More Health Expenditure, Better Economic Performance? Empirical Evidence From OECD Countries

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Abstract
Recent economic downturns have led many countries to reduce health spending dramatically, with the World Health Organization raising concerns over the effects of this, in particular among the poor and vulnerable. With the provision of appropriate health care, the population of a country could have better health, thus strengthening the nation’s human capital, which could contribute to economic growth through improved productivity. How much should countries spend on health care? This study aims to estimate the optimal health care expenditure in a growing economy. Applying the experiences of countries from the Organization for Economic Co-Operation and Development (OECD) over the period 1990 to 2009, this research introduces the method of system generalized method of moments (GMM) to derive the design of the estimators of the focal variables. Empirical evidence indicates that when the ratio of health spending to gross domestic product (GDP) is less than the optimal level of 7.55%, increases in health spending effectively lead to better economic performance. Above this, more spending does not equate to better care. The real level of health spending in OECD countries is 5.48% of GDP, with a 1.87% economic growth rate. The question which is posed by this study is a pertinent one, especially in the current context of financially constrained health systems around the world. The analytical results of this work will allow policymakers to better allocate scarce resources to achieve their macroeconomic goals.

Keywords
health expenditure, economic performance, generalized method of moments, Organization for Economic Co-Operation and Development

Introduction
The global financial crisis has led many countries to reduce spending dramatically, with health care being a common target of such reductions. However, the provision of health care is important for improving a population’s health, which in turn can lead to more productivity, better economic performance, and then more fiscal resources. However, could better economic performance be achieved through more health spending? The findings of the current literature with regard to the influences of health expenditure on economic growth are ambiguous. How much should countries spend on health care? Previous research has not suggested the optimal level of health expenditure using empirical evidence. The current study thus aims to investigate whether raising health expenditure can effectively improve economic performance, and so it also aims to find the optimal level of health expenditure to maximize economic growth.

Methods and Specifications
Existing studies have examined various aspects of the health expenditure–economic growth nexus. However, the historical and institutional backgrounds of each country are unique, and thus the question is a rather complex one. An empirical methodology that controls for cross-country variations in certain political and economic institutional characteristics, and successfully deals with differences across countries, would be able to offer a better framework for statistical inferences. The use of simple ordinary least squares (OLS) estimation could lead to biased and inconsistent parameter estimates, due to regressor endogeneity. This article overcomes these issues by introducing the generalized method of moments (GMM) technique to derive the design of the estimators of interest.

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Subjects
Health expenditure in developed countries has risen faster than gross domestic product (GDP). Organization for Economic Co-Operation and Development (OECD) countries are all developed nations. The well-established social security systems in these countries have contributed to improvements in the health of their populations, although this has also caused a fast rise in health expenditure. This research provides rigorous scientific examinations to examine the following issues: (1) how health expenditure affects an economy’s GDP growth, (2) whether there is an optimal ratio of health expenditure relative to GDP, and (3) whether and how the other factors influence economic performance. The results could be used to derive the appropriate health expenditure level to obtain better economic performance and social well-being.

Analytical Framework
The Grossman model has yielded considerable insights into the determinants of health, as well as into the allocation of time and money into health production. The working hours and productivities of workers in poor health both decline, and this is one economic side effect of a health care policy. A key premise of the literature is that good health enhances worker productivity and improves economic outputs.6 The production function of per capita GDP ($y$) could be a function of health expenditure ($h$) and a vector ($X$) of public services and socio-economic variables that affect real per capita GDP:

$$y = f(h, X).$$

Obviously, a rise in the share of health expenditure favors (deters) the economic growth rate if it improves (deteriorates) workers’ health. The relationship between health expenditure and economic growth may be non-linear, and this issue needs to be examined. This research then tries to find the optimal level of health expenditure. The model used here is typical of economic growth determinant models, and is as follows: 11

$$\log y_{it} = \omega_0 \log y_{i(t-1)} + \omega_2 h_{it} + \omega_3 h_{it}^2 + \omega_4 X_{it} + \epsilon_{it} = 1,2,...,T; i=1,2,...,N,$$

where $\log y_{it}$ represents per capita real GDP in logarithmic form, $h_{it}$ represents the ratio of health expenditure relative to GDP, $h_{it}^2$ represents the square of the ratio of health expenditure relative to GDP, $\epsilon_{it}$ represents an idiosyncratic error term, and $i$ and $t$ represent country and time period, respectively. The vectors of $X_{it}$ are composed of socio-economic and demographic explanatory variables. Our primary interest is how health expenditure affects economic growth, and whether other factors influence this relationship.

Econometric Method
GMM has been widely applied by researchers, to examine subjects as diverse as financial and economic issues to public health studies on the effects of AIDS deaths on households since the 1990s. This econometric technique is specifically designed to extract causal lessons from data or observations (whether countries, hospitals, or patients), each of which is observed only annually over 5 or 10 years, as well as to resolve the issue of multicollinearity between explanatory variables.

Data Description
Applying the experiences of OECD countries, the panel datasets of the dependent and explanatory variables are observed over the period from 1990 to 2009, thus excluding the global financial crisis that arose after this. The following socio-economic and demographic explanatory variables are examined: the ratio of health expenditure relative to GDP; the square of the ratio of health expenditure relative to GDP; the ratios of military expenditure, education expenditure, and government consumption expenditure to GDP; the tax rate; the growth rate of the college enrollment rate; the inflation rate; the openness and the corruption indexes; the development index; the aggregate birth rate; the population; the ratio of young people in the population; the ratio of elderly people in the population; and the per capita GDP growth rate for the last period in logarithmic form. The survey data are collected from World Development Indicator for the period from 1990 to 2009. Table 1 summarizes the descriptive statistics and Figure 1 presents a scatter plot showing the relationship between government health expenditure and the economic growth rate over the period 1990 to 2009.
After identifying the factors that might affect the per capita GDP growth rate in log form and by applying the GMM estimators in STATA 10.0 to the survey data, this research further estimates the significance of the coefficients corresponding to each of the above-mentioned explanatory variables.

### Results

The GMM estimated results for per capita GDP growth rates in log form, as well as for the other variables, are presented in Table 2. The results for AR(1), AR(2), and the Sargan test are 0, 0.876, and 0.051, respectively, and indicate that the selection of variables is valid, the estimation equation is correctly specified, and the estimation results are robust.

### Discussion

In general, people with better health are capable of producing more goods and services than those in poor health.
leading to faster economic growth. Nevertheless, an increase in health expenditure, which could improve the health of the workforce, might crowd out other expenditure, such as spending on infrastructure inputs, that could also stimulate economic growth. The impact of increases in health expenditure on economic growth is thus ambiguous.

Over the coming decades both developing and industrialized countries will face sharp rises in health expenditure, as well as other long-term health care challenges, because of their aging populations. Our findings indicate that it is worthwhile for governments to increase investment in health until it reaches an optimal level to achieve greater economic development. The Dartmouth Atlas project and researchers agree that more spending on health does not necessarily equate to better care.12-14 The current study challenges the assumption that increased spending in health care is inevitable and unavoidable, and tries to find the effective level of health spending for stimulating economic growth, while also improving the population’s well-being. Based on empirical evidence from OECD countries, when the ratio of health spending to GDP is less than the optimal level of 7.55%, increases in health spending effectively lead to better economic performance. Otherwise, such spending does not cause improvements in care. With the provision of appropriate health care, the population could have better health, and thus a nation’s human capital would be stronger and better able to contribute to economic growth through improved productivity.15

Recent economic downturns tend to have the greatest effects on working age adults. The World Health Organization has raised concern over the financial crisis’ impact on global health, in particular among the poor and vulnerable.7,8 Furthermore, this article finds that increases in the ratio of the elderly people in the population do not affect economic growth significantly. Our findings reflect that appropriate spending on health care supports economic development. The overarching empirical question that is posed by this research is a pertinent one, especially in the context of the financially constrained health systems that now operate around the world, which are being squeezed by multiple developments, including (1) a financial squeeze due to the global economic downturn, (2) rapidly expanding and increasingly costly treatment regimes, and (3) rapidly aging populations. It is thus more crucial than ever to carry out an appropriate policy analysis at the macroeconomic level, which will allow policymakers to better allocate scarce resources in the public sector. In future work, we shall investigate the impact of preventative health care on a nation’s health and economic performance, through its effects on improved health and productivity, as well as reduced future demand for health care and possible reductions in health expenditure. This issue is important, as the knowledge gained from such research could help reduce the deficits in public budgets caused by expensive health systems.

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