The Economic consequences of Financial Accounting Information Usefulness and Debt Maturity for Improving Investment Efficiency: an Empirical study

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Abstract

This study which conducted with a sample of 1300 firm-year observations of Egyptian firms between 2000 and 2016, examines the effect of the usefulness of financial accounting information on investment efficiency depends on the debt maturity level . Consistent with this claim, I find that the effect of the usefulness of financial accounting information on investment efficiency depends on the debt maturity level when the financial accounting information usefulness measured by C score and G score of conditional conservatism. While I didn't find evidence about the effect of the usefulness of financial accounting information on investment efficiency depends on the debt maturity level when the financial accounting information usefulness measured by accruals quality, persistence, predictability smoothness, and timeliness and value relevance.

INTRODUCTION

Corporate investments1 are related with certain risks. These risks are in turn linked with potential structural, political and economic problems as well as informational problems (such as information asymmetry) arising from the difficulty of obtaining relevant and faithfully represented information.

The decision of investment or not in new firms, new markets, or new countries influenced to a great extent on the perception of risk. So, the amount of publicly available information about firms, markets, and countries and its usefulness for decision makers is necessary to increase investors' trust and confidence in firms and countries and thus their willingness to invest.

The information environment includes financial accounting information which is a crucial part of the information set the investors use in their decision making. One objective of financial reporting information is to facilitate the efficient allocation of capital. It affects the distribution of wealth among individuals and the allocation of resources among firms as it affects the rate of return on capital *Beaver (1998)*. An important aspect of this role is to improve firms' investment decisions *Hellström(2009)*.

So, more useful financial accounting information decreases the risk for capital providers, enhances investment activities, creates efficient allocation of resources, and increases the chance for companies to raise funds at a reasonable

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[1] corporate investments refer to money used by a firm to purchase tangible and intangible assets. Based on this concept, in the current study, investment efficiency is related to firms' investment decisions in the long –term.

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cost of capital and improve investment efficiency. Therefore, it is expected that financial accounting information will be useful when it has economic consequences in the form of investment efficiency, a key determinant of economic productivity.

Empirically, prior literature such as *(Biddle et al. 2009 and Verdi 2006)* finds that higher quality financial reporting increases investment efficiency by reducing over- and under- investment through alleviating information asymmetry between firms and external suppliers of capital. Also, *Lara et al. (2010)* further documents that firms which are more conservative in preparing accounting reports are able to invest more efficiently and in more profitable projects. Concentrating only on the over-investment behaviors of firms, *Richardson (2006)* finds that over-investment is more in firms which have high levels of free cash flow and that are match with agency cost explanations. He shows, it is difficult and more costly for investors to monitor management in the presence of information asymmetry. Under these circumstances, managers are more likely to engage in additional investment on self- serving projects rather than paying out dividends to shareholders *Xie (2013)*.

On the other hand, prior research argues that not only financial statements and financial accounting numbers are important for the economic consequences of the usefulness of financial accounting information in improving investment efficiency but there are other factors such as the of debt maturity . *(Flannery, 1986; Berger and Udell, 1998; Ortiz-Molina and Penas, 2008)* also suggest that the use of short term debt will help in reducing information asymmetry problems . In other words, the short-term debt can be used as a mechanism to help in controlling underinvestment and overinvestment, as it gives greater financial flexibility for borrowers and more monitoring for lenders. From the borrower's perspective, when there are projects with a positive NPV, firms are expected to finance them through short-term debt and alleviate underinvestment problems, because the debt will be liquidated in a period of time and the profitability will be entirely for the firm *Myers (1977), From the lender's perspective*, the roll-over of short-term debt achieves the best monitoring of borrowers by the debt holders. So that it reduces the agency conflict between creditors and borrowers which arises from investment opportunities *(Barclay and Smith, 1995; Guedes and Opler, 1996; Parrino and Weisbach, 1999; and Lai, 2011)*. Shortening of debt maturities which induce more frequent renegotiations, permits better control of managers. Lenders can decide whether to renew or change the contract terms for

borrowers after ascertain firms' performance during the first period *(Ortiz-Molina and Penas, 2008; Gomariz and Ballesta, 2014)*.

Based on the discussion above, the economic consequences of the usefulness of financial accounting information for investment efficiency could be decreased by the presence of short-term debt because through short-term debt, creditors can exert their monitoring role on managers to reduce overinvestment and this short-term debt may be also beneficial for managers to carry out positive NPV investments in underinvestment situations. In contrast, the economic consequences of the usefulness of financial accounting information for investment efficiency could be greater for those firms with higher short-term debt if both beneficial effects on investment are added. So, in the current research, the interaction effect of the usefulness of financial accounting information and debt maturity on investment efficiency will be investigated.

Research question

Do the economic consequences of the usefulness of financial accounting information for investment efficiency depend on the level of maturity of debt?

Objective of the Study

The objective of this study is to answer empirically on the research question.

Investment efficiency

Introduction

The irrelevance paradigm of *Modigliani and Miller (1958)* suggested that in a complete market without frictions, the capital structure of a firm is completely irrelevant to "real" firm decisions such as the decision to undertake an investment. That is, the capital structure does not affect investment policy when there are no bankruptcy costs, taxes, and capital markets are frictionless (the irrelevance proposition).

According to the optimal investment argument proposed in the neoclassical theory of *Modigliani and Miller (1958)*, the marginal value of an investment project is the only factor needed for firms to decide whether invest or not *(wang et al., 2014)*. Therefore, investment opportunity is the only determinant of investment decision and the financial structure of the firm has no direct role with respect to investment decisions *(Xiao et al., 2017)*.

Therefore, under this paradigm, a firm is said to be investing efficiently if it undertakes all and only projects with positive net present value (NPV) under the assumption of no market frictions such as adverse selection or agency costs and when firms continue to invest efficiently until the marginal rate of return to investment become zero *(Biddle et al. 2009)*.

The irrelevance paradigm of *Modigliani and Miller (1958)* has been critiqued and challenged by several authors that have attempted to demonstrate that, in the real world, their assumptions do not hold. It is generally accepted that a firm's investment policy is affected by its financial position. For example, firms' investment decisions are taken by facing internal financial constraints, imperfect information, and restricted access to credit *(Bojoc and Enache, 2013)*.

However, previous findings in finance such as *(Hubbard, 1998)* have shown that there are at least two determinants that affect investment efficiency, including raising capital and project selections when the capital markets are inefficient, information is asymmetric and there are agency problems among managers, shareholders and creditors. Therefore, firms' investment decisions may not always be sensitive to changes in growth opportunities and firms may depart from their optimal investment levels *(Verdi, 2006 and Biddle et al., 2009)*.

Empirical studies in corporate finance produced two modern investment theories: underinvestment theory and overinvestment theory *(Bojoc and Enache, 2013)*.

Financial accounting information usefulness and investment decision

Information asymmetry plays a crucial role in the accounting field because it allows for the examination of decision usefulness of financial accounting information. Since asymmetric information is the main source of the observed suboptimal investment so, it is expected that a better information environment can curb managers from overstating firm performance in the market and from the tendency to over- and under-invest. The argument is that, if disclosing more information to the public, especially when prospect projects with positive NPV are more visible, it will facilitate the process of raising firms' capital, decrease related costs and in turn the set of projects with positive NPV available for investment will be enlarged. Also, curbing managerial control rights and increasing the ability of shareholders to monitor managerial investment decisions can be achieved by decreasing levels of information asymmetry or increasing transparency. Alternatively, firm' managers may recognize the monitoring and constraints they face and build up and maintain self-discipline.

As a result, managers may refrain from trying to expropriate firm cash flows from shareholders through engaging in value-destroying investments (Xie, 2013).

However, Financial accounting information can trigger economic consequences[2] through its informational and contracting roles. The information (contracting) role of financial accounting information can be named as the ex-ante (ex-post) role, which is mainly concerned to address adverse selection (moral hazard) problems.

The informational role of financial accounting information (ex-ante role or valuation role of financial accounting information) is of great importance for investors' and capital providers' decision making as it allows the evaluation of prospected return of investment opportunities. Further, the contracting role of financial accounting information (the ex-post role or stewardship role of financial accounting information) permits capital providers to design mechanisms (such as corporate governance) to monitor and control the use of their capital resources once those have been allocated (Beyer et al. 2010 and Brüggemann et al., 2012).

However, Financial accounting information is generally considered to be an important mechanism in decreasing information frictions (information asymmetries) and mitigating agency problems that ultimately hamper investment efficiency *Healy and Palepu (2001)*. As noted by *(Wang et al., 2015;Biddle and Hilary, 2006; Biddle et al., 2009; Beaty et al., 2010; Chen et al., 2011; Ramalingegowda et al., 2013)* Increasing the quality of financial

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[2] According to *(Beaver,1998)* there are several potential economic consequences of financial accounting information: for example: 1) financial accounting information has impact on the distribution of wealth among individuals. Make the information available to investors help them in their investment choices. 2) Financial accounting information has an effect on the aggregate level of risk and the allocation of risk among individuals as well because, it helps in allocating the resources of investors. 3) Providing the financial accounting information investors/individuals can decide whether to consume now or invest later in the future and thus financial accounting information affects the whole consumption and production. Financial reporting affects the allocation of resources among firms as it affects the cost of capital and affects the action of management. The information may change management's incentives to undertake certain projects because the problem of competitive disadvantage of disclosure. The financial accounting information has economic consequences in many fields, such as , in the valuation of the firms , pricing the firms' shares (decision makers are investors), Credit and loan giving (decision makers are creditors), Managing, controlling and compensating systems (decision makers are the management) *Hellwion(2009)*.

accounting information has important economic implications such as increase the efficiency of investment in developed countries.

Financial accounting information can affect investment efficiency through several channels *(e.g.,Bushman and Smith, 2001; Chen et al., 2011. As illustrated by Bushman and Smith, (2003)* financial accounting information of firms and their competitors help managers and investors in determining and evaluating investment opportunities. Disappearance of reliable and reachable information in the economy obstructs the flow of human and financial capital toward sectors that are anticipated to have high returns and far from sectors with bad prospects. Given no agency conflicts between firm's managers and owners, financial accounting information quality improves the efficiency of investment by allowing firm's managers and owners to make better decisions and determine value creation of investment opportunities with high accuracy and with less risk. This leads to the allocation of resource accurately to achieve highest valued uses. Inaccurate estimation of risk can also decrease the cost of raising capital and contributing to economic performance. Financial accounting regimes produce direct information about investment opportunities of the firm. For instance, managers or potential investors can identify positive new investment opportunities, acquisition candidates, or strategic innovations based on the profit margins reported by other firms. Also, Financial accounting systems concentrated on credibility and accountability which support the informational role played by stock price. *(Black (2000) and Ball (2001) Bushman and Smith, 2003).*

In the real world, financial market problems are severe and the allocation of firms' resources might be inefficient. For example, firms may suffer from funding constraints that restrict their ability to raise capital required for future projects, which implies that the problem of underinvestment may occur (e.g. *Fazzari et al. 1988; Hubbard 1998; Petersen and Rajan 1994).*

Also, if the funding is available, cash resources' allocation by managers might be inefficient because the problem of overinvestment that leads to engagement in managerial empire building resulting in reduction of profitability and value of the firm *(Stein 2003; Hope and Thomas 2008; Chen et al. 2011; Jenger et al.,2011).*

So, the overall purpose of financial accounting information is to mitigate adverse selection and moral hazard costs related to asymmetric information in order to ensure capital markets' efficiency *(Fama and Jensen1983; Diamond and Verrecchia 1991; Bushman and Smith 2001; Verdi,2006; Beatty et al., 2010; Jenger et al., 2011).*

Literature Review and hypotheses

This section reviews and discusses empirical studies on the effects of the usefulness of financial accounting information on investment efficiency (Table1). I will start by introducing the theoretical reasoning underlying these studies which I group into four categories:

Panel (a): Empirical studies examining the impact of the properties of accounting numbers on investment efficiency at firm level

The empirical studies reviewed in this panel are motivated by the assumption that improved financial reporting quality can reduce the information asymmetries between firms and external suppliers of capital and can be associated with investment efficiency.

Panel(b): Empirical studies examining the accounting properties and moderating variables on investment efficiency

The empirical studies reviewed in this panel are motivated by the assumption that debt maturity as a mechanism, besides improving financial reporting quality, can mitigate informational asymmetries and agency costs among investors, external capital suppliers and managers in code law country and can be associated with investment efficiency.

Table(1) literature review

Panel(a) Empirical studies examining the impact of the properties of accounting numbers on investment efficiency at firm level:

study	Objective	Desirable attributes		Measurement of investment efficiency	Sample details	Main findings
		Accounting - based attributes	Market - Based Attributes			
Biddle et al. (2009)	examine the relationship between the quality of financial reporting and investment efficiency	Accruals quality		1) cash flow sensitivity of investment.	Sample of U.S firms *(common law country), market – based system),* covering the time period 1993 - 2005.	▪High-quality financial reporting is associated with lower investment among firms that are more likely to over-invest, and higher investment among firms that are more likely to under-invest. Firms with higher financial reporting quality are less likely to deviate from their predicted level of investment.
				2) The deviations from expected investment using a regression model that predicts investment as a function of growth opportunities.		
McNichols and Stubben (2008)	examine whether companies manipulating their reported earnings numbers make investment inefficiency.	measure of discretionary revenues to proxy for earnings manipulation.		the deviations from expected investment using a regression model that predicts investment as a function of growth opportunities	Using a sample of U.S *(common law country)* firms, covering the time period 1990- 2002.	Earnings management leads to the problem of overinvestment because distorted information is used by managers.

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Panel(c) Empirical studies examining the accounting properties studies and moderate variables on investment efficiency.

study	Objective of the study	Desirable attributes		Measurement of investment efficiency	Sample details	Main findings
		accounting based attributes	market based attributes			
Gomariz and Ballesta, (2014)	Test the role of financial reporting quality and the debt maturities on investment efficiency	1) Discretionary accruals. 2) Discretionary revenues. 3) accruals quality		the deviations from expected investment using a regression model that predicts investment as a function of growth opportunities	A sample of Spanish companies *(code law)*, covering the time period 1998 - 2008.	Increasing the quality of financial reporting reduces the problem of over investment Also, lower debt maturities improves investment efficiency, by reducing both the under -and over - investment.

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Research Hypotheses

The effect of the usefulness of financial accounting information on investment efficiency depends on the debt maturity level.

Method and Results

In order to examine the hypotheses of research:

First, I will estimate a model that predicts the level of investment based on growth opportunities (measure by sales growth). Deviations from the model, as reflected in the error term of the investment model, **represent the investment inefficiency.** This model is:

$$Investment_{i,t+1} = \beta_0 + \beta_1 \, SalesGrowth_{i,t} + \mu_{i,t+1} \qquad (1)$$

Investment, the total investment of firm i in year t, defined as the net increase in tangible and intangible assets and scaled by lagged total assets.

SalesGrowth, a proxy of firm investment opportunities calculated as the average change in sales from year t-1 to t for each sample year.

$\mu_{i,t+1}$, The residuals from the regression model (1) reflect the deviation from the expected investment level. A positive residual means that the firm is making investments at a higher rate than expected according to the sales growth, so it is overinvesting and vice versa. Then, I will use these residuals as a proxy of the investment inefficiency.

Second, to examine the prediction whether the effect of the usefulness of financial accounting information on investment efficiency depend on the debt maturity level [11]

To examine this hypothesis, I will involve an interaction effect between financial accounting information usefulness *USACINF* and a dummy variable for an inverse proxy of debt maturity *DumSTdebt_{i,t}*, which takes the value one if the ratio of short-term debt over total debt is above the median of the sample and zero otherwise. I will estimate the Following model:

$$InvEff_{i,t} = \beta_0 + \beta_1 \, USACINF_{i,t} + \beta_2 \, Stdebt_{i,t} + \beta_3 \, USACINF * DumSTdebt_{i,t}$$
$$+ \beta_4 \, \Sigma_j \, Controls_{j,i,t} + \mu_{i,t}$$

InvEff$_{it}$ a measure of investment efficiency (the dependent variable) for firm i in period t. This measure is the absolute value of the residuals from model (1) multiplied by -1, so a higher value means higher investment efficiency.

Independent Variable

Measurement of the usefulness of financial accounting information (*USACINF*)

The measurement of financial accounting information usefulness in this study is based on the accounting information attributes defined by *Francis et al. (2004)* which includes:

First, Accounting-based attributes including: a) Accruals Quality

Accruals quality is based on *Dechow and Dichev's (2002)* model relating current accruals to lagged, current and future cash flows from operation:

$$\frac{TA_{jt}}{A_{jt-1}} = a_0 + a_1 \frac{CFO_{jt-1}}{A_{jt-1}} + B_2 \frac{CFO_{jt}}{A_{jt-1}} + a_3 \frac{CFO_{jt+1}}{A_{jt-1}} + \varepsilon_{jt}$$

Accruals quality (AQ) equal to the standard deviation of firm j's estimated residuals Higher value represents higher quality.

B) Persistence:

Persistence of earnings measured as the slope coefficient in a regression of current earnings on lagged earnings *(Lev, 1983; Francis et al., 2004)*

$$\frac{X_{jt}}{A_{jt-1}} = a_0 + a_1 \frac{X_{jt-1}}{A_{jt-1}} + v_{jt}$$

Larger (smaller) values of Persistence correspond to less (more) persistent earnings.

c) Predictability

Equation (2) of persistence is used also for measuring predictability. Predictability is measured as the size of the prediction error is also derived from the firm- and year the time-series earnings model (2) *(Lipe, 1990; Francis et al., 2004)*.

d) Smoothness

Smoothness is measured as the ratio of firm j's standard deviation of net income before extraordinary divided by beginning total assets, to its standard deviation of cash flows from operations divided by beginning total assets. Larger

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values of Smoothness indicate less earnings smoothness than do smaller values of Smoothness *Francis et al. (2004)*.

Second, Market-based attributes including: **a) Value Relevance**

$$P_{jt} = α0 + α1\ X_{jt} + α2\ BV_{jt}$$

Measure of value relevance (Relevance) is based on the explained Variability from the regression of price on earnings and Book value. Large (small) values of Relevance imply less (more) value relevant earnings.

b) Timeliness

Bushman et al., (2004) and Ball et al. (2000) measured timeliness as explanatory power of a reversed returns regression which use earnings as the dependent variable and returns measures as independent variables :

$$Smoothness = \frac{\sigma\left(\frac{x_{jt}}{A_{jt-1}}\right)}{\sigma\left(\frac{CFO_{jt}}{A_{jt-1}}\right)}$$

The measure of timeliness is based on the explanatory power of the above equation

C) Conservatism

The annual cross-sectional regression model of *Khan and Watts (2009)* used to estimate C-Score, firm-year measure of conditional conservatism and G-Score, firm-year measure of good news timeliness, is:

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\begin{aligned}
E_i = &\ \beta_1 + \beta_2 D_i + R_i\left(\mu_1 + \mu_2\, Size_i + \mu_3\left(\frac{M}{B}\right)_i + \mu_4\, Lev_i\right) \\
&+ D_i R_i\left(\lambda_1 + \lambda_2\, Size_i + \lambda_3\left(\frac{M}{B}\right)_i + \lambda_4\, Lev_i\right) \\
&+ \left(\delta_1\, Size_i + \delta_2\left(\frac{M}{B}\right)_i + \delta_3\, Lev_i + \delta_4 D_i\, Size_i + \delta_5 D_i\left(\frac{M}{B}\right)_i + \delta_6 D_i\, Lev_i\right) + \varepsilon_i
\end{aligned}
$$

Where, j indexes the firm ,

E equals annual earnings per share scaled by beginning stock price ,

R is the firm's common stock return from 9months before fiscal year-end tothree months after fiscal year-end (measuring news ,(

D is a dummy variable equal to 1 when R < 0 and equal to 0 other wise ,

Size is the natural log of market value of equity ,

M/B is the ratio of market value of equity to book value of equity, Lev is ratio of debt to equity .

Equation (2) is estimated annually for all firms. Using the regression results from Equation (2), C-score is derived using following equation:

$$C\text{-}Score = \lambda_1 + \lambda_2 Size_i + \lambda_3 \left(\frac{M}{B}\right)_i + \lambda_4 Lev_i$$

While, G-score is derived using following equation:

$$G\text{-}Score = \mu_1 + \mu_2 Size_i + \mu_3 \left(\frac{M}{B}\right)_i + \mu_4 Lev_i$$

Larger values of Conservatism imply less conservative earnings than do smaller values of these variables.

Control variables

following the study of *(Biddle et al.,2009)* control variables that can affect of the dependent variable are including in model(2), these variables are volatility of cash flows is standard deviation of the cash flows from operation deflated by average total assets, for years t-5 to t-1, volatility of sales is standard deviation of sales deflated by average total assets, for years t-5 to t-1, volatility of investment is the standard deviation of investment, Firm size is measured as the log of assets, The length of the operating cycle is as the natural logarithm of log of receivables to sales plus inventory to COGS multiplied by 360, The frequency of losses (Loss) is an indicator variable equaling one if the firm's net income before extraordinary items is negative, and zero otherwise, CFO to sales (CFOsale) is the ratio of CFO to sales, Financial slack (Slack) is the ratio of cash to property, plant and equipment, Tangibility is the ratio of property, plant and equipment to total assets, Dividend payout ratio (Dividend) is a dummy variable that takes the value of 1 if the firm paid a dividend; 0 otherwise, the market-to-book ratio (MB) is the ratio of the market value of total assets to book value of total assets, K-structure.

According to the model above, β_1 refers to the effect of accounting information usefulness *USACINF* on investment efficiency for firms whose level of short-term debt is lower than the median and the sum of the coefficients on the main and interaction effect, $\beta_1+\beta_3$, refers to the *USACINF* effect on investment efficiency for firms whose level of short-term debt is higher than the median. If the effect of *USACINF* on investment efficiency is stronger for those firms with lower maturities (higher proportion of short-term debt), β_3 would be positive and significant, whereas if the effect of *USACINF* on investment efficiency is lower for those firms with shorter maturities, β_3 would be negative and significant.

Main Empirical Results

Sample and descriptive statistics

The sample used in this study includes firms listed on the Egyptian Stock Exchange from 2000 to 2016. Initially I had a total of 1,300 observations for this period, but the

estimates of investment efficiency and financial accounting information usefulness reduced the number of observations considerably. Therefore, the final sample consists of 697 firm-year observations from 2000 to 2016.

Descriptive statistics

Panel A of Table 1 presents the descriptive statistics for the continuous variables, including the mean, median, standard deviation, Min and Max.

Panel B provides the frequency for the dichotomous variable Loss.

Table 1. Descriptive statistics a) Continuous variables

Variables	OBS	Mean	Std.Dev.	Min	Max
InvestEff	697	-4.677071	10.4523	150.639-	-.000448
stddebt	697	.8235721	.1720875	.2733287	1.
AQ	697	-.1075818	.1610286	-1.615953	-.005925
Persistence	697	-.7413584	2.646288	-68.6068	-.000181
Predictability	697	.0717947	.235911	-2.921132	-.001062
Smoothness	697	-.8310755	1.233908	-12.62696	-.0292495
G-Score	697	.5044728	2.669769	-25.21531	-.0004938
G-Score	697	-.2283412	.5405799	-7.106832	-.0005586
Timeliness	697	-.3912593	.2845229	-.9808322	-.0012713
Relevance	697	-.5346168	.2975389	-.999162	-.0025093
Cash	697	.1452938	.1246214	.0009053	.6656493
Tangibility	697	.2679082	.2075376	.001837	.8636629
MB	697	1.580825	2.393154	-54.82879	8.928729
Slack	697	4.785951	18.62397	.0022741	219.9467
StdCFO	697	.1024628	.1106064	0	1.070489
StdSales	697	.1859978	.2522756	0	2.337108
StdInvestment	697	.0429159	.0548418	0	.5445608
StdCFOSales	697	.3993568	2.604897	-5.118873	26.12924
Logassests	697	.2007627	.1365057	15.88845	24.17086
Logoperatcycl	697	6.110716	1.518494	3.530959	13.31248

a) Dichotomous variable

Dividend	697	.9010043	.2988707	0	1
Loss	697	.1219512	.3274645	0	1

Table 2. Regression of investment efficiency on the usefulness of financial accounting information (USACINF), debt maturity (STdebt), and interaction between *USACINF* and *STdebt* control variables

$InvEff_{i,t} = \beta_0 + \beta_1 USACINF_{i,t} + \beta_2 Stdebt_{i,t} + \beta_3 USACINF*DumSTdebt_{i,t} + \beta_4 Exj\ Controls_{i,t} + \mu_{i,t}$

Panel (A) Dependent Variable =InvEff

Predictors	prediction		Dependent Variable= InvEff							
			Accounting Based Attributes				Market Based Attributes			
			STDAQ	Persistence	Predictabili	Smoothness	C.Score	G.Score	Timeliness	Relevance
Intercept		Coeff.	-45.70023	-41.66507	-43.06357	-47.47249	-41.33604	-42.21642	-43.89179	-42.28925
		T-stat	-2.20**	-1.81***	-2.23**	-2.47**	-1.99**	-1.99**	-1.99**	-1.97**
USACINF	+	Coeff.	-5.331995	.325732	(8.668144)	.6728552	-.9350026	-1.255201	.6351661	.9514237
		T-stat	-1.06	0.74	0.86	1.08	-1.64	-1.64	0.36	1.37
Stdebt	+	Coeff.	-5.864972	-6.400016	-5.948086	-6.377365	-4.544723	-4.977676	-7.148887	-5.830329
		T-stat	-2.40**	-2.65**	-2.06**	-2.46**	-1.81***	-2.00**	-2.57**	-2.17**
USACINF*DumSTdebt	+	Coeff.	2.495192	-.0220833	-5.174134	.6238655	.5774795	1.280624	-1.573512	.1526187
		T-stat	0.55	-0.03	-0.33	-0.96	3.39*	2.00**	-1.26	0.14
Control Variable										
Cash		Coeff.	-4.59825	-4.581477	-4.455359	-5.956292	-6.008411	-6.110122	-5.672728	-5.147729
		T-stat	-1.29	-1.27	-1.25	-1.65	-1.46	-1.66***	-1.57	-1.37

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Dependent Variable=*InvEff*

Control Variables		Accounting Based Attributes				Market Based Attributes			
		STDAQ	Persistence	Predictability	Smoothness	C Score	G Score	Timeliness	Relevance
Tangibility	Coeff.	3.378064	3.347587	3.662302	3.875507	2.72906	3.283035	3.46501	3.876904
	T-stat	0.79	0.78	0.87	0.97	0.68	0.77	0.80	0.91
MB	Coeff.	.7636913	.8326204	.9112115	.8336782	.4763562	.6994586	.913479	.8675049
	T-stat	0.91	1.09	1.13	1.16	0.99	1.15	1.20	1.21
Slack	Coeff.	-.0253998	-.0264601	-.0174516	-.0168576	-.0167138	-.0208922	-.022146	-.0234491
	T-stat	-0.78	-0.75	-0.42	-0.42	-0.55	-0.66	-0.66	-0.74
StdCFO	Coeff.	-3.418552	-5.52	-5.60826	-6.413734	-4.099802	-4.827203	-5.650459	-6.086156
	T-stat	-0.77	-1.01	-1.06	-1.07	-0.74	-0.90	-1.03	-1.13
StdInvestment	Coeff.	11.50418	12.40706	12.44924	12.36986	14.21109	14.19995	12.14628	11.97763
	T-stat	1.30	1.33	1.50	1.43	1.56	1.56	1.36	1.36
StdSales	Coeff.	-.971102	-1.010775	-1.055931	-.8946361	-1.085554	-.9314431	-1.043538	-1.116886
	T-stat	-0.60	-0.63	-0.66	-0.58	-0.68	-0.58	-0.69	-0.73
StdCFOSales	Coeff.	.1095898	.1198801	.057318	.0532679	.132174	.1071824	.1048883	.1102618
	T-stat	0.44	0.48	0.29	0.26	0.46	0.43	0.42	0.47
Logassests	Coeff.	2.555796	2.432211	2.353432	2.598195	2.314207	2.37222	2.54896	2.463877
	T-stat	3.21	2.85	2.97	3.25	3.09	3.05	3.06	3.06

Dependent Variable = InvEff

		Accounting Based Attributes				Market Based Attributes			
		STDAQ	Persistenc	Predictabl	Smooth	C Score	G Score	Timeliness	Relevance
Logoperatcycl	Coeff.	(-.7472332)	.8416411	(-.4279953)	.4081037	-.8115774	-.7979957	.8148406	.8714286
	T-stat	-0.60	-0.65	-0.47	-0.46	-0.63	-0.62	-0.64	-0.69
Dividend	Coeff.	(-2.382107)	(-2.209145)	-2.21875	-1.865117	-1.581022	-1.948135	-2.146637	-2.174603
	T-stat	-2.00**	-1.69*	-1.55	-1.32	-1.46	-1.68*	-1.70*	-1.73*
Loss	Coeff.	(-1.136747)	(-1.209885)	-1.131067	-1.073339	-1.04551	-1.182682	-1.113871	-1.128117
	T-stat	-1.27	-1.27	-1.20	-1.07	-1.09	-1.19	-1.18	-1.15
Joint Significance test P>|F|	Coeff.	(-2.135603)	(3.036488)	3.49403	.0489897	-.357523	.0254226	.9383458	1.144042
	T-stat	0.48	0.40	0.24	0.09	-1.90***	0.03	-0.77	1.03
Firm Choice		yes	yes	yes	yes	YES	YES	yes	YES
OBS		697	697	697	697	697	697	697	697
R-square within (%)		0.0720	0.0724	0.0734	0.0786	0.0853	0.0779	0.0741	0.0750

Table 2 reports the results of the estimation of model (2) using different financial accounting information usefulness measures which include accounting based attributes (accruals quality- persistence – predictability – smoothness) and market based attributes(C score - G score – timeliness- value relevance).

For those firms with higher short-term debt, the effect of financial accounting information usefulness measured by C score and G score of conditional conservatism is stronger ($\beta3>0$) as they have positive and significant coefficients at the 1% and 5% level, respectively. Whereas the effect of financial accounting information usefulness measured by accruals quality, persistence, predictability smoothness, and timeliness and value relevance is lower at the 1%, 5% and 10% level, respectively.

On the otherwise, for firms that have lower $STdebt$, I find that the coefficient of $USACINF$ is negative and significant for C score, negative and not significant for G score and accruals quality whereas it is positive and not significant for persistence, predictability smoothness, and timeliness and value relevance.

Therefore, for firms which have higher short-term finance, the USACINF effect measured by C score and G score of conditional conservatism (3.39 and 2.00) on investment efficiency is higher than for firms with a lower short-term debt level (-2.70 and -1.64). While there is no effect of $USACINF$ and STdebt on investment efficiency either for firms that have lower or higher $STdebt$ when the financial accounting information usefulness measured by accruals quality, persistence, predictability smoothness, and timeliness and value relevance. These findings are consistent with my prediction which is the effect of the usefulness of financial accounting information on investment efficiency depends on the debt maturity level when the financial accounting information usefulness measured by C score and G score of conditional conservatism.

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مقاطع الطاقة النسبية المقاسة بالطريقتين الإلكترونية والطاقة النسبية إلى الطاقة الكلية تعتمد

١٢٠٠ عينة المستوى الكلي عند التشغيل من قيمة الاستقطاب على الأخرى وقيمة أخرى تعتمد

الطاقة النسبية للطاقة الكلية تعتمد إلى أنه لا يوجد أي مقياس أخر أو قيمة أخرى تعطاها

قيمة الطاقة النسبية تكون أكبر عند الاستقطاب على الأخرى قيمة أخرى ضرورة

تعتمد الطاقة النسبية لهذا G Score ويقيس C Score لمبدأ لا يوجد أي مقياس أخرى

مقاطع الطاقة النسبية من قيمة ضرورة الأخرى على الأخرى وتعتمد قيمة الطاقة

النسبية للطاقة النسبية لقياس الاستقطاب بعض الطاقة النسبية المقاسة بالطريقتين

The Impact of Governance on Health Sector

"Evidence from developing and developed countries"

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Abstract:

The main objectives of this research are to investigate the impact of the governance on the health sector, investigate the associations between governance on mortality trends and explore the possible mechanisms of any such effect through using a sample of countries, so as to a sample of 75 developing and developed countries. Using the period between 1996 to 2014. Doing this empirical research, estimating the models using the fixed effects model, depending on the Hausman test. It is estimated that the fixed effect model was estimated using the Robust Standard Errors PCSE and the Lagrange multiplier (LM) test was also used to test non-linearity and model specification. The researcher concluded that there is a positive impact of Governance on the health sector through the comparing the selected countries that has been done which underscores the view that the performance of public institutions is crucial to increasing the effectiveness of public expenditure on services, and rich countries (high good governance) have high life expectancy at birth, as the efficiency of public expenditure on the health sector in raising the life expectancy at birth is highly correlated with a low level of corruption and, low correlated with an increase in voice and accountability. So, the econometric results of the impact of the institutional quality of the health sector on the health status are stabilized and robust.

Keywords: Governance - Health system - Health system governance - Public expenditure - Child mortality.

الملخص العربي:

استهدفت الدراسة اختبار مدى تأثير الحوكمة على قطاع الصحة والتحقق في الارتباط بين الحوكمة في اتجاهات الوفيات واستكشاف الآليات المحتملة لتحسين القطاع الصحي من خلال دولة مقارنة بين مختلف البلدان، وذلك باستخدام عينة من 75 دولة نامية ومتقدمة. وقد تم فحص هذه الدول إلى مجموعتين وفقا لمستوى الحركة الكل دولة باستخدام الفترة من 1996 حتى القرن 2014. وقد قامت Hausman.

وتقدر الإطار في تقدير نماذج الدراسة باستخدام نموذج الأكثر الثابتة، وذلك بناءً على اختبار الباحثة بتقدير نماذج الدراسة باستخدام نموذج الأكثر الثابتة LM كما تم استخدام اختبار لاختبار عدم الخطية وتوصيف النموذج. وكانت النتائج هي وجود تأثير موجب للحوكمة على القطاع الصحي من خلال الدراسة المقارنة بين الدول والتي تؤكد بأن أداء المؤسسات العامة هو أمر حاسم في زيادة فعالية الإنفاق العام على الخدمات، بالاستناد إلى أن الدول الغنية (مرتفعة الحكم الرشيد) لديها توقع عمر عند الميلاد أكبر وأن كفاءة الإنفاق العام على قطاع الصحة في رفع توقع العمر عند الميلاد مرتبط بشكل كبير مع انخفاض مستوى الفساد ويمكن أقل مع زيادة مستوى التعبير عن الرأي والمساءلة. مرتبط بشكل كبير مع انخفاض مستوى الفساد وأن النتائج القياسية لأثر الجودة المؤسسية لقطاع الصحة على الحالة الصحية ثابتة ومستقرة بشكل كبير.

(1) *Introduction:*

The health system in any country is one of the important tools through which to embark on the building of a strong, productive state. To measure the effectiveness of its ability to achieve social solidarity and equality among citizens, both in receiving treatment and in providing equitable health care as a citizen's inherent right. (Central for Political and Strategic Studies, 2016)

Governance nowadays occupies an important stage in the development process so it is a crucial element that should be taken into consideration in the development strategy of the health sector, which aims at developing cohesive policies, processes and manage consistent to improve the health sector.

Health economics is the application of the economic principles to the health field and is considered as an important component of health management. There are many major aspects of the health economics, one of its components, financing health care which including governmental finance comes from tax resources, user fees (user of out-pocket charges), health insurance and non-governmental organization and donations.

The most important challenge faced by 21st century societies is driving new approach to governance; consequently, governance has been diffused from a state model to a collaborative one, in which the governance is considered a joint project between a different levels; at the state level (such as ministries, parliaments, agencies, authorities and commissions), at the society level (citizens, businesses and community groups), global media level through networked social media and foundations and lastly at international level through the European Union and the United Nations, which is reflected in varies approach to health that asserts the improvement of the coordination and integration of government activities for health with the society's goals such as equity, sustainability, well-being, accountability and prosperity. (Kickbusch & Gleicher, 2012).

To achieve better governance in health and ensure the provision of the health service, great efforts are made to increase the efficiency of the governments by enhancing the allegiance the organizations (i.e. World Health Organization) to work with the governments and reinforce the

political accountability which lead to reforms in the health sector, better opportunities and wellbeing across the world (Batniji, et.al, 2014).

The central building block of good governance is the governance for health and well-being which includes the framework of health as a human right, a global public good and a matter of equality between citizens in the access to the health service.

Egypt's health sector is one of the cornerstones of the Egyptian government's vision of a future vision 2030 for achieving sustainable development. This vision has been aimed at building an integrated health system, based on good health indicators for the public satisfaction of citizens and the efficient use of manpower that characterize Egypt in accordance with the global health indicators. (Central for Political and Strategic Studies, 2016).

It is worth mentioning that this vision and its goals also raise many of the problems facing the health sector in Egypt. Some are related to administration and organizational Problems, others to financial, social and economic problems and there are a number of challenges to be dealt with during the period especially coming under the process of preparing for the Health Insurance Act during the next phase, the most notable of these challenges are the marked disparity in health service indicators in different regions and towards different segments of society, as well as the absence of a complete database for the management of health services in different regions, and inefficient use of the available financial and human resources as well, in addition to the low wages of health workers, the problem of health spending in the sector is an impediment to the provision of a privileged service to the public, which has generated a sense of dissatisfaction among citizens about the level of service delivery health. (Central for Political and Strategic Studies, 2016).

The right of citizens to have access to adequate health care must depend on their needs and not on their ability to pay for such care. Therefore, future strategies must be developed, taking into account population growth and the capabilities of the citizen and the government to achieve goals that are not to be ceded to the citizen regardless of his financial capacity. (Fared, 2016).

Egypt's vision 2030 with regard to the health sector is that all Egyptians enjoy safe and healthy life by implementing an integrated health system. Enjoy quality and non-discrimination, improve health indicators through universal health and prevention coverage, and ensure financial protection for those who are unable to do so. In addition to the satisfaction of citizens on the one hand, paying attention to health workers to achieve prosperity and well-being on the other hand, Egypt's vision is to be a pioneer in health and preventive services and research in the Arab and African sectors. (Askar, 2016).

Egypt's Vision 2030 has a number of strategic objectives, perhaps most notably; To promote the health of citizens in a framework of justice and equity by paying attention to all influences on human health from social determinants, infrastructure and public awareness; as well as achieving universal health coverage for all Egyptians while ensuring the quality of the services provided by ensuring the provision of high quality curative and preventive services available to Egyptians, both able and unable, in addition to the governance of the health sector through the availability of accurate data that facilitates timely and sound decision-making while improving the efficiency of sector resource management within a framework of transparency and accountability. (Askar, 2016).

Egypt is not different from the developing world in terms of service-specific attention given its important role in achieving economic growth and social development. Despite the government's substantial support for services, it is not sufficiently available. The main problem is not only the lack of financial resources, but the misuse of these resources in the absence of governing criteria and controls for the distribution process, or appropriate rates on the basis of which needs are determined in the light of available resources. (Anwar, 2016).

Barbazza & Tella (2014) and Smith (2012) amongst others as literature studies that concluded that multiple governance perspective approaches and newly legal frameworks have been projected to assess governance of the health system in both developing and developed countries as a gate to good governance through the ministry of health under the government supervision and included the private sector in the implementation of it. (Barbazza & Tello, 2014), (Smith, et al., 2012).

These findings have important implications that increasing the public spending on health may not only be the unique policy option to achieve better outcome but also improving governance is the assurance to deliver health services in an efficient way, develop the health sector by involving the private sector more in the health sector in the form of encouraging health expenditure and health investment and take into consideration the requirements of good governance and translate into the expected achievement of better health outcome.

(II) Literature Review:

The studies on governance in health care have received little scholarly attention in recent years. Yet the literatures on health governance internationally become more complex and not particularly abundant.

The increasingly complex set of international literature brings into play how global health governance can be divided within this research; so the theoretical structure of the subject can be based upon the following division; it can be divided into three groups: **The first one**, talking about the different modes and frameworks for assessing governance that is applied within countries and how to use them in order to improve the health system for other countries. **The second one**, points out the indicators of the quality of governance, its impact on the health sector, addresses the empirical evidence from the relationships between them, uses them in their best efficient form and how could possibly be translated in order to reform the health sector. **The last one**, indicates other literatures that describe the health sector with its difficulties and development and any other research related to our topic.

In the first group, it found that (Birchall, Barron, Klinder, & Wright, A regulatory governance perspective on Health Technology Assessment (HTA) in Sweden, 2014; applied a regulatory governance frame to study of the Swedish process for HTA using a qualitative interviews with institutional stakeholders and they found that this approach has the capacity to draw attention to a new ranges of issues and challenges to improve the conduct of HTA within national regulatory spaces, also (Ettelt, Fazekas, Mays, & Nolte, 2012) used a new framework for analyzing health care planning organized under three main dimensions: vision, governance and intelligence in order to assess this frame in two contrasting countries, Germany and New Zealand. In addition to that,

(Smith, et al., 2012) explored a cybernetic model of leadership and governance composed of three fundamental functions: priority setting, performance monitoring and accountability arrangements in seven developed health systems: Australia, England, Germany, Netherlands, Norway, Sweden and Switzerland. Afterwards, (Siddiqi, et al., 2009) developed a framework for assessing Health System Governance (HSG) which has been in countries of the Eastern Mediterranean by shedding light on the case of Pakistan where the framework was applied. At last but not least, (Barnett, et al., 2009) understood the implementation of the new modes and mechanisms of governance in New Zealand health system reforms to assess these in the context of international trends by using methods of surveys and interviews.

But in the second group, we found that (Hwang & Akdede, 2011) used control of corruption and government effectiveness which are compiled by the perception of governance in order to represent a country's governance quality and examine the relationship between the public sector efficiency in the policy areas of administration, infrastructure, and stability and governance, moreover, (Rajkumar & Swaroop, 2008) studied the impact of public spending on outcomes at different levels of governance measured by the level of corruption and the quality of bureaucracy to determine the efficacy of public spending in improving human development outcomes. Posteriorly, (Rashid, Savchenko, & Hossain, 2005) used some indicators such as; number of doctors, number of nurses, total health expenditure on health as percentage of GDP and etc. with an inductive approach to deriving principles for governing the health sector and knowing the role of the health sector by focusing upon governance, institutions and culture taking into consideration the experience of the Ukrainian state and Bangladesh as an example. Lastly, (Gericka, 2004) made a comparison between Egypt and Cuba of the health care financing mechanisms for their effectiveness, efficiency, and equity with the objective of identifying the determinants of success in the Cuban health care system and translated its success in the Egyptian context.

Finally, in the last group, (Callaghan & Wistow, 2006) explained the role of the public involvement in the British National Health Service to walk in the direction way of governance by understanding the difficulties and

the developments of the health sector, in addition to that, (Kurt, 2015) tested the direct and indirect effects of health expenditures on economic growth by using total government expenditures, general government cure and pharmaceutical products health expenditures, general government medicine and health expenditures and life expectancy at birth as an indicator in order to improve and develop the health sector in Turkey.

(III) Analytical model specification:

To measure the impact of health governance on the output of this sector. In addition to measuring the efficiency of public health expenditure on health status, based on unbalanced panel data from 75 developing and developed countries during the period (1996-2014) with a total of 927 observations. The research was adopted to reflect the health sector's outputs on four different indicators to validate the strength of results; The life expectancy at birth and three indicators of child mortality (under five years, or one year, or 28 days). As for governance, representing the country's governance by using Kaufmann, Kraay and Mastruzzi's (2005) measures of voice and accountability, government effectiveness and control of corruption, which are compiled by the perception of governance.

The research was based on the "Rajkumar, A. S., and Swaroop, V." model. Thus, the equation of the health status in its simplest form can be determined as a quasi-logarithmic format as follows:

$$ln\ Health\ status_{it} = \beta_{0i} + \beta_1 Governance_{it} + \beta_2 Governance * Health\ Exp._{it} + \beta_3 RGDP_{cit}$$
$$+ \beta_4 Health\ Expenditures_{it} + \beta_5 Physicians_{it} + \beta_6 (ln\ Nurses_{it} + \beta_6 (ln\ Beds_{it} + \epsilon_{it}$$

Which (i) expresses a sample of countries: (75) developing and developed countries, (t) indicate to the period used (1996- 2014). (β_0) reflects the constant function, while ($ln\ Health\ status$) reflects a logarithm of the dependent variable of the health sector outputs or (health situation). (β_1) refers to institutional quality for the health sector (corruption level, effectiveness, and accountability), (β_2) is an interactive variable of institutional quality level multiplied by health expenditure in order to identify the direct and indirect effects of institutional quality on the health status [1], It allows to test whether the health spending is more effective in

[1] ....
....

improving the health status in case of high quality of institutions, while ($\beta_{3,4,5,6,7}$) refer to variables vector assistance such as GDP per capita, health expenditure total (% of GDP), the number of physicians, the number of nurses, and the number of beds respectively and finally ($\epsilon_{i,t}$) refers to random error.

The research model has been estimated using the fixed effects method based on the "Hausman" test. It is estimated that the fixed effect model was estimated using the Robust Standard Errors PCSE and the Lagrange multiplier (LM) test was also used to test non-linearity and model specification.

(IV) Data:

For empirical estimation, this paper employed the data on LE, GE, COR, VA, GDPc, HE, PH, Nu, Bd, M_5, M_1, M_Neo. It was compiled from the World Bank national accounts data, OECD National Accounts data files, united nations development program (UNDP, 2013), and world governance index (WGI).

Worldwide governance indicators; these indicators, assembled by the world bank & the Brookings institution from 1996 to 2014, summarize the views on the quality of governance collected from survey institutes, think tanks, non–governmental organizations, international organizations, the private sector, while the healthcare indicators; these indicators assembled by the WHO, the WB, the International Monetary Fund (IMF), Egypt's Ministry of Health and Population (MOHP) and the Egyptian cabinet (IDSC)[2] from (1996 to 2014), summarize the several indicators of health care sector that based on different areas.

The Studied variables; which available data are as the following: four dependent variables and three independent variables.

The research divided the above variables into two groups; first group: dependent variables are: (Life expectancy at birth, under–five mortality rate, under–one mortality rate and the neonatal mortality rate), the second group: independent variables are: (voice and accountability, government effectiveness and control of corruption), in addition to controlled variables such as the number of doctors, the number of nurses, number of beds and health expenditure, total (% of GDP) and GDP per capita.

The World Bank Egypt database provides original data for the dependent variables. Life expectancy at birth (LE) is defined as the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Under-five mortality rate (M_5) is the probability per 1,000 that a newborn baby will die before reaching age five, if subject to age-specific mortality rates of the specified year. Under-one mortality rate (M_1) is the probability per 1,000 that a newborn baby will die before reaching age one, if subject to age-specific mortality rates of the specified year. The neonatal mortality rate (M_Neo) is the number of neonates dying before reaching 28 days of age, per 1,000 live births in a given year. The data cover the time period 1996-2014.

Control of Corruption (CC) represents capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The Control of Corruption values is determined in the range of (0, 100); higher values indicate lower corruption and vice.

Government Effectiveness (GE) represents capturing 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 index of government effectiveness ranges from 0-100 where 0 indicates least government effectiveness and 100 indicates the greatest government effectiveness.

Voice and accountability index is scaled from 0 (low democracy) to 100 (high democracy) which is defined as capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

GDP per capita (constant 2010 US$), GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars.

Health expenditure, total (% of GDP) is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation.

Physicians (per 1,000 people), Physicians include generalist and specialist medical practitioners. Nurses (per 1,000 people), Nurses and midwives include professional nurses, professional midwives, auxiliary nurses, auxiliary midwives, enrolled nurses, enrolled midwives and other associated personnel, such as dental nurses and primary care nurses. Hospital beds (per 1,000 people), Hospital beds include inpatient beds available in public, private, general, and specialized hospitals and rehabilitation centers. In most cases beds for both acute and chronic care are included.

(V) Model estimation:

Table 1: Descriptive statistics:

Variables	Obs	Mean	Std Dev	Max	Min	Jarque-Bera (Prob.)
Life expectancy	1425	73.809	6.7096	83.588	45.745	1184.5 (0.000)***
Mortality rate_5	1425	21.486	25.835	168.30	2.0000	3696.9 (0.000)***
Mortality rate_1	1425	17.055	18.618	102.10	1.6000	1838.8 (0.000)***
Mortality_neonatal	1425	9.9790	10.155	65.500	1.0000	3418.0 (0.000)***
Gov. Effectiveness	1346	66.225	25.119	100.00	3.9024	93.161 (0.000)***
Corruption	1346	37.384	27.469	97.596	0.0000	87.532 (0.000)***
V. Accountability	1346	58.764	31.759	100.00	0.9615	11.97 (0.000)***
GDPc	1404	16720	19076	113731	111.53	1406.2 (0.000)***
Health Expenditure	1425	6.9843	2.4103	17.141	1.9253	92.647 (0.000)***
Physicians	1300	2.4871	1.2722	6.7230	0.0200	6.6956 (0.035)**
Nurses	1007	5.9245	4.0892	19.450	0.1140	62.052 (0.000)***
Beds	1267	4.7377	2.7827	15.199	0.2000	221.55 (0.000)***

Note: - ***, **, * indicate significance at 1%, 5% and 10% respectively.
- The countries are: Albania, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Botswana, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Cuba, Kyrgyz Republic, Czech Republic, Denmark, Ecuador, Egypt, Estonia, Ethiopia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Latvia, Lithuania, Luxembourg, Kazakhstan, Korea, Rep., Macedonia, FYR, Malta, Mexico, Moldova, Netherlands, New Zealand, Norway, Oman, Pakistan, Panama, Poland, Portugal, Russian Federation, Saudi Arabia, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Swaziland, Switzerland, Syrian Arab Republic, Tajikistan, Thailand, Tunisia, Turkey, United Kingdom, United States, Uzbekistan, Vietnam.

Table 2: Correlation Matrix between variables:

	In Life expectancy	In Mortality_5	In Mortality_1	In Mortality_neonatal	Gov. Effectiveness	Corruption	V. Accountability	GDPc	Health Expenditure	Physicians	In Nurses	Beds
Ln LE	1											
Ln M_5	-	1										
Ln M_1	-	-	1									
Ln M_neo	-	-	-	1								
G E	0.613 [23.58]	-0.768 [-36.51]	-0.776 [-37.44]	-0.752 [-34.70]	1							
C C	-0.586 [-21.98]	0.770 [36.76]	0.784 [38.36]	0.769 [36.65]	-0.937 [-81.47]	1						
VA	0.517 [18.37]	-0.703 [-30.08]	-0.711 [-30.74]	-0.662 [-26.85]	0.854 [49.97]	-0.822 [-43.88]	1					
GDPc	0.594 [22.48]	-0.719 [-31.44]	-0.729 [-32.39]	-0.716 [-31.22]	0.709 [30.65]	-0.716 [-31.24]	0.652 [26.17]	1				
HE	0.449 [15.31]	-0.565 [-20.83]	-0.569 [-21.09]	-0.523 [-18.61]	0.567 [20.95]	-0.607 [-23.24]	0.657 [26.51]	0.555 [20.29]	1			
Ph	0.436 [14.72]	-0.592 [-22.34]	-0.585 [21.94]	-0.526 [-18.83]	0.299 [9.529]	-0.309 [-6.899]	0.353 [11.48]	0.398 [13.21]	0.529 [18.96]	1		
In Nu	0.499 [17.51]	-0.695 [-29.37]	-0.694 [-29.35]	-0.676 [-27.91]	0.516 [18.29]	-0.528 [-18.89]	0.577 [17.16]	0.611 [23.47]	0.496 [17.36]	0.653 [26.26]	1	
Bd	0.221 [6.896]	-0.461 [-15.79]	-0.466 [-16.04]	-0.467 [-16.06]	0.233 [7.298]	-0.208 [-6.477]	0.299 [9.558]	0.218 [6.780]	0.284 [9.002]	0.538 [19.42]	0.552 [20.15]	1

(VI) The empirical results:

The empirical results that represent the impact of governance on the life expectancy at birth.

Table 3: Fixed effects with robust standard errors (PCSE).

Dependent variable: *Ln Life expectancy*

Variables	(1)	(2)	(3)	(4) (Beck-Katz standard errors)	(5)
Gov. Effectiveness		0.00072 (4.963)***	0.00069 (4.826)***	0.00117 (5.595)***	0.00071 (4.894)***
Corruption		0.00063 (2.573)**	1.47e-05 (0.049)	0.00052 (2.206)**	0.00063 (2.579)**
Corruption ²		-4.84e-06 (-2.178)**	-2.77e-06 (-1.232)	-3.64e-06 (-1.677)*	-4.83e-06 (-2.169)**
V. Accountability		-0.00066 (-2.759)***	-0.00064 (-2.752)***	-0.00058 (-2.420)**	-0.00054 (-2.070)**
V. Accountability ²		1.56e-06 (0.590)	1.71e-06 (0.658)	1.13e-06 (0.429)	2.09e-06 (0.782)
Corruption*Health Exp.			7.09e-05 (3.132)***		
Gov. Effectiveness*Health Exp.					-7.55e-05 (-3.576)***
V. Accountability* Health Exp.					-2.40e-05 (-1.190)
RGDPc	6.94e-07 (13.70)***	7.32e-07 (13.62)***	7.66e-07 (13.74)***	7.70e-07 (13.37)***	7.51e-07 (13.60)***
Health Expenditure	0.0066 (9.040)***	0.0063 (9.131)***	0.0041 (5.351)***	0.0116 (6.182)***	0.0078 (4.849)***
Physicians	0.0108 (7.249)***	0.0086 (5.746)***	0.0091 (5.904)***	0.0092 (5.948)***	0.0089 (5.711)***
Ln Nurses	0.0158 (4.531)***	0.0163 (4.894)***	0.0162 (4.940)***	0.0161 (5.000)***	0.0163 (4.895)***
Beds	-0.0028 (-4.235)***	-0.0027 (-4.222)***	-0.0030 (-4.707)***	-0.0030 (-4.624)***	-0.0028 (-4.287)***
Constant	4.2167 (516.7)***	4.1925 (217.8)***	4.2110 (211.8)***	4.1611 (173.9)***	4.1849 (192.7)***
LSDV R²	0.973	0.975	0.975	0.975	0.975
Within R²	0.441	0.469	0.474	0.474	0.469
Robust test for differing group intercepts F-stat. (74, 233.6)	[427.39]***	[252.26]***	[251.55]***	[237.19]***	[284.72]***
Residual variance F (74, 841)	[243.08]***	[222.69]***	[224.77]***	[223.94]***	[221.66]***
Hausman test F-stat.	[10.705]*	[22.592]*	[23.088]*	[23.614]*	[23.659]*

Note:- *** , ** , * indicate significance at 1%, 5% and 10% respectively.
- ( ), [ ] indicate to *t- statistics*, *F-statistics* respectively.
- *Fixed-effects*, using 927 observations. & *Time series length*: minimum 4, maximum 19.
- *Hausman test*: Null hypothesis: Random effects model is consistent.
- *Fixed-effects*: Null hypothesis: Pooled OLS model is adequate.
- *Residual variance*: Null hypothesis: The groups have a common intercept.
- *Robust test for differing group intercepts*: Null hypothesis: The groups have a common intercept.

It is clear from the foregoing table that there are many interesting results, as follows:

The previous table showed that there is a positive impact GDP per capita, health expenditure as a percentage of GDP, and the number of physicians and nurses per 1000 population on logarithm life expectancy at birth, thus consistent with previous economic theory and literature. While we find the impact of the number of beds per 1000 population is negative, it is the opposite of what some expect.

The results in the table have also shown that the most influential institutional variables on health status is the Government effectiveness, a positive impact of the health sector's effectiveness on the logarithm of life expectancy at birth, as well as the results showed that the impact of corruption on the logarithm life expectancy at birth takes the form of an inverted U –shaped curve, which is consistent with the literature on corruption. Which, according to the hypothesis (grease/Sand in the wheel), is useful at low levels of corruption, but is very harmful at high levels.

In contrast, the results showed that the impact of Voice and accountability on the logarithm of life expectancy at birth takes the form U, that is, its effect is negative at lower levels of it (in dictatorial systems) in which it is positive at elevated levels (in democratic systems).

In order to determine whether health expenditure is more effective in improving the health status in the case of high-quality institutions, an interactive variable reflects the multiplication of health expenditure with each of the institutional indicators.

An interactive variable has been integrated to reflect the interaction of health expenditure with the level of corruption in the health sector (the indirect impact of corruption) and keeping the corruption indicator on a single way in order to obtain the direct impact of corruption. The table illustrates that the insertion of an interactive variable has eliminated the direct impact of corruption on the logarithm of life expectancy at birth, in addition to the positive effect of the interactive variable on the logarithm of life expectancy at birth. Another interactive variable has been integrated to

reflect the interaction of health expenditure with the level of government effectiveness in the health sector.

In addition to that, the research has been used the other three indicators of mortality related to the health status as dependent variables which is in full conformity with their impact on the life expectancy at birth, (although the signs are reversed as death is the opposite of life), in all procedures verify the strength and robustness of the results.

(VII) *Empirical conclusion:*

We conclude that the low level of corruption and its interplay of health expenditure increases the effectiveness of government spending on health and reduces the negative impact of corruption significantly.

Results have shown that the direct impact of the health sector effectiveness indicator remains positive, while the impact of its interaction with health expenditure has been negative.

The research found that health governance has a significant positive impact on the health situation in the countries of the world, which is in line with the analysis.

The results also showed that the influence of the two variables (controlling corruption, voice and accountability) on the health situation is non-linear (quadratic). That is, their impact on the health situation is negative at low levels, while their impact is shifting to a positive level from their high levels. The results also showed that the efficiency of public spending in the health sector on the improvement of health status is highly correlated with a lower level of corruption and less with an increase in the level of voice and accountability. This underscores the view that the performance of public institutions is crucial to increasing the effectiveness of public expenditure on services. The research has used several verification procedures of the strength and robustness of results, and the results are not different, underlining the strength and fortitude of the positive impact of governance on the health situation.

This is greatly supported by the fact that the econometric results of the relationship between the institutional quality of the health sector and the health status are stabilized and robust.

(VIII) Conclusion:

From the theoretical and empirical parts of the research, support that rich countries (high good governance) have high life expectancy at birth. The efficiency of public expenditure on the health sector in raising the life expectancy at birth is highly correlated with a low level of corruption and, low correlated with an increase in voice and accountability. This underscores the view that the performance of public institutions is crucial to increasing the effectiveness of public expenditure on services.

So the research suggests that the most important strategic pillars that the government can adopt to develop the health sector system are the application of governance indicators in the health sector which can be represented in the following:

- Move towards the implementation of the universal health insurance coverage system and improve social justice in the health field, provided that the guidelines and the appropriate governance system are in place.

- Establishment of an effective governance system that relies on the legal, regulatory and institutional framework and encompasses the multiple sectors of health. It works to achieve efficient channelling of human, financial and technological resources, based on the availability of information and evidence, and the application of effective management systems.

- The integration and participation of civil society and the private sector as a key part in policy making and planning, strategy development, and the achievement of governance components and social accountability.

- Establish a system for monitoring, evaluation and performance of the health sector through good governance indicators to measure performance, support decision-making to correct the path in strategies and procedures and develop the planning system for health services. By affirming the availability and application of the basic principles of the health care reform policy, which are quality, justice and effectiveness.

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