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Fernandes Gonçalves da Silva, Marcos

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# BUDGETING AND RESOURCE ALLOCATION IN UNIVERSITIES: a public choice approach

**Marcos Fernandes Gonçalves da Silva**

Professor at EAESP/FGV and Visiting  
Research Fellow (1997-98) at ILAS/  
University of London.  
E-mail: [mdasilva@fgvsp.br](mailto:mdasilva@fgvsp.br)

## RESUMO

As demandas exigindo a melhoria da produtividade em faculdades e universidades estão surgindo dramática e rapidamente no Brasil. Muitos estudos têm sugerido sistemas de avaliação e critérios externos para controlar a produção universitária em termos quantitativos e qualitativos. Considerando-se que as universidades e faculdades não são organizações com fins lucrativos (excetuando-se, é claro, as caça-níqueis), as variáveis microeconômicas e administrativas tradicionais usadas para medir a eficiência não possuem nenhuma função direta. Nesse sentido, dever-se-ia criar um sistema de controle "à la" mercado (imitando o mercado) para avaliar a produção em universidades e faculdades. O orçamento e o mecanismo de alocação de recursos contido nele podem ser usados como instrumentos de incentivo para melhorar a qualidade e a produtividade. Esse será o principal tema deste artigo.

## ABSTRACT

*The calls for colleges and universities to improve their productivity are coming thick and fast in Brazil. Many studies are suggesting evaluation systems and external criteria to control the quality of teaching and research in universities. Since universities and colleges are not profit-oriented organizations (considering only the legitimate and serious research and teaching organizations, of course), the traditional microeconomics and administrative variables used to measure efficiency do not have any direct function. An alternative would be to create an "as if" market control system to evaluate performance in universities and colleges. Internal budget and resources allocation mechanism can be used as incentive instruments to improve quality and productivity. It will be the main issue of this article.*

## PALAVRAS-CHAVE

Qualidade da educação, avaliação de universidades, elaboração de orçamentos, alocação de recursos públicos, incentivos.

## KEY WORDS

*Education quality, university evaluation, budgeting, public resources allocation, incentives.*

*“Non multa sed multum.”*

## INTRODUCTION

The crisis facing the public sector in many countries and such fashionable conceptions as “reengineering” and “downsizing” are bringing about fundamental changes in financing structures and productivity decline in institutions of higher education. In Brazil, for example, there are growing budgetary constraints on public universities and private institutions of higher education. Salaries in public universities are very low because of the public sector crisis, and the productivity of these institutions is frequently questioned by government education agencies and by society. On the other hand, public money for private institutions is scarce and the situation will get worst in the very near future.

Public institutions are facing today the need for productivity improvements to justify more government support and grants, and teachers and researchers will likely compete more aggressively in the coming years for money to compensate for the wage gap.

However, in private institutions, the strategy demands an aggressive policy for achieving productivity and quality goals. Effective fundraising policies and competition for public money would be based on efficiency and professionalism. So the real question is: How could we improve academia’s performance?

The main purpose of this paper is to discuss some fundamental ideas developed mainly by Massy (1996c) and others<sup>1</sup> about productivity and budgeting issues in higher education. Secondly, I will analyze some issues in the political economy of non-profit organizations such as universities and colleges in order to argue that many problems that are arising in these institutions have to be studied with some public choice hypotheses and agency theory<sup>2</sup>. Finally, I am going to establish some linkages between productivity incentives and budgeting in colleges and universities.

The traditional economic model of the firm is that of the “black box”. In this view, the organization is an abstract unit that transforms inputs into outputs, and the economist is not concerned about what happens “inside” the firm. However, economics has an applied field that really “opens” the black box. The studies developed by economists on organization matters and incentives schemes take into account agency and contract problems<sup>3</sup>. An effective understanding of

productivity issues in universities and colleges requires this type of approach.

In this paper, I am going to analyze some issues related to productivity, incentives, and budgeting in universities and colleges, in terms of the common perception that increased efficiency is required in these institutions. For this reason, the first analytical step is to understand why it is very common to justify the fall in productivity in colleges and universities using the traditional arguments of “cost decrease” and the “growth force”.

**Public institutions are facing today the need for productivity improvements to justify more government support and grants.**

## PRODUCTIVITY, COST DECREASE AND THE GROWTH FORCE

Productivity is an economic concept related to the profit maximization hypothesis. Despite the fact that colleges and universities are not, at least apparently, profit-seeking institutions, the profit-maximizing-seeking approach can be used as an “as if” friedmanian hypothesis<sup>4</sup>.

Economists usually define productivity in organizations as the ratio of inputs to outputs in a firm. This definition performs well when we analyze a single output firm, but not for a multiproduct one. The productivity can be understood, in a multiproduct firm, as the ratio between the total benefits generated by the use of many inputs (that create costs). Productivity can be defined simply but usefully as follows:

$$\text{Productivity} = \text{Benefits/Costs}$$

In the case of a single product firm, the marginal approach to productivity implies that marginal benefits are equal to marginal costs. This is an objective measure of efficiency in organizations. However, in firms that produce many outputs the maximization calculus is more complicated, and we can assume that the simple ratio between benefits and costs is only one possible measure of productivity.

In higher education, inputs and outputs are qualitative and multidimensional (Massy, 1996a, p. 50). The inputs and outputs are much more intangible than in ordinary good producing firms because they are

characteristically services. Additionally, in these institutions, quality is more crucial than quantitative efficiency. The quality dimension of the service supplied by universities and colleges must be considered when we are measuring productivity. But, in higher education, is very difficult to assess the quality of the outputs. Quality itself is an elusive concept.

**The cost decrease is a very common problem in labor-intensive institutions such as colleges and universities when they try to achieve improvements in productivity.**

Creating precise definitions of quality is very difficult and there is no consensus about proxies that could be used<sup>5</sup>. Following Baumol, Blackman and Wolf (1989, p. 235), one can define “gross productivity” as the number of units of output produced per unit of input, despite changes in product quality. The increase in unit costs in universities and colleges can be seen, using the gross productivity approach, as a productivity gain because the rise in costs can be caused by quality improvements in education and research.

The problem of productivity is not only related to output, but also to costs. Colleges and universities in the USA and Europe (see Massy, 1996c, p. 52), and even in Brazil, argue that the decline in gross productivity has two main causes. The first one is the argument that educational institutions in general demand continuous cost increases to maintain quality (this is the “cost decrease” argument). Secondly, there are “growth forces” that demand from universities and colleges more and more improvements in supplying knowledge and improving quality.

The cost decrease is a very common problem in labor-intensive institutions such as colleges and universities when they try to achieve improvements in productivity. Baumol, Blackman and Wolf (1989) have a classical example of this problem. String quartets are labor-intensive organizations, and as such are resistant to productivity increases. There is another factor that blocks productivity improvements. In the example above, consider the case where musicians try to study a piece using less time than normal. The result would likely not be positive. In some activities there are rigidities concerned with productivity improvements because there is a trade-off between productivity (in a quantitative sense) and quality. So,

the training time of a string quartet has not changed in two hundred years. This phenomenon is called “stagnant productivity”.

In many production structures, labor requirements have been reduced. The problem of cost decrease, as defined by Massy (1996c, p. 53), is the persistent rise in the relative price of college and university services. In the case of the string quartet, there is the same problem. The real unit costs of many services and goods produced in the economy have been reduced through productivity gains, but meanwhile costs in the string quartet have been unchanged. The result is the rise in the relative price of the ticket compared to other goods and services.

In the USA, Europe and Brazil the cost decrease apparently provides an explanation for the rise in costs of education and rigidities in productivity and costs. Colleges and universities in the USA, as in other countries, spend more than 70% of the budget with labor payments (Zemsky and Massy, 1995). On the other hand, quality demands pressure colleges and universities to constantly increase costs. The characteristics of production in universities and colleges seem to be the same as the string quartet example. So, for universities and colleges to be suffering from cost decrease would be natural and expectable.

Massy (1996c) disagrees with this vision, and I agree with his criticism. There are many incentives problems associated with the traditional budgetary process adopted in these institutions. There is a tendency in traditional budgeting processes to maintain the level of expenses. The expenses of one period are the floors for the expenses in the next period. The cost decrease is, in this case, a political economy problem inside the organization. The *a priori* acceptance that the quality goals implicit to universities and colleges production systems are intrinsically costly and that the budgetary process is too rigid to reduce expenses creates a very uncompromising situation for managers of universities and colleges. This approach works more to block productivity improvements than it does to stimulate the search for less costly production strategies.

In many public and private higher education institutions in Brazil, this kind of ideology permeates the traditional speech of teachers and researchers. This is a public choice problem, since the internal labor market of colleges and universities does not respond to market incentives. In this case, the uncritical acceptance of the cost decrease reasoning (and its implicit wishful thinking) reveals some kind of *akrasia*, or simply self-seeking behavior. People who work at universities and colleges are not altruistic; they are

economic agents inside the organization like any economic agent in the market place or in a company or government.

Today, the revolution in information systems profoundly affects the cost structure of institutions of higher education. It is possible that the resistance to adopting these technologies will cause serious damages in the future, because of the failure to compete with more efficient and less costly institutions that are able to supply education at a lower price. Using the example of the string quartet, Massy (1996c, p. 54) argues that information technologies can reduce the costs of this small organization despite the high wages offered to musicians. The sale of CDs and the supply of music by the “Internet”, for example, can bring music to millions, reducing cost to the audience. The same process could occur in higher education.

Another argument used to justify the lack of efficiency in production systems in colleges and universities is the “growth force”. There is a common perception in higher education institutions that opportunities for education and research grow without limit because scientific knowledge is intrinsically progressive (see Massy, 1996c, p. 54). Universities must implement new programs and spend money on new research and knowledge diffusion, and new academic programs are required to allow universities to compete. The metaphor here is the library that never removes the old books but has to incorporate the expanding new production.

These growth forces are, in fact, real. However, there is a dangerous fallacy in unreflectively linking this phenomenon with a decline in gross productivity. One can ask why productivity has not increased to offset costs increases? The problem again is linked with the incentive structure inherent to traditional budgetary processes in such institutions.

An in-depth analysis of these phenomena requires an examination of some issues in agency theory.

### THE PRINCIPAL-AGENT THEORY APPLIED TO COLLEGES AND UNIVERSITIES

Some economists have focused on a more realistic unit of analysis than the black-box firm: the contracts negotiated by two typical economic agents who act inside the firm. The study of the negotiation of contracts between a principal and an agent is the core of principal-agent theory or agency theory, and recently this approach

has been applied to businesses as well as public and private organizations (see Silva, 1996a, 1996b).

In this theoretical approach, the term “principal” refers to a person who is in a position of control and has the authority to act, while the agent is someone who acts in the place of the principal.

The principal-agent relationship is important in economics and business organization because in the real world there are many imperfections like risk and asymmetric information. The principal has no way to supervise the agent’s action, and can only very imperfectly police the agent’s behavior.

**In higher education, inputs and outputs are qualitative and multidimensional. The inputs and outputs are much more intangible than in ordinary good producing firms because they are characteristically services.**

The agent may have more information than the principal does and may act only in his/her self-interest. The key point is that the information that the principal receives is insufficient to police the agent: in other words, the agent can act strategically, using game theory jargon.

Agency problems pervade the economy and organizations. There are many examples of the importance of principal-agent relationships in real life. A government regulatory agency, for example, can be viewed as the agent for the consumer of public goods, who is the principal. On the other hand, the regulation agency can be viewed as the agent by the regulatory bureau. This problem, as we shall see, is very important when we try to improve productivity in colleges and universities using incentives implicit in the budget.

As in any organization, higher education organizations contain many kinds of principal-agent problems. As Massy (1996c, p. 74) points out, there are at least two factors that reveal the presence of agency problems in universities and colleges: (i) economic and value externalities, and (ii) value incongruity.

In the traditional view of externalities, they can be defined as positive or negative. An externality represents a connection between economic agents which lies outside the price system. They exist in both consumption and production. A positive externality in production happens when a producer generates an



indirect and unpaid benefit to another. A negative externality is the opposite. For example, pollution is a negative externality and capital network effects are positive externalities in production.

Atmospheric pollution is a classic example because the pollution made by an agent affects not only his/her well-being, but also the well-being of others. Massy (1996c, p. 74) argues that in universities and colleges positive or value externalities can inhibit a math department from redesigning calculus curricula to meet the needs of nontraditional engineering students. As a result, economic motives might force an engineering department to teach its own calculus course. This is a very common problem in colleges and universities because nobody wants costs, but only benefits. This result leads to the conclusion that someone must police and monitor the actions of departments.

As we have seen, economic agency theory is designed to analyze these and other kinds of situations. In universities and colleges, it is naïve to suppose that the teachers, the researchers, the students and the administration have the same arguments in their utility functions. The values of the teaching staff often differ from those of the administration, and the administration has different motives from those of the government agency that monitors the institution's performance.

Agency theory applied to the study of colleges and universities addresses the question of how a principal (the society or the governing board) can prevent the agent (the teachers and researchers) from self-interested action that implies rent-seeking activities and opportunistic behavior inside the organization. An important example of this is proposed by Massy (1996c, p. 75): the allocation of resources, especially to research, is encouraged because the academia seeks prestige, recognition and, of course, more money for new research. Higher education institutions tend to value research over teaching and the pursuit of personal and collective prestige relegates the educational function to a secondary mission.

Massy (1996c, p. 75-76) suggests three methods that could mitigate principal-agent problems that are facing universities and colleges.

Firstly, he suggests assigning specific responsibilities (SpR system). In this schema, the principal tells the agent exactly where to spend the money and supervises the agent's action in implementing the budget. Massy argues that SpR represents an *a priori* follow-up and control over the agent's actions. The principal's approval is essential to the implementation of the actions. SpR is best applied to small organizations where the supervision costs are low and information asymmetries are insignificant.

However, in the case of large institutions as universities, we need another control system.

The second method proposed by Massy is "the price as regulator" (PriR). In PriR systems, agency problems are minimized by using marginal adjustments in revenues and costs, creating incentives that alter the agent's action in order to maximize the principal's utility function. The example used by Massy is interesting. An institution can tax research revenues and subsidize teaching activities to avoid research bias. PriR problem is that the principal cannot anticipate the impact of an incentive like this on agent's behavior. The key issue here is again the lack of information.

The third solution is called "responsibility for the overall value of outcomes" (OVR). In OVR systems, principal and agent agree on the outcomes to be achieved, including the budget allocation and performance index that will be used to evaluate the agent's performance. In practice, they establish an administration-responsibility contract. The agent assumes the responsibility to achieve the objectives, and the principal provides rewards.

The three methods, according to Massy (1996c, p. 76-77), focus on three different aspects of agent's maximization process. SpR acts upon the variables that are under the control of the agent. PriR regulates the prices that agents must take into account in making decisions. OVR, the more intelligent schema in my opinion, seeks to establish incentive contracts.

However, there is a fundamental critique of Massy's model of agency problems in universities and colleges. He simply ignores the main question that appears when we analyze principal-agent problems: the extent to which the principal and the agent are willing to accept risk (risk preference).

I would argue that there is a more effective way to control agency problems and enforce productivity gains using budgetary incentives.

We must suppose, when studying agency problems, the agents' risk preference towards risk matters. It is very reasonable to suppose that teachers are risk averse and researchers are neutral or, in some cases, risk lovers. Thus incentive contracts in universities and colleges must include these suppositions.

Generically, we can classify the agents (teachers, professional staff and researchers) as risk-averse, risk-neutral and risk-loving. If the preferences associated with the money utility function are concave, the agents (teachers and professional staff) are risk-averse; if the function is convex, the agents (some researchers) are risk-lovers, and if the money utility function is a straight line the agents (some researchers) are risk-neutral.

The agents make their decisions in the face of future events, and the future is only probabilistic. Teachers without tenure face risk of unemployment, researchers face risks associated with the uncertainty of the results of the research. Generically, the research activity is more risky than teaching.

Thus agents within academia face risk in many aspects of their activities. However, since every kind of agent has a particular attitude towards risk, the contracts established inside the faculty organization have to consider these different preferences.

For example, assume that the principal is the Dean's management team and the agent is a researcher. The agent and the principal can face two possible situations at the end of the research period. Firstly, suppose that the research was well conducted and that the fund raising was actually effective. In this scenario the faculty earns \$ 2,000 net of all costs. Secondly, suppose that the research did not have sufficient revenue and he gains only \$ 1,000. I will assume in this example that the management is risk-averse, and the researcher is risk-neutral. Assume that there is initially a contract # 1 wherein the researcher gets a fixed wage of \$ 500. Finally, consider the same probability to the two possible outcomes purposed.

Under the first scenario, the college will receive \$ 1,500 (or \$ 2,000 minus the researcher fixed wage of \$ 500). In the second scenario, the college earns only \$ 500. With contract # 1, the college administration has an expected income of \$ 1,000. The researcher will receive \$ 500 in any situation. In this case, the college is absorbing the risk, despite the fact that the researcher is willing to assume more risk.

Different preferences towards risk mean that some types of contracts are inefficient, as in the case of the one purposed here. A more efficient contract must consider the preferences towards risk. This consideration can generate Paretian-improving trade between the agent and the principal. In the case described above, consider a contract # 2 wherein the college receives \$ 1,000 as a fixed rent, and the researcher receives the remaining \$ 1,000 if the outcome is good, and nothing if the outcome is bad. Because the college places higher value on \$ 1,000 with certainty than \$ 1,000 with risk, the college is in a better position with the first contract than with the last. The researcher is risk-neutral and the expected gain in this case is \$ 500. Because he or she accords the same utility to the \$ 500 expected and the \$ 500 fixed, his or her situation is the same as with contract

# 1. The second contract yields a Paretian improvement.

This contract schema can be conceived inside the budget<sup>6</sup>. I denominate this conception of incentive contracts in higher education as Incentive Compatibility Budgeting (ICB). This framework is very important because there are many risks associated with moral hazard, mainly in the context of tenure contracts. Unfortunately, Massy (1996a, 1996b, 1996c, 1996d, 1996e) does not take into account this important phenomenon, which is pervasive in colleges and universities. For example, in many Brazilian higher education institutions, tenure is received much earlier and moral hazard is a very costly fact.

**In universities and colleges, it is naïve to suppose that the teachers, the researchers, the students and the administration have the same arguments in their utility functions.**

## **MORAL HAZARD IN UNIVERSITIES AND COLLEGES**

The performance of an institution will depend on the efforts of the agents involved with education and research. Such efforts exerted by the agents are costly and they represent disutilities. Imagine a scenario wherein the college and the agent (teacher or researcher) sign contract # 1. Assume that the principal has no way to monitor the agents' performance because the supervision costs are extremely high and there is a collusion risk associated with monitoring (the principal's bureaucrat in the monitoring functions can be suborned by the agent).

The agents will have no incentive to work hard: there will be moral hazard implicit in the contract. In the absence of a way for the college to monitor the agents, a contract could be negotiated with the agents that will give to them incentives to work hard. Technically, the contract will contain an incentive compatibility.<sup>7</sup>

Incentive-compatible contracts suppose a kind of wage efficient contract. The optimal design of these contracts depends on the risk preferences of the parties involved.

For example, consider the case where one party is risk-averse and the other is risk-neutral or risk-lover. The best way to deal with this situation is through a contract wherein the risk-averse party is bearing the

risk premium while the risk-neutral or lover party is accepting the risk.

Clearly, moral hazard is very common in universities and colleges because there are a lot of information asymmetries inside these organizations. Therefore strategic behavior, rent-seeking and opportunistic self-interested actions will appear. In my view, this obvious fact must not be cause for despair in an analysis of productivity issues in universities and colleges (and this is my fundamental critique of the literature examined in this research).

Despite the importance of the internal structure of higher education organizations in understanding the obstacles to improving productivity and reducing costs, there is an important input in such firms that has to be considered when we analyze them – the financial support in the form of loans and grants that enable students to study and conduct research (the latter mainly for graduate students).

I am going to present some facts about the international experience with higher education finance in order to show the enormous difficulties facing higher education financing everywhere, and not only in developing countries such as Brazil.

## THE INTERNATIONAL EXPERIENCE OF COLLEGE AND UNIVERSITY FINANCING

I studied a set of 34 developing countries involving high, middle and low income economies (according to the World Bank classification<sup>8</sup>), the USA and some European countries.

In the USA, students pay tuition and fees, and a small fraction of students receive scholarships and subsistence aid. In the majority of countries in the developed and developing world, students are subsidized through scholarships and subsistence aid, and in some cases they have access to loans, as was the case for undergraduate students in Brazil in the seventies<sup>9</sup>.

As McMahon (1988) indicates, using data from developing countries (Brazil included), students in Africa, Asia, and Latin America do not pay for education costs and in many countries they have scholarships, mainly in graduate studies. However, the efficiency of higher education institutions in these countries is lower than in the USA and the UK, for example (see McMahon, 1988, p. 138-139).

Cohn and Geske (1990) present the results of a study about the costs of undergraduate education in the UK, the USA, Germany, France and Sweden. The research reveals differences among the countries in terms of models of financing for students. In the USA there are no scholarships, and tuition paid by students is

substantial. But in France, because of the students' political power and the *étatisme* tradition, students do not pay tuition.

The USA case is very interesting because in that country a credit system has been developed for students that have to pay university tuition. Thus the incentive scheme appears more effective in inhibiting moral hazard and motivating students to work hard.

In the case of Britain, as Cohn and Geske (1990, p. 379) point out, the Tory government tried to implement a loan system in the eighties but student resistance was strong. This is evidence of rent-seeking behavior that must be controlled through incentive contracts such as is proposed here. In Germany, strangely enough, parents are obliged by law to finance student's higher education.

If the American case is an exception in the world, the rule is not to impose any risk or cost on students or their families. I consider this framework inefficient because there is no way to reduce the significant costs to universities and colleges resulting from indolence and student's moral hazard. Along with the financial aspect, there is a moral one. In many countries, mainly poor ones, education costs are absorbed by the government and by the society in an unequal and unfair way. For example, the Latin American and Brazilian experience shows how universities and colleges have the function, at least in part, to maintain the outsider status of the majority of the population who will never go to universities.

The World Bank (Cohn and Geske, 1990, p. 381) has argued that the students must pay for the costs of higher education (the "cost recovery theory"). In such a situation there must exist loans for students and their families. However, not only in Brazil or France, but throughout the world, it is very hard to find a politician that wants to lose young people's votes. This is why in universities and colleges rent-seeking and opportunistic behavior are the rule, not the exception. Public choice and rent-seeking problems appear not only inside the organizations, but also around them.

## CONCLUSIONS

Clearly, the public sector must support higher education to some extent. Higher education and graduate research are suppliers of knowledge and there are plenty of externalities. So, if the government did not provide any support to higher education there would be a risk of lack of educational production in society.

However, the traditional financing and budgeting systems of universities and colleges are not adequate, given the assumption of opportunistic behavior inside and outside these institutions.



Modern organization theory provides some models and concepts that must be incorporated into higher education productivity achievement literature. The main objective of this paper is to show that contract theory, agency theory, moral hazard, and incentives are conceptions absolutely suited to the study of many ills, such as cost deace and productivity slowdown in universities and colleges.

Agency and contract theories demand, however, some assumptions about risk preferences and self-seeking

behavior. Effective discussion about incentive budgetary frameworks must consider an empirical fact: teachers, researchers and professional managers have different and self-interested utility functions. But also, economic theory of incentives implies that the assumption of economic rationality has to be accepted in models, at least as an "as if" hypothesis. In this context, analyses of Horn (1996) and Kraan (1996) are more persuasive and even more realistic than many other models developed by government and public administration theorists. ○

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#### NOTES

1. This study expands on recent work on the subject in which no consideration is given to public choice assumptions and provides a more incisive and complete analysis applying agency theory to the study of productivity problems facing universities and colleges. The main references in this area: Atkinson, H. and Massy, W. F. (1996), Chevaillier, T. (1993), Cohn, E. and Geske, T. G. (1990), El-Khawas, E. and Massy, W. F. (1996), Lawler, E. and Mohrman, S. (1996), Massy, W. F. (1993), Massy, W. F. (1996a), Massy, W. F. (1996b), Massy, W. F. (1996c), Massy, W. F. (1996d), Massy, W. F. (1996e), Massy, W. F. and Hopkins, D. S. (1996), Schutte, F. (1993), Strauss, J., Curry, J. and Whalen, E. (1996), and Winston, G. (1996).

2. The fundamental elements and conceptions used here are founded in Horn (1996), Kraan (1996), Silva (1996a), and Silva (1996b).

3. This is the case for Milgrom and Roberts (1992).

4. Massy (1996c, p. 50) argues that "unlike business firms, colleges and universities operate on a nonprofit basis and for altruistic goals". I disagree with this point of view. The productivity hypothesis in economics must be used as an instrumental conception and not as a realistic one. It is also naïve to presuppose that the agents in non-profit organizations are economically eunuchs. The public choice assumption that the *homo economicus* assumption has to be extended to politics and public organizations applies equally to such non-profit organizations as colleges and universities.

5. This difficulty explains why evaluations in colleges and universities are so widely criticized, mainly by teachers and researchers.

6. This literature is well developed and has been applied to public administration by Horn (1996) and Kraan (1996).

7. About this concept and for a very simple illustration of contracts and moral hazard, see Silva (1996b).

8. The classification referred to here is that published annually in the "World Economic Report". See, for example, World Bank (1996).

9. In the Getúlio Vargas Foundation in São Paulo, for example, the students can receive scholarships and loans, but the allocation depends on performance. This is a well-designed incentive scheme to the students. However, in public universities there is no payment – they are free. In my opinion, this kind of contract with the students is perverse because there is moral hazard.