A comparative analysis of some policy options to reduce rationing in the UK's NHS: Lessons from a general equilibrium model incorporating positive health effects

Martine Rutten [a],*, Geoffrey Reed [b]

[a] Erasmus University Rotterdam, Institute for International and Development Economics and Royal Tropical Institute, P.O. Box 95001, 1090 HA, Amsterdam, The Netherlands
[b] Leverhulme Centre for Research on Globalisation and Economic Policy, University of Nottingham, United Kingdom

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ABSTRACT

This paper seeks to determine the macro-economic impacts of changes in health care provision. The resource allocation issues have been explored in theory, by applying the Rybczynski theorem, and empirically, using a computable general equilibrium (CGE) model for the UK with a detailed health component. From the theory, changes in non-health outputs are shown to depend on factor-bias and scale effects, the net effects generally being indeterminate. From the applied model, a rise in the National Health Service (NHS) budget is shown to yield overall welfare gains, which fall by two-thirds assuming health care-specific factors. A nominally equivalent migration policy yields even higher welfare gains.

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1. Introduction

The interactions between health care, health and the remainder of the economy are complex. On one hand, changes in income affect the consumption and/or provision of health care and other goods, and thus the health of populations in terms of illness and mortality. On the other hand, changes in health impact upon the well-being of populations, hence labour market participation, productivity and income.

Developed countries, with high living standards and levels of health, are argued to be in a state where the marginal contribution of health care to health is minimal and other factors, such as diet, lifestyle, environment and education, are more important in explaining variations in health (Folland et al., 2001, Chapter 5). However, many former sceptics of the contribution of health care now accept that, even after allowing for diet and lifestyle, health care does make a difference for

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specific conditions, such as cardiovascular disease (Wallace, 2004). Moreover, medical care also enhances the quality of life through pain relief and increased mobility.

Nevertheless, it has been argued that the majority of developed country health care systems fail to deliver specific medical services to a "satisfactory" standard, commonly attributing this to limited financial means and inefficient use of resources. In the UK, such pressures result in poor health outcomes for some diseases (such as cancer), poor service quality, including long waiting lists and waiting times for certain treatments, and inequities in access and health outcomes. These impose significant costs on society above those of health provision itself. Health care costs themselves are bound to rise given an ageing population and advances in medical technology.

While the interdependencies between health care, health and the rest of the economy are now widely acknowledged, most of the economic models used to assess these fail to incorporate the main channels through which interactions take place. Most empirical studies employ econometric analysis and usually ignore the general equilibrium effects of changes in health and health care across sectors, factors, and households, and their implications for the government budget.

Econometric models typically focus on multiple linkages between health, health expenditures and economic growth at the aggregate (macro) level (e.g., Baldacci et al., 2004; Bhargava et al., 2001; Bloom and Canning, 2003; Bloom et al., 2004; Crémieux et al., 1999; Ettner, 1996; Hamoudi and Sachs, 1999; Hitiris and Posnett, 1992; Jamison et al., 2003; Knowles and Owen, 1997; Mayer, 2001a,b; Pritchett and Summers, 1996; Strauss and Thomas, 1998; Stronks et al., 1997; Thomas and Frankenberg, 2002).

The few computable general equilibrium (CGE) models that exist are diverse in their application area. Those set in a developing country context may be categorised into Basic Needs models (Kouwenaar, 1986; Van der Hoeven, 1987, 1988; Vianen and Waardenburg, 1975), Externality models (Savard and Adjovi, 1997), HIV/AIDS models (Arndt, 2003; Arndt and Lewis, 2000, 2001; Arndt and Wobst, 2002; Dixon et al., 2004; Kambou et al., 1992) and Millennium Development Goal (MDG) models (e.g., Lofgren and Diaz-Bonilla, 2006; Sundberg and Lofgren, 2006). There are some "Global" models, such as Lee and McKibbin's (2003) model of the economic effects of Severe Acute Respiratory Syndrome (SARS), and most recently Smith et al.'s (2005) UK model of the macro-economic impact of antimicrobial resistance. While each of these strands of CGE literature has its own merits, most do not assess the endogenous impact of changes in health care provision on population health, and on the labour force in particular and its impact on production, income and welfare.[1]

Empirical studies typically fail to account for the main feature of all nations' health care systems, namely that they treat and (perhaps partially) cure people, i.e., improve their health, which not only makes them "feel better" but also enlarges the effective size of the population through increased working time for some and reduced death rates for all. At the same time, health care systems use factors of production, which reduces their effective supply in the rest of the economy. It is in addressing this caveat that this paper seeks to make a contribution.

The analysis is novel in two main respects.[2] The first contribution is in terms of international trade theory, using the Rybczynski theorem to cast light on some of the resource allocation issues related to the provision of health care. While there is a strong literature on endogenous labour supply models (e.g., Martin, 1976; Martin and Neary, 1980), the analysis has largely focused on direct labour supply responses to higher wages. Here, changes in effective labour supplies come from changes in the size of the health sector.

The second contribution is empirical, the development of a static CGE model for the UK with a detailed health component. The CGE model is calibrated to a purpose-built Social Accounting Matrix (SAM) for the UK for the year 2000 with considerable refinement in terms of sectors (distinguishing health care and its main input suppliers), factors (capital, skilled and unskilled labour) and household types (based on the age and labour market participation of household members). It is the first of its kind in that it has been designed to analyse the macro-economic impacts of changes in health care provision, while recognising the simultaneous effects of changes in health on effective labour supplies *and* the resource claims made by the health sector. The effects on welfare of higher health provision come through two main channels: (a) the direct gain from increasing the "well-being" of the population, and (b) the indirect effects of an increase in the size of the effective (i.e., "able to work") endowments of skilled and unskilled labour for use in non-health activities.

Taking as a case study the UK, an archetype of a developed country health care system in which government provision and funding dominates, allows the modelling and analysis of current "rationed" health care policies. Specifically, we contrast three strategies for increasing health care provision through a higher National Health Service (NHS) budget on the assumption that domestic factor endowments are given. First, under the assumption that all factors are fully mobile within the economy and that there is no immigration of foreign skilled workers. Second, by amending this by assuming that some factors are health care-specific factors. Third, that there is immigration of foreign skilled workers at the current wage.

The remainder of the paper is organised as follows. Section 2 presents an application of the Rybczynski theorem where changes in effective labour endowments are modelled via changes in health provision. Section 3 explains the UK CGE model and SAM. Section 4 presents the results of the counterfactual simulations of policies aimed at alleviating rationing. The final section concludes and suggests directions for future research.

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[1] An exception is the Dixon et al. (2004) model of the impact of the HIV/AIDS pandemic and alternative health interventions on the Botswana economy. However, this model focuses on one particular disease in a developing country setting.

[2] See Rutten (forthcoming) for an analysis from the perspective of migration of skilled medical personnel into the UK, using a different version of the CGE model and including a formal derivation of the theory.