The institutional design of the SUS: is its hybrid public-private nature leading to a better health system?

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Resumo

A concepção ideológica de que a gestão privada é superior à administração pública tem se refletido na área da saúde pelo crescimento do número de convênios e contratações por diversos entes federativos de gestores para a provisão de atendimento do Sistema Único de Saúde. A principal característica deste fator é a explosão de parcerias do Poder Público com instituições privadas. O objetivo deste artigo foi justamente mensurar o impacto da gestão privada no SUS, por meio da estimação de um modelo de regressão para dados de contagem. O banco de dados utilizado consistiu em um painel de dados, organizado com base em informações do Instituto Brasileiro de Geografia e Estatística e do Departamento de Informática do Ministério da Saúde, Datasus, abrangendo todos os municípios brasileiros entre 2000 e 2003. Em síntese, os resultados não confirmaram a existência de ganhos de eficiência, sugerindo que a simples transferência para as mãos da iniciativa privada não significa uma redução no número de mortes.

Palavras-chave: Políticas públicas; Saúde pública; SUS; Modelo binomial negativo em painel.

Abstract

Private management has become an important alternative for the provision of public services in Brazil - a result of a widespread belief that associates the non-governmental sector with higher levels of efficiency. The aim of this paper was precisely to measure the impact of private management in SUS, through the estimation of a regression model for counting data. The database used consisted of a panel of data, organized on the basis of information from the Brazilian Institute of Geography and Statistics and the Information Systems Department of the Ministry of Health, Datasus, covering all Brazilian municipalities between 2000 and 2003. Results did not confirm that private management of public funding leads to a reduction in the number of deaths. In fact, results are unexpectedly significant and negative, which suggests that the improvement in the Brazilian public health sector, i.e. the reduction in child mortality rates, was not caused by its hybrid public-private institutional design.

Keywords: Public policies; Public health; SUS; Panel negative binomial model.

1. Introduction

The Federal Constitution of 1988, which was established with the purpose of expanding human rights guarantees, gave the state the task of organizing the

Brazilian health care system. In fact, the Constitution, in its Article 6, stated explicitly that health is a right of all and a duty of the state, which must promote social and economic policies oriented at reducing the risk of disease and other health problems as well as ensuring universal and equal access.

Thus, the universalized Brazilian health system became a reality with the enactment of Law 8080/1990, which established Brazil´s Unified Health System, known as SUS, which was grounded on the idea of the unification of many pre-existing public systems combined with a high degree of decentralization of its management.

According to Santos (2008), the definition of macro-parameters was entrusted to the federal level, in particular the definition of technical standards and regulation. In turn, state governments were given the role of organizing networks of specialized services, performing the mission of planning, coordination and the establishment of health care models in order to harmonize the efforts of municipal health care authorities. Finally, the municipal authorities were put in charge of health facilities and therefore were the actual providers of basic care services to the population.

In spite of this public-oriented view, the same legislation that created SUS, in its Article 24, stated that when its assets are insufficient to ensure the delivery of healthcare to the population of a given area, the National Health System (SUS) may use the services supplied by the private sector.

As a consequence, the provision of health care services through the private sector, which had originally been planned as a tool to supplement the public system, has increased considerably since the enactment of Law No. 9790/1999, which allowed non-profit organizations to provide health care with public funding.

After that, private management has become an important alternative in the provision of public services in Brazil - a result that may be attributed to a widespread belief in the higher efficiency of the non-governmental sector. Hence, the institutional design has shifted from a traditional pure governmental provision to a hybrid public-private management with public funding.

Surprisingly, in spite of the importance of this radical institutional change, there is an absence of empirical investigation concerning this radical institutional redesign and its effects on the efficiency of the Brazilian Health Care System.

The objective of this article is to fill this gap, evaluating the impact of non-governmental management in SUS with the use of a panel negative binomial model. Data for all Brazilian municipalities between 2000 and 2003 were obtained from the Brazilian Institute of Geography and Statistics (IBGE) and from the Information Systems Department at the Ministry of Health (Datasus). In the first section, a brief review of literature is presented, while in the second some theoretical estimation aspects are discussed. In the third section, the database is described and then results are shown in the fourth section. Finally, the fifth section presents the conclusions.

2. Efficiency in the Brazilian Health Care System

The literature on efficiency of public provision of health care services is rich in studies that compare the relative efficiency of different countries. Examples of interesting findings are found in Evans et al. (2000), Gupta and Verhoeven (2001), Jayasuriya and Woodon (2002), Afonso and St. Aubyn (2004), Murray et al (1994), Herrera and Pang (2005). However, the economic evaluation of efficiency in the provision of health care services by SUS is still incipient, with most of empirical research based on the use of stochastic production frontiers or data envelopment analysis (DEA).

Gupta and Verhoeven (2001) assessed the efficiency of government expenditures on education and health in 38 African countries, both relative to each other and to a sample of countries in Asia and the Western Hemisphere. They concluded that, on average, African countries are less efficient than and there is a wide variation in the way government spending in Africa impacts on the services. For Evans et al (2000), attempts to evaluate the impact of health care sector reforms and to monitor health care sector performance have been hindered by the lack of accepted methods for quantifying the extent to which countries use scarce health care resources to meet the goals of the health care system. They attempted to evaluate the efficiency of health care systems across a larger number of countries (1991) and over time. They suggested a way of routinely measuring and monitoring the performance of health care systems, and this was the first time that the efficiency or performance of the health care system in producing health has been evaluated across a large number of countries. Previously, most of the knowledge of health care sector performance had been anecdotal or based on case studies.

In order to improve efficiency, governments have at least two options. The first consists of changing the allocation mix of public expenditures. For example, Murray et al. (1994) argue that by reallocating resources to cost-effective interventions, Sub-Saharan African countries could improve health outcomes dramatically. The second option consists of implementing wide-ranging institutional reforms in order to improve variables such as the overall level of bureaucratic quality and corruption in a country, with the hope that this will improve the efficiency of public spending in social sectors, among other things.

Using a worldwide panel data set for the 1990-98 period to measure the efficiency of countries in improving health and education outcomes for their populations, Jayasuriya and Woodon (2002) conclude that better indicators are achieved through an expansion in the use of inputs and through improvement in efficiency levels. Their analysis of the determinants of the efficiency measures suggested that bureaucratic quality and urbanization both have strong positive impacts on efficiency, albeit decreasing at the margin. In contrast, corruption does not appear to have the same impact.

As for the Brazilian case, Marinho (2003) uses DEA methodology to assess the efficiency of health care services in the state of Rio de Janeiro. The author

shows the existence of great heterogeneity in performance which is mostly attributed to socio-economic variables that are not controlled by managers. In particular, evidence was also found that population size and efficiency move in opposite directions.

Sousa et al. (2005) also utilized the DEA methodology to estimate the efficiency of public services provided by municipalities, finding evidence of better performance in capital cities, although that does not seem to extend to their metropolitan areas. Boueri (2006) also employs the same technique, controlling for education and sanitation indicators. His findings indicate a high level of inefficiency, positively correlated with the size of government expenditures.

Santos (2008) estimates a stochastic frontier for a sample of municipalities for the period between 1997 and 2000, finding a negative relationship between the use of new technologies and inefficiency. This kind of effect is also seen in the proportion of hospital beds supplied by the private sector with public funding. Moreover, the author highlights a positive correlation between the importance of federal funding for local governmental revenues and inefficiency.

One of the most challenging obstacles encountered in the literature on health care evaluation is the definition of efficiency. The concept is often chosen as a consequence of the methodology employed. For example, stochastic frontier and data envelopment analysis require the choice of a disjoint set of variables that are assumed to be inputs and outputs. In this way, the former is supposed to explain the dynamics of the health care system, and the latter, a singleton for the stochastic frontier, is considered to reflect the quality of service supplied by SUS. In essence, results may depend directly on the statistical model used.

Thus, in order to avoid this problem, or at least minimize it, a model for count data is proposed as it is consider appropriate to explain variables such as the number of deaths. As regressors, socio-economic variables as well as the fraction of private supply in the SUS framework are used, allowing us to test, without any excessively restrictive hypotheses, its effect on the performance of the Brazilian health care system.

3. The model

The number of deaths as the dependent variable is a natural case of count data. Alternatively, ordinary least squares could be employed; however, the high frequency of zeros and the constraint to positive values is information that must be incorporated to the model leading to greater efficiency.

In this fashion, assuming a Poisson process, the number of occurrences of an event, *y*, given the rate of incidence μ, follows:

$$P(Y = y) = \frac{e^{-\mu}\,\mu^{y}}{y!},\ \mathrm{y} = 0,1,2,\ldots, \qquad (1)$$

The regression model is derived from the parameterization of the relationship between the average μ and a vector *x* of regressors. Assuming, for example, the use of the exponential average, we have:

$$\mu_i = \exp(x_i' \beta), \text{ i} = 1,..., \text{N} \tag{2}$$

From (1) and (2), and adding the assumption that observations are independently and equally distributed, the more suitable estimation method is maximum likelihood. For that, the following function must be optimized:

$$\ln L(\beta) = \sum_{i=1}^{N} \left\{ y_i x_i' \beta - \exp(x_i' \beta) - \ln(y_i!) \right\} \tag{3}$$

Following Cameron and Trivedi (2005), it may be shown that, for panel data, the maximum likelihood function is:

$$L(y_i / x_i, \alpha_i, \beta) = \prod_{t=1}^{T} \exp\left[-\alpha_i \exp(x_{it}' \beta)\right] \left[-\alpha_i \exp(x_{it}' \beta)\right]^{y_{it}} / (y_{it}!) \tag{4}$$

given that $y_{it} \sim P\,[\alpha_i \exp(x_{it}\,\beta)]$ is also assumed.

However, an implicit restriction imposed by the Poisson model is equidispersion, since the first two moments of the Poisson distribution are, respectively, $E[Y] = \mu$, $Var\,[Y] = \mu$. Cameron and Trivedi (1990) propose a relatively simple procedure to test the validity of the hypothesis of equality between the mean and variance of *y*, i.e.[1]:

$H_0 : Var\,[Y] = E\,[Y]$,
$H_1 : Var\,[Y] = E\,[Y] + \alpha g\,(E[y_1])$

To perform the test, we simply check the significance of z_i against the expected value of a regression based on the Poisson model ì, where z_i is defined by:

$$z_i = \frac{(y_i - \hat{\mu})^2 - y_i}{\hat{\mu}\sqrt{2}} \tag{5}$$

In the case of rejection of equidispersion, an alternative is to use the negative binomial distribution, in which it is assumed that the dependent variable is generated by a Poisson process and that the rate of occurrence is also a random

1. In this test, it is also assumed that overdispersion follows $Var\,[Y] = E\,[Y] + \alpha g\,(E[y_1])$. See Greene (2003) for alternative tests with less restrictive assumptions.

variable. In this paper, it is also assumed that the dispersion varies randomly from municipality to municipality, so that the inverse of one plus the dispersion follows a negative binomial distribution[2].

4. Data

The empirical analysis uses data from the Ministry of Health, which has a special division in charge of statistics called DATASUS, for the period between 2000 and 2003. The socio-economic variables are obtained from the Brazilian Institute of Economics and Statistics (IBGE). After data cleaning, the panel was reduced to 5094 municipalities in a universe of 5564 in Brazil. The description of the variables is shown in Table 1.

Table 1.- ***Description of variables.***

Child Death	Number of child deaths in the municipality
Elderly Death	Number of elder deaths in the municipality
Death	Number of deaths - children and elder people
Lhealthspending	Log health expenditures of the local government
Llocalwealth	Log local gross product
Lyoungerthan4	Log population younger than 04 years old
Lolderthan60	Log population older than 60 years old
Lpop	Log population younger than 04 years old or older than 60 years old
Medical School	Medical School in the municipality
Fraction SUS Private Hospitals	Fraction of private hospitals in the SUS system in the municipality
Fraction SUS Private Clinics	Fraction of private clinics in the SUS system in the municipality
Health Insurance Coverage	Health Insurance Coverage in the municipality
Northeast	Municipality located in the Northeast
South	Municipality located in the South
North	Municipality located in the North
MidWest	Municipality located in the Midwest

2. The maximum likelihood function for a negative binomial distribution can be found in Greene (2003).

The municipality with the largest number of deaths is São Paulo, the most heavily populated city in the country. In spite of economic disparities, the share of localities that reported no deaths for longer than a year follows approximately the distribution of municipalities in the country. In fact, 31.15% of cities with no report of deaths were observed in the Southeast, 28.71% in the South, 23.46% in the Northeast, 10.35% in the Midwest and 6.31% in the north, indicating a smaller proportion of occurrence in the northern areas of the country

As far as public spending is concerned, the highest level of per capita expenditure on health care is observed in the Middle-South[3]; the data are shown in Table 2. The average expenditure per capita in the South, Southeast and Midwest regions is higher than the national average, while in the North and Northeast its value is substantially lower.

Table 2.- ***Average expenditure per capita.***

Year	2000	2001	2002	2003	Variation
Southeast	102,987	121,117	148,446	167,240	62,39%
South	85,652	104,381	134,773	158,646	85,22%
Midwest	90,499	119,946	152,010	174,199	92,49%
North	58,005	78,591	105,238	115,133	98,49%
Northeast	60,735	78,710	100,202	109,593	80,45%
Brazil	81,053	100,422	126,782	143,625	77,20%

In Brazilian currency (Reais).

Additionally, convergence seems not to be the case. Despite the fact that the Southeast displays a growth rate in health care spending below the national average, the second slowest rate is seen in the Northeast, which has the lowest level of per capita spending, showing that if convergence is taking place, it is doing so at a very slow pace. Consequently, most clinics and hospitals that take part in the Brazilian Health Care System are public institutions. Moreover, the share of organizations owned by medical schools is also significant.

Nonetheless, regarding the supply of hospital care, the participation of the private sector in the SUS is not negligible, since it amounts to 37.85% of establishments which are private; mainly profit-oriented, philanthropic or also funded by labor unions. Similarly, 10.9% of basic clinics[4] are private institutions. This phenomenon is most pronounced in the Southern and Southeastern regions, where private institutions account, respectively, for 54.89% and 48.95% of the affiliates of the SUS. In the North and Northeast, private management is responsible, respectively, for only 14.67% and 23.88%.

3. The area comprised by the Southeast, South and Midwest Brazilian regions, according to the IBGE official territorial divisions. It is the richest and most heavily populated area in the country.
4. Prime Care Units and outpatients.

The management of clinics, in turn, is more homogeneous once the presence of the state clearly prevails. Significant participation of the private sector is felt only in the South, with 19.10% of the establishments, while in other areas of Brazil it does not reach 10%, with the lowest share in the North, with only 5.65% of the institutions that take part in the SUS.

The importance of the Brazilian public system is reflected in the low proportion of people with health insurance. The highest levels of coverage were registered in the Southeast and in the South with, respectively, 8.66% and 4.41% of their populations. On average, between 2000 and 2003, only 4.29% of the population had some form of insurance.

Wide disparities are also observed in medical education, a good proxy for the supply of highly complex medical care, which is available only in 1.2% of the Brazilian cities, with 75.6% of them located in the Middle South.

Table 3 describes the data quantitatively.

Table 3.- ***Data.***

Variable	Mortality in Brazil			
	Mean	Standard Deviation	Minimum	Maximum
Child Death	12,288	67,745	0,000	4599,000
Elderly Death	69,547	523,311	0,000	27997,000
Lhealthspending	14,010	1,087	10,168	21,104
Llocalwealth	10,756	1,378	7,371	20,178
Lyoungerthan4	7,073	1,177	4,043	13,710
Lolderthan60	6,173	1,086	1,792	13,000
Lpop	7,441	1,123	4,595	14,110
Medical School	0,012	0,108	0,000	1,000
Fraction SUS Private Hospitals	0,379	0,462	0,000	1,000
Fraction SUS Private Clinics	0,109	0,163	0,000	0,984
Health Insurance Coverage	0,043	0,078	0,000	1,000
Northeast	0,315	0,465	0,000	1,000
South	0,214	0,410	0,000	1,000
North	0,076	0,266	0,000	1,000
MidWest	0,084	0,278	0,000	1,000
Observations	21161			

5. Results

In addition to variables directly related to health, the number of losses of life in Brazil is also influenced by a wide range of socio-economic issues. Sousa and Lima (2006) highlight the high incidence of homicide rates and deaths caused by

traffic accidents, especially among young individuals. The authors also show that intentional injuries are an important cause of death in the metropolitan areas.

According to the authors, the rate of death from external causes (accidents and violence) per 100 inhabitants rose from 59.0 in 1980 to 72.5 in 2002. In comparison, Western European countries show rates lower than 3 premeditated deaths per 100 thousand inhabitants, while the United States are in the range of 5 to 6 premeditated deaths per 100 thousand inhabitants

As a rule, the segments of the population that are relatively less exposed to external causes such as violence, the elderly and children up to 1 year old are, on the other hand, the most susceptible groups to disease, corresponding respectively to 41.66% and 7.81% of deaths between 2000 and 2003.

For this reason, in order to minimize the impact of preventable deaths in the measurement of the effect of private supply in the SUS, instead of the total number of deaths by municipality, the mortality rate of these two groups are used as the dependent variable, with the performing of both joint and separate estimations.

Naturally, since the Poisson distribution may not be suitable because of excessive dispersion, the inequality between mean and variance was tested, leading to the intuitive conclusion that it cannot be rejected.

Additionally, it is also shown that the impact of public spending is significant, although its effect seems to vary over time. In the short run, it has a positive correlation, while in the long run[5] it is clearly negative. This may suggest that public spending tends to responds intensively to an immediate health problem, characterized by a large number of deaths. However, in the long run, this government reaction has a positive effect, reducing the number of losses of life.

In the case of infant deaths, the non-significance of wealth measured in terms of gross domestic product of the municipality cannot be rejected. However, the same is not repeated for the elderly deaths, since the effect is highly significant, meaning that a higher level of local gross product leads to a decrease in the number of losses of life.

As for the presence of a medical school, its negative effect on death rates is significant, as expected, given that more education is a proxy for the provision of more complex care. Besides, it is also possible to attribute this result to the presence of positive externalities, due to the benign spread of knowledge, for example, or even the cheapening of private health service costs.

Regarding the dissemination of health plans, results are inconclusive. For infant mortality, there is a negative impact, whereas among the elderly the effect is positive, which is also seen in the regression for the entire group.

In general, the access to private services increases the likelihood of prenatal care, as well as appropriate medical care in the early years of childhood. Hence

5. A one-year lag.

a negative relationship is expected between the spread of health plans and the number of deaths.

This logic could be repeated for elderly people, once the use of private medical care does not restrict the access to public clinics and hospitals. However, the estimates do not show such a relationship, and this may be attributed to data problems. Anyway, it also suggests a need for further investigation into the role of health insurance and, ultimately, the supply of private health care for senior citizens.[6]

Concerning the geographic distribution of the population, differences between the South and the Southeast are not significant. Both regions suffer from violence in their urban areas, which leads to a high rate of losses of life due to external causes. By contrast, the same cannot be said of other regions which are characterized by lower levels of violence.

Finally, the effect of private management in the Brazilian Health System is highly significant. However, with the exception of the group of newborn individuals, for whose mortality the presence of non-public clinics seems to have no impact, for the whole population the relationship is positive. Results are shown in Table 4.

Firstly, a word of caution should be brought forward, since medical care for young children and the elderly differs substantially, which may explain, at least partially, the divergence in estimation results. Secondly, regarding the negative impact of a larger share of private institutions with public funding, it must also be considered that the period between 2000 and 2003 was characterized by tighter budgets that stimulated a wave of rapid privatization which may have taken place without the desirable institutional design.[7]

Anyway, further investigation is clearly necessary to identify the factors which may have contributed to this result; if this still persists, a better understanding will surely enable us to improve the Brazilian health system, improving its hybrid public-private design.

6. Conclusion

Private management has become an important alternative for the provision of public services in Brazil - a result of a widespread belief that associates the non-governmental sector with higher levels of efficiency.

The aim of this paper was precisely to measure the impact of private management in SUS, through the estimation of a regression model for counting data. The database used consisted of a panel of data organized with information from the Brazilian Institute of Geography and Statistics (IBGE) and the Systems

6. In a first attempt, we used the proportion of individuals with health insurance in the population with a lag. Nevertheless, results remained insignificant.
7. After the Brazilian financial crisis in 1998, several budget limits were imposed. For example, wages now cannot correspond to more than 54% of total budget expenditures.

Table 4.- ***Results.***

		Deaths		Child deaths		Elderly deaths	
	OLS	**Probit**	**Bin. Neg.**	**Probit**	**Bin. Neg.**	**Probit**	**Bin. Neg.**
$Lhealthspending_t$	-0,098	-0,268	0,036	0,121	0,093	-0,043	0,022
	(1,371)	(0,006)**	(0,013)**	(0,013)**	(0,022)**	(0,006)**	(0,011)*
$Lhealthspending_{t-1}$	-4,828	-0,087	-0,091	0,008	-0,031	-0,108	-0,11
	(1,147)**	(0,005)**	(0,011)**	-0,012	-0,02	(0,006)**	(0,010)**
Llocalwealth	-11,863	-0,036	0,015	0,126	0,055	-0,05	0,009
	(1,339)**	(0,003)**	(0,006)*	(0,008)**	(0,010)**	(0,003)**	-0,005
Lyoungerthan4				0,879	0,852		
				(0,013)**	(0,015)**		
Lolderthan60						1,234	1,079
						(0,008)**	(0,009)**
Lpop	142,446	1,103	0,905				
	(6,750)**	(0,008)**	(0,011)**				
Medical School	21,055	<0.001	0,062	-0,112	-0,215	-0,033	-0,073
	(12,934)	(0,019)	(0,034)	(0,042)**	(0,050)**	(0,02)	(0,024)**
Fraction SUS	-1,622	0,102	0,212	0,121	0,13	0,021	0,049
Private Hospitals	(3,057)	(0,011)**	(0,013)**	(0,018)**	(0,019)**	(0,009)*	(0,010)**
Fraction SUS	16,152	0,116	0,363	-0,272	0,018	0,18	0,224
Private Clinics	(4,682)**	(0,014)**	(0,028)**	(0,033)**	(0,047)	(0,015)**	(0,022)**
Health Insurance	31,23	0,117	0,675	-1,658	-1,099	0,377	0,562
$Coverage_t$	(19.664)	(0.054)*	(0,096)**	(0,128)**	(0,197)**	(0,054)**	(0,089)**
Health Insurance	15,475	0,112	0,184	0,325	0,371	0,972	-0,007
$Coverage_{t-1}$	(16.555)	(0,041)	(0.087)*	(0,104)**	(0,178)*	(0,043)*	(0,082)
Northeast	-107,024	0,328	0,274	0,248	0,017	0,306	-0,265
	(19,278)**	(0,016)**	(0,016)**	(0,024)**	(0,023)	(0,013)**	(0,012)**
South	-13,892	0,076	0,074	-0,094	-0,077	0,128	0,119
	(21,132)	(0,017)**	(0,016)	(0,024)**	(0,023)*	(0,013)**	(0,012)**
North	-120,349	-0,956	-0,939	-0,081	-0,241	-0,359	-0,399
	(30,826)**	(0,025)**	(0,026)**	(0,035)*	(0,034)**	(0,020)**	(0,020)**
MidWest	-45,618	-0,480	-0,423	-0,042	-0,003	-0,019	-0,025
	(35,203)	(0,028)**	(0,028)**	(0,038)	(0,037)	(0,023)	(0,022)
Constant	-735,7983	-2,71	-4,312	-7,990	-6,5777	-1,755	-3,5509
	(49,642)**	(0,057)**	(0,092)**	(0,111)**	(0,140)**	(0,533)*	(0,075)**
Wald Chi2(13)	587,55	39133,07	39893,79	23714,91	21107,31	66636,27	92606,45
P-value	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Overdispersion Test		0,325		0,058		0,039	
Observations			(0,003)**		(0,002)**		(<0,001)**
Number of Municipalities				14863			

Information Department of the Ministry of Health (Datasus) covering all Brazilian municipalities between 2000 and 2003.

Because of the methodological difficulties in assessing health care efficiency, the number of deaths is used as a proxy after controlling for social and economic

variables. However, as it is deeply influenced by violence, which may bias results, we only consider children and elderly deaths.

The results show that the impact of municipal public spending is significant, although its direction changes. In the short term, the sign is positive, which may be attributed to the reaction of the government to health emergencies. However, in the long run, more public spending clearly leads to a reduced number of losses of life.

As expected, a higher level of wealth is associated with a decrease in the number of deaths.

Regarding the presence of a local medical school, in spite of the non-significance in the regression for the entire group, the separate estimates for, respectively, the elderly and children, indicate the existence of a negative relationship with morbidity. It is possible to put this outcome down to the presence of positive externalities with the spread of medical knowledge.

The results did not confirm that private management of public funding leads to a reduction in the number of deaths. In fact, the results are unexpectedly significant and negative, which suggests that the improvement in the Brazilian public health care sector, i.e. the reduction in child mortality rates, is not caused by its hybrid public-private institutional design.

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