Revue d'Economie Théorique et Appliquée ISSN : 1840-7277
Volume 5 – Numéro 2 – Déc. 2015 pp 135-166 eISSN : 1840-751X

On the relationship between public health spending, governance and health outcomes: Evidence from Africa countries

Hilaire G. HOUENINVO
Faculté des Sciences Economiques et de Gestion -Université d'Abomey-Calavi
E.mail: thouenin@yahoo.fr

Abstract: The paper aims to reassess the public health spending-health outcomes nexus in the context of African countries. It emphasizes the interaction of governance with public health expenditure and its effects on health outcomes using a panel of 43 African countries from 1996 to 2012. The study uses cross sectional, fixed effects and Generalized Method of Moments (GMM) estimators, and find that health expenditure per capita and public spending has a significant impact on health outcomes. Moreover, the role of governance and its interaction with public health expenditure appear mixed. This result cannot be interpreted as governance has no impact on the effectiveness of public health spending. One explanation is that the real amount of resources and quality of institution may not perfectly reflect, respectively by public expenditure and governance indicators. The policy implications are discussed.

Key words: Health expenditure – Governance - Health outcomes - Africa.
J.E.L. Classification: H51 - I15 - O55

Liens entre dépenses publiques en santé, gouvernance et état de santé: Evidence sur les pays Africains

Résumé : *Cet article revisite la relation dépense publique de santé et état de santé dans le contexte des pays africains. En utilisant un panel de 43 pays Africains sur la période 1996-2012, l'article a mis un accent particulier sur l'impact de la gouvernance sur l'efficacité des dépenses publiques de santé. Nous avons utilisé à la fois un modèle en coupe transversale, un modèle à effet fixe et la méthode des moments généralisés. Les résultats obtenus montrent que les dépenses de santé par tête et les dépenses publiques de santé ont un impact significatif sur l'état de santé. Cependant, le rôle de la gouvernance ainsi que son interaction avec les dépenses publiques de santé demeurent mitigés. Ce résultat ne signifie pas que la gouvernance n'améliore pas l'efficacité des dépenses publiques de santé. Une explication possible est que les dépenses publiques de santé et les indicateurs de gouvernance utilisés résument imparfaitement et partiellement le montant réel des ressources publiques allouées à la santé et la qualité des institutions que ces variables sont supposées respectivement mesurées. Les implications de politiques sont discutées.*

Mots clés*: Dépense de santé – Gouvernance – Etat de santé – Afrique.*
Classification J.E.L: H51 - I15 - O55.

1. Introduction

Improving social services delivery such as water, health care services, education and sanitation is central for poverty reduction. Making these services available to the majority of the populations, especially for poor, has been recognized as critical to the development processes (Kimenyi, 2012). With respect to this viewpoint, many developing countries have prioritized the provision of such services in their budgetary allocation. For instance, health expenditure as share of Gross Domestic Product (GDP) is higher in Africa (5.6% in 2000 and 6.2% in 2012) than in South-east Asia (3.6% in 2000 and 3.7% in 2012) and Oriental Mediterranean (4.1% in 2000 and 4.2% in 2012). However, it is lower than those of Europe and the average world (respectively 7.2% and 8.2% in 2000 and 9.0% and 9.2% in 2012). Meanwhile, except South-East Asia region, Africa spends the lowest on health expenditure per capita; however health spending per capita is increasing faster over time. For example, between 2000 and 2012 the percentage increases are 64.64% for Africa against 52.31% for Eastern Mediterranean, 60.71% for Europe and 51.83% for the world average. Over the same period, public budget share allocated to health in Africa is higher compared to that of South-East Asia and Oriental Mediterranean regions, which recorded an increase of 15.62% (table 1).

Governments not only spend money on health but also they use different intervention forms such as regulations and public provisions to improve health care system of the country. Governments in developing countries actively attempt to improve the social welfare of their citizens via to change in composition and direction of public expenditure. Health spending also has high potential of capacity to transfer and to redistribute income toward the poor, since the poor heavily consume public goods and services.

Table 1: Trend in health expenditure for selected regions

Regions	Public HE (% total HE)		Public HE (% public budget)		HE per capita (current $US)		Public HE (% GDP)		HE total (% of GDP)	
	2000	2012	2000	2012	2000	2012	2000	2012	2000	2012
Africa	44.0	47.2	8.1	9.6	35.0	99.0	2.43	2.99	5.6	6.2
South-east Asia	32.2	34.7	7.3	7.6	20.0	69.0	1.15	1.35	3.6	3.7
Oriental Mediterranean	47.4	48.5	6.9	7.4	93.0	195.0	1.97	2.14	4.1	4.2
Europe	73.9	74.4	14.0	14.8	931.0	2370	5.86	6.65	7.9	9.0
World	56.4	58.9	13.5	15.1	485.0	1007	4.61	5.35	8.2	9.1

Source: WHO (2014)

In Africa, it is noticed a poor service delivery outcome compared to other regions. African countries experience a heavy burden of diseases leading to immense human sufferings, loss of millions of lives and significant economic losses every year (WHO, 2014). Even if health status in Africa has improved over the last two decades, Africa

remains an unhealthy continent (Mwabu, 2013). On many health indicators, Africa lags behind the rest of the world and behind poor countries of south-East and South Asia (table 2). It can be seen that Africa has the worst indicators in the world for general health outcomes. For instance, compared to other regions, Africa has the lowest life expectancy at birth and records the highest infant mortality rates and death rates (table 2). This trend in health outcomes in Africa reflects the inappropriateness of health policies to offset the negative effects of illness.

Table 2: Selected health outcomes indicators for some regions

Health outcomes	Africa		South-east Asia		Oriental Mediterranean		Europe		World	
	1990	2012	1990	2012	1990	2012	1990	2012	1990	2012
Life expectancy at birth (years)	50	58	59	67	62	68	72	76	64	70
Infant mortality rate per 1,000 live births	105	63	83	39	76	44	26	10	63	35
Under-five mortality rates per 1,000 live births	173	95	118	50	103	57	32	12	90	48
Death rates	326	298	226	149	196	139	96	80	233	187

Source: WHO (2014)

Every country undertakes public fund to health care provision, believing this would improve the health of their citizens (Rajkumar and Swaroop, 2008). However, an increase in budgetary allocation to health sector itself is not sufficient to guarantee improvement in health outcomes because governance as input in health production function may dampen or enhance effectiveness of public spending. For example, inappropriate functioning of health care system and budget mismanagement have been identified as one of the main reason for ineffective public spending in developing countries (World Bank, 1998, 2003). One can argue that as budget formulation and execution are malfunctioning as merely increase in public allocation may not lead to higher health outcomes. Therefore, if the basic principles of governance in health care delivery are not observed, priorities cannot be met and scarce resources will be wasted. Well-intentioned spend may not have impact on health outcomes. This is particularly the case of Africa, where delivery of basic public services including health services can be greatly improved even with the current levels of resources commitments (Kimenyi, 2012).

Most of empirical studies on the relationship between public spending and health care system performance show conflicting results. Some studies indicate that the effect of public spending on health status is not significant (Carrin and Politi, 1995) while other studies report lower or positive effect (Gupta et al., 1999; Gupta et al., 2001; Novignon et al., 2012) throwing some doubt on the conclusiveness of these studies. Given that unresolved nature of the nexus between public spending-health outcomes, the significance of governance comes to mind. However, much of the empirical literature has mostly focused on the narrower question of whether good governance leads to

higher levels of income (Sen, 2014), there is scant literature on the relationship between governance and broader development outcomes such as infant and maternal mortality, life expectancy at birth, year of schooling, etc. The exceptions are Kaufmann et al. (2004), Rajkumaran and Swaroop (2008), Wolf (2007), Hallerod et al. (2013) who confirm the role of good governance in engendering sustainable health care delivery performance. In Africa, except few studies (e.g. Anyanwu and Erhijakpor, 2009; Olafsdottir et al., 2011), many works on health spending-health outcomes nexus did not account for governance (Akinkugbe and Afeikhena, 2006; Novignon et al., 2012). However, it is well-known that in poorly governed countries, high levels of corruption lead to evasion of taxes that could have been used to finance productive government investment and social expenditures for the poor. High levels of corruption also lead to the diversion of government funds that could have been used for service delivery to the poor (Rajkumar and Swaroop 2008).

So, there appears a need to better understand health expenditure-health outcomes nexus focusing on how better governance may affect the effectiveness of public health expenditure in Africa. Thus, the research questions that this paper seeks to answer are as follow: Does greater health expenditure translates to better health outcomes in Africa context? Does governance affect public health expenditure-health outcomes nexus in African countries? Does governance has any income effect on health outcomes?

The relationship between health outcomes and health expenditure is an interesting topic to be studied in Africa for a number of reasons. First, a common feature of all health system from African economies is the shortage of financial resources compared with health needs and this could be currently exacerbated by the economic crisis that has led many Governments to reconsider the level of public spending in the health sector. The scarcity of resources for health system functioning implies that there is an urgent need for efficient use of the available resources. Thus, better knowledge of effect of governance on health outcomes appears to be necessary. Second, the proportion of budget spent on health in Africa tends to rise. It is, therefore, necessary to investigate the health outcomes impact of such a relatively large expenditure. Third, it is particularly interesting to investigate the mechanisms through which health spending affects health outcomes in order to improve the efficiency of such investment. Fourth, as to Schultz (1999), health is the ultimate indicator of the well-being of a nation; hence the attainment of high stocks of health is an important aspect of development in its own right. Fifth, whether better governance leads to greater health outcomes is particularly relevant in the context of Africa characterized by strong economic growth and weak and dysfunctional governance systems, relative to other regions of the world (Kimenyi, 2012). Sixth, findings from previous studies and this study could be a basis for future policy decision regarding how to improve health service delivery in Africa.

This paper proceeds as follows. Section 2 discusses literature review. Section 3 highlights the empirical methodology used, while Section 4 presents data and

descriptive statistics. Section 5 discusses the empirical results. We finish in Section 6 with our concluding remarks.

2. Literature review

In this section, we first show why government intervention in health care sector is critical and how governance can alter the effectiveness of public intervention, and second review empirical studies on public health spending-health outcomes nexus.

2.1. Government interventions in health care sector and governance issues

According to Musgrove (1996), governments intervene in health care market to ensure optimal production of public goods, offset market failures such as externalities, and subsidize poor people who cannot finance out-of-pocket or buy private insurance. It can stimulate information distribution, take regulative activities, finance private health services with public funds and supply health services itself through public facilities and staffs. It is worth noting that there is no final consensus for all countries on whether governments intervene and how to do it. However, some important points could be determined for decisions for whether governments intervene or not and which instruments they use. Musgrove (1999) determines nine criteria based on economic efficiency (public goods, externalities, catastrophic costs and cost-efficiency), ethical reasons (poverty, vertical equity, horizontal equity and rule of rescue) and political considerations (public demands) related with government intervention to health sector. Note in passing that interventions based on the reason of economic efficiency are especially important to treat communicable diseases that create positive external externalities when they have been cured, to ensure safety for food or water and to correct insurance market failures (Çevik and Taşar, 2013). Therefore, many health-related activities must be financed by governments to obtain socially optimum level of consumption for all countries. In these kinds of conditions, public provided health care is probably more efficient than private sector. In most countries market failures translate into publicly financed and delivered care, and/or regulation from public and private bodies. These types of health services are expected to have considerably important impacts on health outcomes such as life expectancy, infant or child mortality. These unique characteristics of health care services make governance issues more critical in health sector (Lewis, 2006). Indeed, in health sector, good governance implies that health care systems function effectively and with some level of efficiency. Therefore, good governance is an important factor in making such a system function by efficiently combining financial resources, human resources, and supplies, and delivering services throughout a country.

Increasing public expenditure is likely to increase health outcomes only if institutions in place ensure efficient use of resources. In this hypothesis, differences in governments' records in terms of poverty reduction, performance of public service delivering including health care service, can be attributed to differences in the incentives for politicians to allocate public resources efficiently. Resources misallocations depend on the extent to which poor people can hold government

accountable for lack of information about service quality, lack of credibility of political promises, and polarization of voters on social and ideological grounds. The fact that increasing resources devoted to health services delivery does not necessarily produce more result can be explained by inefficiency in resources utilization and other forms of misallocation. For example, poor targeting and/or institutional inefficiencies such as leakage in public spending and weak institutional capacity is on raison. In developing countries in general and Africa in particular, a poor budget management has frequently been cited as main reason of why governments in developing countries find it difficult to translating public spending into effective services (World Bank, 2003). In this perspective, managing public resources to promote development (i.e. health status) required well-trained, skillful personnel, working in an institutional setting with an incentive system that reduces frauds, imposes constraints on decision makers and promotes cost efficacy. The efficiency of service delivery is greatly influenced by the allocation of resources within different type of expenditure such as wages, construction, and so on. The allocation of funds depends in turn on the quality of governance. The weak relationship between expenditure and health outcomes can also be explained by the fact that the cost effectiveness of different measures varies widely. For example, the provision of health services, an expansion of hospitals does have less impact on child mortality rates than spending on immunization programs and malaria control (Wolf, 2007). In addition, according to the World Bank and IMF (2005) the number of people involved in decision making and service delivery, and the dependency on the discretionary behavior of the individuals provide opportunities for the leakage of funds. Furthermore, the difficult working conditions and uncompetitive salaries can reduce the accountability of service provision, fostering absenteeism and low quality.

2.2. Empirical studies on health spending and health outcomes nexus

On empirical front, the effect of public spending on health outcomes is mixed (Hammer and Pritchett, 1998; World bank and IMF, 2005). For instance, using cross-sectional data of 50 developing and transition countries Gupta et al. (1999) find that expenditure allocated to health sector reduces mortality rates for infant and children. They also find that shifting health expenditure toward primary care has a favorable effect on infant and child mortality rates. Also, using a sample of 70 countries Gupta et al. (2001) note that the relationship between public health spending and health status of poor is stronger in low income countries than it is in higher income countries. On other hand, Carrin and Politi (1995) argued that poverty and income are critical determinants of health outcomes, but fail to find that public health expenditure has a statistically significant effect on health status. Similarly, Filmer and Pritchett (1997) suggest that cross-country differences in income allow accounting for 84% of the variation in infant mortality, with socio-economic variables accounting for 11% and public spending for less than 1/6 of one percent. In contrast, Badani and Ravallion (1997) by disaggregating health outcomes across rich and poor segments of the population for 35 developing countries for year 1990 and using a random coefficient model, these authors find that public spending has a beneficial impact on health condition of the

poor (life expectancy at birth and infant mortality). Furthermore, they observed that those living on less than $2 a day are likely to live 9 years less on average compared to the rest of the population and their children face 53% higher likelihood of dying before their first birth day. Taking into account allocation within health sector, Filmer, Hammer and Pritchett (1998) find a significant effect of government spending on primary health care on infant mortality rate in their cross-sectional analysis. According to Filmer and Pritchett (1999), the lower or insignificant impact of public health spending on health outcomes does not mean that countries are spending on unproductive activities. One can assume that these studies do not shed light on the true relationship between public health spending and health status. For example, Devarajan et al. (1996) note that the negative impact of capital spending on per capita growth may reflect a problem in the link between public spending and service delivery. This thinking is in line with Pretchett (1996) who note that all of the negative or ambivalent findings on public spending could be a reflection of differences in the efficacy of public expenditure. These differences could rise due to corruption, the replacement of private sector effect by public spending. In the same vein, Filmer et al. (2000) argue that changes in the price or the availability of government interventions may induce a private supply response that can mitigate any actual impact on health status. If an increase in public spending on health crowds out private sector provision of such service thereby a likely impact of an additional unity of public spending on health status may be marginal. Using data from 47 African countries between 1999 and 2004 and fixed effect model, Anyanwu and Erhijakpor (2009) find that health expenditures have a statistically significant effect on infant mortality and under-five mortality.

Akinkugbe and Afeikhena (2006) also provide evidence that the effect of health care expenditure as a ratio of GDP on life expectancy, under-five mortality and infant mortality is positive and significant in Sub Saharan Africa, Middle East and North Africa. More recently, using fixed effect and random effect estimators on 40 Sub Saharan Africa over 1995-2010, Novignon et al. (2012) find that health care expenditure was associated with increase in life expectancy at birth and reduction in death and infant mortality rates. The results also show that while both private and public sources of health care expenditure were significantly associated with improved health outcomes, public health care expenditure had relatively larger impact. Ricci and Zachariad (2006), use data from 72 countries covering the time period from 1961 to 1995, in order to investigate the determinants of public health outcomes in a macroeconomic perspective. They also take into cognizance households' choices concerning education, health related expenditure and savings. The results are that there is an evidence for a dual role of education as a determinant of health outcomes. Sparrow et al. (2009) on the other hand, using panel data set of 207 Indonesian districts over a 4-year period from 2001 to 2004, concluded that district-level public health spending is largely driven by central government transfers.

Many empirical studies suggest that improved governance leads to better development outcomes including health. For example, Kaufmann et al.(1999) and Kaufmann et al. (2004) show that governance indicators including voice and accountability, political stability and violence, government effectiveness, regulatory burden, rule of law and

graft have a strong direct impact on infant mortality. In the same vein, De La Croix and Delavallade (2006) find that countries with high corruption invest more in housing and physical capital in comparison with health and education. Using 91 developing countries for 1990, 1997 and 2003, Rajkumar and Swaroop (2008) show that public health spending lowers the child mortality rates more in countries with good governance (as measured by a corruption index and bureaucratic index). More exactly, a 1% increase in the share of public health spending in GDP lowers the under-5 mortality rate by 0.32% in countries with good governance, 0.2% in countries with average governance, and has no impact in countries with weak governance. Their findings are supported by the latest World Health Report stating that "effective governance is the key to improving efficiency and equity" (World Health Organization, 2011). Wolf (2007) uses simultaneous equations for year 2002 and finds that control over corruption index has a negative coefficient and significant effect on infant mortality. Using cancer mortality rate as measure of health outcomes, Radin (2008) uses data on 26 countries of Central and Eastern Europe over the period 1980 to 2003 and finds that in both the short and long run, World Bank funding has no independently significant effect on cancer mortality and the only significant effect is when it is in interaction with corruption or institutional effectiveness. This finding underlines the need for the consideration of domestic factors (corruption and institutional effectiveness) when analyzing the impact of international funding on health care sector performance because of their ability to affect the goals of international lending agencies such as the World Bank. Using cross sectional analysis for 37 African countries, Olafsdottir et al. (2011) show that governance, in particular sustainable economic opportunities," is significantly associated with health outcomes measured by under-five mortality rate and remains so even after controlling for the other healthcare and non-healthcare factors.

3. Empirical methodology

Based on economic and econometric reasoning, data availability and previous studies on health outcomes (e.g. Mishra and Newhouse 2009; Rajkumar and Swaroop, 2008), three kinds of estimators are used: OLS estimator for cross-sectional analysis in order to assess the long-run effects of institution quality on health outcomes, fixed effect estimator to account for unobservable heterogeneity effect that may bias our estimates and Generalized Method of Moment (GMM) estimator to better understand the dynamics of adjustment (short-run dynamic) for a given health outcomes and endogeneity. These strategies can allow us to overcome both inadequate specification and inappropriate estimation techniques which could lead to biased results since each of the techniques has its strength and weakness (with a view to ascertaining the robustness of our study findings). Health outcomes and health spending are both specified in logarithmic form, as is common in the literature. The log–log specification smoothes the data and also allows for the interpretation of the coefficients as elasticities.

The cross-sectional analysis uses data averaged over 1996-2012, such that there is one observation per country. This regression is performed using a simple OLS estimator, corrected for heteroscedasticity. The basic regression takes the form:

$$\ln(HS)_i = \gamma_0 + \gamma_1 \ln(pubh\exp)_i + \gamma_2 gov_i + \gamma_3 gov_i \ln(puh\exp)_i + \beta X_i + \varepsilon_i \quad (1)$$

- HS is health outcomes measures using national-level probabilistic measures of health status that are widely used: life expectancy at birth, infant mortality rate, child mortality rates and crude death rate. These health status indicators are thought to capture the overall performance of the health system and are selected to facilitate comparison of results with previous studies.
- $pubh\exp$ is the share of public health expenditure which helps measure public investment in health human capital. We assume that health care expenditures do not automatically translate into stocks of health human capital. However, we believe that, in general, the more resources a society devotes to health care, the larger will its stock of health human capital be over time, all things being equal.
- gov is a vector of governance indicators that are related to public finance.
- $gov * \ln(pubh\exp)$ is an interactive term between governance and public health spending which account for the indirect impact of governance on health outcomes. The interaction terms between public health expenditure ratio and the level of governance enable us to determine whether beyond the direct effect, governance increases efficacy of public expenditure. As discussed above, health expenditure might only have a positive effect on outcome, if there is a good institution in place, especially the institutions through which those expenditures were channeled. Therefore, public spending variables are interacted with governance to understand how public funding is affected by quality of governance in a country in any given year.
- X is a vector of control variables made up of socio-economic characteristics.

We complete our cross section regression by panel analysis.

Estimation using panel data has several advantages over purely cross-sectional estimation. First, working with a panel allows taking into account how public spending on health and governance over time within a country may have effect on the country's health outcomes. Panel dada provides more degrees of freedom by adding the variability of time-series dimension. Second, in a panel context, we are able to control for unobserved country-specific effects and thereby reduce bias in the estimated coefficients. Indeed, ignoring the time-specific or country-specific unobserved effects that exist among countries in the conventional time series and cross-sectional studies on health indicators leads to bias results. Finally, our panel estimator also controls for the potential endogeneity of all explanatory variables.

A number of standard diagnostics test were performed. We test the hypothesis that the constant terms are all equal for all countries with Fisher test. Under the null hypothesis of equality, the efficient estimator is pooled least squares (POLS). If the null

hypothesis was rejected, we have made the distinction between fixed end random effects models. The specification test devised by Hausman (1978) is used to test for orthogonality of the random effects and the regressors. The test is based on the idea that under the hypothesis of no correlation, both OLS in the LSDV model and GLS are consistent, but OLS is inefficient, whereas under the alternative, OLS is consistent, but GLS is not. Breusch Pagan Langrage multiplier test was also used to test Random Effects against POLS. The null hypothesis is that the variance of heterogeneity variable is null**.** The basic fixed effect model we performed is below.

$$\begin{aligned}\ln(HS)_{it} &= \gamma_0 + \gamma_1 \ln(pubh\exp)_{it} + \gamma_2 gov_{it} \\ &+ \gamma_3 gov_{it} \ln(puh\exp)_{it} + \beta X_{it} + \mu_i + \varepsilon_{it}\end{aligned} \tag{2}$$

Where the subscripts i and t denote year and country respectively, μ_i is an unobserved country-specific effect (countries heterogeneity term), which may include all unobserved factors constant in time which has impact on health care performance, and ε_{it} is the error term.

Finally, we account for robustness the dynamics of adjustment for health outcomes. Therefore, we estimated a system of moment equations using the Generalized Method of Moments (GMMs). GMM is best suited in dealing with the endogeneity issues and is convenient for estimating extensions of the basic unobserved effects model (Wooldridge, 2001). We use here the Arellano and Bond's two-step estimator to estimate the model, because it is the most optimal. The specification we adopted here is a dynamic two-way error components panel model with fixed effects. This allows controlling for both country specific effects and time specific effects for each year time period. The following regression equations are estimated using a system GMM specification (Blundell and Bond, 2000):

$$\begin{aligned}\ln(HS)_{it} &= \gamma_0 + \gamma_1 \ln(HS)_{i\,t-1} + \gamma_2 \ln(pubh\exp)_{it} + \gamma_3 gov_{it} \\ &+ \gamma_4 gov_{it} \ln(puh\exp)_{it} + \beta X_{it} + \mu_i + \lambda_t + \varepsilon_{it}\end{aligned} \tag{3}$$

$$\begin{aligned}\Delta\ln(HS)_{it} &= \gamma_1 \Delta\ln(HS)_{i\,t-1} + \gamma_2 \Delta\ln(pubh\exp)_{it} + \gamma_3 \Delta gov_{it} \\ &+ \gamma_4 \Delta gov_{it} \Delta\ln(puh\exp)_{it} + \beta \Delta X_{it} + \Delta\lambda_t + \Delta\varepsilon_{it}\end{aligned} \tag{4}$$

Where $HS_{i\,t-1}$ stands for one period lagged of health outcomes to capture the country's initial health and to account for robustness the dynamics of adjustment in health outcomes; λ_t is the time specific effect, γ and β are parameters vectors to be estimated; γ_1 measures the persistence of HS_{it}.

In order to more accurate conclusions, lagged differences of the explanatory variables are used as instruments in the level equation (3). Lagged levels of explanatory variables are used as instruments in first the differences equation (4) (see Arellano and Bover, 1995; Blundell and Bond, 1998). System GMM obtains the estimated coefficients by solving the appropriately weighted set of the moment conditions based on Equations (3) and (4). We use system GMM rather than first difference GMM (Arellano and Bond, 1991), which estimates only Equation (4). System GMM is preferred because exploiting the additional moment conditions in the levels equations provides a dramatic improvement in the accuracy of the estimates when the dependent variable is persistent (Blundell and Bond, 2000).

As consistency of the GMM estimator depends on the validity of the instruments, we consider two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The first is a Sargan/Hansen tests of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The second test examines the hypothesis that the error term ε_{it} is not serially correlated. In the system difference-level regression, we test whether the differenced error term is second-order serially correlated (by construction, the differenced error term is probably first-order serially correlated even if the original error term is not).

4. Data and descriptive statistics

We used data from a sample of 43 African countries. Annual data on each country was collected for the time period covering 1996 and 2012. The criterion for selecting the countries is based on the availability of data. Except the government effectiveness index and corruption perception index which are respectively taken from Worldwide Governance Indicator (2014) and the University of Gothenburg's Quality of Government Institute (2014), other data are obtained from World Development Indicator (2014). Both measures of governance indicators were used to capture different dimensions of governance and see whether our results are robust to alternate measures of governance quality. These governance indicators are built on perceptions of in-country and outside observers which are powerful factors in shaping behavior. The index of government effectiveness ($goeff$) that measures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies. The values range from -2.5 to 2.5, with higher scores corresponding to better outcomes. The corruption perception index (cpi) measures corruption within the political system, which among other things reduces the effectiveness of government**.** The score a country receives for each year ranges from 1 (worst) to 10 (best).

The choice of the control variables is driven by literature, intuition and pragmatics including the availability of the data, and are the following: Per capita real income ($gdppc$) is used to measure economic performance assuming that country with good economic performance is more likely to spend more in public service delivery such as health care. It can acts as a control variable for the demand for health services. We expect that the higher a country's per capita income the better the health care sector performance; health expenditure per capita $h\exp pc$ can affect the quality of health care. It has also been found that increase in medical care spending has direct positive effects on health outcomes (Phelps, 2002); Fertility rate ($frate$) high fertility implies high share of children. Thus high health costs for pregnant women and children and negative effect on health outcomes is expected. As far as it concerns education, we use primary enrolment rate ($prienrate$) of children education indicator. Education allows more access to health-related knowledge which is important in health production function. We also used physical infrastructure ($sanf$) measured by the percentage of the population with sustainable access to safe drinking water sources.

There is ample evidence that health status is affected by access to safe water and improved sanitation facilities (Mishra and Newhouse, 2009; Rajkumar and Swaroop, 2008); population density ($denpop$) is expected to reduce the cost of service provision on a per capita basis. Also the costs to the health facilities in term of transport costs and opportunity costs such as travelling time are lower. Therefore population density should have a positive association with health outcomes indicators; the degree of urbanization rate ($urate$) measure by the percentage of the country's population that lives in urban areas. Schultz (1993) finds that mortality is higher for rural, low income and agricultural households, suggesting that increased urbanization is associated with improve health status of the population.

Table 3 presents basic summary statistics for the variables included in our empirical model. There is large variation in health outcomes between countries. For instance, life expectancy at birth ranges from 35.14 years to 74.98 years with mean value of 55.03 years over the period 1996-2012. Similarly, infant mortality rates ranges from 11.2 to 148 per 1,000 births, while under-five mortality from 13.1 to 266.4. The mean values of infant mortality rate and under five mortality rates are respectively 70.837 per 1,000 births and 111.983 per 1,000 births. It is worth noting that the average share of public health spending in GDP ranges from less than 0.09% to 9.45% with mean value of 2.48. The population density is 78.915 squares Kilometer and the urbanization rate has been on average 38.5808% whereas the access to sanitation facilities per population has been 38.976%. With respect to governance indicators, the mean of the governance effectiveness index is -0.68285 -closer to the minimum value-, indicating that the majority of the countries during this period have ineffective institutions. Again, the average value of the perception of corruption index is of 2.893 which rang African countries among countries perceived high levels of corruption (Szeftel, 2000)

Table 3: Descriptive statistics, cross-section, 1996 - 2012.

Variables	Obs.	Mean	Std. Dev.	Minimum	Maximum
Leb	43	55.032	8.136	35.139	74.987
U1mr	43	70.837	29.310	11.200	148.000
U5mr	43	111.984	52.802	13.100	266.400
Cdrate	43	12.698	4.040	4.173	27.619
Hexppc	43	172.676	218.458	10.204	1652.979
Pubhexp	43	2.479	1.243	0.099	9.451
Goeff	43	-0.683	0.613	-1.982	1.202
Cpi	43	2.893	1.013	0.087	6.500
Gdppc	43	1771.116	2702.018	53.097	14901.350
Denpop	43	78.916	111.531	2.071	633.523
Prienrate	43	73.248	18.242	25.200	99.946
Frate	43	5.030	1.429	1.450	7.772
Sanf	43	38.976	27.390	3.500	97.100
Urate	43	38.581	17.829	7.420	88.100

Source: Own's calculation

5. Empirical results

In this section, we first discuss specification tests issue. Second, we analyze public health expenditure and health outcomes nexus, using cross-sectional, least square dummy variables and dynamic panel methodologies results.

5.1. Specification tests

In all cases, the results of diagnostic tests reveal that the null hypothesis of F test is rejected for regressions indicating that individual effect need to be considered (LSDV). As previously highlighted, if the null hypothesis in F test was rejected, we have made the distinction between fixed end random effects models by Hausman test. Hausman tests indicate fixed effects are the appropriate specification. The statistics tests confirm the intuitive expectation that health outcomes in African countries are country specific, and that the health outcomes has varied over time. Also, Breusch Pagan Langrage multiplier test confirm the presence of country specific effects. Again, diagnostic tests show that the GMM system estimator results satisfy the specification tests. There is no evidence of second serial correlation, but evidence of first serial correlation. Moreover, the regressions pass the Hansen tests and confirm the validity of the instruments. All these tests are performed at significant level of 1%.

In all cases and for all estimators regressions reported in colons (1) and (2) of tables 4a, 4b, 4c, 4d, 5a, 5b, 5c, 5d, 6a, 6b, 6c, and 6d present the results from estimating a simple version of equations (1), (2) and (3 and 4) that does not include the governance variables. To capture the direct effect of governance quality on health status, we then include the governance indicators independently (see colons (3) and (5) of the tables). Finally, we now interact public health spending with the governance variables and

include this as an additional regressor (see colons (4) and (6) of the tables). We explore two causal mechanisms by which governance can affect health outcomes, and conduct a range of robustness tests to assess whether governance is causally related to better health outcomes. First, by increasing the level of income, and allowing households to spend more on health, better governance could have an ‘’income effect’’ on health status. Second, better governance may allow for greater effectiveness of health spending and will therefore allow for greater effectiveness of service delivery for the poor. In line with this thinking, if the ‘’income effect’’ is valid, we would expect the coefficient on per capita to be of right sign and significant, and the coefficient on governance indicators to be insignificant. Also, better governance quality leads to improvements in the health indicators when the coefficient on the governance is of the right sign and statistically significant at 5% or less. In addition, the relationship between governance quality and public health expenditure is stronger when the coefficient of the interaction term of the governance measure with public health expenditure is statistically significant at 5% or less. Health spending has a stronger (positive impact on life expectancy at birth or negative impact on infant mortality, death rate) in countries with good policies.

5.2. Cross section estimations

Tables 4a, 4b, 4c and 4d in the Appendix present respectively cross-section results for live expectancy at birth, infant mortality rate, under five mortality rate and crude death rate. Health expenditure per capita is significantly associated with live expectancy at birth and crude death rate with expected sign. But health expenditure per capita has no significant effect on the other health outcomes. Similar results are found with public health expenditure when direct effect of governance quality is not controlled. This finding is in line with the viewpoint of Filmer and Pritchett (1996) stating that public health expenditure does not any significant impact on health sector performance –child and infant mortality rate. However, our result contradicts with Gupta et al. (2001) who conclude to a significant relationship between public spending on health and health status and argued that public health policy matters more to the poor. Model specification using government effectiveness index and corruption perception index show no significant direct effect of governance on health status-live expectancy at birth, infant mortality rate and child mortality rate (see colons 3 and 5 of tables 4a, 4b and 4c). In these colons, as governance indicators have no significant direct effect on any health outcomes and the coefficients associated to income per capita are statistically significant for live expenditure and crude death regressions, one may conclude that governance has ‘’income effect’’ on these health variables. When we introduce the interaction variables –governance measures with public health spending-, we notice that for life expenditure at birth and crude death rate regressions, governance quality leads to improvements in life expectancy at birth and reduction in crude death rate because the coefficients on the governance indicators are of the right sign and statistically significant at 10% or less (direct effect). The coefficients of the interaction term of the governance measure with public health expenditure - government effectiveness index with public health expenditure and corruption perception index

with public health expenditure- are significant at 10% or less. In other words, health spending has a stronger (positive impact on life expectancy at birth and stronger negative impact on death rate) in countries with good policies. In addition, in these regressions, public health expenditure affects significantly health outcomes. As consequence, governance indicators measured by government effectiveness index and corruption perception index have indirect effect on crude death rate and life expectancy at birth. Thus, public health spending is more effective in improving life expectancy at birth and decreasing crude death rate in countries with good governance quality.

Table 4a: life expectancy at birth, public health spending and governance: Cross-section regressions, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	-0.057* (0.072)	-	-	-	-	-
logpubhexp	-	0.029 (0.352)	0.029 (0.406)	-0.145* (0.078)	0.052 (0.149)	0.278** (0.037)
Goeff	-	-	0.001 (0.981)	0.159** (0.046)		
Cpi	-	-	-	-	-0.042 (0.133)	0.044 (0.485)
Goeff* logpubhexp	-	-	-	-0.179** (0.032)	-	-
Cpi*logpubhexp						-0.087 (0.100)
loggdppc	-0.033** (0.023)	-0.024* (0.084)	-0.023* (0.090)	-0.004 (0.818)	-0.029* (0.058)	-0.025 (0.123)
logdenpop	0.001 (0.995)	0.017 (0.189)	0.017 (0.186)	0.006 (0.636)	0.012 (0.263)	0.004 (0.700)
logprienrate	0.048 (0.36)	0.005 (0.907)	0.004 (0.931)	-0.052 (0.368)	0.001 (0.990)	-0.007 (0.899)
logfrate	-0.311*** (0.000)	-0.216*** (0.001)	-0.215*** (0.013)	-0.285*** (0.001)	0.314*** (0.003)	-0.318*** (0.001)
logsanf	0.003 (0.900)	-0.027 (0.155)	-0.027 (0.192)	-0.020 (0.268)	-0.029 (0.161)	-0.024 (0.246)
logurate	0.058* (0.090)	0.064* (0.061)	0.065* (0.081)	0.039 (0.24)	0.043 (0.250)	0.041 (0.222)
Cons	4.392*** (0.000)	4.139*** (0.000)	4.139*** (0.000)	4.736*** (0.000)	4.533*** (0.000)	4.368*** (0.000)
Observations	43	44	44	44	44	44
R-squared	0.624	0.558	0.558	0.631	0.588	0.624
F test	13.310*** (0.000)	10.010*** (0.000)	8.630*** (0.000)	8.070*** (0.000)	9.420*** (0.000)	11.170*** (0.000)

Notes: p-values are denoted in parentheses, *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

These regressions show that apart from the fact that governance namely government effectiveness improves the efficacy of public health spending governance do have another channel by which it improves life expectancy at birth and crude death rate. Overall, the share of public health spending to GDP does not significantly affect health status when governance is accounted for. Governance has a positive ‘’income effect’’ on life expectancy at birth and on crude death rate.

Table 4b: Infant mortality rate under one-year, public health spending and governance: Cross-section regressions, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	0.0786 (0.340)					
logpubhexp		0.005 (0.938)	0.027 (0.733)	0.299 (0.279)	-0.005 (0.951)	-0.441 (0.286)
Goeff			-0.076 (0.501)	-0.322 (0.195)		
Cpi					0.020 (0.785)	-0.146 (0.460)
Goeff* logpubhexp				0.278 (0.275)		
Cpi*logpubh exp						0.168 (0.327)
loggdppc	0.039 (0.235)	0.027 (0.422)	0.018 (0.561)	-0.012 (0.777)	0.029 (0.374)	-0.441 (0.286)
logdenpop	0.001 (0.992)	-0.020 (0.457)	-0.025 (0.384)	-0.009 (0.809)	-0.018 (0.509)	-0.003 (0.921)
logprienrate	-0.274* (0.081)	-0.216* (0.095)	-0.172 (0.189)	-0.086 (0.586)	-0.214 (0.110)	-0.201 (0.167)
logfrate	1.362*** (0.000)	1.256*** (0.000)	1.171*** (0.000)	1.280*** (0.000)	1.303*** (0.000)	1.311*** (0.000)
logsanf	-0.034 (0.589)	0.005 (0.930)	-0.005 (0.922)	-0.015 (0.778)	0.006 (0.917)	-0.005 (0.926)
logurate	0.060 (0.504)	0.067 (0.432)	0.050 (0.594)	0.091 (0.343)	0.077 (0.452)	0.080 (0.407)
Cons	2.639*** (0.008)	2.865*** (0.003)	2.872*** (0.003)	1.948* (0.069)	2.678** (0.049)	2.995** (0.037)
Observations	43	44	44	44	44	44
R-squared	0.825	0.817	0.819	0.831	0.818	0.826
F test	25.40*** (0.000)	17.10*** (0.000)	14.50*** (0.000)	32.170*** (0.000)	15.02*** (0.000)	35.180*** (0.000)

Notes: p-values are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Some controls variables have significant effect on health outcomes. For example, in all cases fertility rate increases significantly infant mortality rate and child mortality rate. Countries with higher fertility rate have higher infant mortality and under five mortality rate.

Table 4c: Infant mortality rate under five-year, public health spending and governance: Cross-section regressions, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	0.133 (0.143)					
logpubhexp		-0.019 (0.801)	-0.025 (0.788)	0.279 (0.339)	-0.061 (0.517)	-0.502 (0.244)
Goeff			0.017 (0.893)	-0.258 (0.318)		
Cpi					0.078 (0.308)	-0.089 (0.650)
Goeff* logpubhexp				0.311 (0.263)		
Cpi*logpubhe xp						0.169 (0.337)
loggdppc	0.020 (0.481)	0.001 (0.986)	-0.036 (0.224)	-0.031 (0.484)	0.012 (0.723)	0.003 (0.934)
logdenpop	-0.001 (0.980)	-0.037 (0.194)	-0.036 (0.224)	-0.017 (0.640)	-0.028 (0.279)	-0.013 (0.697)
logprienrate	-0.226 (0.103)	-0.131 (0.253)	-0.141 (0.258)	-0.044 (0.765)	-0.123 (0.325)	-0.109 (0.431)
logfrate	1.730*** (0.000)	1.535*** (0.000)	1.554*** (0.000)	1.677*** (0.000)	1.715*** (0.000)	1.724*** (0.000)
logsanf	-0.075 (0.218)	-0.008 (0.872)	-0.006 (0.913)	-0.017 (0.746)	-0.004 (0.943)	-0.015 (0.783)
logurate	0.019 (0.829)	0.021 (0.799)	0.025 (0.797)	0.070 (0.485)	0.061 (0.559)	0.064 (0.515)
Cons	2.353*** (0.011)	2.817*** (0.001)	2.815*** (0.002)	1.782*** (0.082)	2.095 (0.112)	2.415* (0.088)
Observations	43	44	44	44	44	44
R-squared	0.873	0.857	0.857	0.867	0.862	0.867
F	29.320*** (0.000)	19.200*** (0.000)	16.530*** (0.000)	35.660*** (0.000)	18.660*** (0.000)	36.880*** (0.000)

Notes: p-values are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 4d: Crude death rate, public health spending and governance: Cross-section regressions, 1996 - 2012.

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	0.201*** (0.011)					
logpubhexp		-0.063 (0.230)	-0.075 (0.240)	0.351* (0.076)	-0.118* (0.077)	-0.800** (0.015)
Goeff			0.042 (0.725)	-0.343* (0.066)		
Cpi					0.105 (0.166)	-0.156 (0.248)
Goeff* logpubhexp				0.436** (0.031)		
Cpi*logpubhexp						0.263** (0.038)
loggdppc	0.076** (0.044)	0.050 (0.135)	0.055 (0.109)	0.008 (0.860)	0.065* (0.081)	0.052 (0.205)
logdenpop	0.023 (0.509)	-0.032 (0.294)	-0.029 (0.350)	-0.003 (0.929)	-0.019 (0.473)	0.003 (0.913)
logprienrate	-0.195 (0.112)	-0.061 (0.359)	-0.085 (0.367)	0.050 (0.681)	-0.051 (0.487)	-0.029 (0.763)
logfrate	0.835*** (0.000)	0.525*** (0.000)	0.572*** (0.011)	0.745*** (0.002)	0.765*** (0.005)	0.778*** (0.001)
logsanf	-0.055 (0.352)	0.046 (0.324)	0.052 (0.320)	0.037 (0.435)	0.052 (0.319)	0.035 (0.475)
logurate	-0.111 (0.125)	-0.115 (0.105)	-0.106 (0.181)	-0.042 (0.564)	-0.062 (0.459)	-0.057 (0.428)
Cons	1.437* (0.080)	2.249*** (0.001)	2.245*** (0.001)	0.798 (0.355)	1.288 (0.232)	1.783* (0.083)
Observations	43	44	44	44	44	44
R-squared	0.656	0.562	0.564	0.639	0.594	0.651
F	13.640*** (0.000)	9.410*** (0.000)	8.050*** (0.000)	5.580*** (0.000)	8.650*** (0.000)	6.870*** (0.000)

Notes: p-values are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

5.3. Fixed effect estimations

The same regressions are implemented using fixed effect estimator in order to check the robustness of the cross sectional findings. Tables 5a, 5b, 5c and 5d summarize respectively fixed effect estimations results for life expectancy at birth, infant mortality rate, child mortality rate and crude death rate. Here, the number of variables that have significant effect on health outcomes has increased. In all cases, health expenditure per capita has a significant impact at 1% significant level on health status with the right sign. Similar results are found by Anyawu et al. (2009) who argue that health

expenditures have a statistically significant effect on infant mortality and under-five mortality. Health expenditure per capita affects positively life expectancy at birth and negatively infant mortality rate, under five mortality rate and crude death rate. These results reveal that countries with higher health expenditure per capita have better health outcomes. With exception for crude death regression where the coefficient on public health expenditure is significant at 5%, public health expenditure fails to yield significant effect on health outcomes when governance quality is not controlled for. With few exceptions, we figured out that governance indicators have significant direct impact on health outcomes showing that good governance quality improves directly health status.

This suggests the existence of another channel aside public health spending channel. As we do not observed any income effect of governance on health status, one may argue that by increasing tax revenue ratio of GDP, better governance may for example allow for greater resources to be mobilized for social sector spending. Moreover, when we add the interaction term of governance measure with public health expenditure we noticed that the coefficient on public health expenditure has changed and become statistically significant. This change holds more often for when we interact government effectiveness with public health expenditure. For instance, regression reported in colon 4 of table 5a, 5b, 5c and 5d in the Appendix reveal that increase in public health spending is associated with significant increase in life expectancy at birth, decrease in infant mortality rate, decrease in under five mortality rate and decrease in death rate. It is worth noting that the coefficient on the interaction term and those of governance indicators are in most cases significant.

Therefore, governance improves indirectly life expectancy at birth, infant mortality rate, under five mortality rate and crude death rate through public health expenditure. This corroborates Rajkumar and Swaroop (2008) and Bingjie Hu (2010) findings. The index of governance effectiveness has positive efficacy effect on life expectancy at birth. The governance effectiveness has negative efficacy effect on child mortality rate less than one year. The Index of corruption perception has negative efficacy effect on child mortality rate less than one year. Governance effectiveness has negative income effect on child mortality rate under five years. The Index of corruption perception has negative efficacy effect on child mortality rate less than five years. The index of governance effectiveness has negative effect on crude death rate.

The coefficients associated with control variables are often significant and have expected sign. For example, increase in access to good sanitation increases life expectancy at birth and reduces infant mortality, child mortality and crude death rate.

5.4. Dynamic panel results

Again, we performed the same regressions using GMM system estimator on dynamic panel for robustness check. Tables 6a, 6b, 6c and 6d in the Appendix report respectively GMM system estimations results for life expectancy at birth, infant mortality rate, child mortality rate and crude death rate. The results obtained from this estimator show that in all health outcomes regressions previous values of health affect significantly current values of health as we expected. This means that we really need to account for this adjustment process in health dynamic. GMM system estimator has improved the importance of health expenditure per capita and public health spending in explaining health outcomes compared to fixed effect estimators. In all cases, health expenditure per capita affects significantly all health outcomes with expected sign. Also, public health expenditure when governance is not accounted for has significant effect on health outcomes. After including governance indicators –government effectiveness index and corruption perception index- the coefficients on public health expenditure are still significant with smaller standard error and higher size. This result holds for all health outcomes variables. In addition, the corruption perception index has significant direct effect on all health outcomes while government effectiveness index has a direct significant effect only on life expectancy at birth. The direct effect of corruption perception index on health outcomes combine with the significant effect of public health spending on health outcomes means that government improves the effectiveness of health spending –provision of health services-. But as income effect of governance is insignificant, we conclude that governance improves health outcomes through increase in taxes revenue. When we add interaction term as additional variable to governance, we observed that, in most cases, the interaction terms are not statistically significantly showing that governance does not improve efficacy of public health spending.

6. Concluding remarks

This paper revisits some of the empirical determinants of various health outcomes in Africa, with particular focus on governance using cross sectional, fixed effects and Generalized Method of Moments (GMM) estimators. We find that health expenditure per capita and public health spending influence significantly health outcomes. We also figure out that the role of governance in improving health expenditure efficacy is mixed. This result cannot be interpreted as governance has no impact on the effectiveness of public health spending for two main reasons. First, health expenditure and governance may only imperfectly and partially measure the true amount of resources and quality of institution, respectively these two variables are supposed to reflect. Secondly, we recognize the limits of these broader governance indicators, notably when it is possible to conceive of thresholds and non-linearities in the relationships involving governance. The policy implications of our results are that African countries should jointly increase public investment in health and the quality of governance in health sector to expect higher impact of public spending on health

outcomes. Future research could try to more directly address the links across public spending, governance and health outcomes using other data that better capture specific aspects of the governance issues in health sector and approaches. For example, governance indicator related to better public finance management in health sector may provide better measure of governance. It would be useful to analyze the questions addressed in this paper by using sub-national indicators and household survey data. At this point, one could evaluate the impact of interventions that create space for public deliberation and debate of the budget at local government level on health outcomes.

References

Akinkugbe, O and Afeikhena, J. (2006), « Public health care spending as a determinant of health status: a panel data analysis for SSA and MENA », In Applied macroeconomics and economic development. Edited by Adenikinju A, Olaniyan O. Ibadan: Ibadan University Press.

Anyanwu, C. J and Erhijakpor, E. O. A. (2009), « Health expenditures and health outcomes in Africa », African Development Review, 21(2), 400-433.

Arellano, M., Bond, S. (1991), « Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations », Review of Economic Studies 58, 277-297.

Arellano, M., Bover, O. (1995), « Another look at the instrumental-variable estimation of error components models », Journal of Econometrics 68, 29-52.

Barro, R., (1991), « Economic growth in a cross section of countries », Quarterly Journal of Economics 106 (2), 407-443.

Bidani, B. and Ravallion, M. (1997), « Decomposing social indicators using distributional data », Journal of Econometrics, 77(1)125-39.

Bingjie Hu and Ronald U. M. (2010), « Public Spending, Governance and Child Health Outcomes: Revisiting the Links », Unedited Discussion Draft Unicef Policy And Practice.

Blundell, R., Bond, S. (1998), « Initial conditions and moment restrictions in dynamic panel data models », Journal of Econometrics 87, 115-143.

Carrin, G., and Politi, C (1995), « Exploring the health impact of economic growth, poverty reduction, and public expenditure », Tijdschrift voor Economie en Management, 40 (3-4) 227-247.

Çevik., S., and Taşar., M. O. (2013), « Public spending on health care and health outcomes: cross country comparison », Journal of Business, Economics & Finance, 2 (4): 82-100.

De la Croix, D., Delavallade, C., (2006). « Growth, public investment and corruption with failing institutions », Working paper 2007-61, Society for the Study of Economic Inequality.

Devarajan, S., Swaroop, V., Zou, H., (1996). « The composition of public expenditures and economic growth », Journal of Monetary Economics, 37, 313–344.

Easterly, William. (2007), « The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill And So Little Good », OUP Catalogue », Oxford University Press 9780199226115.

Filmer, D., Pritchett, L., (1999), « The impact of public spending on health: does money matter? », Social Science and Medicine, 49 (1), 1309–1323.

Filmer, D., Hammer, J., Pritchett, L., (2000). « Weak links in the chain: a diagnosis of health policy in poor countries », The World Bank Research Observer, 15, 199–224 (2, August).

Gisselquist, R. (2012). « Good Governance as a Concept, and Why This Matters for Development Policy », UNU-WIDER Working Paper 2012/30.

Gupta, S, Verhoeven, M and Tiogson E. (1999), « Does higher government spending buy better results in education and health care? », WP/99/21, International Monetary Fund.

Gupta S, Verhoeven, M and Tiogson E (2001), « Public Spending on Healthcare and the Poor IMF Working Paper », Fiscal Affairs Department

Gupta, S., Verhoeven, M., and Tiongson, E. R. (2002), « The effectiveness of government spending on education and health care in developing and transition economies », European Journal of Political Economy, 18, pp.717-737.

Gwatkin DR, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A: (2007) « Socio-Economic Differences in Health, Nutrition, and Population Within Developing Countries. », Washington DC: World Bank.

Hallerod, B., B. Rothstein, A. Daoud, and Nandy, S. (2013), « Bad Governance and Poor Children: A Comparative Analysis of Government Efficiency and Severe Child Deprivation in 68 Low and Middle Income Countries », World Development, 48: 19–31.

Hammer, J., Filmer., D and Pritchett, L. (1998), « Health policy in poor countries: weak links in chain », Working Paper n°1874.

Kaufmann D, Kraay A, Zoido P: (2010), « Governance Matters », 1999 [http://papers.ssrn.com/sol3/papers.cfm?abstract_id=188568], Accessed 11/8, 2010

Kaufmann D, Kraay A, Mastruzzi M: (2009); « Governance Matters VIII: Aggregate and Individual Governance Indicators », 1996-2008. 2009 http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1424591], Accessed 6/1, 2009.

Kimenyi, M. (2012), Introduction and overview, in Institution and services delivery in Africa, Edided by Mwangi S. Kimenyi, African Economic Research Consortium.

Levis, M (2006), « Governance and corruption in public health care systems », Working Paper n° 78.

Mishra, P and Newhouse, D., (2009), « Does health aid matter? », Journal of Health Economics, 28: 855–872

Musgrove, P. (1996), Public and private roles in health: Theory and financing patterns, Health, Nutrition and Population (HNP) Discussion Paper, World Bank, Washington D.C.

Musgrove, P. (1999), « Public spending on health care: how are different criteria related? », Health Policy, 47, pp.207–223.

Mwabu, G. (2013), « Universal health coverage », University of Nairobi and Kobe University »X, June, 1 2013 TICA V, Yokohama, Japan.

Novignon, J., Olakojo., S. A. and Nonvignon, J. (2012), « The effects of public and private health care expenditure on health status in sub-Saharan Africa: new evidence from panel data analysis », Health Economic Review, http://www.healtheconomicsreview.com/content/2/1/22

Olafsdottir, A., E., Reidpath, D.D., Pokhrel1, S., and Allotey, P., (2011), «Health systems performance in sub-Saharan Africa: governance, outcome and equity», BMC Public Health, 11:237 http://www.biomedcentral.com/1471-2458/11/237.

Ricci, F., and Zachariadis, M., (2006), « Determinants of Public Health Outcomes: A Macroeconomic Perspective », Computing in Economics and Finance. Society for Computational Economics.

Radin, D (2008) «World Bank Funding and Health Care Sector Performance in Central and Eastern», International Political Science Review, Vol.29, No. 3 (Jun., 2008), pp. 325-347

Rajkumar, A., S., and Swaroop, V. (2008), « Public spending and outcomes: Does governance matter? », Journal of Development Economics 86: 96–111

Reidpath D, Allotey P. (2006), « Structure, (governance) and health: an unsolicited response », BMC International Health and Human Rights, 6(1):12.

Reidpath DD, Morel CM, Mecaskey JW, Allotey P (2009), « The millennium development goals fail poor children: the case for equity-adjusted measures », PLoS Medicine, 6(4):e1000062.

United Nations Development Programme (2008), Statistics of the Human Development Report. [http://hdr.undp.org/en/statistics/], Accessed 02/04, 2009.

WHO (2014), Statistiques sanitaires mondiales.

Wolf, S. (2007) « Does aid improve public service delivery? » Review of World Economics, 143 (4) 650-672.

Schultz, T. P. (1999), « Health and schooling investments in Africa », Journal of Economic Perspectives, 13(3), 67–88.

Schultz, T. P (1993), « Mortality decline in low income world: causes and consequence », Economic Growth Center Discussion paper n° 681 New Haven, Yale University

Sen, K. (2014), « Governance and development outcomes in Asia », ADB Economics Working Paper Series n°384.

Szeftel, M (2000), « Between Governance &Underdevelopment: Accumulation &Africa's 'Catastrophic Corruption », Review of African Political Economy, 27(84):287-306.

World Bank, (2003), « Making services work for poor people », World development report 2003. World Bank, Washington, D.C.

World Bank. (1991), « Managing Development: The Governance Dimension », World Bank Discussion Paper No.34899. Washington, DC.

World Bank and IMF (International Monetary Fund) (2005), Global Monitoring Report 2005: Millennium Development Goals: From Consensus to Momentum. Washington, D.C.

Appendix

Table 5a: Life expectancy at birth, public health spending and governance: LSDV regressions, 1996 - 2012.

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	0.040*** (0.000)	-	-	-	-	-
logpubhexp	-	0.008 (0.152)	0.005 (0.331)	0.025*** (0.002)	0.008 (0.176)	-0.003 (0.765)
Goeff	-	-	.02754*** (0.000)	.0191*** (0.005)	-	
Cpi				-	0.003 (0.523)	0.001 (0.966)
Goeff* logpubhexp	-		-	0.019*** (0.001)	-	-
Cpi*logpubhexp					-	0.004 (0.278)
loggdppc	0.002 (0.245)	0.002 (0.276)	0.002 (0.340)	0.001 (0.572)	0.002 (0.262)	0.002 (0.293)
logdenpop	0.148*** (0.000)	0.166*** (0.000)	0.176*** (0.000)	0.179*** (0.000)	0.167*** (0.000)	0.168*** (0.000)
logprienrate	0.002 (0.867)	0.010 (0.480)	0.006 (0.657)	0.003 (0.806)	0.008 (0.580)	0.008 (0.597)
logfrate	0.234*** (0.000)	0.139*** (0.000)	0.125*** (0.000)	0.138*** (0.000)	0.142*** (0.000)	0.147*** (0.000)
logsanf	0.092*** (0.000)	0.086*** (0.000)	0.084*** (0.000)	0.088*** (0.000)	0.091*** (0.000)	0.091*** (0.000)
logurate	0.100*** (0.001)	0.141*** (0.000)	0.129*** (0.000)	0.113*** (0.001)	0.139*** (0.000)	0.137*** (0.000)
Cons	2.226*** (0.000)	2.328*** (0.000)	2.396*** (0.000)	2.404*** (0.000)	2.316*** (0.000)	2.316*** (0.000)
Obs	667	680	680	680	669	669
R ajusted	0.468	0.409	0.426	0.396	0.409	0.409
F test, p-value	83.980*** (0.000)	76.120*** (0.000)	78.330*** (0.000)	77.160*** (0.000)	73.090*** (0.000)	69.100*** (0.000)
Hausman test, p-value	91.590*** (0.000)	78.900*** (0.000)	80.170*** (0.000)	93.640*** (0.000)	81.090*** (0.000)	91.980*** (0.000)

Notes: p-value are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 5b: Infant mortality rate under one-year, public health spending and governance: LSDV regressions, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	-0.284*** (0.000)					
logpubhexp		-0.019 (0.262)	-0.015 (0.364)	-0.074*** (0.003)	-0.014 (0.411)	0.044 (0.212)
Goeff			-0.038*** (0.056)	-0.014 (0.514)	-	-
Cpi			-	-	-0.061*** (0.000)	-048*** (0.001)
Goeff* logpubhexp			-	-0.054*** (0.002)	-	-
Cpi*logpubhexp			-	-	-	-0.023*** (0.061)
loggdppc	-0.013*** (0.001)	-0.007 (0.174)	-0.006 (0.195)	-0.005 (0.348)	-0.008 (0.128)	-0.007 (0.161)
logdenpop	-0.363*** (0.000)	-0.514*** (0.000)	-0.528*** (0.000)	-0.539*** (0.000)	-0.492*** (0.000)	-0.501*** (0.000)
logprienrate	-0.086** (0.019)	-0.149*** (0.001)	-0.145*** (0.001)	-0.137*** (0.002)	-0.129*** (0.003)	-0.128*** (0.004)
logfrate	-0.035 (0.724)	0.508*** (0.000)	0.527*** 0.000	0.492*** (0.000)	0.501*** (0.000)	0.478*** (0.000)
logsanf	-0.169*** (0.000)	-0.176*** (0.002)	-0.174*** 0.002	-0.187*** (0.001)	-0.223*** (0.000)	-0.222*** (0.000)
logurate	0.003 (0.973)	-0.305*** (0.003)	-0.289*** (0.005)	-0.241** (0.020)	-0.322*** (0.002)	-0.313*** (0.002)
Cons	7.788*** (0.000)	7.583*** (0.000)	7.489*** (0.000)	7.466*** (0.000)	7.808*** (0.000)	7.806*** (0.000)
Obs	667	680	680	680	669	669
R ajusted	0.699	0.558	0.560	0.567	0.573	0.575
F test, p-value	85.140*** (0.000)	54.380*** (0.000)	54.480*** (0.000)	55.220*** (0.000)	55.720*** (0.000)	54.910*** (0.000)
Hausman test, p-value	68.610*** (0.000)	81.730*** (0.000)	83.050*** (0.000)	86.830*** (0.000)	80.860*** (0.000)	86.150*** (0.000)

p-values are denoted in parentheses,; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 5c: Infant mortality rate under five-year, public health spending and governance: LSDV regressions, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	-0.323*** (0.000)					
logpubhexp		-0.031 (0.124)	-0.027 (0.173)	-0.099*** (0.001)	-0.024 (0.220)	0.062 (0.135)
Goeff			-0.036 (0.124)	-0.006 (0.818)		
Cpi					-0.075*** (0.000)	-0.055*** (0.002)
Goeff* logpubhexp				-0.067*** (0.001)		
Cpi*logpubhexp						-0.034** (0.018)
loggdppc	-0.017*** (0.001)	-0.010* (0.083)	-0.009* (0.093)	-0.008 (0.193)	-0.011* (0.056)	-0.010* (0.078)
logdenpop	-0.477*** (0.000)	-0.645*** (0.000)	-0.658*** (0.000)	-0.672*** (0.000)	-0.619*** (0.000)	-0.632*** (0.000)
logprienrate	-0.142*** (0.001)	-0.213*** (0.000)	-0.208*** (0.000)	-0.198*** (0.000)	-0.188*** (0.000)	-0.185*** (0.000)
logfrate	-0.165 (0.159)	0.450*** (0.001)	0.469*** (0.000)	0.425*** (0.001)	0.441*** (0.001)	0.408*** (0.002)
logsanf	-0.217*** (0.000)	-0.222*** (0.001)	-0.219*** (0.001)	-0.236*** (0.000)	-0.281*** (0.000)	-0.279*** (0.000)
logurate	0.012 (0.903)	-0.326*** (0.007)	-0.311*** (0.010)	-0.252** (0.037)	-0.345*** (0.004)	-0.331*** (0.006)
Cons	9.379*** (0.000)	9.092*** (0.000)	9.003*** (0.000)	8.975*** (0.000)	9.371*** (0.000)	9.367*** (0.000)
Observations	667	680	680	680	669	669
R ajusted	0.694	0.564	0.566	0.574	0.581	0.585
F test, p-value	68.920*** (0.000)	45.090*** (0.000)	45.160*** (0.000)	45.880*** (0.000)	46.540*** (0.000)	45.910*** (0.000)
Hausman test, p-value	93.340*** (0.000)	91.170*** (0.000)	91.610*** (0.000)	96.500*** (0.000)	91.500*** (0.000)	97.660*** (0.000)

Notes: p-values are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 5d: Crude death rate, public health spending and governance: LSDV regressions, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	-0.071*** (0.000)					
logpubhexp		-0.025** (0.054)	-0.019 (0.122)	-0.060*** (0.001)	-0.023* (0.076)	-0.007 (0.786)
Goeff			-0.053*** (0.000)	-0.036** (0.023)		
Cpi					-0.013 (0.182)	-0.009 (0.394)
Goeff* logpubhexp				-0.038*** (0.003)		
Cpi*logpubhexp						-0.006 (0.507)
loggdppc	-0.004 (0.276)	-0.004 (0.233)	-0.004 (0.280)	-0.003 (0.458)	-0.005 (0.212)	-0.005 (0.230)
logdenpop	-0.383 *** (0.000)	-0.412 *** (0.000)	-0.431*** (0.000)	-0.439*** (0.000)	-0.412*** (0.000)	-0.414*** (0.000)
logprienrate	-0.011 (0.732)	-0.024 (0.472)	-0.016 (0.617)	-0.011 (0.743)	-0.016 (0.628)	-0.016 (0.639)
logfrate	-0.487*** (0.000)	-0.322 *** (0.000)	-0.294*** (0.000)	-0.319*** (0.000)	-0.329*** (0.000)	-0.336*** (0.000)
logsanf	-0.311*** (0.000)	-0.295*** (0.000)	-0.292*** (0.000)	-0.300*** (0.000)	-0.314*** (0.000)	-0.314*** (0.000)
logurate	0.163** (0.030)	-0.222*** (0.004)	-0.199*** (0.009)	-0.167** (0.031)	-0.219*** (0.005)	-0.216*** (0.006)
Cons	6.678*** (0.000)	6.431*** (0.000)	6.299*** (0.000)	6.284*** (0.000)	6.492*** (0.000)	6.491*** (0.000)
Observations	667	680	680	680	669	669
R ajusted	0.493	0.463	0.473	0.481	0.464	0.464
F test, p-value	81.750*** (0.000)	79.740*** (0.000)	81.520*** (0.000)	79.140*** (0.000)	76.350*** (0.000)	70.620*** (0.000)
Hausman test, p-value	114.670*** (0.000)	94.170*** (0.000)	96.070*** (0.000)	110.850*** (0.000)	97.500*** (0.000)	113.120*** (0.000)

Notes: p-values are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 6a: Life expectancy at birth, public health spending and governance: System GMM, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	-0.034*** (0.002)	-	-	-	-	-
logpubhexp	-	0.041** (0.018)	0.036*** (0.005)	0.026** (0.085)	0.045*** (0.004)	0.045*** (0.004)
Goeff	-	-	0.016** (0.066)	-0.012 (0.227)		-
Cpi	-	-	-	-	-0.019*** (0.000)	-0.019*** (0.000)
Goeff* logpubhexp	-	-	-	0.014 (0.235)	-	-
Cpi*logpubhexp	-	-	-		-	0.004 (0.278)
loggdppc	-0.001 (0.846)	0.002 (0.156)	0.001 (0.273)	0.001 (0.273)	0.002 (0.239)	0.002 (0.239)
logdenpop	-0.005** (0.079)	0.006 (0.117)	0.005 (0.153)	0.005 (0.115)	0.004 (0.141)	0.004 (0.141)
logprienrate	0.014 (0.284)	-0.004 (0.744)	-0.002 (0.908)	0.001 (0.942)	-0.008 (0.536)	-0.008 (0.536)
logfrate	0.058*** (0.009)	-0.013 (0.700)	-0.031 (0.391)	-0.018 (0.565)	-0.069 (0.226)	-0.069 (0.226)
logsanf	0.013*** (0.011)	-0.005 (0.522)	-0.008 (0.260)	-0.004 (0.508)	-0.008 (0.288)	-0.008 (0.288)
logurate	0.007 (0.237)	0.022** (0.034)	0.016** (0.066)	0.014* (0.048)	0.009 (0.427)	0.009 (0.427)
Hs(-1)	0.952*** (0.000)	0.852*** (0.000)	0.857*** (0.000)	0.871*** (0.000)	0.841*** (0.000)	0.841*** (0.000)
Cons	0.329 (0.123)	0.515 (0.228)	0.543 (0.250)	0.461 (0.252)	0.776 (0.230)	0.776 (0.230)
observations	625	637	637	637	627	627
AR(1) test, p-level	-0.500 (0.617)	-0.990 (0.322)	-1.170 (0.241)	-0.960 (0.335)	-2.200** (0.028)	-2.200** (0.028)
AR (2) test, p-level	0.980 (0.326)	-0.430 (0.665)	-0.110 (0.914)	0.500 (0.614)	-0.600 (0.552)	-0.600 (0.552)
Hansen test, p-level	42.180 (0.941)	40.580 (0.960)	41.150 (0.954)	40.000 (0.966)	39.790 (0.968)	39.790 (0.968)
Instruments	67	67	68	69	68	68

Notes: p-value are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 6b: Infant mortality rate under one-year, public health spending and governance: System GMM, 1996 - 2012.

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	0.037*** (0.003)					
logpubhexp	-	-032*** (0.011)	-0.026*** (0.005)	0.001 (0.969)	-0.036*** (0.001)	-0.008 (0.528)
Goeff	-	-	0.003 (0.579)	-0.004 (0.510)	-	-
Cpi	-	-	-		0.011*** (0.005)	0.008** (0.031)
Goeff* logpubhexp	-	-	-	0.006 (0.496)	-	-
Cpi*logpubhexp	-	-	-	-	-	-0.017 (0.621)
loggdppc	0.001 (0.593)	-0.001 (0.302)	-0.001 (0.244)	-0.001 (0.282)	-0.001 (0.410)	-0.001 (0.706)
logdenpop	0.006 (0.342)	-0.003 (0.316)	-0.003 (0.292)	-0.001 (0.967)	-0.002 (0.637)	-0.005 (0.152)
logprienrate	0.002 (0.928)	0.001 (0.980)	-0.004 (0.666)	0.007 (0.540)	-0.003 (0.741)	0.004 (0.776)
logfrate	-0.079** (0.040)	-0.075*** (0.005)	-0.078*** (0.001)	-0.115*** (0.002)	-0.056** (0.052)	-0.014 (0.582)
logsanf	-0.012 (0.235)	0.005 (0.461)	0.006 (0.184)	0.002 (0.813)	0.009 (0.126)	0.006 (0.365)
logurate	-0.008 (0.563)	-0.012 (0.107)	-0.013* (0.080)	-0.003 (0.814)	-0.008 (0.346)	0.006 (0.596)
Hs(-1)	1.110*** (0.000)	1.048*** (0.000)	1.051*** (0.000)	1.089*** (0.000)	1.052*** (0.000)	1.039*** (0.000)
Cons	-0.495*** (0.009)	-0.045 (0.656)	-0.044 (0.612)	-0.241*** (0.031)	-0.145 (0.125)	-0.228*** (0.026)
observations	625	637	637	637	627	477
AR(1) test, p-level	0.360 (0.718)	-0.500 (0.616)	-0.290 (0.768)	0.670 (0.505)	-1.170 (0.241)	-0.740 (0.458)
AR (2) test, p-level	-0.200 (0.842)	-0.330 (0.744)	-0.350 (0.726)	0.040 (0.968)	-0.300 (0.767)	-0.940 (0.346)
Hansen test, p-level	35.440 (0.992)	39.020 (0.974)	35.210 (0.992)	39.530 (0.970)	37.140 (0.985)	27.130 (1.000)
Instruments	67	67	68	69	68	69

Notes: p-values are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 6c: Infant mortality rate under five-year, public health spending and governance: System GMM, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	0.049*** (0.006)					
logpubhexp		-0.030*** (0.004)	-0.024*** (0.010)	-0.012 (0.326)	-.034*** (0.001)	-0.102** (0.039)
Goeff			-0.001 (0.875)	-0.001 (0.860)		
Cpi					0.009** (0.024)	-0.024 (0.199)
Goeff* logpubhexp				-0.004 (0.519)		
Cpi*logpubhexp						0.032* (0.046)
loggdppc	0.003 (0.143)	0.001 (0.729)	0.001 (0.769)	0.001 (0.239)	0.001 (0.626)	0.001 (0.743)
logdenpop	0.010 (0.202)	-0.001 (0.726)	-0.001 (0.923)	0.002 (0.640)	0.001 (0.783)	0.006 (0.259)
logprienrate	-0.003 (0.886)	-0.003 (0.786)	-0.001 (0.973)	0.004 (0.676)	-0.004 (0.705)	0.005 (0.676)
logfrate	-0.180*** (0.000)	-0.127*** (0.000)	-0.138*** (0.000)	-0.171*** (0.001)	-0.115*** (0.000)	-0.126*** (0.005)
logsanf	-0.019 (0.159)	0.008 (0.118)	0.008 (0.110)	0.007 (0.137)	0.009* (0.081)	0.006 (0.330)
logurate	-0.004 (0.801)	-0.011 (0.169)	-0.010 (0.273)	-0.006 (0.493)	-0.004 (0.647)	-0.002 (0.887)
Hs(-1)	1.157*** (0.000)	1.068*** (0.000)	1.077*** (0.000)	1.100*** (0.000)	1.074*** (0.000)	1.083*** (0.000)
Cons	-0.647*** (0.010)	-0.099 (0.220)	-0.139 (0.154)	-0.249*** (0.011)	-0.202** (0.024)	-0.200 (0.374)
observations	625	637	637	637	627	627
AR(1) test, p-level	2.490*** (0.013)	2.310** (0.021)	2.460*** (0.014)	2.710*** (0.007)	2.000** (0.046)	1.890* (0.059)
AR (2) test, p-level	1.140 (0.255)	0.100 (0.921)	0.240 (0.810)	0.640 (0.521)	0.010 (0.995)	0.240 (0.813)
Hansen test, p-level	37.280 (0.984)	31.330 (0.998)	30.250 (0.999)	32.850 (0.997)	32.840 (0.997)	33.340 (0.996)
Instruments	67	67	68	69	68	69

Notes: p-value are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.

Table 6d: Crude death rate, public health spending and governance: System GMM, 1996 - 2012

	(1)	(2)	(3)	(4)	(5)	(6)
loghexppc	0.077*** (0.005)					
logpubhexp		-0.097*** (0.014)	-0.084*** (0.007)	-0.049 (0.235)	-0.114*** (0.012)	-0.244*** (0.016)
Goeff			0.029 (0.206)	0.022 (0.365)		
Cpi					0.054*** (0.000)	-0.033 (0.267)
Goeff* logpubhexp				-0.017 (0.575)		
Cpi*logpubhexp						0.077** (0.027)
loggdppc	0.001 (0.642)	-0.004 (0.174)	-0.003 (0.274)	-0.001 (0.541)	-0.003 (0.316)	-0.002 (0.387)
logdenpop	0.011 (0.133)	-0.014 (0.126)	-0.012 (0.138)	-0.014 (0.129)	-0.007 (0.368)	0.001 (0.859)
logprienrate	-0.035 (0.280)	0.009 (0.762)	-0.012 (0.628)	-0.007 (0.697)	0.011 (0.701)	0.005 (0.676)
logfrate	0.144*** (0.009)	0.058 (0.522)	0.088 (0.222)	0.081 (0.301)	0.161 (0.118)	0.197*** (0.010)
logsanf	-0.029** (0.035)	0.016 (0.443)	0.015 (0.497)	0.012 (0.329)	0.014 (0.455)	0.005 (0.700)
logurate	-0.019 (0.135)	-0.046* (0.055)	-0.037* (0.080)	-0.034* (0.067)	-0.024 (0.396)	-0.007 (0.666)
Hs(-1)	0.919*** (0.000)	0.806*** (0.000)	0.802*** (0.000)	0.806*** (0.000)	0.831*** (0.000)	0.783*** (0.000)
Cons	-0.107 (0.624)	0.593** (0.029)	0.612*** (0.012)	0.561** (0.013)	0.118 (0.654)	0.303 (0.159)
observations	625	637	637	637	627	627
AR(1) test, p-level	-1.250 (0.213)	-1.300 (0.193)	-1.510 (0.131)	-1.450 (0.147)	-2.320** (0.020)	-2.350** (0.019)
AR (2) test, p-level	-0.820 (0.415)	-1.830* (0.067)	-1.620 (0.104)	-1.590 (0.111)	-1.740* (0.082)	-1.550 (0.121)
Hansen test, p-level	38.240 (0.979)	42.270 (0.940)	41.180 (0.954)	41.220 (0.953)	41.070 (0.955)	37.950 (0.981)
Instruments	67	67	68	69	68	69

Notes: p-values are denoted in parentheses; *Significance at 10 percent, ** Significance at 5 percent and *** Significance at 1 percent.