The Emergence of For-Profit Higher Education Institutions

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Abstract

This paper examines the market conditions that facilitate the entry of for-profit institutions into the higher education market. I show how, despite significant government financial support for public institutions, for-profit institutions may still find it profitable to enter the market. They do so by spending large amounts of money on advertising campaigns in order to attract students who are relatively more influenced by the persuasive effect of advertising. I show that entry is more likely the more government subsidies are targeted directly toward students, as opposed to institutions. Even if it decreases social welfare, the introduction of market conditions that are friendly to for-profit universities will allow a government to fulfill its objective of increasing participation in the higher education system.

Keywords: for-profit higher education institution, competition, entry, advertising


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One prospective student with financial difficulties, the complaint said, was promised in writing that “in five years she would have a job in a hospital, a big house in Florida, enough money to go to Disney World with her family and a new Lexus.”


1. Introduction

In the last 20 years, public, private not-for-profit and private for-profit higher education institutions (HEIs) in the U.S. have all experienced an important increase in their enrollment. Fig. 1 shows the evolution of the number of full-time-equivalent students enrolled (in millions). Up until the end of the 90’s, for-profit institutions played a minor role in the American higher education landscape. According to the statistics from the U.S. Department of Education (U.S. Department of Education (2011)), they now enroll almost two million students, or more than 10% of the student population.

Figure 1: Number of full-time equivalent students enrolled by type of institution (in millions)
For-profit HEIs are not uncontroversial. Several puzzling facts have surrounded the large expansion of the for-profit sector.

First, Chung (2009), Deming et al. (2012) and Lang and Weinstein (2012) have observed that the benefits from attending a for-profit institution are lower than from attending a comparable program in a traditional HEI (community college). This conclusion still holds after controlling for the endogeneity problem created by the self-selection issue as, on average, less able students tend to attend for-profit institutions.²

Second, according to the U.S. Government Accountability Office (2010), for-profit higher education programs are between six to 13 times more expensive than the ones offered in comparable traditional institutions (community colleges or four-year colleges).

Third, while only 10% of the students attend a for-profit college, they form 26% of borrowers and 43% of student loans defaulters (U.S. Department of Education (2011)). Further, Cellini (2012) computed that a student will have a positive net return from going to a for-profit HEI if and only if his additional earnings per year of education exceeds 8.5%, while Cellini and Chaudhary (2012) estimated these earning gains at only 6%. Considering that for-profit institutions offer programs in fields with excellent job prospects (Kinser (2007)), this raises ex-post the question for many students of the worthiness of this educational investment.

These observations are even more puzzling knowing that students see the programs offered by for-profit and by traditional (public and not-for-profit) institutions as close substitutes (Cellini (2009)). According to Chung (2012), this is particularly true for students with relatively lower cognitive and non-cognitive skills. Hence, both types of institutions have an overlapping student base and are active in the same market.

At first glance, if students are evaluating the costs and benefits of their education,³ they would likely have earned a higher net return by going to a

²Cellini and Chaudhary (2012) find no difference in the earning benefits for students who have graduated but they highlight a huge gap in graduation rates between the two types of HEIs.

³In this paper, we abstract from the externalities created by higher education. Little is known about the non-monetary effects of for-profit higher education. Persell and Wenglinsky (2004) is an exception; they observe that, compared with traditional education, for-profit education has a negative impact on the civic engagement of students (they are less likely to vote, to participate in political activities and to become involved in their
traditional HEI or even not pursuing a higher education at all, as opposed to attending a for-profit institution. Thus, the objective of this paper is to reconcile these observations with the emergence of for-profit HEIs and the theory of human capital.

My main argument is that, in order to attract students, for-profit institutions invest intensively in advertising campaigns. This strategy aims to attract students by increasing their perceived benefit of studying at a for-profit institution.

Table 1 compares the advertising intensities (total advertising expenditures divided by revenues) of 10 of the largest for-profit HEIs with a traditional (private not-for-profit/public) HEI and the average of the U.S. top-10 marketers. This ratio is 20 times higher for for-profit institutions than for a traditional HEI. The marketing intensity of for-profit institutions is, on average, more than double that of the average American top-10 firm in terms of advertising level. None of these firms even reach the ratio of the least advertising-intensive for-profit institution in my sample. These differences are even greater if one considers in addition expenses related to the recruitment and the admission of students. Based on the financial data of the 30 biggest for-profit companies in the U.S., the U.S. Senate Committee on Health, Education, Labor and Pensions (2012) observed that a total of 22.7% of their revenues are spent on these two categories.

It is not just the size of for-profit HEIs’ investments in advertising that has garnered attention. Recent testing by the U.S. Government Accountability Office (2010) shows that for-profit institutions have repeatedly engaged in questionable marketing practices. In their recruitment campaigns, several for-profit colleges were accused of exaggerating salaries after graduation, of giving false information about the college’s accreditation, and of misrepresenting graduation rates or future employment prospects. Similar conclusions have been drawn by the U.S. Senate Committee on Health, Education, Labor and Pensions (2012). Several lawsuits concerning deceptive recruitment practices are still pending.4

This paper develops a theoretical framework that illustrates how for-profit institutions have been able to enter the higher education market by investing

Table 1: Advertising intensities of HEIs and of the average top ten marketer in the US

<table>
<thead>
<tr>
<th>Marketer</th>
<th>Advertising Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Public education</td>
<td>11.1%</td>
</tr>
<tr>
<td>Apollo Group</td>
<td>12.7%</td>
</tr>
<tr>
<td>Bridgepoint Education</td>
<td>11%</td>
</tr>
<tr>
<td>Capella Education</td>
<td>15.1%</td>
</tr>
<tr>
<td>Career Education, Inc.</td>
<td>14.3%</td>
</tr>
<tr>
<td>Corinthian Colleges Inc.</td>
<td>9.2%</td>
</tr>
<tr>
<td>DeVry Inc.</td>
<td>11.7%</td>
</tr>
<tr>
<td>Education Management</td>
<td>10.4%</td>
</tr>
<tr>
<td>Strayer Education Inc.</td>
<td>11%</td>
</tr>
<tr>
<td>Universal Technical Institute</td>
<td>7.5%</td>
</tr>
<tr>
<td>Traditional American HEI</td>
<td>maximum 0.5%</td>
</tr>
<tr>
<td>Average top 10 marketer</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

*Source: Steinerman et al. (2011), LipmanHearne (2010) and Belleflamme and Peitz (2010).*

In advertising and influencing students’ perceived benefit of their educational programs. Through their advertising campaigns, for-profit HEIs are able (1) to influence a portion of the student market such that these students will consider their existence when deciding to pursue their studies and (2) to persuade them of the supposedly high benefits that can be derived from completing their programs (Königbauer (2007)). Due to naivety, students who would normally be relatively less inclined to attend a traditional institution will be relatively more impacted by the persuasive effect of advertising. In other words, advertising explains the overestimation of the benefits from studying at a for-profit HEI.5

I formalize this idea by building a mixed-duopoly model between HEIs where the incumbent has multiple objectives. On the one hand, it cares about the prestige derived from the educational programs it offers, and on the other

5A closely related argument has been developed in intertemporal behavioral models (DellaVigna and Malmendier (2004)) to explain puzzling quality/price market outcomes for goods and services with delayed benefits. Observed consumer decision making can be predicted by assuming that consumers are naive, defined as the overconfidence about the lack of time inconsistency of their own preferences. Note that compared to this approach, a student’s decision-making process is simplified and static. I focus on the role played by this naivety bias (as in Gabaix and Laibson (2006)) in strategic interactions between institutions.
hand, it values the research produced in the institution. The threat of entry by a for-profit firm, which uses educational programs to attain its financial objectives, is endogenized.

The model provides several useful findings. It supports the fact that for-profit HEIs tend to charge higher tuition fees the more students are subsidized to study there. This is in line with the Bennett hypothesis, according to which institutions react to an increase in subsidized loans or grants programs available to students by setting higher fees. Second, I show how a change towards a demand-side funding of education, rather than a supply-side funding system, facilitates the entry of for-profit HEIs when students have (at least partial) access to this loan/grant system to study at for-profit HEIs. This model brings attention to one of the caveats of demand-side subsidies used to promote competition: the consequence related to the inability of students to correctly assess the benefits of education. Third, I derive the conditions under which for-profit HEIs will prefer not to improve the quality of the education they provide. Finally, I highlight why governmental authorities might still find it profitable to ease the entry of for-profit institutions, despite the decrease in social welfare that this creates. I argue that it allows governments to better reach their objective of increasing the participation of students in the higher education system.

The paper is organized as follows. Section 2 surveys explanations of the emergence of for-profit HEIs from the economic and higher education policy literature. The policy context is discussed in Section 3. The model is developed in Section 4. Section 5 describes the equilibrium outcome and provides a welfare analysis. Section 6 discusses the robustness of the results as well as their policy implications. Section 7 concludes.

2. Literature Review

Several explanations of the emergence of for-profit institutions have already been discussed in the economic and higher education literature (Breneman et al. (2006)). On the supply side, Ortmann (2001) and Kinser (2007) argue that the business model of for-profit institutions makes them more cost effective. Many for-profit institutions have shifted from being enterprise colleges owned and managed by the same legal person (individual, family or corporation) to being multi-campus, publicly traded corporations. This has allowed them to take advantage of regulatory and marketing economies of scale and to have quick access to funds by issuing additional shares in order
to be responsive to the market demand. For Winston (1999), the objective of traditional (public or not-for-profit) HEIs makes them less cost-effective. This is due to the positional nature of competition, which makes them spend resources to achieve a higher rank in the hierarchy of HEIs, by investing in research rather than in their educational programs. According to Turner (2006), for-profit providers were able to enter the market thanks to the inelastic supply of traditional institutions.

On the demand side, the reduction in the gap between tuition at a traditional institution and tuition at a for-profit institution has narrowed (Cellini (2010)). On the one hand, over the last 10 years, traditional institutions have raised their tuition fees. On the other hand, there has been an increase in funding to the Federal Pell Grant Program and to the G.I. Bill program for veterans, which students attending for-profit colleges are entitled to use. Coupled with the increasing demand for education, this change could explain the recent emergence of for-profit institutions.

However, these explanations cannot altogether reconcile the co-existence of the stylized facts without violating the theory of human capital. ⁶ To my knowledge, only one argument has been formalized prior to this study that can explain the growing existence of for-profit institutions in the U.S., considering their lower quality and their higher tuition fees. ⁷ This explanation has been developed by Brunello and Rocco (2008) for the competition between private and public compulsory education. Their basic idea is that private institutions offer programs of a lower standard, which means that stu-

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⁶Note that even if traditional institutions were capacity constrained, this could not explain the decision of students to study at a for-profit institution rather than not pursuing higher education. Also note that, in Fig. 1, the number of students enrolled in traditional institutions has continuously increased throughout the past 20 years, while the number of institutions, as pictured in Fig. 2 (see Appendix), has been stable. Therefore, traditional institutions have increased their individual capacity. According to Bound and Turner (2007), this is especially true for community colleges, which have an elasticity of supply close to one. Hence, students are not constrained to go to a traditional institution at the aggregate level, even if this might still be an issue in some locally congested areas, as discussed in Turner (2006) and in Cellini (2009).

⁷Martínez-Mora (2006) starts with the same price/quality observation for the compulsory education system. However, he uses a line of argumentation less adequate for the higher education sector, which is mainly funded at the state and at the federal level. His main idea is that tuition-free public schools of high quality have additional implicit costs for students in the form of a higher tax burden and higher housing rents.
dents can graduate for a lower cost of effort. They show that this arrangement can survive a majority voting system if the costs of a higher standard for the private school are low compared to its benefits. This line of argumentation is complementary to mine.\footnote{Low standards in for-profit HEIs are alleged in a report from the U.S. Government Accountability Office (2011). Also note that this concept of effort cost could be extended to opportunity costs. For-profit institutions tend to be located in easily accessible places (highway exits, shopping malls, business districts, etc.) and offer very flexible programs (evening and weekend classes, accelerated degrees, etc.).} However, it is not considered by my model, which instead highlights the role played by the persuasive effect of advertising.

To fit with the context of higher education, I reconsider several aspects of the Brunello and Rocco (2008) model. First, in line with actual observations, not all individuals choose to pursue a higher education. Hence, students’ enrollment should be endogenized. Second, Brunello and Rocco (2008) assume that for-profit institutions are always active in the market, while this is not true in many higher education markets (Kinser (2007)). The entry (or lack thereof) of the for-profit institutions is therefore endogenized in my model. Third, Brunello and Rocco (2008) assume that private not-for-profit schools maximize profits. As argued in Besley and Ghatak (2005), this is unrealistic, given the mission-oriented objectives and the non-distribution constraint associated with their not-for-profit status. This makes them quite similar to a public institution. In the case of traditional HEIs, stakeholders ensure that this mission is attained and profits are reinvested in the organization’s activities. On the other hand, for-profit institutions are managed such that returns for shareholder are maximized. Hence, educational programs are only a means to achieve this monetary objective. In addition to this, when an asymmetry of information exists between the institution and consumers, not-for-profit and public institutions can credibly commit to students about what they sell. Due to the non-distribution constraint, they will invest in the non-contractable quality of what they offer in the market (Hansmann (1980) and Glaeser and Shleifer (2001)) and they won’t exploit the existence of consumer biases (Bubb and Kaufman (2011)). Hence, in this paper, I look at the competition between a traditional mission-driven HEI and a for-profit HEI, when the latter takes advantage of the existence of student’s’ biases related to their naivety.
3. Policy Context

On June 2, 2011, the Obama administration released “gainful employment regulations”, which change the conditions to qualify for federal aid (for-profit institutions have been eligible for these “Title IV” funds since 1972, when there was a change to the *Higher Education Amendments of 1965*). These regulations were introduced in response to growing discontent around for-profit colleges. As a result of the changes, starting in 2015, an institution’s students will only be able to qualify for federal aid if at least 35% of the institution’s former students repay their loans, based on an annual loan payment that is less than 30% of the student’s discretionary income or 12% of total earnings.

In the U.K., the financing model for universities changed as of the 2012-13 academic year. Direct teaching grants to universities were cut, with the missing revenues financed by higher tuition fees. Starting in 2012-13, universities could charge annual tuition fees of up to £9,000 (as opposed to £3,375 before). In addition, a subsidized income-contingent loan system was introduced, but was only made available to students attending accredited universities. Since 2010, the University of Buckingham and BPP University College have been the only accredited for-profit HEIs. Other than these two institutions, the presence of for-profit institutions is rather limited.

The British government recently published a white paper that examines the possibility of further opening doors to private for-profit HEIs in order to “promote the development of a more diverse, dynamic and responsive higher education sector where funding follows the student and the forces of competition replace the burdens of bureaucracy in driving up the quality of the academic experience” (U.K. Department for Business Innovation and Skills (2011), p. 24). In other words, the government suggests that the competition created by for-profit providers can lead to better functioning traditional HEIs. A new regulatory framework was expected for the 2012-13 academic year, but these plans have been postponed (The Telegraph (2012)).

The presence of for-profit HEIs is minimal in the rest of Europe (except in some eastern European countries and for some advanced specialized programs in several countries). However, there is a push by some policy makers for a different funding system for European universities (Aghion et al. (2010) and Van Der Ploeg and Veugelers (2008)). These policy makers argue for a bigger private investment in universities, especially through an increase in tuition fees. However, students would also have access to funding sources, in
the form of competitive grants and through a loan system, to finance their education. Depending on the system for accrediting universities, this might open the doors of the higher education sector to new institutions, including for-profit ones. For-profit HEIs are quite active in Chile and in some Asian countries (Kinser (2007)). However, it is difficult to find accurate information about for-profit HEIs in these countries. Their legislations are quite different and relatively difficult to grasp. The ownership structure of for-profit institutions is also very different (they are less likely to be publicly traded) and the information about them is quite diffuse.

4. The Model

In this section, I first examine the case where a traditional HEI acts as a monopoly. Then, I model the case where entry of a for-profit HEI can occur and the three possible kinds of behavior of the traditional HEI: blockaded entry (when it acts as a monopoly and no entry is observed), deterred entry (when the traditional HEI strategically drives the for-profit HEI out of the market) and accommodated entry (when both the traditional and for-profit HEI coexist).

4.1. Monopoly Case

Students decide whether or not they want to study at a traditional HEI based on a simple static cost-benefit analysis. Students benefit from studying because it increases their productivity. This can be interpreted as the discounted present value of further studying, which I refer to as the productivity premium. If potential students choose to study, they must pay a tuition fee. The tuition fee can be partially subsidized in the form of a grant, a voucher system, a student allowance or a subsidized loan system. The productivity premium depends on \( q_u \), the quality of the education provided, and on the student’s ability, \( \theta_s \), which is uniformly distributed between 0 and 1. The tuition fee paid to the HEI is represented by \( f_u \). Students only pay a share \( z_u \) of this tuition fee; the government subsidizes the remaining \( 1 - z_u \). A student will decide to study if his net utility from studying is weakly positive. The net utility of going to the traditional HEI is such that:

\[
U_t(\theta_s) = \theta_s q_u - z_u f_u
\]
Students’ net utility derived from his education decision is shown in Fig. 2. The traditional HEI (which could be either not-for-profit or public) maximizes its utility $U_u$ subject to a budget constraint. Utility is composed of two elements: one related to its educational activities and another related to its research activities. When valuing education, the traditional HEI cares about the total productivity increase it generates. For simplicity, research activities are valued by the revenues, $R$, invested in this activity. The relative importance that the HEI places on its educational activities compared to its research output is described by $\gamma$. The objective of the traditional HEI can

\[ U(\theta, R) = U_u(\theta) + \gamma R \]

9. This second objective captures the fact that teaching activities have an opportunity cost. Interpreting the opportunity cost as being research activities seems quite natural if one considers a research university. For other types of institutions, this can also be interpreted as the other missions (like local economic development for a community college or the spread of beliefs for religious institutions) pursued by the institution. This could also be interpreted as the extent of rent-seeking expenditures arising in the institution (although I assume that social welfare will positively increase in revenues).
be written as:

\[ \gamma \int_{\theta_s}^{1} \theta_s q_u \, d\theta_s + R \]  

(1)

The traditional HEIs budget is as follows. Revenues are based on the number of students the HEI enrolls. The institution receives a tuition fee, \( f_u \), for each student \( N_u \) that it enrolls. In addition, the government provides a direct per-student subsidy, \( s_u \). There are two types of expenditures: research investments, \( R \), and a per-student cost of providing education, \( c_u \). I assume that the unit cost of education is linearly increasing in its quality such that: \( c_u = \delta q_u \). The budget constraint of the traditional HEI is as follows:

\[ N_u f_u + N_u s_u = R + N_u c_u \]  

(2)

I suppose that the only tool at the disposal of the HEI in order to balance its expenditures between research and education is to choose the quality of its education, \( q_u \).

In this monopoly case, the timing of the game is the following:

**Stage 1:** The HEI chooses the quality of its educational programs.

**Stage 2:** Students decide whether or not to study.

Under this specification, a student who is indifferent between studying and not studying in stage 2 is represented by \( \theta = \frac{z_u f_u}{q_u} \) and the HEI’s enrollment is \( N_u = 1 - \theta \).

In stage 1 of the model, I can rewrite the budget constraint in Eq. 2 explicitly with respect to \( R \) and replace it in the objective function in Eq. 1. After simplification, I can rewrite the objective function as:

\[ \gamma \int_{\theta_s}^{1} \theta_s q_u \, d\theta_s + (1 - \theta)(f_u + s_u - \delta q_u) = \gamma \frac{q_u}{2} \left( 1 - \left( \frac{z_u f_u}{q_u} \right)^2 \right) + (1 - \frac{z_u f_u}{q_u})(f_u + s_u - \delta q_u) \]  

(3)

The first-order condition from maximizing Eq. 3 with respect to \( q_u \) is:

\[ \frac{\gamma}{2} \left( 1 - \left( \frac{z_u f_u}{q_u^*} \right)^2 \right) + \gamma \left( \frac{z_u q_u^*}{q_u^*} \right)^2 - \delta \left( 1 - \frac{z_u f_u}{q_u^*} \right) + (s_u - \delta q_u^* + f_u) \frac{z_u f_u}{(q_u^*)^2} = 0 \]  

(4)

I observe four effects of a marginal increase in \( q_u \). First, an increase in \( q_u \) leads to an increase in the productivity premium. Second, it causes additional student to enroll at the margin. Third, it leads to a diversion of funding away from research. Fourth, the increase in enrolment will increase both revenues
and expenditures. From Eq. 4, I find that, at the optimum, the monopoly HEI will set the quality of its education at:

\[ q_u^* = \sqrt{\frac{\gamma (z_u f_u)^2 + 2 z_u f_u s_u + 2 z_u f_u^2}{2\delta - \gamma}} \]

I assume that \(2\delta - \gamma > 0\) is respected; otherwise, the two first positive effects will be too important and an infinitely high quality level will be chosen. Therefore, the model shows that the quality of education chosen increases in \(f_u, \gamma\) and \(s_u\), and decreases in \(\delta\). An increase in \(z_u\) will also lead to an increase in the quality of the programs offered. This is needed to compensate for the rise in tuition to be paid, in order to keep attracting students.

4.2. Entry Case

I now consider the case where a for-profit HEI can choose to enter the market. This decision will depend on the impact of the different parameters of the model on the anticipated profit of the for-profit HEI. Specifically, it depends on the direct impact of a parameter related to anticipated profit, and on the indirect impact of the quality of education chosen by the traditional HEI. The traditional HEI will choose its quality level in order to block, deter or accommodate entry. The for-profit institution will try to enter the higher education market using intensive advertising campaigns. The strategic game is as follows:

**Stage 1:** The traditional HEI chooses the educational quality of its programs.

**Stage 2:** The for-profit HEI decides to either enter or not enter the market.

**Stage 3:** If the for-profit HEI enters, the for-profit HEI sets its level of advertising and its tuition fee.

**Stage 4:** Students decide to study at the traditional HEI, study at the for-profit HEI, or not study.

Advertising is modeled similar to Königbauer (2007). It plays a dual role of segmenting the market by making a share of the potential student population consider the for-profit HEI’s existence when making their education decisions, and of persuading these potential students to go enrol by upwardly
distorting the perceived benefits from the for-profit HEI’s educational program.

Formally, there is a fraction $\phi$ of potential students who consider the existence of the for-profit HEI when making their educational choice. This is the exposed part of the student population. The $1 - \phi$ remaining students are unexposed and can only decide whether or not to study at the traditional HEI. The cost of advertising, $\Phi(\phi)$, is such that $\Phi(\phi) = \frac{\phi^2}{2}$. The fraction of exposed students is randomly chosen from the population of potential students, i.e. it is independent of the student’s ability.

The perceived benefit of the for-profit HEI’s education, from the perspective of exposed students, depends both on the actual quality of education provided and on the distortion created by advertising. These two components cannot be disentangled by the students, but are known by both HEIs. I assume that, as with a traditional HEI, more able students benefit more from education at a for-profit HEI, as represented by $q_\pi$. The upward naivety bias created by the persuasive effect of advertising positively depends on $t$, the maximum level of opacity concerning the benefits of studying at the for-profit HEI. In the context of higher education, this opacity arises from the impossibility to certify ex-ante that the perceived benefits received from an educational program will be effective ex-post. We assume that this persuasive effect is smaller for relatively more able students. This hypothesis is supported by the cognitive learning literature, which analyzes how people respond differently to persuasive communication (see a.o. Greenwald (1968)). In the higher education context, it also seems to be supported by Chung (2012), who observes that students with relatively less cognitive and non-cognitive skills have more misconceptions about the benefits of higher education. The specification of the distortion created by the persuasive effect of advertising will be $(1 - \theta_s)t$. For simplicity, I assume that these two effects enter the student’s utility function in an additively separable manner. This way, we will have that relatively less-able students will be the most tempted to study at a for-profit HEI.

The costs for students to study at the for-profit HEI is modeled similarly to the costs of study at the traditional HEI. The for-profit HEI charges a tuition fee $f_\pi$, of which a share $z_\pi$ must be paid by students (the rest is subsidized by the government). Students’ net utility from attending a for-profit HEI is such that:

$$U_\pi(\theta_s) = \theta_s q_\pi + (1 - \theta_s)t - z_\pi f_\pi$$
Students’ net utility from attending a for-profit HEI and from attending a traditional HEI is pictured in Fig. 3. Note that an increase in $t$ will change the slope of a student’s utility derived from attending the for-profit HEI. The for-profit HEI does not receive any direct funding from the government, although its students can be subsidized to study there at a co-payment rate $z_\pi$. In addition to a per-student unit cost of education linearly increasing in the quality of education $c_\pi = \chi q_\pi$, it faces a fixed entry cost $F$ and the cost of advertising. $N_e^e$ is the share of exposed students who decide to enroll at the for-profit HEI. When entry occurs, the maximization problem of the for-profit HEI is such that:

$$\max_{\phi,f_\pi} \phi N_e^e(f_\pi - c_\pi) - \frac{\phi^2}{2} - F$$

I solve the game using backwards induction, starting from the student’s decision to participate.

I will make further restrictions on the parameters analyzed. In line with the American higher education landscape discussed in the introduction, I assume that the quality of education is higher in the traditional system ($q_u > q_\pi$) and
that the education provided there is less costly \((f_\pi > f_u)\). In my framework, \(q_\pi\) is exogenous. This can be interpreted as the minimum level of quality required in order to be accredited to host students receiving government subsidies.\(^{10}\) I also assume that \(t = 0\) for the traditional HEI and that it will not try to persuade students via advertising campaigns. This is in line with the conclusions drawn by the incomplete contract theory literature. As argued in Bubb and Kaufman (2011), the ownership structure of traditional HEI (more precisely, its non-distribution constraint), plays the commitment role of not taking advantage of biases by running intensive advertising campaigns.

**Stage 4**

Two segments of the student market exist, depending on whether or not a potential student has been exposed to the presence of for-profit higher education. The probability of ending up in a particular market segment depends on the level of advertising, \(\phi\), which is chosen in stage 3 of the game. The \(1-\phi\) segment, which represents unexposed potential students \((u)\), chooses between attending the traditional institution and not studying. Their enrollment function is:

\[
N_u^u = 1 - \overline{\theta}_s = 1 - \frac{z_u f_u}{q_u}
\]

In this segment of the market, the traditional HEI behaves as a monopoly. The \(\phi\) segment, which represents exposed students \((c)\), choose between attending the traditional HEI and the for-profit HEI. A student of ability \(\tilde{\theta}_s\) is indifferent between the two types of institutions such that \(U_\pi(\tilde{\theta}_s) = U_t(\tilde{\theta}_s)\). This can be explicitly defined by

\[
\tilde{\theta}_s = \frac{z_u f_u - z_u f_u + t}{q_u - q_u f_u - t}. 
\]

For tractability, I assume that the market for exposed students is fully covered. Two conditions, which can be better understood from Fig. 3, need to be respected for this. The first condition \((t \geq z_\pi f_\pi)\) guarantees that the least-able student (i.e. where \(\theta_s = 0\)) always decides to study at the for-profit institution. The second condition \((t \geq \frac{z_\pi f_\pi q_u - z_u f_u q_u}{q_u - z_u f_u})\) implies that the indifferent student derives a positive net utility from studying \((U_t(\overline{\theta}_s) = U_\pi(\overline{\theta}_s) \geq 0)\). Hence, I will assume throughout the paper that \(t\) is sufficiently large, i.e.

\(^{10}\)In Section 6, I also derive the condition needed such that an increase in \(q_\pi\) has a negative impact on the entrant’s profit, i.e. the condition such that the for-profit institution has no incentive to improve the quality of its education if it had the opportunity to do so.
\[ t \geq \max (z_{\pi} f_{\pi}, \frac{z_{\pi} f_u q_u - z_u f_u q_{\pi}}{q_u - z_u f_u}) \]

For exposed students, the number of potential students enrolling at the traditional and the for-profit institution are, respectively:

\[ N_u^e = 1 - \tilde{\theta}_s = 1 - \frac{z_u f_u - z_{\pi} f_{\pi} + t}{q_u - (q_{\pi} - t)} \quad \text{and} \quad N_{\pi}^e = \tilde{\theta}_s = \frac{z_u f_u - z_{\pi} f_{\pi} + t}{q_u - (q_{\pi} - t)} \quad (6) \]

Stage 3

I now look at the strategic decision made by the for-profit HEI, assuming that it has entered the market in stage 2. In stage 3, the for-profit HEI chooses simultaneously the amount to invest in advertising, \( \phi \), and its tuition fee, \( f_{\pi} \), in order to maximize Eq. (5) considering Eq. (6). The first-order conditions with respect to \( f_{\pi} \) and \( \phi \) are:

\[ \phi^* \tilde{\theta}_s - \phi^* z_{\pi} \frac{f_{\pi}^* - c_{\pi}}{q_u - (q_{\pi} + t)} = 0 \]

\[ \tilde{\theta}_s (f_{\pi}^* - c_{\pi}) - \phi^* = 0 \]

Relying on the first expression, two counteracting effects are created by an incremental increase in \( f_{\pi} \): it increases the revenues received by the for-profit institution and it decreases the demand of students to study there. The second first-order condition shows that increasing the amount of advertising will increase the revenues due to a higher demand, but will increase the cost related to advertising. At the optimum,\(^{11}\) the solution of this system of equation is unique and is such that:

\[ f_{\pi}^* = \frac{z_u f_u + z_{\pi} q_{\pi} t}{2 z_{\pi}} \quad \text{and} \quad \phi^* = \frac{(z_u f_u - q_{\pi} z_{\pi} + t)^2}{4 z_{\pi} (q_u - (q_{\pi} - t))} \]

Observe that \( f_{\pi}^* \) is decreasing in \( z_{\pi} \), the share of the tuition fee that is paid by the student. Therefore, under our specification, the Bennett hypothesis, according to which an increase in federal grants and student loans leads to a tuition increase, is observed. This is consistent with Cellini and Goldin (2012) who have empirically found that for-profit institutions have largely captured the increase in tuition subsidies given to their students. The fee

\(^{11}\)For a maximum, the second-order condition is \( 2\phi z_{\pi} (q_u - (q_{\pi} - t)) - (z_u f_u + z_{\pi} (q_{\pi} - 2 f_{\pi}) + t)^2 > 0 \). It will be verified ex-post.
chosen by the for-profit HEI is also increasing in the education cost parameter, $\chi$, in the quality of education, $q_\pi$, in the level of opacity, $t$, and in the net tuition fee paid by students going to the traditional HEI, $z_u f_u$.

I observe that the quantity of advertising is always decreasing in $z_u$ and $q_u$, and increasing in $t$. It is also increasing in $z_u$ and $f_u$, but decreasing in $\chi$. Depending on the parameters of the model, $\phi^*$ can increase or decrease in $q_\pi$.

**Stage 2**

In order for the for-profit institution to enter the market, it must anticipate a positive profit. This condition depends on the quality level of education chosen by the traditional institution in the first stage of the game. Entering the market will be profitable when:

$$\pi(q_u) = \phi^* \left( \frac{z_u f_u - z_\pi f_\pi^* + t}{q_u - (q_\pi - t)} \right) \left( f_\pi^* - \chi q_\pi \right) - \frac{(\phi^*)^2}{2} - F \geq 0$$

After replacing $\phi^*$ and $f_\pi^*$ with their subgame perfect equilibrium values, I find that market entry will take place if the following condition is met:

$$\pi(q_u) = \left( \frac{z_u f_u + t - z_\pi \chi q_\pi}{32 z_\pi^2 (q_u - (q_\pi - t))^2} \right) - F \geq 0 \quad (7)$$

The profit function is quadratic with respect to $q_u$ and we have that, for $q_u \geq 0$, $\frac{d\pi(q_u)}{dq_u} < 0$. The higher the educational quality level chosen by the traditional institution the lower the profit will be for the for-profit institution. Hence, it is always possible for the traditional institution to set its educational quality level so as to prevent the entry of the for-profit HEI, but it is not always optimal for the traditional institution to do so, as setting a higher $q_u$ is costly to it.

The quality level chosen will be determined in the initial stage of the game. The threshold quality level after which no entry will take place is defined by $q_u^D$ such that:

$$\left( \frac{z_u f_u + t - z_\pi \chi q_\pi}{32 z_\pi^2 (q_u - (q_\pi - t))^2} \right) - F = 0 \quad (8)$$

---

12 To show this, note that $z_u f_u - \chi q_\pi z_\pi + t > 0$ as $c_\pi = \chi q_\pi$, $t \geq z_\pi f_\pi$ to have a fully covered market of exposed students and that $f_\pi > c_\pi$. Otherwise, the for-profit HEI won’t be able to make a positive profit.

18
This condition can be rewritten explicitly such as:

\[ q_u^D = q_\pi - t + \frac{(z_u f_u - z_\pi \chi q_\pi + t)^2}{4z_\pi \sqrt{2F}} \]  

(9)

We see that \( q_u^D \) is the positive root of Eq. (8). It is increasing in \( z_u f_u \), the portion of the traditional institution’s tuition fees paid directly by students. It is also decreasing in \( F \), in \( \chi \) and in \( z_\pi \). It will also be increasing in \( t \) if \( t > 2\sqrt{2F} + z_\pi \chi q_\pi - z_u f_u \). \( q_u^D \) will be decreasing in \( q_\pi \) for \( q_\pi > \frac{\chi (f_u + t) - 2\sqrt{2F}}{\chi^2 z_\pi} \).

Stage 1

In this first stage, the incumbent sets the quality of its education, \( q_u \). Following the terminology of Bain (1956), three kinds of behavior are possible: blockaded entry, deterred entry and accommodated entry.

- **Blockaded Entry**
  Blockaded entry occurs when the traditional institution sets \( q_u^B \) to maximize its utility, without anticipating the potential threat of entry. Hence, this assumes the same maximization problem as in the monopoly case. In this case, the optimal quality level will be set at:

\[ q_u^B = \sqrt{\frac{\gamma(z_u f_u)^2 + 2z_u f_u s_u + 2z_u f_u^2}{2\delta - \gamma}} \]

- **Deterred Entry**
  In this case, the incumbent chooses the minimum quality level that will prevent the entry of the for-profit institution into the higher education market. As computed in the previous stage of the game, deterred entry is represented by:

\[ q_u^D = q_\pi - t + \frac{(z_u f_u - z_\pi \chi q_\pi + t)^2}{4z_\pi \sqrt{2F}} \]

- **Accommodated Entry**
  In this case, the traditional institution anticipates the potential entry of the for-profit HEI but does not try to avoid its entry. It will therefore choose \( q_u^A \) such that:

\[ \max_{q_u} \gamma[\phi \int_{\theta_s}^1 \theta_s q_u d\theta_s + (1 - \phi) \int_{\theta_s}^1 \theta_s q_u d\theta_s] + N_u(f_u + s_u - c_u) \]  

(10)
\[ N_u = \phi(1-\bar{\theta}_s) + (1-\phi)(1-\bar{\theta}_s) \quad ; \quad \bar{\theta}_s = \frac{z_u f_u - z_\pi f_\pi + t}{q_u - (q_\pi - t)} \quad ; \quad \overline{\theta}_s = \frac{z_u f_u}{q_u} \]

\[ \phi^* = \frac{(z_u f_u + (t - z_\pi \chi q_\pi))^2}{4z_\pi (q_u - (q_\pi - t))} \quad ; \quad f^*_\pi = \frac{z_u f_u + z_\pi \chi q_\pi}{2z_\pi} \quad ; \quad c_u = \delta q_u \]

The optimal quality \( q_A^u \) chosen\(^{13} \) under accommodated entry is defined by the following first-order condition:

\[ \gamma \left[ \left( 1 - \phi^* \right) \left( 1 - \frac{z_u^2 f_u^2}{(q_u^4)^2} \right) + \left( \phi^* \right) \left( 1 - \frac{z_u f_u + (t - z_\pi \chi q_\pi)^2}{4(q_u^4 - (q_\pi - t))^2} \right) \right] \]

\[ + q_u^4 \left( 1 - \phi^* \right) \frac{2z_u^2 f_u^2}{(q_u^4)^3} + \phi^* \frac{(z_u f_u + t - z_\pi \chi q_\pi)^2}{2(q_u^4 - (q_\pi - t))^3} + \phi' \left( \frac{1}{4(q_u^4 - (q_\pi - t))^2} - \frac{z_u^2 f_u^2}{(q_u^4)^2} \right) \]

\[ - \delta \left[ \phi^* (1 - \bar{\theta}_s) + (1 - \phi^*) (1 - \overline{\theta}_s) \right] \quad \text{(13)} \]

\[ + (f_u + s_u - c_u) \left( 1 - \phi^* \right) \frac{z_u f_u}{(q_u^4)^2} + \phi^* \left( \frac{z_u f_u + t - z_\pi \chi q_\pi}{(q_u^4 - (q_\pi - t))^2} - \phi' (\bar{\theta}_s - \overline{\theta}_s) \right) \quad = 0 \quad \text{(14)} \]

As for the monopoly case, the effect of a marginal increase in \( q_A^u \) can be disentangled into several components. Eq. (11) shows that increased quality increases the productivity of students who study at the traditional HEI. Eq. (12) shows that an increase in quality causes an increase in enrollment at the traditional HEI. Eq. (13) shows that an increase in quality causes downward pressure on research funding at the traditional institution, while Eq. (14) shows an opposing upward pressure on research funding as a result of increased revenue from increased enrolment. The first and second effects are always positive. The third effect is always negative. The last effect can either be positive or negative. It is positive when some of the surplus earned from the per-student funding cross-subsidizes research activities. It is negative when \( R < 0 \). This is possible because, in my simple framework, I assumed

\(^{13}\)A non-negative weighted average of two concave functions is still concave. The term following \( (1 - \phi) \) is always concave. Therefore, a sufficient condition for the term following \( \phi \) to be concave is that \( q_\pi > t \), i.e. that an exposed student’s utility from attending the for-profit institution decreases with respect to his ability. Necessary conditions will be derived ex-post in the numerical example.
that the only funding source is from tuition fees, which are calculated on a per-student basis.
Depending on the parameters of the model, the traditional HEI will choose quality level \( q^A_u \), \( q^B_u \) or \( q^D_u \). If \( q^B_u > q^D_u \), then the for-profit HEI’s entry will be blockaded. Otherwise, entry will be accommodated if \( U_u(q^A_u) > U_u(q^D_u) \) and deterred when \( U_u(q^A_u) \leq U_u(q^D_u) \).

5. Analysis

The overall impact of an incremental parameter change depends on the two effects it creates. The first is the direct impact on the potential entrant’s anticipated profit (see Eq. (7)). The second is the indirect impact on the quality, \( q_u \), that would be chosen in the case where entry is accommodated. This effect is related to the disciplining effect created by the traditional HEI on the potential entry of a for-profit HEI. Due to the impossibility to explicitly solve for \( q^A_u \), and the fact that the two effects are often in opposite directions,\(^{14}\) it is difficult to compute analytically which of the three behaviors will prevail. Therefore, a numerical analysis will provide suggestive evidence about the impact of potential policy interventions.

The calibration of the model is inspired by the U.S. policy context. According to the Institute for College Access and Success (2009), the student’s tuition paid to attend a traditional HEI is subsidized at a rate of 40% while, according to the U.S. Department of Education (2011), students attending a for-profit institution are subsidized at a rate of 75%. Therefore, \( z_u \) and \( z_\pi \) are equal to 0.25 and 0.6, respectively. The other parameters are calibrated such that the following targets are attained. According to the U.S. Department of Education (2011), the tuition of a traditional HEI, \( f_u \), is on average six to seven times lower than the tuition for a similar program at a for-profit institution, \( f_\pi \). According to LipmanHearne (2010) and computations based on the financial reports of for-profit institutions, \( \Phi \frac{\Phi}{N_e \Phi + \Phi + F} \), the share of spending invested in advertising and promotional activities, is between 20% and 30%. The share of students attending a for-profit HEI \( \frac{N_\pi}{N_e + N_u} \) within the population participating in higher education is equal to 11%. As discussed previously, we also have that \( q_u > q_\pi \). The equilibrium conditions derived analytically are checked ex-post.

\(^{14}\)Based on Eq. (7), we observe that a change in \( F \) only has a direct impact on entry. For smaller fixed-entry costs, entry will be more likely.
I divide parameters into three groups for the purpose of analyzing how they change: parameters related to the traditional institution (γ, fu and δ), parameters related to the for-profit HEI (t, qπ and χ), and parameters related to the public financing of higher education (zu, zπ and su). I already demonstrated that, in stage 3, F has a negative impact on the probability of entry of the for-profit HEI. The base scenario assumes the following parameter values: γ = 1.6, zu = 0.6, fu = 1.3, zπ = 0.25, su = 3.9, δ = 0.9, t = 2.4, qπ = 4.2, χ = 0.905 and F = 0.2. B stands for blockaded entry and D for deterred entry. The last two columns of the forthcoming tables will be discussed in the next subsection. I will look at discrete parameters’ changes and describe how these changes impact the strategic choices made, the level of profit of the for-profit HEI, as well as students’ decision on where to study. I will first focus on the for-profit HEI’s decision to enter the market, and then analyze the welfare consequences that this decision might have.

5.1. Numerical Analysis

Traditional HEIs parameters

<table>
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<tr>
<th>Parameters</th>
<th>φ*</th>
<th>f*</th>
<th>qu &gt; qπ</th>
<th>Uπ</th>
<th>Uπ</th>
<th>Nπ</th>
<th>Nπ</th>
<th>W1</th>
<th>W2</th>
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<td>4.55</td>
<td>4.47</td>
<td>0.07</td>
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<tr>
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<td>5.2</td>
<td>B</td>
<td>B</td>
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<tr>
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<td>3.4</td>
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<td>4.1</td>
<td>4</td>
<td>0.14</td>
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<td>4.1</td>
<td>3.6</td>
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</table>

Base case: γ = 1.6, zu = 0.6, fu = 1.3, zπ = 0.25, su = 3.9, δ = 0.9, t = 2.4, qπ = 4.2, χ = 0.905 and F = 0.2

Table 2 shows the comparative static analysis for the parameters directly related to the traditional HEI.

How does a change in the preferences for the educational quality relative to the research output, γ, influence entry? We see that, all else equal, a higher weight given to educational quality will decrease the probability that the for-profit HEI enters the market. Although γ does not have a direct impact on
the for-profit institution’s potential profit as described in Eq. (7), it has an indirect impact through the quality of education chosen by the traditional HEI. A larger $\gamma$ increases the quality under blockaded entry and decreases the quality chosen under accommodation. When $\gamma$ is sufficiently large, entry will be blockaded. A higher importance given to education makes entry more difficult for the for-profit HEI. The utility of the traditional institution is increasing in $\gamma$. The number of students enrolled is decreasing up to the point where entry is deterred. It increases after the point where entry is blockaded. A higher $\gamma$ also leads to a higher cross-subsidization of research funding going toward educational quality.

The traditional HEI’s tuition fee, $f_u$, also has an influence on the entry decision of the for-profit HEI. Note that it does not consider the subsidy received by students to encourage them to study. A lower fee means that it is both cheaper for students to go to a traditional HEI and that the institution will, all else equal, receive less funding. A higher $f_u$ has a direct positive impact on the entrant’s potential profit. However, an increase in the tuition fee also has a negative impact on this profit, through its indirect impact on the quality of education chosen (which will increase thanks to the additional funding coming from students). Overall, we see that the first effect is the highest, at least under this calibration. So, for a higher $f_u$, entry is more likely. Overall, this has a small positive impact on the utility of the traditional HEI and a negative impact on enrollment. Therefore, an increase in the tuition fee will not entirely go toward an increase in educational quality. The amount invested in research will also be increasing in $f_u$.

An increase in $\delta$, the per-student cost of providing education, has no direct impact on the entrant’s potential profit. However, it has a positive indirect impact on the probability of entry because it makes it more costly to set a high level of education quality, which could potentially deter or blockade entry. This has a negative impact on the utility of the traditional institution and on its enrollment.

**For-profit HEIs parameters**

Table 3 shows the comparative static results for the parameters related with the for-profit institution. A higher $t$ means that there exists more opacity around the benefits to education and this increases the persuasive effect of the for-profit advertising campaigns. It can be derived from Eq. (7) that it has a direct positive effect.
on both types of institution. A higher \( t \) leads also to an indirect negative impact created by the endogenous increase in the quality of education provided at the traditional HEI. We see in Table 3 that the former effect will be bigger. This will therefore make entry more likely. Thanks to this disciplining effect on quality, the utility of the traditional HEI will slightly increase. However, its enrollment will decrease.

How does a change in the quality of the education provided in the for-profit HEI, \( q_\pi \), influence its entry decision? We observe that an increase in \( q_\pi \) has a negative impact on the profit of the entrant. However, entry still takes place for parameters respecting the equilibrium conditions. In this numerical analysis, both the direct and indirect impact go in the same direction. It will also have a small negative effect on the utility of the traditional institution and on its enrollment.

An increase in \( \chi \) makes it more difficult for the for-profit institution to enter. The direct impact on the expected profit is negative. This cannot be entirely compensated for by the positive indirect effect created by the decrease in \( q_u \). This increase has a positive effect on the number of students enrolled in the traditional system.

**Public financing parameters**

Table 4 shows the parameters related to the public funding granted di-
directly to the traditional HEI and to the students attending either the traditional or for-profit institution.

Recall that $z_u$ is the share of the tuition fee that a student at the traditional HEI pays out of his pocket. A higher $z_u$ means that the student will pay a larger share. However, note that this won’t have a direct impact on the HEI’s budget. All else equal, a larger $z_u$ has a direct positive impact on entry of the for-profit HEI. However, it also leads to an increase in the quality of education set by the traditional HEI in order to keep attracting students due to the increase in what they have to pay to study. The indirect effect on entry will therefore be negative. Under my configuration, the first effect is larger than second effect, and entry of the for-profit HEI is more likely the larger $z_u$ is. Overall, this creates a negative impact on the total enrollment.

What is the impact of a change in the direct per-student subsidy received by the traditional HEI (represented by $s_u$)? An increase in the subsidy has no direct impact on the probability of entry of the for-profit HEI. However, this increase in the budget of the traditional HEI leads to an increase in the quality of education chosen by the traditional HEI. This in turn leads to a negative indirect effect on the likeliness of the for-profit HEI’s entry. When $s_u$ increases, the number of students enrolled also increases, as well as the utility of the traditional HEI.

The share of the fee that is actually paid by the student when going to a for-profit HEI is formalized by $z_{\pi}$. A higher $z_{\pi}$ has both a direct and an indirect negative impact on the profit of the for-profit institution. This has an
unambiguous negative effect on the for-profit institution’s decision to enter. A higher $z_\pi$ leads to a decrease in the utility of the traditional institution despite the increase in the number of students it enrolls. This is due to the lower benefits that students derive as a result of lower quality education resulting from the lack of a disciplining device from competition.

5.2. Welfare Analysis

The aim of this subsection is to relate this model to government interventions. Abstracting from the issues associated with the opportunity cost of public funds or the externalities created by education, I can show that caring about the democratic objectives of education — the number of students who choose to pursue post-secondary education — rather than about the net benefits that students derive from higher education can lead to a very different welfare appreciation of the model’s parameters.\textsuperscript{15} The democratization of higher education is often an important consideration for policy makers. It has the advantage of being easy to compute. It avoids the difficult practical issue of measuring the quality of an educational program. It also quickly shows the direct impact of a policy change, as statistics on the number of students enrolled at an institution are readily available. When democratization of education is the key policy goal, entry of the for-profit HEI will always be preferred.

The trade-off between the accessibility of the higher education system and of the quality of the programs offered can be shown using two different welfare functions. The welfare function for democratization of higher education is:

$$W^1 = \begin{cases} N_u & \text{if no entry} \\ N_u + N_\pi & \text{if entry} \end{cases}$$

The second welfare function is the sum of students’ net benefits from education, the traditional HEI’s utility and the profit of the for-profit HEI, minus

\textsuperscript{15}The issue behind this welfare analysis is closely related to the problem of damaged goods (Deneckere and McAfee (2005)), as analyzed in the industrial organization literature. There, a monopolist has to decide whether or not to sell a second good of a lower, damaged, quality. This allows him to implement second-degree price discrimination. Even when this second good is more costly to produce, the monopolist may find it profitable to sell it if it sufficiently increases the number of consumers. In this context, it is possible that this new good creates a welfare improvement.
the amount of public funding invested in subsidizing students and HEIs. For simplicity, all these components are equally weighted. As discussed in Bagwell (2007), the artificial impact of advertising on students’ preferences to attend a for-profit HEI will not be considered in this welfare analysis. However, the overall impact of advertising on welfare can still be positive depending on how it impacts the choice of the quality of education. When the for-profit HEI does not enter the market, the welfare function is:

\[ W_2 = \begin{cases} 
\int_0^1 (\theta_u q_u - z_u f_u) d\theta_u + U_u - N_u((1 - z_u)f_u + s_U) & \text{if no entry} \\
(1 - \phi) \int_0^{\tilde{\theta}_u} (\theta_u q_u - z_u f_u) d\theta_u + \phi \int_0^{\tilde{\theta}_u} (\theta_u q_u - z_u f_u) d\theta_u + \phi f_u^\delta (\theta_u q_u - z_u f_u) d\theta_u & \text{if entry} \\
U_u + \pi - N_u((1 - z_u)f_u + s_u) - N_\pi((1 - z_u)f_u) & \end{cases} \]

Computations for each parameter are provided in the last two columns of Tables 2, 3 and 4. Note that \( W_1 \) and \( W_2 \) cannot be compared in the absolute. However, I can analyze the impact at the margin of a change in a parameter. It is interesting to see that both welfare criteria lead to very different conclusions. Entry is highly valued by the first criteria because it opens the higher education system to a larger number of students. Under the second criteria, entry always leads to a lower welfare level. This last result is independent of the impact of a lack of entry by the for-profit HEI on the quality of education chosen by the traditional HEI (which is positive for an increase in \( \gamma, \delta \) or \( s_u \) and negative for the other parameters). In this case, entry is heavily dependent on public financing and its quality is not sufficient to surpass the tuition costs faced by students attending it.

6. Discussion

Incentives to improve the quality of for-profit education

An important assumption of the model presented in this paper is that \( q_\pi \) is exogenous. Due to the non-monotonic relationship between \( q_\pi \) and the decision to enter the market, it is complicated to endogenize \( q_\pi \). A simpler framework would be needed to endogenize \( q_\pi \). However, it is still possible to show the condition under which an increase in \( q_\pi \) would decrease the expected profit of the for-profit institution and make entry less likely. The sufficient condition\(^{16}\) such that Eq. (7) is decreasing with respect to \( q_\pi \) is

\[ \tilde{\chi} > \frac{z_u f_u + t}{(2t + q_u)z_\pi}. \]

Under this condition, the for-profit institution would have no

\(^{16}\)Note that this doesn’t consider the presence of the indirect disciplining effect. It is
incentive to improve the quality of its education if it had the opportunity to do so. This condition also shows how, by increasing the minimum quality standard needed to enroll subsidized students, the entry decision of the for-profit institution can be negatively impacted.

The strategic choice of advertising and fees

To explain the high level of advertising expenditures observed in the for-profit sector, we can show that choosing both a high level of advertising expenditures and high tuition fees is optimal for the for-profit institution. As derived from the Dorfman-Steiner approach to advertising (Dorfman and Steiner (1954)), this can be done by showing\(^{17}\) that the student’s enrollment is more sensitive to advertising than to fees, i.e. that the price elasticity of enrollment, \(\eta = \frac{z\pi f}{q_u - q_\pi + t}\), is smaller than the marginal value of advertising, \(\mu = f \frac{zu f_u - z\pi f \pi + t}{q_u - q_\pi + t}\). In our framework, this condition will hold for fees lower than \(\bar{f}_\pi\) where \(\bar{f}_\pi = \frac{zu f_u + t + \sqrt{zu (t + q_u - q_\pi)}}{zu}\). As noted in Jacobs (2004), the price elasticity of students’ demand tends to be very low (between 0.03 and 0.37). To my knowledge, no studies have computed the marginal value of advertising in the higher education sector, at least with respect to for-profit HEIs. However, recent works have highlighted a relatively large impact on student demand for higher education as a result of increasing the information available concerning the benefits of higher education (see Jensen (2010) or Bettinger et al. (2012)).

Perceived vs. effective benefits of education: The role of information

This paper also highlights an issue related to students’ difficulty to assess ex-ante what their effective benefit of education will be. The government faces the possibility that for-profit institutions take advantage of this informational asymmetry, especially if students, instead of the traditional

\(^{17}\)We abstract from second-order effects due to the endogeneity of the quality of education provided by the traditional sector.
higher education system, are subsidized. Due to traditional institutions’ governance structures (where professors and students are often part of the decision-making process) and their non-distribution constraint, traditional institutions are unlikely to take advantage of the opacity surrounding the benefits of further studying. By improving the information about the returns to education (decreasing $t$), the legislator will make the entry of the for-profit institution less likely. This could be done, for example, by publishing more extensive data on labor-market outcomes and on loan reimbursement rates of former students. The importance of the persuasive effect might also be damaged by critiques made openly in the press (see, for example, The Economist (2010) and The New York Times (2011)).

**Supply- vs. demand-side funding**

I have shown that, holding all else equal, an increase in the subsidies to students makes entry of for-profit institutions more likely. On the other hand, an increase in subsidies to traditional institutions makes entry by for-profit institutions less likely. This result would still hold, and would even be reinforced, if the total amount of per-student subsidy (given to students and granted via their hosting institution) was fixed and the allocation was more going in the direction of the indirect per-student subsidy. I have also assumed that the tuition fee charged by the traditional institution, $f_u$, is exogenous. If the Bennet hypothesis is also observed at the level of the traditional institution, a higher tuition fee created by an increase in the subsidy given to students would further facilitate entry of the for-profit institution. This would reinforce this result.

7. Conclusion

The objective of this paper is to propose a framework that shows the market conditions that facilitate the entry of for-profit institutions into the higher education market. The framework shows that students can still decide to study in for-profit institutions despite their comparably lower returns on investment, but that policy makers may nevertheless want to implement policies that would lead to market conditions that are friendly to for-profit institutions. I show how advertising plays a crucial role in explaining students’ decisions to study at these institutions. Even when the entry of a
for-profit institution has a positive disciplining effect on a traditional institution, subsidizing students (especially if the money can be used to study in a for-profit institution) instead of directly subsidizing traditional institutions will facilitate the emergence of for-profit institutions. Even though for-profit institutions are not desirable from a social welfare point of view, I argue that they still allow policy makers to fulfill the objective of increasing access to higher education.

To my knowledge, this theoretical model is the first to address the issue of the entry of for-profit institutions into the higher education market. There are, however, several avenues for further research.

First, I assumed a very simple production function of education. Further extensions could consider the role played by peer effects or by students' studying efforts.

Second, as is often the case in the literature on competition between HEIs, I assumed that for-profit and traditional institutions strategically interact to attract students. To date, there is no empirical data to support this hypothesis. However, it is important to consider that, as previously noted, policy makers often make this assumption when intervening in this market. In the absence of a competitive disciplinary effect, my welfare conclusions would still hold and would most likely be even stronger. However, some of the parameters might have a different impact on the for-profit institution's entry decision than under my analysis.

Third, my assumptions concerning the strategies chosen by the two types of institutions could be endogenized. To allow for this possibility, a simpler framework would be needed.

Finally, as discussed in Scott-Clayton (2012), students are imperfectly informed about the costs and benefits of pursuing their education. In my model, this assumption is only made when students consider the possibility of attending a for-profit HEI. However, it leads for-profit higher education students to a negative ex-post net return to education. This is rather extreme, as the marketing practices of for-profit HEIs can partially solve the information problem faced by some students (the ones badly informed about the net returns to traditional education and for whom for-profit education has still a positive net return). These considerations tell us that the benefits of entry are undervalued according to the second welfare criteria. To be able to consider this, a richer description of the role of information in students' decision-making processes would be needed.
APPENDIX

Figure 4: Evolution of the number of HEIs per type

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