AMERICAN AND ITALIAN PERSPECTIVES ON PUBLIC AND PRIVATE EDUCATION CHOICES

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This work is based on the analysis of the public and private support to education and human capital development in two specific national contexts: the U.S. and Italy. Recent researches have firmly demonstrated the value of higher levels of education for socio-economic development, poverty reduction, higher incomes, employment and eliminating child labour, gender equality. The increased competition and globalization of economic activity, acceleration in technological and scientific knowledge, information revolution and more recently the worldwide economic recession continue to raise the value of education and training in preparing individuals for future employment, upgrading skills for greater workplace mobility, and underpinning wealth creation and economic development through human capital formation. The International Labour Organization (2010) has pointed out the key role played by higher levels of education and skills training in employment and social protection policies. In the Western world, the education industry is complex and diverse. It combines a dominant public sector of schools and universities and community colleges which educate the majority of students; a varied private sector mainly consists of nonprofit organizations that encompass some of the world's most elite education and scientific institutes. The importance of education for economic growth and development is well documented from a historical and economic standpoints. In this research we examine some evolving relationships between the marketplace, the state, and education institutions, knowing that the context of these relations has evolved strikingly in recent years, which have seen three major developments: a growing system differentiation, changing governance patterns, and a diminished direct involvement of governments in the funding and provision of education. Therefore, we are interested in understanding on one hand the possible evolution of the studied phenomenon, and on the other if the experience of a leading country as the U.S. may represent a useful starting point of imitation. So that, our analysis is focused on the investigation, through a period of ten years, of students enrollment according to the willingness to invest in education, independently of the resources needed. In particular, we use the Box-Jenkins methodology to fit data by using an ARIMA model and in order to achieve more information about the phenomenon. Our findings show a similar trend over time both for public and private enrollments although backgrounds and rules are very different in the two nations considered.

Keywords: human capital, public and private education, time series analysis.
JEL code: C23, E24, I25.

1. Introduction

Although not a pure public good, public provision of education is widely viewed as a primary function of government and it satisfies a natural commitment to the welfare of people. In many of developed countries public spending on education accounts for as much as 10% of government expenditures and as much as 5% of GNP. At the same time, the private sector of education has

been growing in importance over the past decades, and public education has been commonly supplemented by private education, since there are few technical barriers to its private provision (Stiglitz 1974). The processes of education and training, by supporting the formation of human capital, acquire a meaningful relevance especially in the more advanced socio-economic contexts, such as those belong to EU or OECD. In our analysis we consider two advanced countries, the U.S. and Italy, which were both in the former G8 group. The aim is to recognize a similar path in choosing to invest in public or private education, mainly the higher one. We focus on college or university registration, trying to find a trend by which this economic point could be explained. The differences in scholastic achievement of public and private schools have been the topic of a large number of studies in the educational sciences, economics and sociology, mostly in the U.S. but also to some extent in Europe. Within this literature, a significant distinction emerges inside the private sector, namely between publicly financed and private independent schools (Godwin and Kemerer 2002).

2. Related literature and other resources

As a few other Western countries, the U.S. have a system of education and training which enables not only widespread knowledge and lifelong learning, but also the possibility to establish very advanced educational paths. This purpose is shared by central institutions and by peripheral ones, with obvious differences which can arise in a country with a typical federal character. This so highly competitive socio-economic context leads the national system to seek and use especially that part of the workforce with high efficiency. On the other side, Italy has the same American public purpose, but differently its centralized institutional structure denotes that the selection of goals only depends by central government, without any peripheral institution directly involved in development of human capital. So that it is necessary to examine the possible motives for households or individuals to choose a type of public or private education. Certainly, this choice covers issues related to the quality of educational institutions, which reflects better preparation for students, who gain more experience and skills in specific perspectives. These differences in educational systems should be stronger in countries where wider space is left to private, and the State chooses not to provide significant resources to public education. In a complex economic system such as that of the U.S. there are additional conditions in order to choose, and the study of choices is a separate field of scientific inquiry (*e.g.* Murnane *et al.* 1985, on the quality of schools in the U.S. and the differences for various ethnic groups). Focusing on the private school, Cheslock's work (2005) examines the share of transfers which constitute the total number of students in public and private schools, noting that the percentage for the latter is lower if compared to the other. This would not occur for less attractive institutions, but only for the most selective, and consequently the role of transfers become critical in the U.S. higher education system. From such studies it is clear that both types of education require additional features, such as the selection, fees, and financial resources. This can also lead to transfers between different private institutions, more or less "selective". However, over time there has been a quantitative advantage in terms of transfers to the public part, certainly influenced by the fact that there are more opportunities to enroll. There are also differences in autonomy, and consequences of selection decisions to human resources and programs, which of course has always been higher in the U.S., compared to the European experience. Before examining the influence of education on the future well-being of individuals, it is necessary to consider how, today, we can estimate a different level of quality for the various training courses. Certainly there is no a single method, and we can mention some of those who are close to our case studies. For the U.S. case, Cherchye *et al.* (2010) uses a nonparametric approach for the evaluation of public and private education. In fact, even in contexts where private education is widespread, public funds should still be used in an effective and useful way through education programs. Another approach is instead to test the results on the next level of education (see for example Horowitz and Spector 2005). In this work the authors in comparing students who attended public, private

and religious schools, notice that they seem to get the best performance once in college. However, if it is possible to demonstrate the superiority of one of the possible better education, it should have general benefits, and therefore should be supported with public funds. In terms of benefits, there are also studies dedicated to estimating the contribution of public and private investment in education on economic growth. These include, for example, de la Croix and Doepke (2004), who estimate a greater contribution to the economic growth of private education when it is present in a low level of inequality in human capital, taking into account levels of fertility and the trade-off between quantity and cost of education of children. Finally, Arcalean and Schiopu (2010) study the interaction between public and private spending in a two-stage education framework (K-12 and tertiary education) and their effects on economic growth. Obviously, economic theory highlights positively the contribution of specific investments, both public and private, when they support an increase in the average human capital. In this sense, in a balanced socio-economic system the public spending should encourage private investments, also understood as the costs of households for their children. For this reason, in a highly competitive and multifaceted system, as in a Western country, it is necessary to create a harmonious and mutual support among the various education levels, integrating where appropriate public and private institutions. This may happen for example when only a certain type of private institutions, having more autonomy, can create specific courses of study, identified as useful to the global national context.

3. Analysis and findings

Starting from U.S. Census Bureau and OECD databases concerning education, we find a ten years data, 1998-2008, related to registration in higher schools, divided into public and private institutions. According a time-series analysis, this could allow us to describe the behavior of institutions and people on choosing their type of investment in schooling. Preliminary, we consider a simple axiom, which we could summary as following: people in a moment of their life decide to spend money to assure themselves to pursue their educational path; this amount of money is given and the same is for the private and public profiles, and people do not have benefits to acquire more education than the minimum required to enter in the workforce. At least, the only people problem is in which institution they want to learn. According to this statement, we follow the evolution of data, and at the end we try to predict them, according to the Box-Jenkins approach and applying an ARIMA model to find the best fits of a time-series to past values, and to make forecasts and verifying, where possible, if forecasts are closer to data. The method applied consists in an iterative three-stage modeling methodology:

- *model identification and model selection* making sure that the variables are stationary using plots of the autocorrelation and partial autocorrelation functions of the time-series to decide which, if any, autoregressive or moving average component should be used in the model;
- *parameter estimation* using computation algorithms to arrive at coefficients which best fit the selected ARIMA model, and we use the most common method of maximum likelihood estimation;
- *model checking* by testing whether the estimated model conforms to the specifications of a stationary univariate process, verifying that the residuals are independent of each other.

Moreover, in our analysis we consider four time-series with the same temporal scheduling and annually frequencies started in 1998 and ended in 2008, covering a period of ten years. In a first moment we can see, because the fact that economically the two countries are very similar, that the curve hits the value and it seems to have the same shape and underlying trend for the public institutions (see Fig. no. 1)
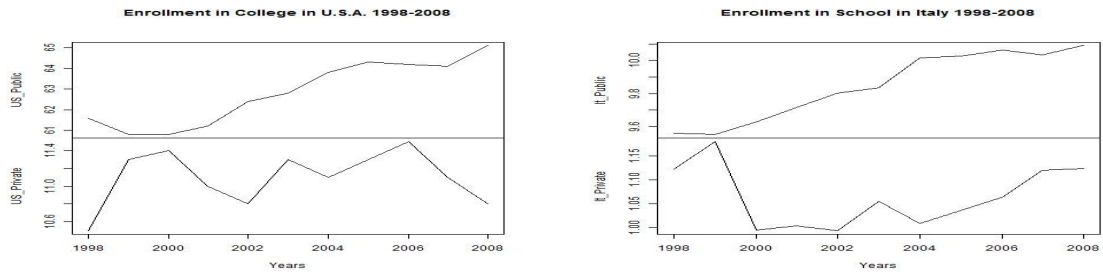
Figure no 1 - Enrollments (made by the authors)

Hence, we determine if the time-series is stationary and if there is any significant seasonality that needs to be modeled. As our time-series have annually frequency we are not able to have a significant seasonality to break up, so we can focus on stationarity which could be assessed from the sequence of plots above (see Fig. no. 1). We can also detect it from the autocorrelation plot, specifically, in our case, stationarity is indicated by an autocorrelation plot with a quick decay, as shown in the following figure. Indeed, for public institutions, both in the U.S. and Italy, the autocorrelation function decays after lag 3, while for private institution it takes place immediately after lag 2 (see Fig. no. 2).
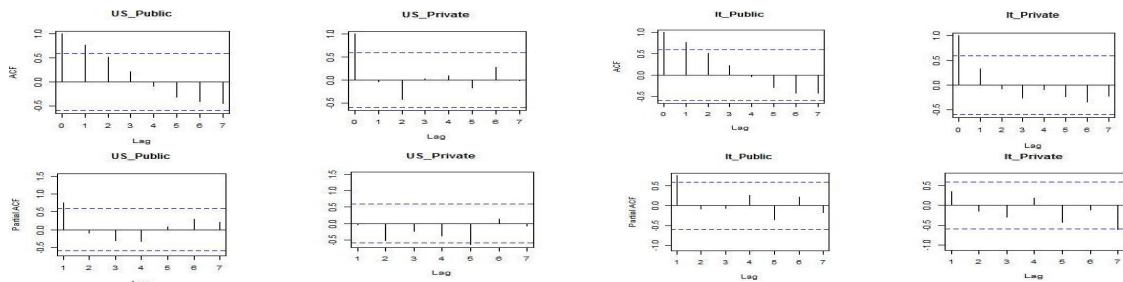

Figure no 2 - ACFs and PACFs (time series) made by the authors

The next step is to identify the order (p, d, q) of the autoregressive and moving average function and the order of the differences at which lag it will be computed. In practice, the autocorrelation and partial autocorrelation functions are random variables and sometimes will not give the same results as the theoretical functions. This could make the model identification more intricate, in particular, if we will find out a mixed models particularly difficult to identify. Thus, we already establish that our time-series are stationary, although the index of the partial autocorrelation function could suggest a cyclical period. We use statistical software R to determine that our time-series regarding the U.S. could be modeled by ARIMA process (2,0,0) with non zero mean, while the others two regarding Italy could be modeled by ARIMA (1,0,0) with non zero mean, supported in our choice by information-based criteria Akaike Information Criterion (AIC), technique that could help in the process of identification of the model. This model could be summarized by the following table (Table no 1):

Table no 1 - ARIMA coefficients

	AR(1)	AR(2)	Intercept	Est. σ^2	Log-ML	AIC
U.S. Public	1.4499	-0.6016	63.4474	0.3165	-10.59	29.17
U.S. Private	-0.0789	-0.6865	11.1334	0.05091	0.13	7.74
IT Public	0.9485		9.8296	0.005956	11.42	-16.84
IT Private	0.3655		1.0695	0.003185	15.94	-25.88

made by the authors

The model diagnostic is similar to the validation for non-linear least squares fitting, where the error terms are assumed to follow the assumptions for a stationary univariate process. The

residuals should be white noise drawings from a fixed distribution with a constant mean and variance. If the Box–Jenkins model is a good model for the data, the residuals should satisfy these assumptions. The plot of the mean and variance of residuals analyzed over time and that of autocorrelation of residuals help us to identify to select the model. As in the plot (see Fig. no. 3), our data assure the respect of those assumptions so the model is checked and validated.
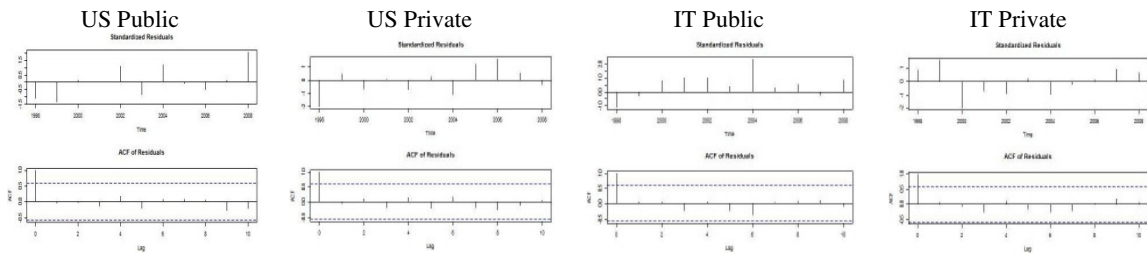
US Public	US Private	IT Public	IT Private

Figure no 3 - Residuals of the model (made by the authors)

After those steps, our model is checked, and it fits well the data since well itemized, so that we can use it to forecast the global behavior of enrollments. In the graphics below (see Fig. no. 4), we can observe that the forecast about American enrollments in public college decays slowly describing an exponential decreasing curve, while the forecast for private college is more erratic and not easily to interpreter. This lack of a continuous and increasing curve may be attributed to a casual elements, different from statistical errors, which affect the total amount independently from the householders' decision. Forecasts for Italy show a quite stationary values, indicating that decisions to enroll at schools do not suffer unintended effects due to critical situation and the level of enrolments, therefore, are stable over time with unimportant, compared to past, fluctuations in the levels.
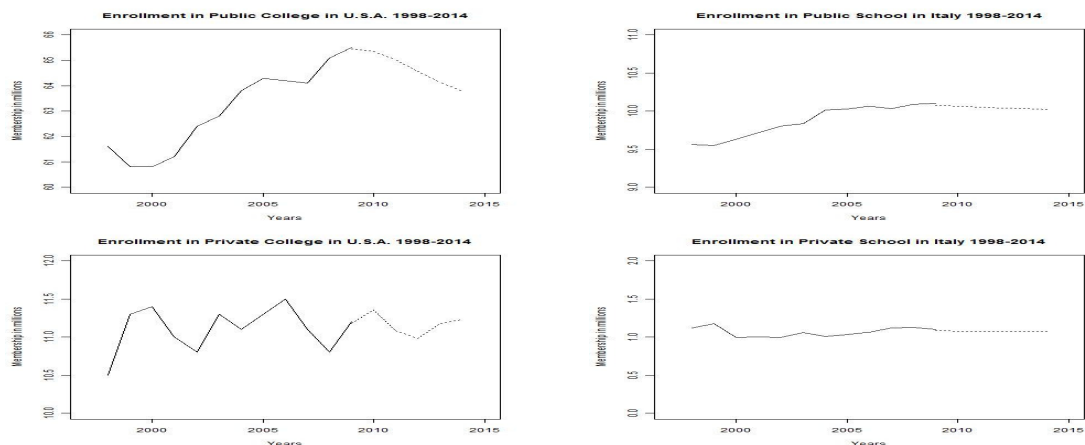

Figure no 4 - Forecasts (made by the authors)

4. Conclusive remarks

This paper show empirically the increasing importance that public and private education assume in two socio-economic systems. In particular, our research is focused in comparison with two countries, the U.S. and Italy, which differ for many things such as the choices of public and private investments, the population, the national financial debt and government expenditures. The preliminary analysis of the curve of enrolments at public school shows a similarity between the U.S. and Italy in their shapes, but not in the values of the curves, while we cannot reflect the same for private schools. This could be interpreted as a proportional ratio in government expenditure in education or, as we believe, in the preference of public education system *coeteris paribus*. Nevertheless, the proportionality of the expenditure is only a quantitative representation. Actually, the reasons for the apparent contradictions should be required in the existence of at

least two different views, in many ways divergent, about the ideological role of the university, and more generally education, in those countries. In the U.S., education organization is considered a private investment than an individual or his family voluntarily support, if can afford it, to be capitalize as a result by means of the major income received. In this country, a request for a private education responds also a private offer, where even the public schools and universities operate, with the private ones, in a market logic. Hence, this logic leads to a sort of competition between institutions to be seen as the most suitable not for the quality of education provided but only for the value which people received by attending one noticeable college rather than an unknown one. This kind of competition is carried on only by institutions which have the opportunity, or in most cases the resources, to attract famous professors, researchers or benefactors. Otherwise, in Italy, education is still ensured by national Constitution and it is seen as a right by citizens, often with a financial aid provided by government. This gives rise to a misunderstanding about higher education institutions, so that people do not perceive the need for attending a private schools instead of public one. In conclusion, while data shows a closer paragon between the U.S. and Italy, the realistic representation is far from it. Indeed, the U.S. education becomes a real commodity and it is forced to follow market rules, whereas in Italy it is still a right and our goal is reached and it could be summarized as follow: people choose always the quality, *coeteris paribus*.

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