grooming and educational processes, through Equations (4) and (5), respectively.

In Equation (4), educational institution k's return on an investment in social grooming of a student, j, depends on the student's intelligence, $I_{j,k}$, multiplied by a response parameter, a^{SG}, indicating the degree to which different levels of intelligence leverage the investment in social grooming. Note that the impact of social grooming expenditures are adjusted by a root, m, of the beginning level of social grooming, $SG_{j,k,t-1}$. This represents the fact that institutions experience diminishing returns on investments in higher levels of social grooming. If m were equal to 2.0, and a student had no social grooming (a level of 1.0), the investment would have full, or maximum, effectiveness (1.0^{-2}=1.0). If a student had s grooming level of 2.0, the same investment would be only 25% as effective (2.0^{-2}=.25). This creates strategic tension for the educational manager, who must decide how much to invest

EQUATIONS 4 AND 5

$$SG_{j,k,t} = SG_{j,k,t-1} + EC^{SG}_{j,k,t} \cdot \left(a^{SG} \cdot I_{j,k}\right) \cdot SG^{-m}_{j,k,t-1} \tag{4}$$

$$E_{j,k,t} = E_{j,k,t-1} + EC^{E}_{j,k,t} \cdot \left(a^{E} \cdot I_{j,k}\right) \cdot \left(b \cdot SG_{j,k,t-1}\right) \cdot \left(d \cdot \left|SG_{j,k,t-1} - SG^{E}_{k}\right|^{p} \cdot\right) \cdot \left(J^{1/n}_{j,k}\right) \tag{5}$$

Where

$SG_{j,k,t}$	=	Social grooming level of individual j within educational manager k's population of students *after* the social grooming process (at time t) on a scale where an absence of social grooming would be defined as 1.0.
$EC^{SG}_{j,k,t}$	=	Resources devoted to socially grooming individual j within educational manager k's population of students for time period-ending t
$I_{j,k}$	=	Intelligence level of individual j within educational manager k's population of students
a^{SG}	=	Social grooming response parameter that describes the effect of intelligence on social grooming investment efficiency
m	=	Parameter that describes the slope of the concave function converting resources devoted to social grooming into social grooming
$E_{j,k,t}$	=	The magnitude of education achieved by individual j within educational manager k's population *after* the educational process (at time t)
$EC^{E}_{j,k,t}$	=	Resources devoted to educating individual j within educational manager k's population of students for time period-ending t
SG^{E}_{k}	=	Social grooming level targeted by educational manager k's educational strategy
$J_{k,t}$	=	The total number of students comprising the population managed by education manager k at time t
a^{E}	=	Education response parameter that describes the effect of intelligence on educational investment efficiency
b	=	Social grooming response parameter that describes the effect of the *level* of social grooming on educational investment efficiency
d	=	Social grooming response parameter that describes the magnitude of the effect of the *fit* between the level of a student's social grooming and the level of social grooming educational managers' curriculum is designed to educate
p	=	Educational efficiency response parameter that describes the slope of the effect of the *fit* between the level of a student's social grooming and the level of social grooming educational managers' curriculum is designed to educate
n	=	Parameter that describes the slope of the concave function converting resources devoted to education into education

in social grooming versus education. The lower the level of social grooming possessed by incoming students, the more attractive social grooming would become, whereas better groomed students would call for a greater investment in education.

Looking at Equation (5), we again see the leveraging effect of intelligence, where a^E determines the impact of $I_{j,k}$ on the effect of educational expenditures. We also see the leveraging effect created by social grooming, where b determines the degree to which $SG_{j,k,t-1}$ increases the efficiency of the educational budget. Third, we see how focusing the curriculum on a particular level of social grooming affects efficiency. The absolute difference between a student's level of grooming and the level targeted by the program, $|SG_{j,k,t-1}\text{-}SG^E_{,k}|$, indicates the program's degree of focus, where the larger the number, the lower the focus. The parameter p represents the relative impact of small versus large variations in students' social grooming, while d determines how important these are in determining educational efficiency. Finally, parameter n determines the effect of economies of scale on efficiency, where values between 0 and 1 indicate economies of scale whose magnitude decreases with increasing enrollments.

SOCIETAL RESOURCES AND MANAGER'S INCENTIVES

As discussed earlier, society endows educational managers with a discrete quantity of resources that can be used to increase social grooming and/or educate individuals within their educational program. The resources endowed can be construed as a discrete budget that an educational manager can allocate to social grooming and/or educational processes as depicted by equation (6). Although there are countless possible approaches to establishing an educational manager's societal resource endowment, for simplicity, we consider an approach where the societal resource endowment is based on a flat per student rate (v). This is described through Equation (7).

Consider an incentive system where educational managers' personal compensation is a function of the number of students educated and the magnitude of the change in educational level of students enrolled in their program. Equation (8) illustrates an incentive function that compensates managers based on the number of students who gain education and on the overall aggregate increase in education within the student body. The median measure addresses the need for broad educational achievement, whereas the total change encompasses potentially large changes in the educational level of a potentially limited number of students within the student body. Given this incentive system, educational managers' objective is to maximize both the breadth (across the student body) and the overall educational increase derived from the discrete societal resource endowment.

TRADITIONAL AND NON-TRADITIONAL PUBLIC SCHOOLS

Traditional public schools (TPS) differ from non-traditional public schools (NPS) in the flexibility of their admission policies. A TPS system is usually required to supply an educational option for any student within its geographic boundaries (Lacireno-Paquet, et. al., 2002). In contrast, while local laws often do not permit NPS to recruit a particular student population; NPS can still manipulate their student body by using entrance exams. If an NPS can demonstrate through an entrance exam that a student is unprepared for the lowest level academic class that the NPS offers, then the NPS can legally turn that student away (Lacireno-Paquet, et. al., 2002). Because academic success positively correlates with social grooming, NPS educational managers can effectively create a *lower limit* on the distribution of social grooming within the population of students (J_k) to avoid admitting students who are particularly costly to educate and/or are not well-suited to the school's curriculum $\left(SG_k^E\right)$. As such, this paper proposes a simulation where NPS managers have the flexibility to establish admission policies with a lower limit of social grooming $\left(SG_k^{MIN}\right)$. This enables participants taking the role of NPS educational managers, to explore the

Equations 6 and 7

$$\sum_{j=1}^{J_{k,t}} EC^E_{j,k,t} + \sum_{j=1}^{J_{k,t}} EC^{SG}_{j,k,t} \le EC^*_{k,t} \qquad \text{Societal Resources budget constraint} \qquad (6)$$

$$EC^*_{k,t} = v \cdot J_{k,t} \qquad \text{Societal Resources endowment} \qquad (7)$$

Where

$EC^*_{k,t}$ = Societal resources endowed to educational manager k for period-ending t

v = Endowment of societal resources per enrolled student

possibility of creating specialized programs that address a particular level of social grooming as a means of improving educational efficiency.

In contrast with NPS educational managers, TPS managers do not have the flexibility to establish admission policies that exclude students with a particular level of social grooming. However, they can still specialize through their choice of curriculum. When students have a choice between educational options *and* students desire to enroll in a program that is well-suited to their level of social grooming, they will naturally select the TPS program if it is best suited to their needs. To illustrate, consider an education market consisting of two educational programs, one NPS and one TPS. The manager of the NPS program establishes a mid-level social grooming minimum admission requirement and a curriculum targeting high-level social grooming students. The manager of the TPS program cannot influence the type of student enrolling their program through admission requirements. However, the TPS manager can dissuade mid- and high-level social grooming students from choosing his/her program by establishing a curriculum targeting low-level social grooming students. By doing so, the TPS program enjoys economies of scope derived from a relatively homogeneous population of low-level social grooming students, effectively specializing its program.

DEVELOPING THE SIMULATION GAME

The objective of our game is for educational managers to develop programs that will maximize social welfare (*SW*) through their educational impact, subject to their budget constraint (equation 6) within a competitive market consisting of a discrete number of students (*J*). Managers of TPS must make three decisions: First, they must decide what level of social grooming their curriculum is targeting $\left(SG_k^E\right)$; second, they must decide what portion of their societal resource endowment is devoted to the social grooming process $\left(\sum_{j=1}^{J_k} EC_{j,k}^{SG}\right)$; and third, they must decide what portion of their societal resource endowment is devoted to the educational process $\left(\sum_{j=1}^{J_k} EC_{j,k}^{E}\right)$. Managers of NPS face one additional decision, that of admission policy $\left(SG_k^{MIN}\right)$. Table 1 describes the decision variables faced by traditional and non-traditional public school managers: (see Table 1 on the page 154)

As discussed earlier, competition for students arises when students may choose from more than one educational program option and students desire to enroll in a program well-suited to their level of social grooming. Equation (9) reflects students' enrollment decision function within this competitive environment: (See equation 9 on pg 155)

The student enrollment function (9) indicates that the number of students included in educational manager *k*'s population ($J_{k,t}$) is limited to students meeting the minimum social grooming admission requirement $\left(SG_k^{MIN}\right)$ *and* to students whose level of social grooming is best matched with the curriculum $\left(SG_k^E\right)$ offered by manager *k* relative to all other curricula available $\left(SG_{\sim k}^E\right)$.

DEBRIEFING

The simulation game debriefing should address three issues: Assessments of educational efficiency, compensation, and social welfare derived from educational effectiveness (ΔE_t). Educational efficiency reflects the

Equation 8

$$\pi_{k,t} = q \cdot \overline{\Delta} E_{k,t} + w \cdot \left(\sum_{j=1}^{J_{k,t}} \Delta E_{j,k,t} \right) \qquad \text{Compensation function} \qquad (8)$$

Where

$\pi_{k,t}$	=	Compensation earned by educational manager *k* for education produced in period-ending *t*
$\overline{\Delta} E_{k,t}$	=	Median change in educational level of individuals within educational manager *k*'s population of students for period-ending *t*
$\Delta E_{j,k,t}$	=	Change in educational level of individual *j* within educational manager *k*'s population of students for period-ending *t*
q	=	Educational managers compensation rate per *median* change in educational level
w	=	Educational managers compensation rate per *total* change in educational level

efficient use of limited resources in achieving educational effectiveness. The change in the level of educational effectiveness per unit of resources endowed provides a summary measure of educational efficiency $\left(\Delta E_{k,t} / EC^{*}_{k,t}\right)$. In addition, the debriefing should also include information about *sources of educational efficiency* such as temporal trends associating changes in educational efficiency with changes in economies of scope, the fit between students' social grooming and the educational curriculum $\left(\sum_{j=1}^{J_k} \left| SG_{j,k,t-1} - SG^{E}_{k} \right|\right)$. By so doing, the debriefing calls participants' attention to the benefits derived from early investments in social grooming and admission policy.

The second part of the debriefing should call attention to educational manager compensation. Compensation is partially determined by educational efficiency insomuch that managers use their limited resources to generate the most educational effectiveness possible (equation 8). However, compensation also reflects the breadth and magnitude of educational effectiveness achieved. As such, compensation provides participants with feedback regarding the breadth and scale of their education program. Comparing compensation with educational efficiency allows participants to realize the tradeoffs they made between the scale and efficiency of their educational program.

Finally, as discussed early in the paper, society endows educational managers with resources with the intent of maximizing social welfare through educational effectiveness. Recall that students achieving levels of education above the educational threshold contribute to social welfare, while those whose educational level is below the threshold consume social welfare. We propose that the final component of the debriefing include a discussion of social welfare (*SW*), both that generated by each participant and that generated in aggregate across all participants. The debriefing should specifically address the proportions of students that achieve educational levels above and below the educational threshold. This illustrates how particular educational strategies influence both the overall increase in and distribution of contributors to social welfare. By so doing, the participants can realize the full impact of their educational program choices on accomplishing society's educational objective.

SUMMARY AND CONCLUSIONS

The purpose of our proposed simulation is captured in the title of this paper: "Modeling Educational Entrepreneurship and Its Social Consequences: A 'Skin-in-the-Game' Approach to Exploring the Relationship between Free Enterprise and Social Policy." It is not meant to be a political statement, but rather, a tool for helping stakeholders in the shaping of our public school system to become more aware of how flexible/inflexible enrollment policies shape the strategies employed by educational managers. As educational managers in the simulated school management market, participants will have "skin in the game" in that they will experience the pressures of limited resources, the rewards of educational success, and the exhilaration of exploring alternative methods of achieving that success.

One of the obvious problems with this, or any simulation, is that the validity of the simulation itself is a function of its underlying assumptions. One of the critical assumptions in our proposed simulation is that of economies of scope – increased educational efficiency through targeting students with a specific level of social grooming. One might argue that education includes encouraging students with differing socioeconomic backgrounds to learn to respect each other through daily interaction. Insomuch as social grooming is correlated with socioeconomic conditions, educational programs that specialize in particular levels of social grooming may offer limited opportunities to encourage students to respect socioeconomic diversity. The literature has expressed

TABLE 1
PARTICIPANT DECISION VARIABLES

Decision Variable:	Description:	School Type:
SG^{E}_{k}	Level of social grooming educational manager *k*'s curriculum is designed to educate	TPS *and* NPS
$\sum_{j=1}^{J_k} EC^{SG}_{j,k}$	Resources devoted to socially grooming individuals within educational manager *k*'s population of students	TPS *and* NPS
$\sum_{j=1}^{J_k} EC^{E}_{j,k}$	Resources devoted to educating individuals within educational manager *k*'s population of students	TPS *and* NPS
SG^{MIN}_{k}	Admission requirements policy in terms of minimum level of social grooming	NPS *only*

concern that charter schools encourage self-segregation to the detriment of teaching respect for socioeconomic diversity (Ni, 2012).

An additional problem with simulation is its ability to adequately reflect all variables that influence outcomes. This paper focuses on how educational managers can design programs that specialize in meeting specific social grooming needs, independent of the roles of intelligence and learning disabilities in educational effectiveness. In practice, it may be difficult to determine if students are struggling academically because they lack social grooming, because they lack intelligence, or because of some other obstacle, such as a learning disability (Lindsay, 2007). We recognize the need for future simulations to design tradeoffs that may exist between economies of scope and scale along intelligence, learning disabilities, and other potentially dimensions of educational effectiveness.

To avoid discrimination, some states place legal restrictions on admission requirements available to NPS educational managers. As such, we recognize the need for policy research to determine the feasibility of creating an educational market predicated on the theoretical assumptions proposed in this paper. For example, future researchers may want to explore the role that state legislature plays in the conflict between economies of scope and student diversity. As mentioned earlier, society benefits from schools that maximize education among as many members of a population as possible. Principles of economics suggest that specialization is the best way to do this. However, most states also try to encourage student diversity, a goal that may conflict with economies of scope.

The simulation described in this paper focuses on how educational managers might trade off economies of scope and scale to design an educational program that maximizes educational effectiveness. Specifically, managers must balance the allocation of their resources between education and social grooming programs that will improve the students' ability to learn. This paper does not describe exactly what a social grooming program might entail. It would necessarily include a process designed to remediate any holes in the students' ability to learn efficiently. Such a process might include teaching study and time management skills. It would also likely incorporate processes designed to better utilize aspects of social capital as it is described in the education literature, particularly by increasing the expectation of continued education, discussing future careers, and facilitating positive social interactions between students who reinforce each other's commitment to educational success. Future research might explore what kind of grooming program or combination of programs is most likely to appeal to a particular student population.

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Equation 9

$$J_{k,t} = \sum_{j=1}^{J_t} j \quad \left| \begin{array}{c} SG_{j,t} \geq SG_k^{MIN}; \\ \left|SG_{j,t} - SG_k^E\right| \leq \left|SG_{j,t} - SG_{\sim k}^E\right| \end{array} \right. \qquad \text{Student Enrollment function} \qquad (9)$$

Where

SG_k^{MIN} = Lower limit of social grooming student admitted in educational manager k's program (equal to zero for TPS)

|… = Operator indicating contingent on … criteria are met

~k = All educational programs *not* managed by manager k

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