Planning for higher education in Socialist Romania. Political priorities or economic needs?[1]

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Abstract

The present paper intends to analyze the planning of study places in Romanian higher education during the real Socialist regime. A strict *numerus clausus* system was in place that enabled a national planning of study places for each discipline. The numbers were supposed to reflect the "real" needs of the economy. We use econometric models (VAR regressions and Granger causality tests) to find if the planning was related to previous and following GDP values as estimated by an independent source (the Maddison project). The results show that the planning was indeed based on the economic situation as well as on political goals, and even succeeded in positively influencing economic development in some areas of study. The economic disaster of Romanian communism was not caused by deficient planning.

Keywords: Economic labor force planning, Higher education planning, Real Socialism, Romania

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Argument

One of the main criticisms that Marxist economists bring to existing real free markets is their sub-optimality. Market system actors never have complete information, leading to inadequacy of supply and demand, and consequently to waste and other forms of inefficiency. According to them, this could be improved by judicious planning. An all-knowing system could thus determine the real needs of the economy and appropriate prices. Such planning would also help avoid the cyclical capital crises and would lead to establishing real prices in line with Marxist value theory. In addition, such planning would also have consequences for business organization and even for the transformation of the labor market into a loss-free system. This is just a step away from a life without fail, a system like Aldous Huxley's Brave New World.

Although the idea of economic planning has lost ground after Eastern Europe's planned economies have collapsed as a result of their inefficiency, the idea of planning the relationship between education, particularly higher and vocational education, and the labor market, is still quite present. Regularly, not only in Eastern Europe, voices of politicians deplore the inadequacy of the diplomas obtained by young people and the "objective" needs of the labor market. Under free economy conditions, labor market predictions are mostly unreliable, given the long duration of education cycles. Such planning was, however, possible and functional within planned economies.

In this article we try to test the effectiveness of the student places planning in Communist Romania in relation to the economic growth. Our intention is, in fact, to study the planning of student places on specializations within systems where such planning was conducted, in order to draw conclusions for current intents on planning.

For this approach, a number of assumptions are necessary, assumptions which are questionable, but which we will accept as hypotheses in the context of this modeling. These are the following: we will assume that the planning target was economic development, that it can be modeled by the growth of the gross domestic product (GDP) and that we can use relatively safe independent estimates which are not part of the planning exercise of the state-socialist economy, and therefore test this exercise.

Literature review

Let us start with a few considerations on educational planning in general before turning to the analysis of the empirical case at hand.

Higher and vocational education are often considered priorities on governmental agendas due to the fact that they can generate the skills and knowledge required by the labor market, which in turn can contribute to the global competitiveness of a country. The competitiveness of a country can as such rely on the capacity of its teaching institutions. Developed countries have developed educational systems (Greenwood, Hinings & Whetten, 2014) in a kind of virtuous cycle.

Higher education is thus a catalyst, a vehicle for change and innovation, instrumental in achieving national growth and sustainability (Johnstone, 2006). Sustainable endogenous development becomes possible by providing each individual with the skills and knowledge he/she requires to function properly within society.

If education would be planned, the long term goal of such a planning would be to encourage, support and generate productivity (Daft, 2010). Planning would also create a proper framework for comparing results across individuals, universities, industries and regions (Abraham, 2012). Because of the limited nature of resources, planning could be a way to ensure that resources are used in the most suitable way, by measuring the return on investment in education.

Therefore, education planning is concerned with the issue of "how to make the best use of limited resources allocated to education in view of the priorities given to different stages of education or different sectors of education and the need of the economy" (Akinyemi, Bassey, 2012).

Planning has changed everywhere over time; it shifted from a highly rational administrative science to systems planning, a form of participatory strategic decision-making (Keller, 1983). The shift has positive implications because both universities and governments have an incentive to focus on their own capacity, to analyze both the internal environment and the outside factors, to

undertake long range planning, to have a vision and to build the road map for its implementation, move beyond institutional inertia and make long overdue choices – like identifying emerging needs on the market and turning them into new study programs to replace those that have become obsolete. Being market-driven was considered beneficial to higher education by some authors (Kotler, Murphy, 1981). On the other hand, the ability to plan is negatively related to the market-openness of the educational system. A fully controlled system as the state-socialist economies were, is easier to plan.

However, research shows that development is more likely to happen in countries in which state control over education is low. Institutional theories highlight that most countries show similar growth patterns but at different speeds. Evan Schofer and John W. Meyer (2005) have created a theoretical framework and designed the empirical methodology to operationalize the institutional processes, including "scientization, democratization and the expansion of human rights, the rise of development planning, and the structuration of the world polity". The changes associated with these institutional processes can be perceived globally. One of their implications is that higher education enrollment rates grew in the developing countries to the extent that in some cases they have surpassed the enrollment rates in the developed countries.

Historically, we can identify three stages in planning tertiary education: "(1) the physical growth orientation of the 1960s/1970s, (2) the more competitive orientation of the 1980s/1990s and (3) moving beyond strategic planning to structural changes that tailor academic/financial/facilities planning to the four segments of higher education: research universities, liberal arts colleges, state colleges and universities, and two-year and proprietary colleges" (Keller, 1999).

For many years, planning was considered a fundamental key for higher education success, in both Eastern and Western Europe. But in order for planning to work in favor of higher education, it needed to be done "properly". The Western point of view was that planning should be organization-based. Ulrich Teichler wrote that "educational leaders need to understand and embrace planning as essential to their personal success and the success of

their institution" (Teichler, 2006). The state-socialist point of view, on the other hand, considered planning to be a national endeavor (Murgescu & Sadlak, 2014).

Through planning at organizational level, universities are meant to set the framework and the direction required to enhance productivity in the organization (Aquino, 2014). Higher education decision makers would need to be able to understand and implement planning, be aware of their assets and their liabilities, and be able to understand and defend, the role planning plays in their institution. Planning is thus context sensitive – what works for an institution might not work at all for another, if the external environment is fundamentally different (Rothaermel, 2015). The state-socialist point of view on planning was not dependent on organizational context and viewed the whole system, economy and education included, as an indivisible unit. Though the two were coordinated separately, they were expected to merge into a higher goal, that of producing the advancement of the country.

One shouldn't confuse this form of planning with strategy. Plans are usually closely connected to a strategy, plans being the step by step approach to implementing the strategy. Strategy however means setting the vision for development, the mission for the future. The meeting point of the two is the strategic planning which can be defined as "a rational, systemic, and systematic process that requires higher education leaders to state the goals of the organization, how to attain the goals, and provide the criteria for planning, designing, developing, implementing, and evaluating plans, programs and processes" (Harris et al., 2017). One problem with Communist Romania was that all sectors of life, economy and society were controlled by a single computer, the Communist Party. For development one needs disruptive flows (Christensen, Horn, 2008). If the planning, execution and reporting are done by a single organism, without any control mechanism in place, the end results cannot be otherwise than questionable.

Planning higher education is not an easy task in current day society, nor was it a few decades ago. During the state-socialist period the economy was planned by the government, carried by the government and reported by the

government. Higher education was planned by the government as everything else was, universities had no autonomy, and they were merely institutions in which the will of the government was transposed into action. We can understand the appeal of the simplicity of a designer society, but reality outside the controlled environment is fairly different. The most they could do was to support professors in getting an understanding of the state of the economy and of the state of the society as a whole according to the doctrines of the Communist Party, in order for them to be able to educate and train the professionals that the society supposedly needed.

During state-socialism, higher education planning was done in accordance with economic planning. Higher education was meant to support the economy in the sectors which were a priority for the state, to enhance workers' productivity so that in turn they could support the well-being of the nation and maybe even more than that, the attainment of the "multi-laterally developed socialist society" (Ceauşescu, 1973).

Data and method

The socialist system claimed a solution to the suboptimal relationship between the distribution of disciplines studied in higher education and the "objective requirements of the labor force" through a complex system of planning of both sides of the relationship. Thus, the number of student places has been rigidly established on the basis of a system of collection of business needs, aggregated and then adjusted according to national political priorities.

We are using here the data collected in the EPHE project, data gathered from various archives and that reproduce the planning of the number of student places (seats) for admission based on specializations for each year from 1948 to 1989.

In order to represent the performance of the Romanian economy, we rely on the GDP calculated within the Maddison Project that is largely independent of the socialist planning system.

The values of the Maddison Project can be considered realistic estimates of Romania's GDP for the investigated period, but they are different from the values used and those projected by the planners of Romania's socialist economy. On one hand, the planning of student places in Romanian institutions was based on predicted values while the values of the Maddison Project are accomplished values, and on the other hand, the calculation method of the values is different. We tend to believe that the Maddison estimates are closer to the economic reality, but this is debatable. However, if we accept that the Maddison values describe well Romania's GDP, including in terms of purchasing power[2], then the modeling that we want to present could be interpreted as a post-factual analysis of the suitability of the planning of student places on disciplines for the Romanian economy. Our goal is not to check whether the planning was followed rigorously on the basis of predictions available to decision makers, but rather if in time the planning had a positive impact upon economic growth.

We have generally followed three categories of VAR (vector autoregressive) models having the number of planned student places as independent variable and the GDP as a dependent variable. Concerning the three categories, the first one had 8 lags, starting from the first previous value to the 8th one, the second had 4 lags starting from the first value to the 4th and the third one also with 4 lags, but starting from the 5th previous value to the 8th one. We have separated the models based on these previous values because the effect on the economy of the number of student places offered for admission is delayed by at least the duration of the study cycle. The results are those expected, the alternative with the biggest effects on all the specializations is found when considering the lags starting from the 5th to 8th one.

For each of the disciplinary categories, we have also tried to check not only the effect of the number of student places on GDP, but also the effect of GDP on planning the number of study places. For the latter model, the

[2] This is questionable because the PPP values used by Maddison are problematic in the context of the socialist economy.

relevant values are obtained by using the lags from the 1st to the 4th one, considering that planning the number of student places for admission is in some way dependent on the country's economic performance. Of course, for these models, the dependent variable was the number of places and the independent variable was the GDP.

We performed all these modeling in order to test the assumptions, but will only show the relevant models.

Hypothesis

We start from a H_0 hypothesis, and two alternative hypotheses:

> H_0. The Romanian higher education system was planned according to the needs of the socialist economy, while the economy was planned to achieve the highest growth. This must lead to a very strong causal relationship between the number of planned student places and the economic growth. The relationship must not necessarily be a positive one, nor are the coefficients of relationship, of course, equal, some specializations being foreseen as having a greater impact on economic growth, some less impact, and some even need to be reduced in order to maximize growth. Regardless of the direction and strength of the relationship, causality should be present and strongly significant if planning was a success in terms of the relationship between what was planned and the reality.
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> H_{a1}. The planning of the higher education system was not dependent solely on economic factors. When political considerations were more important than economic growth, the causality is no longer necessarily present or significant.
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> H_{a2}. Planning the higher education system was a failure even at a technical level, although it wanted to plan the system to support economic growth, it did not succeed. The lack of significant causality between planned number of student places for admission and economic growth

is not only motivated by non-economic planning considerations but by its failure as a planning system.

We must add a consideration to these assumptions: the planning system should be differentiated on specializations, because different considerations and even different methods of the forecasting of the labor market[3] have been present in different categories of specializations (e.g. industrial, pedagogical, medical or legal specialties). If in economical specialties the need for student places was connected to the needs of labor force allocation that could be understood as an economic necessity, in the case of specializations unrelated to the economy, the need must of course be understood differently.

Results

We will present the results of the modeling in a synthetic table in order to facilitate reading.

1. Column A contains the name of the specialization.

2. Column β contains the value of the standardized coefficient of a simple regression of the effect of the number of student places for admissions for the specialization in question on GDP deviated by 4 years, accompanied by the significance of the coefficient, in order to determine the direction of the positive or negative relationship and its significance. Small values of significance (less than 0.05) allow rejection of the variability independence hypothesis.

3. Column R2 contains the predictive power of simple regression as the estimator (of course, imperfect) of the power of the relationship. At a value above 0.5, the relationship is considered strong, and above 0.1 is considered average.

[3] The labor market term is not inadequately used in the context of the planned economy system.

4. Column A → GDP contains the significance of the Granger's Wald test for the causality of the number of places/seats for admissions over GDP downward by 4 to 8 years.

5. The GDP column → A contains the significance of the Granger's Wald test for the causality of GDP on the number of places/seats for admissions, down by one year to 4 years.

The meanings of the Granger tests are to be read as following: a small value indicates a low risk of error in rejecting the non-causality hypothesis. Therefore, small values can be understood as clues for causality. Usually, values are considered significant if under 0.05.

A	β (Sig)	R^2	A → GDP	GDP → A
Forest	1.22 (0.490)	0.0141	0.299	0.209
Agricultural	-0.16 (0.735)	0.0034	0.467	0.062
Zootechnics	2.77 (0.000)	0.4269	0.000	0.002
Veterinary medicine	0.09 (0.901)	0.0005	0.003	0.872
Mine	3.51 (0.000)	0.3893	0.685	0.000
Oil	4.09 (0.000)	0.6584	0.000	0.037
Geology and geophysics	3.91 (0.000)	0.3547	0.002	0.014
Geology	-11.67 (0.000)	0.5237	0.922	0.000
Metallurgy	2.06 (0.000)	0.6426	0.000	0.000
Mechanic	0.39 (0.000)	0.8450	0.028	0.000
Mecanochimic	7.32 (0.000)	0.3894	0.845	0.053
Electrical	0.93 (0.000)	0.8035	0.129	0.001
Power	3.40 (0.000)	0.5652	0.845	0.059

Industrial chemistry	2.05 (0.000)	0.7236	0.206	0.006
Light industry	5.23 (0.000)	0.6468	0.007	0.004
Food industry	-2.27 (0.322)	0.0289	0.015	0.272
Construction/building	0.83 (0.000)	0.3321	0.030	0.004
Architecture	0.05 (0.980)	0.0000	0.000	0.270
Economy	0.34 (0.000)	0.4143	0.000	0.001
Medicine	0.79 (0.000)	0.5811	0.000	0.002
Dentistry	4.54 (0.000)	0.4908	0.128	0.249
Pharmacy	-0.72 (0.686)	0.0049	0.000	0.009
Sports	-5.74 (0.000)	0.3936	0.000	0.014
Mathematics	1.50 (0.012)	0.1718	0.011	0.011
Physics	4.36 (0.000)	0.5200	0.000	0.646
Biology	-4.29 (0.000)	0.3892	0.225	0.000
Geography	-2.36 (0.320)	0.0291	0.346	0.216
History	-2.78 (0.008)	0.1900	0.000	0.002
Philosophy	0.98 (0.483)	0.0146	0.000	0.036
Pedagogy and psychology	-0.03 (0.782)	0.0023	0.000	0.017
Philology	0.08 (0.773)	0.0025	0.000	0.000
Law	0.64 (0.083)	0.0858	0.043	0.000
Theater and cinema art	-27.25 (0.000)	0.3421	0.120	0.000
Music	-1.63 (0.187)	0.0507	0.000	0.192
Arts	12.16 (0.020)	0.1502	0.620	0.044
Total study places	0.087 (0.000)	0.8105	0.020	0.000

The overall number of study places is strongly correlated with the lagged GDP per capita, the Granger causality test showing significant bi-directional Granger causality.

We will systematize the relations between per capita GDP and planned places of the separate study programs in two major groups: specializations whose graduates were distributed in the socialist economy and specializations whose graduates engaged in the service sectors (education, health, justice, arts)[4]. In the synthetic table above, the two sectors are separated by a double line.

Only five of the specializations of the economic sector do not have a significant relationship with the deferred GDP. Four of these specializations are subsumed in the agricultural sector: forest and agricultural engineering, veterinary medicine and food industry. The fifth specialization is architecture. There is only one specialization in this group with a significantly negative relationship with the offset GDP: geology, which we included here because its graduates were predominantly distributed in the economy. We can assume that the negative relationship was not a failure of the plan, since the technical specialization of "geology and geophysics" is significantly positive in relation to the offset GDP, and the two study programs might have been planned together. Thus, after 1977, the university's specialization in geology disappears altogether, and the technical specialization is experiencing a significant growth.

The situation is completely different when it comes to the disciplines belonging to the non-economic sector. Seven specializations are unrelated to GDP and 4 are in a negative relationship. Only 5 of these specializations are in a significantly positive relationship with the deviated GDP. These are: medicine and dentistry, mathematics and physics, as well as arts. However, mathematics and arts have relatively low values of R2, indicating statistically significant but weaker relationships.

[4] There are imperfections of this simple separation: computer-based subspecialization included in mathematical specialization, as well as physics and law in which there were also distributions in the economy.

A preliminary conclusion would be: job planning has achieved the expected effects in the industrial and health sector. In agriculture and all other non-economic sectors either planning had other considerations than economic ones, or it did not have the expected effects.

Sector	No. of specializations	No. of specializations positively linked to the offset GDP	No. of specializations negatively linked to the offset GDP	No. of specializations with a causal effect on the offset GDP[5]	No. of causal-dependent specializations of pre-GDP
Economic	19	12	1	8	14
Non-economic	16	5	4	5	12

Considering the causality tests, the image of these relationships is tinged. Eight of the 13 specializations pertaining to the economic sector seem to have a causal effect on deviated GDP, which is positive for all these specializations. For non-economic specializations, only 5 have an apparent causal effect, but 2 of them have a negative effect (history and sports). Only medicine, mathematics and physics have positive effects. Given the fact that both mathematics (including computer science) and physics may be considered mixed specializations, including a number of industry distributions, the picture of a radical difference between the two sectors is reinforced by the modeling of causality.

Looking at this relationship from a reversed point of view, that is, trying to find out whether planning of student places can be considered the result of pre-GDP values, we no longer find such a significant difference between

[5] We consider that only causalities that are connected either positively or negatively to the offset GDP have a possible causal effect.

the sectors previously defined. Most specializations can be considered as being dependent on the planning of student places of previous GDP values, whether they have led to increases or decreases in the number of places. However, it is important to note that the economic specializations that are independent of the previous GDP are once again architecture and the same four specializations close to agriculture (forestry and agricultural engineering, veterinary medicine and food industry), specializations that did not show any significant relationship with the deviated GDP. Basically, these 5 specializations seem to be independent of GDP. In non-economic specializations the situation is to some extent paradoxical, a number of specializations that did not have any effect on GDP, prove to have a number of places depending on the pre-GDP values.

By systematizing the results, we propose a classification of the disciplines by how they are included in a quasi-circularity caused by the following form:

Previous GDP (years -4 to -1) → Number of student places → Next GDP (years +5 to +8)

We have gathered the derived classification into a table below:

	Positive relation	Negative relation
Specializations dependent and with an effect on the GDP	Zootechnics	Pharmacy
	Petroleum, Geology and Geophysics	Physical Education
	Metallurgy, Mechanics	History
	Construction, Economics	Theater and cinema
	Medicine	
	Mathematics	

Specializations dependent and without effect on the GDP	Mining, Mechanical Engineering, Electric Engineering, Power Engineering, Industrial Chemistry, Light Industry Philology Law Plastic arts	Biology Pedagogy and Psychology Geology
Independent GDP-specializations but with impact on GDP	Physics	
Independent GDP-specializations and without impact on GDP	Forestry, Agriculture, Veterinary Medicine, Food Industry Architecture Dentistry Geography, Philosophy, Music	

We shall return to the hypotheses we have built at the beginning of this text.

Our assumption that the specializations are in different relations with GDP has been confirmed, both as compared to previous values that can be considered as prerequisites for planning, as well as compared to subsequent values that can be interpreted as effects of planning.

Taking into consideration the fact that some of the specializations prove to be well inserted into the causal chain that links them to past and future GDP values, we cannot speak of a complete failure of planning. Of the 35 specializations analyzed, we find 13 that are inserted quite strongly into the causal chain of planning. Though, four of them are in negative relation to GDP values.

Twelve specializations are dependent on previous GDP values, which would indicate economic planning but do not have an effect on the offset GDP, which could mean a failure in planning. Of course, some of these specializations do not have an economic character anyway, nor can we expect an effect on GDP in the 5-8 years after the beginning of the studies. However, the presence in this group of some key specializations for the socialist Romanian industry such as Mining, Mechanical, Electric and Power Engineering, or Industrial Chemistry can be interpreted as failures in planning.

Finally, another important group of 10 specializations seems independent of both the previous and the later GDP and those are Forestry, Agriculture, Veterinary Medicine, Food Industry, Architecture, Dentistry, Geography, Philosophy and Music

Considering that specialization planning had to take into account the Marxist theory of the primacy of the economy over the other sectors, the overall picture in the table is largely coherent. However, it is surprising that there is a lack of relationship regarding the agricultural specializations. Agriculture should have been part of the structure of society, unlike other areas neglected or even disadvantaged by planners, and which were considered to be superstructure elements that are not essential for ensuring the wellbeing of the people. A hypothesis would be the perpetuation of a typical Stalinist image of Communism, in which the prevalence of industry is an essential premise of social progress, and the agricultural field is not only of no interest but must be restricted as much as possible. Another explanation might be that agriculture didn't yield only economic goods, but there was a large share of the production dedicated to direct consumption, which did not get to enter the economic records.

Conclusions

Concluding, all of the results allow us to consider the following hypotheses:

1. The hypothesis H_0 cannot be fully rejected. All industrial specializations have been planned with a certain coherence. However,

some of them were not satisfactory, with no noticeable effects on the consecutive values of GDP. In particular, a special mention has to be made regarding the chemical and mechanical-chemical fields, probably overvalued in planning and without the foreseen impact.

2. The alternative hypothesis H_{a1} seems to be useful in explaining the number of student places for certain specializations whose planning has not occurred under the impact of the economy, whether they were independent of GDP, or that their planning was in a negative relationship with GDP. Here extra-economic considerations must have been important, most likely ideological considerations. Interesting and important is the presence of almost all agricultural specialties in this group.

3. The alternative hypothesis H_{a2} could be limited in case of industrial specializations, which have no effect on the subsequent GDP. All non-GDP-dependent or negative-dependent specializations are outside the industry and relationships can be more easily explained by the H_{a1} alternative hypothesis. Still, the interpretation of agricultural specializations remains uncertain.

We reiterate the essential result of our research: the planning of student places has been at least partially in line with economic growth. For some specializations, planning has been successful, leading to growth, but for others it was less successful. However, the socialist economic bloc was undoubtedly a failure. Current estimates of per capita GDP for Romania show a stagnation starting with the mid 1970s, even with a decrease from 1979 (4.148 USD PPP) until 1989 (3.941 USD PPP) (Maddison Project). The reality behind the data was much worse, the living conditions of the population deteriorated, access to basic goods was hindered, the personal income of consumers stayed largely the same, but their spending opportunities decreased, causing a structural economic slowdown. As such, although the planning proves to have been in relation with the real values of economic growth and has not been totally unsuccessful, the economic system has collapsed as a whole.

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