



Do treatment decisions depend on physicians' financial incentives? [☆]



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ABSTRACT

We study how General Practitioners (GPs) respond to fee changes with respect to the number of visits and treatment intensity. Our empirical strategy is to exploit within GP variation in the fee schedule due to specialisation in general medicine that implies a higher consultation fee, and to use only a narrow time window around the date of the fee change to identify the GPs' supply responses. Making use of detailed administrative claims data covering all GPs in Norway over a six-year period (2006–2011), we find that a higher consultation fee increases the number of visits (with an elasticity of 0.2), but reduces the treatment intensity per visit (and per patient). This is a pure substitution effect where GPs respond to the fee increase by seeing more patients but spending less time with each, without changing the total amount of time spent per month treating patients. Thus, our analysis suggests that fee-for-service is a powerful policy instrument that needs to be carefully designed in order to ensure optimal provision of care.

1. Introduction

Volume-based payment schemes for health care provision are commonplace in most health care systems throughout the OECD.¹ Critics argue that such schemes, as opposed to payment systems based on, for example, block grants or fixed salaries, lead to over-provision of health care and possibly supplier-induced demand, which in turn result in excessive health expenditures without much gains to patients' health. However, proponents argue that the provider incentives generated by volume-based payment schemes are necessary for an efficient supply of health care and result in substantial health gains to patients. Knowledge about (whether and) how health care providers respond to financial incentives is therefore of great importance for the design of health policy.

In this paper we study the impact of fee-for-service payments on the provision of health care by General Practitioners (GPs). In general, physician responses to exogenous changes in fees for medical services could take a variety of forms, from responses at the extensive margin, such as entry and exit of physician practices or changes in specialisation

and practice style, to responses at the intensive margin, such as changes in the quantity or quality of treatment offered by the same GPs to a given set of patients. Since the latter type of effect is often very hard to disentangle empirically from general equilibrium effects, the received empirical literature on this topic tends to focus either on effects at the extensive margin or on aggregate effects.

In contrast, we present in this paper a set-up that allows us to focus on (and isolate) physician responses at the intensive margin (i.e., for a fixed number of GP practices in the market), which in turn enables us to paint a very clear picture of how individual physicians respond to financial incentives. More specifically, the present paper combines the use of unique data with a novel approach to empirical identification in a way that allows us to estimate, with a great deal of precision, the following two interlinked effects: (i) the physician *supply response* (in terms of number of patient visits) to a fee increase, and (ii) the effect of a change in relative fees on physicians' *substitution* between number of visits and other medical services (which we classify as *treatment intensity*). The sign and magnitude of these estimates will in turn allow us to draw some conclusions regarding individual GP objectives, in

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¹ Two key examples of volume-based payments schemes are fee-for-service (FFS) payments for physician services and diagnosis-related group (DRG) pricing for hospital services. Both schemes are widely used in almost every OECD country.

particular the degree to which GPs' treatment decisions are decided by profit oriented versus patient oriented concerns.

Our strategy to arrive at these estimates is the following. From administrative registry data, we obtain a panel data set covering all fee-for-service payments to GPs in Norway over the six-year period 2006–2011. To identify the effect of fee changes on the GPs' provision of care, we exploit variation related to specialisation in general medicine. Certification as a specialist entitles the GPs to a higher consultation fee, implying a change in both absolute and relative fee levels per visit. Since GPs obtain specialist certification at different dates continuously over the year, this approach gives us substantial variation in the fees over time and across GPs.

Specialisation is obviously an endogenous choice by the GPs, which may have more long-term demand and supply effects. However, we are not interested in the effects of specialisation (though this is arguably an interesting topic), but use specialist certification as an instrument to obtain individual variation in the fee schedule for each GP. Our identification strategy is to consider only a *narrow time window* before and after the date of certification. In this short period it is highly unlikely that observed changes in GPs' treatment decisions are caused by anything else than the change in the consultation fee, thus allowing us to identify and isolate causal effects. We estimate a GP fixed-effect model, capturing the within-GP supply responses, and control for a wide set of observable GP and patient characteristics.

Our results show a sharp supply response among the GPs shortly after receiving specialist certification. We find that the higher consultation fee induces an increase in the number of visits, but a reduction in the amount of services provided per visit. The reduction in service intensity occurs along all three dimensions measured: laboratory tests, medical procedures and prolonged consultations. The impact on the number of visits is relatively strong with an implied short-run supply elasticity in the order of 0.2. We also find a positive effect on the total fee income per visit, but which is smaller than the increase in the consultation fee because of the substitution effect (i.e., the reduction of services per visit).

We conduct a series of complementary estimations in order to uncover the exact mechanisms behind our results and also to check their robustness. First, using the same time window, we find that specialist certification does not lead to an increase in the patient lists of the GPs who become specialists, and it does not lead to a higher number of visits from patients who are listed with other GPs. This implies that our estimated effects cannot be caused by demand responses to specialist certification, which provides confirmation that the effects are really caused by the fee change. Further estimations provide direct and indirect confirmation that the increase in the number of visits can partly be explained by each of the following mechanisms: (i) an increase in the number of patient recalls, (ii) an increase in the share of clinic visits relative to other GP-patient contacts, and (iii) an increase in the supply of consultation slots by GPs facing excess demand.

Second, we also find that specialist certification does not lead to an increase in the number of hours worked (with patients) per month for the GPs who become specialists. This implies that the fee change leads to a pure substitution of visits for treatment intensity, where GPs respond by seeing more patients but spending less time and effort with each patient, without changing the total amount of time spent working with patients. Furthermore, we also find strong evidence that this substitution takes place at patient (or treatment episode) level and not only at visit level, implying that each individual patient receives less treatment as a result of the fee change.

Finally, we also show that our results are very robust to several sensitivity tests. Our results remain intact if we contract or expand the time window around specialist certification. We also obtain very similar results when using a much smaller sample of GPs who temporarily lose their specialist status during the period of analysis. A loss of specialist status, which implies a *reduction* in the consultation fee, leads to a *reduction* in the number of visits and an *increase* in treatment intensity

along all three dimensions. These results are then reverted, with a remarkable degree of symmetry, when the specialist status is regained and these GPs are once more entitled to the higher consultation fee. We also perform a placebo test using a different sub-sample of GPs – those who work in group practices – and show that specialist certification has no effects on the treatment patterns of other GPs working in the same practice as the GPs who become specialists.

We interpret these results in the light of a simple theoretical model of treatment decisions by a semi-altruistic physician. In this model, we show that the *magnitude* of physician responses to a fee change depends on the degree of altruism, and that these responses vanish in the extreme case where the physician acts as a perfect agent for patients. On the other hand, and as long as physicians are to some extent profit-oriented, the *direction* of the effects depends on the size of physician income effects. If these are sufficiently small, physician responses are determined by the following substitution effect: A higher consultation fee implies a change in relative prices (fees), making consultations more profitable relative to services related to the intensity of treatment, and physicians will respond by increasing the number of consultations. The extra time and effort spent on consultations then imply that the marginal cost of medical treatments increases, and physicians will therefore choose a lower treatment intensity. Thus, in light of this model, our empirical results indicate that physicians are relatively profit-oriented and that income effects are relatively small.

As indicated above, there is a vast empirical literature on physician responses to financial incentives. The strand of this literature more closely related to the present paper is the one analysing the effect of fee changes on physicians' supply of medical services. The overall picture from this literature is somewhat mixed, although many studies find a positive supply response to higher fees. For example, studying the effects of changes in US Medicare fees, [Hadley and Reschovsky \(2006\)](#) find that a higher fee increases both the number of patients treated and service intensity. Similarly, [Clemens and Gottlieb \(2014\)](#) find strong positive supply effects of US Medicare fee increases. Using data from Canada, [Kantarevic et al. \(2008\)](#) also find mostly positive effects of fee increases on the supply of medical services.² Furthermore, both [Epstein and Johnson \(2012\)](#) and [Iizuka \(2007\)](#) find some evidence of drug choice based on the prescribing physician's financial incentives in the US and Japan, respectively. On the other hand, [Carlsen et al. \(2003\)](#) find little or no effect of fee changes on the supply of laboratory tests in Norway.

The results are considerably weaker (and more mixed) regarding cross-price effects on the supply of medical services; that is, the extent to which a fee change for a particular service leads to adjustments in the supply of other services. For example, the aforementioned study by [Kantarevic et al. \(2008\)](#) find mostly insignificant cross-price effects. Also using Canadian data, [Hurley and Labelle \(1995\)](#) find relatively weak and mixed evidence of a relationship between relative fees and the supply of medical services. [Tai-Seale et al. \(1998\)](#) conduct a specific empirical test of the McGuire-Pauly model³ on US Medicare data and find some evidence of negative cross-price elasticities but overall quite mixed results.

A related strand of this literature consists of papers studying the effects of different physician payment schemes, usually fee-for-service contracts versus fixed-salary contracts. Also here the results are somewhat mixed. Using Canadian data, [Devlin and Sarma \(2008\)](#) find that

² The short-run supply elasticity of 0.2 resulting from our analysis is roughly similar to the ones estimated by [Hadley and Reschovsky \(2006\)](#) and by [Kantarevic et al. \(2008\)](#), but considerably smaller than the elasticity of 2.5 estimated by [Clemens and Gottlieb \(2014\)](#). However, because of differences in the measure of health care supply and in the time scale of analysis (short-run versus long-run), these elasticities are arguably not directly comparable.

³ [McGuire and Pauly \(1991\)](#) present a theoretical framework for studying physician response to changes in relative fees, incorporating both the profit-maximisation hypothesis (zero income effects) and the target income hypothesis (income effects of infinite size).

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