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Is the quest for efficiency harmful to health equity? An examination of the health efficiency-equity nexus in OECD countries over the past two decades

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ABSTRACT

Background: Has the quest for efficiency in OECD health systems impacted the social gradient of health? We examined the cross-dynamics of the health system equity-efficiency nexus among OECD countries in the past two decades.

Methods: We used a three-step methodology based on annual macro-level data from 36 OECD countries for the period 2004–2021. First, we estimated the efficiency of health systems using a stochastic frontier analysis. We then assessed the equity of health systems using simple measures of income-related inequality in self-assessed health. Lastly, we estimated the dynamic relationship between health system efficiency and equity using a panel Granger causality analysis. We also stratified the analysis by type of health system: *viz.* publicly- vs. privately-dominated health service provision.

Findings: We find evidence for a bidirectional causality between health system efficiency and equity. An increase in health system efficiency leads to an increase in socioeconomic inequalities in health; a result particularly salient in countries with predominantly private health service provision. Interestingly, decreases in socio-economic inequalities in health are likely to lead to higher health system efficiency, especially in countries where the health system relies predominantly on public provision.

Interpretation: The pursuit of efficiency gains in OECD health systems has not been a precondition for socio-economic equity in health. Adverse effects of efficiency-seeking interventions on health equity are particularly apparent in the private provision of healthcare. However, addressing health inequalities provides a plausible route to enhance efficiency.

1. Introduction

In developed democratic nations, governments are increasingly compelled to reallocate their constrained budgets among multiple competing social and environmental priorities. This imperative to achieve greater allocative and technical efficiency pervades all aspects of social spending, including health spending which is sometimes deemed to be too high by some policymakers (Aaron and Ginsburg, 2009). Public authorities are in pursuit of enhancing efficiency and containing costs within the health systems. However, the efficiency gains can be at the expense of equity in health. There is a prevailing concern that the quest for efficiency may disproportionately burden the socially vulnerable groups of the population (Horton, 2006). This article aims to empirically investigate the impact of enhancing budgetary constraints on the social gradient of health. To this end, we employ panel data on a sample of OECD countries for the period 2004–2021. One of the major challenges of the empirical approach undertaken in this paper is the potential presence of reverse causality; i.e., the bidirectional relationship between

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the observed socio-economic inequalities in health and the efficiency of the health system (Paul et al., 2022). We, therefore, examined the cross-dynamics of the equity-efficiency nexus to assess whether (i) efficiency in the health system exacerbates health inequality, and (ii) whether health inequality affects the efficiency of the health system. To answer these questions, we adopted a three-step empirical strategy. First, we conducted a stochastic frontier analysis (SFA) to estimate and rank the efficiency of OECD countries' health systems. Secondly, we assessed the equity of the health systems using the available data on income-related inequality in self-assessed health (SAH). Lastly, we estimated and tested the dynamic relationship between efficiency and equity using Granger-type causality analysis in heterogeneous panel-data models.

Our empirical results confirm the above conjecture about the presence of a bidirectional trade-off between efficiency and equity. Interestingly, the estimated efficiency-equity trade-off is found to be salient in private health systems as compared with publicly-led systems. The remainder of this paper is organized as follows. The next section (Section 2) presents the methods and the datasets used in the analysis. Section 3 presents the results, and Section 4 discusses the main findings and concludes.

2. Materials and methods

We used annual data on 36 OECD countries for the period 2004–2021. Our sample includes all OECD member countries (except for Colombia and Costa Rica, which joined the OECD in 2020 and 2021, respectively). The definitions and sources of all variables used in the present analysis are provided in the Supplementary Material (Appendix p 2). Missing data, which represented only 4 % of observations in the database, were imputed by linear interpolation on a logarithmic scale.

We implemented a three-step method. Firstly, we estimated the efficiency of countries' health systems using SFA for panel data spanning from 2004 to 2021. We employed a maximum-likelihood random-effects time-varying inefficiency effects model (Battese and Coelli, 1995). The dependent variable was the log of life expectancy at birth. To investigate the factors associated with the inefficiencies in health systems, we fitted a conditional mean model where the mean of the truncated normal distribution is expressed as a linear function of the log of GDP per capita, the share of public health expenditures, and the share of out-of-pocket expenditures. The input variables in the frontier function included the log of health expenditure per capita, the log of alcohol consumption, obesity prevalence, and the log of years of schooling along with its squared term. This model jointly estimated the frontier function and the correlates of health system inefficiencies. We then provided country-level estimates of (technical) health system efficiency (expressed in percentage) (Kumbhakar and Lovell, 2000), as well as the ranking of countries in terms of health system efficiency for each year.

Secondly, we estimated the equity of OECD health systems as proxied by the income-related inequality in SAH. Given that only grouped data for SAH were made available by socioeconomic status (SES), we opted for a simple measure of inequality that involves comparing the ratio of persons who reported 'good/very good SAH' in the highest income quintile to those who reported the same SAH in the lowest income quintile (Mackenbach and Kunst, 1997). In a sensitivity analysis, we also used the relative ratio (defined as the difference in the proportion of persons who reported their health to be 'good/very good' between the highest and the lowest income quintile relative to the mean) as a measure of socioeconomic inequality in health. Complete annual data were only available for the period 2008–2021 and for 26 countries (i.e., all countries except Australia, Chile, Iceland, Italy, Japan, Korea, Mexico, New Zealand, Norway, and the United Kingdom).

Thirdly, we estimated the dynamic relationship between the health system efficiency (estimated in step 1) and equity (estimated in step 2). Our econometric analysis of the joint dynamics of health system efficiency and equity is based on the concept of "Granger causality": a variable X "Granger-causes" a variable Y if accounting for past values of X enables better predictions of Y than using solely past values of Y, other things being equal (Granger, 1969, 1988).

We used the Juodis, Karavias, and Sarafidis (JKS) test, which is one of the most recently developed Granger non-causality tests for panel data (Juodis et al., 2021). The JKS test has advantages over other tests for heterogeneous panels with many cross-sectional units and a moderate time dimension, as it allows for both cross-sectional dependence (when the outcomes in one country also depend on the outcomes in other countries in the sample, due for instance to spillover effects or common shocks) and cross-sectional heterogeneity (when the autoregressive parameters are not the same for each country, or said differently, when the outcome dynamics vary across countries).

Specifically, we performed the half-panel jackknife (HPJ) Wald-type test for Granger non-causality in heterogeneous panel-data models (Xiao et al., 2023), which implements the testing approach developed by Juodis et al. (2021). Given the presence of cross-sectional dependence in our data, we used cross-sectional heteroscedasticity-robust standard errors and no variance degrees-of-freedom correction. The lag-length selection was based on the Bayesian information criterion (BIC) up to four lags.

Our causality analysis enables us to estimate and test the dynamic relationship between efficiency and equity. More specifically, we test whether past values of efficiency contain information that helps to predict equity, and vice versa. The null hypothesis is that efficiency (equity) does not Granger-cause equity (efficiency). The alternative hypothesis is that efficiency (equity) does Granger-cause equity (efficiency) for at least one country.

The analysis was performed for the 2008–2021 period, on the panel of 26 countries for which data were available. We, then, stratified the analysis to estimate distinct parameters for two different types of health systems: the publicly-led systems and the predominantly-private health systems. We have relied on the OECD health system classification proposed by Böhm et al. (2013), supplemented by the latest available OECD Country Health Profiles (Organisation for Economic Co-operation and Development, 2023) (see Appendix p 3 for the list of countries according to this classification).

Analyses were performed using Stata version 16.1.

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3. Results

Descriptive statistics for the year 2021 are provided in Appendix p 4. In what follows, we focus on the main empirical results.

3.1. Stochastic frontier analysis of the health system efficiency

Maximum likelihood estimates of the parameters of the stochastic frontier and technical inefficiency models are provided in Appendix p 5. The variance parameter is positive and significant ($\lambda = 0.538$), indicating substantial inefficiency effects in the production of health output among the OECD countries. In the frontier function, health outcome – as proxied by life expectancy at birth – is found to be positively associated with health expenditure per capita and years of schooling (with a concave relationship indicating diminishing returns of schooling on life expectancy), and negatively associated with health-risk factors (alcohol consumption and obesity prevalence). The health system inefficiencies are negatively associated with the GDP per capita, and positively associated with both the share of public health expenditures and the share of out-of-pocket expenditures in total health expenditures.

Table 1 shows the ranking of the OECD countries' health systems in terms of efficiency (in 2021). Accordingly, Ireland ranks best while Mexico exhibits the lowest level of efficiency. The country ranking in 2005 (i.e., the first year for which we used a dynamic model with a

Table 1
Health system efficiency: Country ranking in 2021.

Country ranking	Country	Health system efficiency (in %)
1	Ireland	99.91
2	Luxembourg	99.91
3	Australia	99.88
4	Switzerland	99.88
5	Canada	99.85
6	Slovenia	99.82
7	New Zealand	99.79
8	Israel	99.79
9	Austria	99.78
10	Netherlands	99.77
11	Korea	99.76
12	Belgium	99.73
13	France	99.73
14	Norway	99.72
15	Finland	99.71
16	Denmark	99.71
17	United States	99.70
18	Iceland	99.70
19	Germany	99.68
20	Spain	99.64
21	Sweden	99.64
22	United Kingdom	99.62
23	Portugal	99.47
24	Japan	99.45
25	Italy	99.39
26	Poland	99.15
27	Czech Republic	98.62
28	Estonia	98.47
29	Chile	98.18
30	Greece	98.14
31	Lithuania	97.75
32	Turkey	97.68
33	Latvia	97.43
34	Hungary	97.42
35	Slovak Republic	96.75
36	Mexico	95.96

lagged dependent variable) is provided in Appendix p 6. It is worth noting that our ranking of countries is quite similar to that previously published elsewhere for OECD countries (Ngami and Ventelou, 2023). The US ranked highest in terms of efficiency as per the country ranking in 2005 (the first observation period), but dropped to the median tier of the sample in the final ranking of 2021 (17 out of 36 countries). This good ranking in 2005 might appear surprising. A possible explanation might pertain to the way health system efficiency is measured. The SFA model measures technical efficiency, that is, the highest level of output (in our case, life expectancy) that OECD countries can achieve given a set of inputs. The input variables include not only variables related to health care expenditures, but also the prevalence of risk factors in the general population. In 2005, life expectancy at birth in the US was 77.6 years, ranking it in the bottom third of OECD countries, even though the US had the highest level of health expenditure per capita ($6433). At the same time, the US had a relatively high prevalence of risk factors, especially obesity prevalence, which was the highest in the sample (29 %). Therefore, the US might have exhibited the highest level of efficiency in 2005 because it achieved a relatively long life expectancy despite a high risk factor prevalence.

3.2. *Measurement of health system equity*

In terms of health equity (as measured by the ratio of SAH of the highest to the lowest income quintile), in 2021, New Zealand ranks the best (with a ratio of 1.061), followed by Greece and Luxembourg (with a ratio of 1.077–1.087, respectively), while Lithuania, Latvia and Estonia rank the lowest (with the highest income quintile reporting good SAH at twice that of the lowest income quintile). Fig. 1 displays the country-level cross-dynamics of the health system SES inequality and efficiency. No clear trend emerges regarding SES inequality in health, with large between- and within-country heterogeneity. We observe an increasing trend in health system efficiency for each country, albeit at varying rates depending on their initial efficiency level.

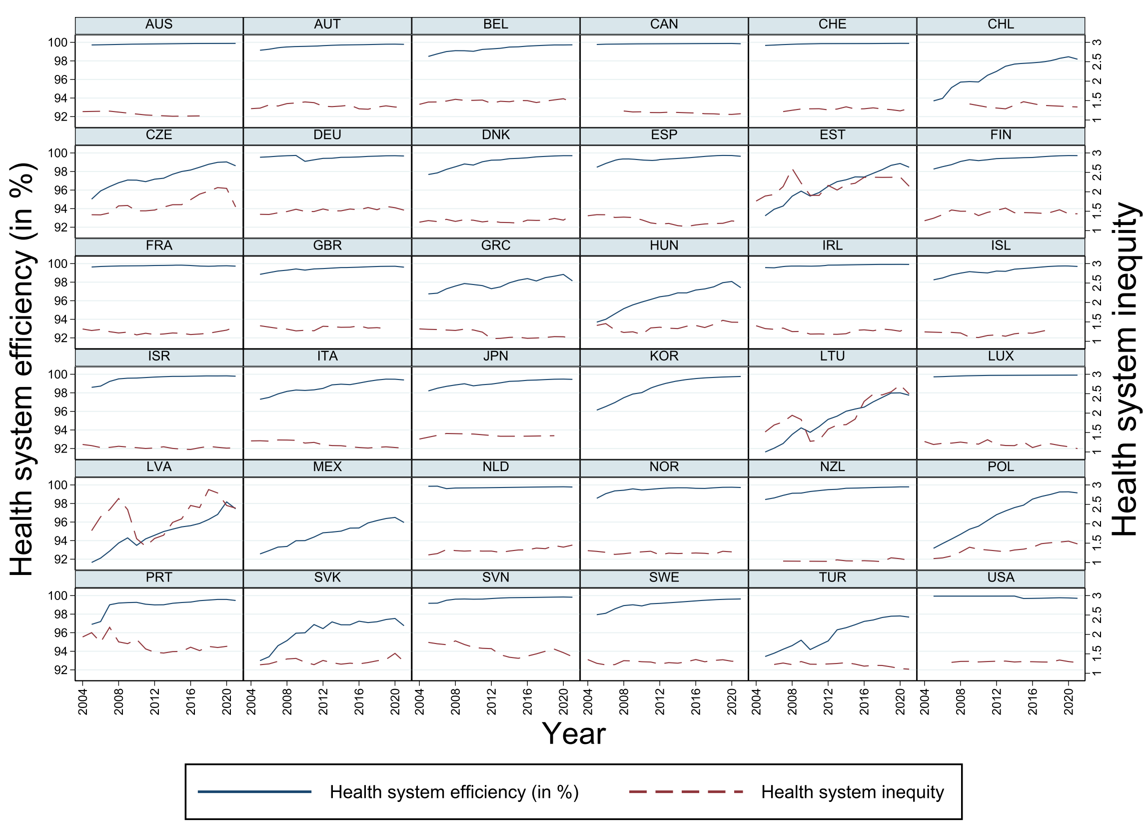

Fig. 1. Cross-dynamics of health system efficiency (performance) and inequity (income-related inequality in self-assessed health) for the period 2004–2021.

3.3. The dynamic relationship between health system efficiency and equity

The results of the Granger non-causality analysis are presented in Table 2. Across all models, the optimal number of lags according to the BIC is 1. The results for the whole sample of 26 OECD countries reveal a bidirectional causality between the health system efficiency and inequality in health. The null hypothesis that the health system efficiency does not Granger-cause SES inequality, and conversely that SES inequality does not Granger-cause efficiency, is rejected ($p < 0.001$). This suggests that past values of efficiency contain information that improves the prediction of inequality, and vice versa.

When looking at the direction of causality, results show a positive effect of efficiency on inequality and a negative effect of inequality on efficiency. This means that (i) an increase in the health system efficiency leads to an increase in SES inequalities in health, while (ii) an increase in SES inequalities in health leads to a decrease in the health system efficiency. These findings were confirmed in the sensitivity analysis using the relative ratio as a measure of socioeconomic inequality in health (see Appendix p 7).

By stratifying the analysis by type of health service provision (public vs. private), results confirmed that a rise in health inequality always leads to a decrease in health system efficiency, regardless of whether public or private actors are the dominant actors of health service provision. However, we find evidence for a causal relationship between higher efficiency and higher inequality in predominantly private health systems only. Such a result does not hold when healthcare services are mainly provided by the public sector (i.e., we cannot reject the null hypothesis that efficiency does not cause inequality).

4. Discussion

4.1. Evidence on the health efficiency-equity nexus

There exists a traditional body of literature that explores the 'equity-efficiency' debate (Le Grand, 1990; Okun, 2015), which is closely tied to normative welfarism and the two versions of social justice – egalitarian and Rawlsian. Our approach to this subject is empirical and agnostic. The recent availability of data on health systems has enabled us to compare and correlate trends in efficiency and health inequalities across various countries and periods. Our methodology aligns closely with a recent study that estimated the relationship between efficiency (with a focus on child mortality) and equity (proxied by a universal health coverage index) in developing nations (Paul et al., 2022). Our study indicates that OECD countries with increasingly efficient health systems are more susceptible to health inequities; this is particularly evident when healthcare services are provided by the private sector. We also find evidence that socio-economic inequities in health can undermine the efficiency of health systems.

Two noteworthy observations emerge from our analyses. First, results indicate that improving the efficiency of the health system can jeopardize health equity. However, when considering the reverse direction, health inequalities are found to be statistically detrimental to the efficiency of health systems. This suggests that addressing health inequalities first provides a plausible route to enhance health system efficiency. Second, the observed efficiency-equity tradeoff appears to be rather large when the health system relies predominantly on private provision. Although such observation corroborates previous findings (Goodair and Reeves, 2022; Tudor Hart, 1971), our study is the first to validate this result on a large multi-country scale.

We believe it is important to elaborate on the concept of health system efficiency and clarify what we are measuring in our empirical exercise. We acknowledge the broader scope of the term "health system" compared to "healthcare system" or "healthcare sector." While the former encompasses a wide range of factors that influence health outcomes both directly and indirectly, the latter refers more narrowly to the components directly involved in the technical input-output functions of healthcare delivery. We argue that examining the equity-efficiency nexus in health across countries requires this broader perspective, as it allows for the consideration of wider determinants of health.

Our measure of efficiency, which uses life expectancy as the outcome, not only aggregates the health determinants linked to the health system but may also incorporate broader, societal determinants of health. Nevertheless, we also conducted a sensitivity analysis using life expectancy at age 60 years instead of life expectancy at birth, as the former is an outcome on which health systems are likely to have a more direct impact. Results of the SFA analysis, shown in Table 3, remain qualitatively similar, including the ranking of health systems according

Table 2
Granger non-causality analysis (Health system efficiency ↔ Social inequalities in health).

Sample		Direction of causality	Optimal lag length	Coefficient	Significance of the JKS non-causality test
Whole sample		Efficiency → Inequality	1	0.133	0.000
		Inequality → Efficiency	1	−0.524	0.000
By type of health system in terms of service provision	**State**	Efficiency ↛ Inequality	1	0.046	0.428
		Inequality → Efficiency	1	−0.565	0.000
	Private actors	Efficiency → Inequality	1	0.153	0.000
		Inequality → Efficiency	1	−0.455	0.001

Notes: The whole sample includes 26 OECD countries with complete annual data for the period 2008–2021. Cross-sectional heteroskedasticity-robust variance estimation. No degrees-of-freedom correction in the variance estimator. JKS: Juodis et al. (2021) Granger non-causality test.

Table 3
Granger non-causality analysis: Health system efficiency ↔ Social inequalities in health (using life expectancy at age 60 years as the outcome in the measurement of efficiency).

Sample		Direction of causality	Optimal lag length	Coefficient	Significance of the JKS non-causality test
Whole sample		Efficiency → Inequality	1	0.070	0.000
		Inequality ↛ Efficiency	1	−0.434	0.416
By type of health system in terms of service provision	**State**	Efficiency → Inequality	1	0.056	0.067
		Inequality → Efficiency	1	−0.981	0.000
	Private actors	Efficiency → Inequality	1	0.079	0.000
		Inequality ↛ Efficiency	1	−0.115	0.855

Notes: The whole sample includes 26 OECD countries with complete annual data for the period 2008–2021. Cross-sectional heteroskedasticity-robust variance estimation. No degrees-of-freedom correction in the variance estimator. JKS: Juodis et al. (2021) Granger non-causality test.

to their level of efficiency (with only minor differences, as shown in Appendix p 8 for the regression results, and p 9 and 10 for the country rankings in 2005 and 2021, respectively). The main results of the causality analysis are also consistent with those using life expectancy at birth as an outcome measure for efficiency, as shown in Table 3: Efficiency gains in health systems are likely to generate inequality. While this is particularly salient for health systems with privately-led service provision, this is also the case for publicly-led health systems, yet to a lesser magnitude and significance ($\beta = 0.056$, $p = 0.067$). Interestingly, our findings suggest a causal relationship between higher inequality and lower efficiency only in predominantly public health systems ($\beta = -0.981$, $p < 0.001$), probably because inequality is an overarching goal for such systems, while this is not necessarily the case for health systems that rely predominantly on private provision.

4.2. Possible underlying mechanisms

While our results suggest that a two-way causal relationship exists between efficiency and inequality, we could not investigate the microeconomic mechanisms through which each one affects the other. Several mechanisms might be at play. In France (which ranks 13/36 in terms of efficiency as per our results), the persisting inequality in health stems partly from the unequal access to healthcare services; specifically, the unequal distribution of primary care physicians (Nay et al., 2016), which is further exacerbated by a deliberate rarefaction of qualified doctors (the *numerus clausus*, organized to control healthcare spending in the 1990s) (Dumesnil et al., 2024). This problem of socio-spatial inequality in the distribution of healthcare, together with an ethnographic analysis of those affected (Morel, 2019), suggests a concrete mechanism through which improving the efficiency of health systems can worsen health inequality. Other countries show a similar pattern. For instance, in Chile, although universal health coverage has improved access to healthcare, the persisting fragmentation of the health system still makes access to healthcare cumbersome (González-Agüero et al., 2020).

Generally, in the private sector, the search for provider efficiency is achieved through specific incentive systems (performance-based contracting: Diagnosis-Related Group (DRG)-based payment for inpatient care, Pay-for-Performance (P4P) in the outpatient setting) that, as an unintended effect, could penalize access to care for low-income groups and minorities (Gilman et al., 2015; Karve et al., 2008; Milstein and Schreyoegg, 2016). For example, the waves of hospital closures following the implementation of a stricter payment system have been shown to generate price increases and/or geographical unevenness in care access (Cooper et al., 2019; Dafny et al., 2019; Goodair and Reeves, 2022).

Another mechanism through which efficiency affects equity is the implementation of user fees, which was viewed as a way to combat wasteful spending (the customer-payer would be more reasonable), but has exacerbated inequality in health and access to healthcare (Oster, 1995). A user-fee policy necessarily increases the risk of unequal treatment, as the ability to afford co-payments is unequally distributed across the socioeconomic spectrum. Our study, although not specific to user fees, contributes to the growing evidence against co-payments in healthcare.

Although the analysis undertaken in this study employed the available data and state-of-the-art methods, some practical limitations must be acknowledged. When measuring health inequality, we relied on SAH and the ratio of the highest to the lowest income quintiles. There are two problems with this measurement. First, SAH is subjective and may not perfectly reflect the true health status. Second, data on SAH were only available at the aggregate level for the two extreme income quintiles, which prevents us from accounting for the full spectrum of the health distribution across all income groups (Mackenbach and Kunst, 1997). Future research may better employ disaggregated data on objective measures of health, such as clinical morbidity.

5. Conclusions

Economic orthodoxy holds that efficiency must precede equity. Our findings, however, show that the pursuit of efficiency generates an increase in inequalities in health, especially where health service provision is dominated by the private sector. In OECD countries that have already achieved very high levels of efficiency, it seems more difficult to implement equity-enhancing policies with privately-led health service provision.

CRediT authorship contribution statement

Marwân-al-Qays Bousmah: Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Mohammad Abu-Zaineh:** Writing – review & editing, Writing – original draft. **Simon Combes:** Writing – review & editing, Writing – original draft. **Bruno Ventelou:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

Data sharing statement

All data used in this paper are publicly available (see Appendix p 2 for the source of all variables used).

Ethical statement

No ethical approval was needed for this study as it involved the analysis of publicly available country-level data gathered from the OECD, UNDP, and WHO. No primary data collection was undertaken.

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Declaration of competing interest

All authors report no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2025.118379.

Data availability

All data used in this paper are publicly available (see Appendix p 2 for the source of all variables used).

References

Aaron, H.J., Ginsburg, P.B., 2009. Is health spending excessive? If so, what can we do about it? Health Aff. 28, 1260–1275. https://doi.org/10.1377/hlthaff.28.5.1260.
Battese, G.E., Coelli, T.J., 1995. A model for technical inefficiency effects in a stochastic frontier production function for panel data. Empir. Econ. 20, 325–332. https://doi.org/10.1007/BF01205442.
Böhm, K., Schmid, A., Götze, R., Landwehr, C., Rothgang, H., 2013. Five types of OECD healthcare systems: empirical results of a deductive classification. Health Policy 113, 258–269. https://doi.org/10.1016/j.healthpol.2013.09.003.
Cooper, Z., Craig, S.V., Gaynor, M., Van Reenen, J., 2019. The price ain't right? Hospital prices and health spending on the privately insured. Q. J. Econ. 134, 51–107. https://doi.org/10.1093/qje/qjy020.
Dafny, L., Ho, K., Lee, R.S., 2019. The price effects of cross-market mergers: theory and evidence from the hospital industry. Rand J. Econ. 50, 286–325. https://doi.org/10.1111/1756-2171.12270.
Dumesnil, H., Lutaud, R., Bellon-Curutchet, J., Deffontaines, A., Verger, P., 2024. Dealing with the doctor shortage: a qualitative study exploring French general practitioners'

lived experiences, difficulties, and adaptive behaviours. Fam Pract cmae017. https://doi.org/10.1093/fampra/cmae017.

Gilman, M., Adams, E.K., Hockenberry, J.M., Milstein, A.S., Wilson, I.B., Becker, E.R., 2015. Safety-net hospitals more likely than other hospitals to fare poorly under Medicare's value-based purchasing. Health Aff. 34, 398–405. https://doi.org/10.1377/hlthaff.2014.1059.

González-Agüero, M., Chenhall, R., Basnayake, P., Vaughan, C., 2020. Inequalities in the age of universal health coverage: young Chileans with diabetes negotiating for their right to health. Med. Anthropol. Q. 34, 210–226. https://doi.org/10.1111/maq.12555.

Goodair, B., Reeves, A., 2022. Outsourcing health-care services to the private sector and treatable mortality rates in England, 2013-20: an observational study of NHS privatisation. Lancet Public Health 7, e638–e646. https://doi.org/10.1016/S2468-2667(22)00133-5.

Granger, C.W.J., 1988. Some recent development in a concept of causality. J. Econom. 39, 199–211. https://doi.org/10.1016/0304-4076(88)90045-0.

Granger, C.W.J., 1969. Investigating causal relations by econometric models and cross-spectral methods. Econometrica 37, 424–438. https://doi.org/10.2307/1912791.

Horton, S., 2006. The double burden on safety net providers: placing health disparities in the context of the privatization of health care in the US. Soc. Sci. Med. 63, 2702–2714. https://doi.org/10.1016/j.socscimed.2006.07.003.

Juodis, A., Karavias, Y., Sarafidis, V., 2021. A homogeneous approach to testing for granger non-causality in heterogeneous panels. Empir. Econ. 60, 93–112. https://doi.org/10.1007/s00181-020-01970-9.

Karve, A.M., Ou, F.-S., Lytle, B.L., Peterson, E.D., 2008. Potential unintended financial consequences of pay-for-performance on the quality of care for minority patients. Am. Heart J. 155, 571–576. https://doi.org/10.1016/j.ahj.2007.10.043.

Kumbhakar, S.C., Lovell, C.A.K., 2000. Stochastic Frontier Analysis. Cambridge University Press, Cambridge.

Le Grand, J., 1990. Equity versus efficiency: the elusive trade-off. Ethics 100, 554–568. https://doi.org/10.1086/293210.

Mackenbach, J.P., Kunst, A.E., 1997. Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe. Soc. Sci. Med. 44, 757–771. https://doi.org/10.1016/s0277-9536(96)00073-1.

Milstein, R., Schreyoegg, J., 2016. Pay for performance in the inpatient sector: a review of 34 P4P programs in 14 OECD countries. Health Policy 120, 1125–1140. https://doi.org/10.1016/j.healthpol.2016.08.009.

Morel, S., 2019. Inequality and discrimination in access to urgent care in France ethnographies of three healthcare structures and their audiences. Soc. Sci. Med. 232, 25–32. https://doi.org/10.1016/j.socscimed.2019.04.028.

Nay, O., Béjean, S., Benamouzig, D., Bergeron, H., Castel, P., Ventelou, B., 2016. Achieving universal health coverage in France: policy reforms and the challenge of inequalities. Lancet 387, 2236–2249. https://doi.org/10.1016/S0140-6736(16)00580-8.

Ngami, A., Ventelou, B., 2023. Respective healthcare system performances taking into account environmental quality: what are the re-rankings for OECD countries? Health Res. Pol. Syst. 21, 57. https://doi.org/10.1186/s12961-023-01005-6.

Okun, A.M., 2015. Equality and Efficiency: the Big Tradeoff. Brookings Institution Press.

Organisation for Economic Co-operation and Development, 2023. OECD Country Health Profiles 2023. OECD, Paris, France.

Oster, S.M., 1995. Strategic Management for Nonprofit Organizations: Theory and Cases. Oxford University Press.

Paul, P., Nguemdjo, U., Ngami, A., Kovtun, N., Ventelou, B., 2022. Do efficiency and equity move together? cross-dynamics of health system performance and universal health coverage. Humanit. Soc. Sci. Commun. 9, 1–8. https://doi.org/10.1057/s41599-022-01271-9.

Tudor Hart, J., 1971. The inverse care law. Lancet 1, 405–412. https://doi.org/10.1016/s0140-6736(71)92410-x.

Xiao, J., Karavias, Y., Juodis, A., Sarafidis, V., Ditzen, J., 2023. Improved tests for granger noncasuality in panel data. STATA J. 23, 230–242. https://doi.org/10.1177/1536867X231162034.