

The Role of Primary-Care Physicians in Health and Well-Being

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Introduction and purpose

The rise in **health-care spending** has initiated a large literature on the features and origins of health-care spending. This literature – in particular research produced as part of the Dartmouth Atlas of Health Care project – has recognized substantial geographic variation in spending, both within and across countries, and found little evidence that higher spending is associated with better health outcomes (e.g., Fisher et al. 2003a,b).

A main problem in studying interrelations between health-care providers and patients is data limitations. This has led researchers to focus on more aggregate levels of care than family doctors, such as hospitals in which individuals are treated, since patient-doctor information is rarely available. Using detailed administrative health and income registers, that link patients and physicians, our approach will **apply state-of-the-art estimation methods of “value-added” models to construct measures for physicians’ impact on patients’ medical-care utilization.**

The **purpose of this project** is to document the discrepancies across physicians in health-care spending as well as in other behaviors, above and beyond differences that are attributable to the observed characteristics of their patients.

Policy relevance

We focus on **the physicians’ role in the health production** for two main reasons. First, in populations with near-complete health-care coverage, such as Danes, one of the primary decisions individuals face is choosing between providers – specifically, primary-care doctors. Second, in many health-care systems the family physician acts as a gate-keeper, responsible for determining a patient’s medical services. This renders the family doctor a key player in the provision of health-care with an innate **dilemma**: on one hand the physician should provide the **highest level of health care** to the individual patient, while on the other hand the physician should **avoid overspending**. Thus, it is central for the design of health-care systems to evaluate the extent to which physicians drive high spending, to construct quality measures that can assist performance-based reimbursement, which some systems are contemplating, and to assess the effects of medical-care spending on patient health and economic outcomes.

Background

Recent papers have investigated variation in health care spending in two connected routes. Some papers aimed at identifying the source of this variation. For example, research showed that spending widely varies across hospitals (Wennberg et al. 2004a,b; Wennberg et al. 2005; Baker et al. 2008), and Finkelstein et al. (2014) assessed the relative roles of demand and supply factors in utilization by analyzing migration within the US. Other papers focused on estimating the causal effect of spending differences on health outcomes. Exploiting plausibly exogenous variation, Doyle (2011) analyzed emergency patients who were exposed to health-care systems when they were far from home, and Doyle et al. (2015) studied the impact of higher-spending hospitals on patient outcomes using effectively random assignment of ambulance companies to patients who live near one another. We will push this research forward by studying the role of physicians.

Methodology

We will import estimation methods from the literature on teachers’ **value-added** (e.g., Chetty et al. 2014a,b) to estimate physicians’ “value-added”. Simply put, to estimate teacher VA, i.e., teachers’ impact on students’ test scores, economists link students to teachers using classroom assignment

data and analyze how being taught by specific teachers in specific grade-levels affects student grades. Similarly, **we will link patients to doctors using healthcare data and analyze how being treated by a specific doctor (in a specific patient-age cohort) affects patient outcomes**, such as medical care utilization and labor market outcome. The estimated incremental impact of physicians on patient-level outcomes, controlling for a rich set of controls, will capture the physicians' value-added with respect to that outcome.

The simplest model, adapted to our application, follows a two-stage linear specification:

$$Y_{imjt} = \beta_0 + \beta_1 Y_{imjt-1} + \beta_2 X_{imjt} + \beta_3 M_{imjt} + \lambda_m + \alpha_i + \eta_{imjt} \quad (1)$$

$$\eta_{imjt} = \pi T_{imjt} + \varepsilon_{imjt} \quad (2)$$

In equation in (1), Y_{imjt} is some outcome, such as medical care spending, of individual i at location m with physician j in year t , X_{imjt} is a vector of individual characteristics, M_{imjt} is a vector of location characteristics, λ_m and α_i are location and individual fixed effects, and η_{imjt} is a residual. In equation (2), η_{imjt} , the residual individual outcome after removing the effect of observable characteristics, is a function of the vector of physician indicator variables, T_{imjt} , and an error term, ε_{imjt} . **The vector π captures the value-added estimates for physicians.**

Analyzing the variation in these estimates will allow us to document outcome discrepancies across physicians. In addition, we will assess how these discrepancies contribute to geographic differences in health-care spending, to health disparities at different ages and across ethnic groups, and to differences in end-of-life spending, all issues with research value of their own.

Variation in physicians' behavior can result from a range of factors, from differential payment schemes and financial incentives across locations to attitudes toward treatments of ill-defined conditions that lack specific protocols (Currie et al. 2015; Van Parys 2015). Therefore, we will use a spectrum of dimensions in which physicians may differ to estimate physician VA with different measures. These include leniency of prescribing drugs and rate of referrals, with a focus on overall spending, which is directly related to policy and serves as a summary measure of treatment intensity (Doyle et al. 2015).

Data

Our research proposal will rely on **Danish administrative data**. The necessary Danish linked income, wealth, health-care utilization, and demographic registers from 1980-today are already available to us for the entire population via Statistics Denmark. However, we currently need to purchase the following datasets: (1) register on physicians including treatments provided; (2) prescription drugs database including specific drugs prescribed; (3) "Sikringslisten" that links specific physicians to patients to refine the analyses (we already have linkages of patients to clinics, of which approximately 70% are run by a single physician);

Research plan:

While working toward conducting the research outlined in this proposal in the Danish setting, we also plan to carry out a similar analysis using US register-based data for Americans aged 65+ via Medicare claims data from 1998-today. Still, our EPRN application will support the work on the Danish aspect of the overall research endeavor involved in our proposal.

Access to these US data will be through an agreement between the Centers for Medicare and Medicaid Services and the NBER, where Itzik Fadlon is a Faculty Research Fellow. These data contain about 13 million patients for whom we will observe detailed information on all Medicare claims for in- and outpatient care, and physician services. We also observe demographic characteristics for each patient, including age, gender, race, and zip code of residence. For these purposes we have teamed up with Jessica Van Parys.

Potential publications and expected output

Since the project requires data purchases as well as preparation, construction, and analysis of massive administrative datasets in Denmark and in coordination with studies of the US, our research plan spans two years starting in the fall of 2016. We expect the analyses on Danish data could suit a good field journal in health economics. We anticipate having a working paper ready on Danish data by the end of 2017.

Budget:

We apply for 348.688 DKK (including overhead) for three purposes: 1) wages for the projects' primary investigators, 2) additional data purchases, 3) travel funds for the authors enabling us to spend an annual working week in either Copenhagen or San Diego.

Salaries

| | | | |
|----------------------|------------|------------|--------------------|
| Torben Heien Nielsen | 1 month | 1,5 month | |
| | 42.250 kr. | 64.629 kr. | 106.879 kr. |
| Itzik Fadlon | 1 month | 1,5 month | |
| | 42.250 kr. | 64.629 kr. | 106.879 kr. |

Travel expenses (One annual stay of coauthors in US or DK)

| | | | |
|---------------------|------------|------------|-------------------|
| Flight tickets | 11.000 kr. | 11.000 kr. | 22.000 kr. |
| Hotel (five nights) | 5.000 kr. | 5.000 kr. | 10.000 kr. |
| Travel expenses | 2.385 kr. | 2.430 kr. | 4.815 kr. |

| | | | |
|-----------------------|------------|--|-------------------|
| Data Purchases | 40.000 kr. | | 40.000 kr. |
|-----------------------|------------|--|-------------------|

| | | | |
|-------|--|--|--------------------|
| Total | | | 290.573 kr. |
|-------|--|--|--------------------|

| | | | |
|----------------------|-----|--|--|
| EPRN overhead factor | 1,2 | | |
|----------------------|-----|--|--|

Total Application

| | | | |
|---------------|--|--|--------------------|
| Amount | | | 348.688 kr. |
|---------------|--|--|--------------------|

| | | | |
|------------------------------|------------|------------|--|
| VIP Salary Rates | 42.250 kr. | 43.086 kr. | |
| Travel per diem expense rate | 477 kr. | 486 kr. | |

Research Team and Bios:

Torben Heien Nielsen and Itzik Fadlon are the leading investigators whom we are applying research funding for. The projects will be carried out with co-investigator Jessica Van Parys.

Torben Heien Nielsen is EPRU member and an Assistant Professor in the Department of Economics at the University of Copenhagen. His research centers at understanding behavioral responses to public policy and family events over the life cycle. He received his Ph.D. in Economics from the University of Copenhagen in June 2012 and has already published in top outlets such as *The Quarterly Journal of Economics*, *American Economic Journal: Applied Economics* and *Health Economics* as well as numerous book chapters and commissioned reports. At the University of Copenhagen, he has played a significant role in developing the economics department's research field of health economics, not only by teaching health economics courses both at the economics and the public health departments, but also as a Ph.D. advisor and as a core member of Centre for Health Economics and Policy.

Itzik Fadlon is an assistant professor at the University of California, San Diego and a Faculty Research Fellow in the program on aging at the National Bureau of Economic Research. His primary fields of interest are public finance, health economics, and labor economics. His research to date applies rigorous theory in analyzing the behavior of households, firms, and the social planner, and quasi-experimental research designs that use newly available administrative data on labor market behavior and health outcomes. Itzik has a special interest in addressing issues of health and retirement as they affect households and translate into the design of optimal social policies.

Itzik received his Ph.D. in economics from Harvard University in May 2015. His dissertation, titled "Essays on Retirement, Savings, and Health", was awarded the Outstanding Doctoral Dissertation prize by the National Tax Association (NTA). After receiving his Ph.D., Itzik spent a year as a Postdoctoral Fellow in Disability Policy Research at the National Bureau of Economic Research.

Jessica Van Parys is an assistant professor at Department of Economics and Accounting, Hunter College, CUNY. She graduated with a Ph.D. from Columbia University in 2015 after which she spent a year as a Research Associate at The Dartmouth Institute for Health Policy and Clinical Practice. She specializes in health-care research and public policy. Her research uses applied microeconomics methods to study topics in health economics, education economics, and political economy. Her current research focuses on how health-care providers decide to treat their patients. It is part of a growing literature in health economics that identifies inefficiencies in the health-care system by identifying inefficiencies in how providers treat patients.

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