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International differences in the impact of doctors on health: a multilevel analysis of OECD countries

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Abstract

This paper aims to measure whether there are country variations in the efficiency of the physician workforce in reducing various measures of mortality across 21 OECD countries over 3 decades. It utilises a multilevel modelling approach both to measure country variations in physician efficiency and to explore the determinants of these variations. The results suggested that physician numbers are an important determinant of mortality across OECD countries, and cross-country heterogeneity in the effect of physician availability on health is significant. We also found that availability of advanced medical technology is an important factor intervening in this relationship.

JEL classification: C23; I12; O57

Keywords: Health system efficiency; Physician effect; Multilevel analysis

1. Introduction

There is a growing demand from different actors in health policy for more information on the performance of health care systems by measuring what the health system is achieving

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across a range of objectives. This demand corresponds to a fundamental need for evidence-based health policies. Of particular interest is whether and how health systems vary in the efficiency with which they use health care resources to improve health.

This paper does not seek to provide a comprehensive view about country variations in health system performance. Instead, it aims to measure whether there are country variations in the efficiency with which medical care resources (more specifically, the physician workforce) are used in terms of their contribution to reductions in various measures of mortality across OECD countries. It is designed to exploit the strengths of a relatively rich data set by using OECD health data for 21 countries over 3 decades. It also utilises a multilevel modelling approach both to measure country variations in physician efficiency and to explore the determinants of these variations. In particular, this approach allows us to estimate, for the first time, the role of advanced medical technology and major financing mechanisms as potential determinants of efficiency.

Estimating the efficiency or performance of each country's health care system is not straightforward. There are many methodological difficulties to be resolved. The most straightforward way to compare the impact of health care across countries would be to examine health care outcomes (that is, measures of changes in health status directly attributable to health care). However, health outcomes data are not yet available at an international level, although work has begun to collect them at the WHO and the OECD. Meanwhile, in their absence, indicators of health status can be used. That France's female life expectancy of 82.5 years in 1999 exceeded that of the United Kingdom by 2.6 years provides valuable comparative information about health attainment (just as GDP per capita provides information about comparative standards of living). The obvious problem is that this is an unadjusted comparison. We cannot tell if the position of the UK is due to poor performance of its health system or inadequacy of available health resources or any other factor beyond the control of a health system.

Thus, assessing health system performance requires disentangling the "effect" of health care from the "effect" of all other determinants. For instance, it would not be surprising to learn that female life expectancy in Portugal is shorter compared with Sweden or France, given the large differences in their respective per capita income levels. However, it might be more interesting to learn that female life expectancy in Portugal in 1998 was 3 years higher than predicted from its income and education level whereas female life expectancy in Denmark, in contrast, was lower than its predicted level by 2 years. Before going any further, it may be useful to make clear the terms to be used in discussing measurement of efficiency and performance.

The term "health system performance" is best defined with respect to a set of agreed goals related to different health domains. The major goals for health systems include improving the health status of the population, access to health care, equity and quality of service provision, and financial protection (WHO, 2000). However, the attempts of the WHO have shown that collecting and combining information related to all these areas is not simple. That is why this paper adopts a partial approach concentrating on one aspect of health (mortality reduction) and one specific health resource (number of doctors). In particular, we apply the approach suggested in Jamison and Sandbu (2001) whereby estimates of country-specific elasticities of health outcomes with respect to health inputs can be estimated from time series data using multilevel modelling methods. While this leaves aside other important