

Why is there such a gap between health expenditures and outcomes in Norway compared to Finland?

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ABSTRACT

According to the OECD Norway spends 47% more on health care per capita compared to Finland and about 30% more than the other Nordic countries. At the same time indicators of health status show that Norway is not better on important indicators of health. This raises the question of why there is such a gap between spending and outcome in Norway compared to the other Nordic countries. This paper lists a number of possible explanations and quantifies their importance. The conclusion is that higher wages may explain up to 38% of the difference between Norway and Finland and differences in staff levels explain about 25%. Data errors are difficult to quantify, but the data on in long term care suggests that it accounts for at least 20% of the difference. Diminishing or zero marginal return is a controversial explanation for the lack of difference in outcomes despite higher spending and a brief review of the literature shows conflicting evidence. Finally, the last section argue that a convincing explanation of the growth of health spending should be based on a model that takes into account the fact that health care to a large extent is provided outside the free-market and that people seems to have special moral intuitions when it comes to the provision of health services as opposed to many other goods.

Why is there such a gap between health expenditures and outcomes in Norway compared to the other Nordic countries?

1. Introduction

According to data from the OECD, Finland spent only about half as much as Norway on health care per capita in 2005 (see Figure 1). At the same time Finland did not do dramatically worse than Norway on several measures of health, and on some they did better (lower infant mortality, higher breast cancer survival rate, see Table 1). Finland may be the most extreme example, but the same is true more generally: Data from OECD seems to indicate that the relationship between health expenditure and outcome is not simply that “higher expenditure equals better outcome.” The current paper starts from this simple observation and the puzzle it creates: Why is there such a gap between expenditures and outcomes?

In order to answer the question, I will first provide an overview of possible explanations that have been mentioned in the literature. I will then focus on four of these explanations in more detail: Data problems, wage levels, and staff levels, and diminishing or zero marginal return to health investments. Finally, I will discuss some of the problems that must be solved in order to make further progress on the issue. Although mainly descriptive, I will argue that in order to make progress we need not only better data, but also a better theoretical foundation for comparisons at the macro level. Explanations of the growth of the sector should be based on two facts. First, that decisions about demand and supply in the sector often is governed by political processes and not free market demand and supply. Second, that the preferences underlying choices in this political process often have special properties which include paternalism, altruism and a demonstration of solidarity.

Figure 1: Total health expenditure per capita in OECD countries in 2005

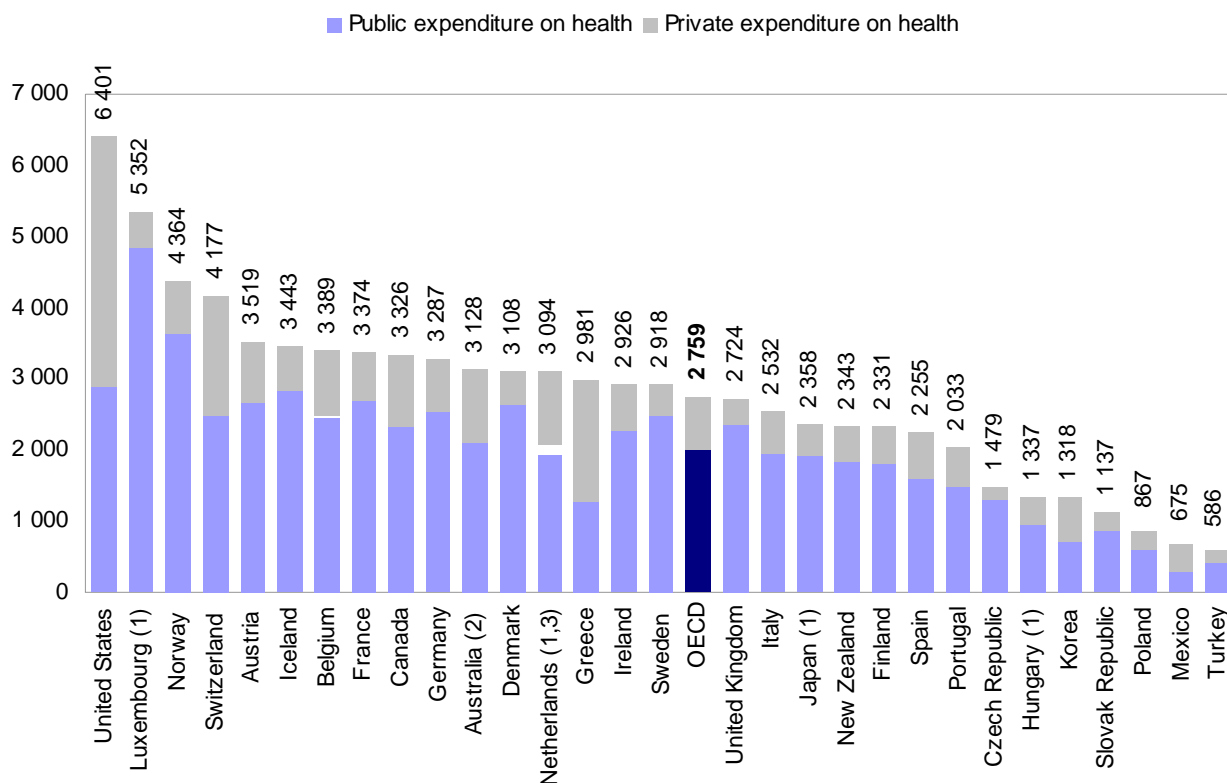


Table 1: Health expenditure per capita and health outcomes in Norway and some OECD countries (red = better than Norway)

	Expenditure	% less than Norway	Life expectancy	Infant mortality	Breast cancer survival rate	AMI mortality rate
Finland	2331	-47 %	78,9	3,0	88,4	11,1
United Kingdom	2724	-38 %	79,0	5,1	80,0	11,8
Sweden	2918	-33 %	80,6	2,4	87,0	8,3
Denmark	3108	-29 %	77,9	4,4	85,0	n/a
Germany	3287	-25 %	79,0	3,9	78,0	11,9
France	3374	-23 %	80,3	3,6	79,7	7,6
Norway	4364	0 %	80,1	3,1	82,8	8,0

* Total expendit. on health /capita, US\$ purchasing power parity 2005; ** At birth, total population, 2005; *** Infant mortality, Deaths per 1 000 live births 2005; **** Breast cancer, five year survival rate per 1000; ***** In-hospital case-fatality rates within 30 days after admission for AMI, 2005.

2. Policy relevance

International comparisons of health spending and outcomes have obvious policy relevance to the extent that they can identify factors that make one health care system more efficient than another. For instance, if the main reason Norway has a high health care cost is a high wage level, then reorganizations are unlikely to improve the situation significantly. However, if the costs are driven by high staff levels this suggests that there is scope for improvement by reorganizations or other measures to improve technical efficiency.

Although useful, there are limitations when it comes to the inferences one can draw from comparing health care systems. Countries often differ on so many variables that it becomes very difficult to assign credit for success to one factor alone. For this reason, and instead of trying to give a complete answer to the question of “which country has the best system”, this paper will use a modest approach: trying to identify some important mechanisms and evaluating some proposed explanations.

3. An overview of some explanations

There is a large body of research on why some countries seem to provide better and often cheaper health service than other countries (Häkkinen & Joumard 2007; Murray & Evans 2003, Gerdtham & Jönsson 2000). Some of the literature focuses on explaining why the US spending and outcome pattern is so different from the rest of the world (Andersson et al 2003). Possible explanations of this fact have included high administrative costs, the cost of protecting against very expensive law-suits, higher disease incidence due to lifestyle and demographic factors (e.g. obesity) and the cost of being the main inventor and early adopter of technology. Some of these explanations do not apply to Norway given the differences in the way the health system is organized. However, there are still a large number of possible explanations which have been mentioned in the debate on health care costs (see Table 2).

Table 2 Some suggested explanations for Norwegian exceptionalism

1. Data errors (measurement errors and different accounting standards)
 2. Different priorities in Norway not captured by traditional health indicators (and or a time lag)
 3. Wage and cost differences
 4. Differences in staffing levels
 5. Differences in "sickliness" (Caused by age, genes, climate, nutrition, climate)
 6. Differences in productivity
 - a. Economic efficiency (money → treatment inputs/activities)
 - b. Technical efficiency (treatment inputs → health)
 7. Disruption and administrative burden caused by reorganizations
 8. Incentives and accounting problems caused by changes in the financial system
 9. Diminishing or not marginal return to health spending
 10. High income in Norway combined with a high income elasticity for health spending
 11. High administrative costs in Norway and less than optimal staff composition
 12. The costs of operating with a decentralized hospital structure and providing health care in a large and sparsely populated area.
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It is impossible to focus on all of these in a single paper. However, one of the unifying themes in both the American and European literature, is that much of the difference might be explained by data problems. For instance, Gerdtham & Jönsson (1994) have shown how different accounting standards can produce misleading comparisons. Similarly, the differences between countries also change depending on whether the comparison is done using current exchange rates or purchasing power parity rates. Clearly then, one of the first possible responses when faced with the comparisons based on the OECD numbers is to ask to what extent the differences are real and not just an artefact of the data.

3.1 Are the differences real?

3.1.1 Sensitivity to the unit of conversion

As shown by Table 3, the difference between Norway and the other countries remain large independent of whether it is measured using in dollars using exchange rates or purchasing power parity (PPP). Using power purchasing parity to reduce the difference between Finland and Norway from 47% to 40%, but the difference is still large and in contrast to Gerdtham and Jönsson (1994) the average difference does not decrease significantly when the unit of conversion is PPP as opposed to exchange rates.

One might also ask whether the purchasing power parity adjusted sums always are a better basis for comparisons than exchange rates converted spending. Admittedly, there is little reason to expect a connection between health and a spending variable that jumps up and down because of changes in the exchange rate. Hence, if the purpose is of international comparison is to examine the link between spending and health outcomes, it seems desirable to eliminate fluctuations due to short term exchange rate variations and use purchasing power parity or some health based PPP index. However, I will still argue that the large difference based on the exchange rates is of some interest as well as the PPP adjusted differences. An interesting and relevant example is the case of buying health services abroad. Norway has debated, and to some extent implemented, a system in which they buy health services from other countries by sending patients abroad. In this perspective the interesting comparison before making a choice is based on exchange rates and not units that are adjusted for the wage and living costs of the other countries. Also, making comparisons in terms of PPP adjusted spending levels may lead us to ignore obviously important variables because PPP automatically adjusts for wages and other costs in one operation. Instead of aggregating all these adjustments under a single heading of "adjusting spending levels to make them comparable" we might gain more understanding by making the adjustment explicit and at a more detailed level. For instance by examining the extent to which differences in wages in the health care sector can explain different spending levels between countries separately from the importance of prices of pharmaceuticals.

Table 3: Sensitivity of comparisons of per capita health spending (2005) depending on whether one uses exchange rates or purchasing power parity

	Nominal measures		Percentage difference from Norwegian spending	
	Exchange rate	PPP	Exchange rate	PPP
Denmark	4513	3152	-24 %	-27 %
Finland	3164	2590	-47 %	-40 %
Iceland	5198	3304	-13 %	-23 %
Norway	5941	4301	0 %	0 %
Sweden	3713	2958	-38 %	-31 %

3.1.2 Data and measurement problems

I will argue that misleading data is an important, but not the main answer to the question of why Norway seems to be different. For instance, one problem that emerges from closer examination of the OECD data is the treatment of long term care. These expenses are typically a mix between medical and social services and this creates problems for reporting. In the OECD data the Nordic countries present very different sums in this category (see Table 4). It has previously been noted that Denmark does not include long term nursing costs, but the differences between the other countries are also large enough to justify the suspicion that they may not include all the same expenses. If we were to take the numbers seriously, they show that Norway spends about four times as much as Finland on these nursing services (long term care and in-home care). Norway reports a total spending of 1440 USD, while Finland reports 377 USD. This is a difference of 1063 USD which is about 38% of the overall difference in health care spending reported by Norway and Finland in 2005 (5941 vs. 3162, a difference of 2779 USD).

There are similar problems in other areas. For instance, in 2003 the treatment of drug addiction was transferred from the social sector to the health care system in Norway. This meant that the health budget jumped by more than 1 billion NOK, but this was just a switch from one budget to another and not a real growth in health spending. Although this only represents a small sum, less than 50 USD per capita, it illustrates the problems with comparing non-standardized expenses across countries.

Some of this may be a problem of classification, so that the spending not reported in one area will be balanced by higher expenses in another area and the errors will cancel out in the total. Some will also reflect real differences in costs and spending, but it seems likely from the numbers that there are also significant arbitrary differences caused by different traditions for what is reported as a health spending versus a social spending. It is difficult to estimate the extent to which misleading data can account for the cost differences. However, it is possible to make a suggestive though experiment. If, for instance, if we assume that the true Finnish numbers are at least half of the Norwegian spending on long term nursing and in-home nursing, then the total health care spending differences is reduced to the extent that it implies that more then 20% of the previously measured difference can be accounted for by misleading data.

Table 4: Total expenditure on long term nursing services (in-patient) and Total nursing care (home), US dollars per capita, 2005.

	<i>Long term nursing</i>	<i>In-home nursing</i>
Denmark	2	980
Finland	347	30
Iceland	992	
Norway	920	520
Sweden	153	131

Source OECD HEALTH DATA 2009, June 09

3.2 Wage differences

A frequently mentioned fact that could explain the high spending levels in Norway, is the high wage levels. The OECD Health Data contains some data that allows us to get some idea of the importance of these factors. The data include remuneration of different professions of people

working in the health care sector, both self-employed and salaried staff. There are many obvious problems also with these data, but as a starting point it is useful to take a look at the big picture.

Nurses are the largest group employed in the health care sector. In the OECD data, Norwegian salaried nurses are reported to earn about 50% more than their Finnish colleagues in 2005 (measured in dollars and using average annual exchange rates). For physicians the data are less complete and for those that exist seems to suggest that the differences between Norwegian and Finnish physicians are less than between nurses. In order to get a sense of the importance of the wage differences, it is useful to calculate how large the Norwegian spending levels would be with Finnish wages in Norway without altering the staffing levels i.e. assuming that each Norwegian nurse gets a Finnish salary. For the health sector as a whole we do not have the numbers required to do so, but for the hospital sector it is possible to get numbers that give us an idea of the relevant magnitudes.

The unadjusted per capita cost difference between the Finnish and Norwegian hospital care is 49% (1049 USD) i.e. very similar to the unadjusted difference in total health care spending (47%). We also know the density of full time equivalent hospital workers per 1000 inhabitants in Norway and Finland (20,5 vs. 15,8) and the average remuneration of hospital nurses (56 277 USD in Norway, 36 909 in Finland). Using this it is possible to calculate how hospital spending in Norway would change if we gave all the Norwegian workers a Finnish nurse salary. Doing this shows that the Norwegian per capita hospital spending would fall from 2111 to 1715 USD. In other words, out of the total difference in hospital spending between the two countries (1049), 396 (38%) would be attributed to wage differences.

This does not, of course, imply that we can blame the Norwegian spending levels on overpaid Norwegian nurses or that the data imply that the salaries of nurses should be cut. First of all the calculations are only approximate (not all hospital health workers are nurses and the wage difference between the other groups may be different) and there are as always concern about data comparability. In addition to this we know that Norwegian nurses are not exceptional. Most Norwegians earn more than their Finnish counterparts and it is the general wage and cost of living level that is behind the high wages, not a distinctly high wage for nurses. To distinguish between the general and specific contributions of high wages, we may compare wages of nurses

in the two countries as a percentage of the average annual salary of production workers. Doing so shows that Norwegian nurses still earn more than Finnish nurses, but the difference is much very small. In Norway the average nurse salary was 120% of an average production worker, while in Finland it was 117%. Giving Norwegian nurses the same relative wage as their Finnish colleagues (the same percentage of a production worker salary as in Finland) would then reduce Norwegian health spending per capita by only 1% as compared to 38% when we used absolute Finnish wages. The "excessive" wage would then only explain 2% of the total spending difference. Hence, the most important variable in the wage explanation is simply the general wage level and not excessive pay to nurses. In any case, "excessive" in this context is a normative question that positive economics cannot answer. All we can do is to quantify the importance of wages, and as shown above it turns out that this is a very large part of the explanation of why Norway seems to be spend more than Finland. It is also an explanation that fits well with the result that we do no better on most indicators of health status since this is probably more affected by the level of care and not the payment for that care. This then, turn the attention to another potentially important variable in order to explain Norwegian exceptionalism: Staffing levels.

3.3 Differences in staff levels

In addition to having higher wages, the OECD data reports that are more nurses and physicians per capita in Norway compared to Finland. However, the raw numbers illustrate some of the problems that arise when countries employ the same definitions differently. According to the OECD Norway had 44 nurses per 1000 while Finland had 8 (OECD Health 2008; The 2009 data are different with 31 vs. 10). The difference is too large to be credible and this was confirmed by collecting more information from the individuals that did the reporting to the OECD. Unlike in Finland, the Norwegian statistics include not only professional nurses, but also auxiliary nurses and other people doing "nurse-like" work. This implies that the OECD data for nurse density cannot be used. There is also some controversy surrounding the number of physicians per 1000 which is also significantly higher in Norway than in Finland (3.7 vs. 2.9), but this seems to be more reliable than the nurses since the controversy is more about the number of specialist as opposed to the number of physicians in general.

In addition to the problem of counting nurses, there is the problem of part-time work and differences in working-hours, length of holidays and overtime. This means that instead of using the number of nurses and physicians, a better point of departure is what the OECD labels "Full time equivalent" (FTE) number of individuals employed in the hospital sector. Although this does not cover the whole health sector, the numbers are comparable to the total number of people employed in the health sector. The measure does not distinguish between different professions so it cannot be used to discuss differences in the composition of the health care employment, but it can be used as a coarse point of departure which takes care of some of the other problems mentioned above. This measure - the FTE - shows that according to the OECD Norway employs significantly more labour resources in the health care sector per capita compared to Finland (20,5 vs. 15,8, i.e. 30% more in Norway than in Finland). The importance of this for total spending is indicated by the fact that if Norway had had the same level of employment as Finland, total hospital spending would be reduced from 2111 to 1849 USD (12%). The higher staff levels in Norway, if true, would then account for 262 USD (25%) of the total difference in hospital spending between Norway and Finland (1049 USD). Of course, this is once again this is more a scenario than an actual policy possibility. There may be good reasons why the staffing levels are different, there may be errors in the data and in any case the scenario may change some when it comes to the health sector as a whole. However, the numbers for the whole health and social care sector indicate that the difference in employment density between Norway and Finland is even larger here than in the hospital sector (41% difference in the health and social care sector compared to 30% difference in the hospital sector). If generalized, the staffing levels may therefore explain even more than 25% of the difference.

3.4 Summing up: Wages and prices

Figure 2 and 3 illustrates the results so far. Figure 2 shows how the Norwegian costs would change depending on whether we assume Finnish wages (absolute and relative) and/or staff levels. Assuming both Finnish wages and staff levels, leads to the conclusion that hospital costs will decrease from 2111 to 1543 USD per capita which implies that these two factors alone would account for 54% of the difference between Norway and Finland. Figure 3 illustrates the same percentages for the other factors and illustrates the extent to which they account for the cost differences between Finland and Norway in the scenarios listed above.

Figure 2: Finnish and Norwegian per capita hospital costs under different assumptions about wages and staff levels

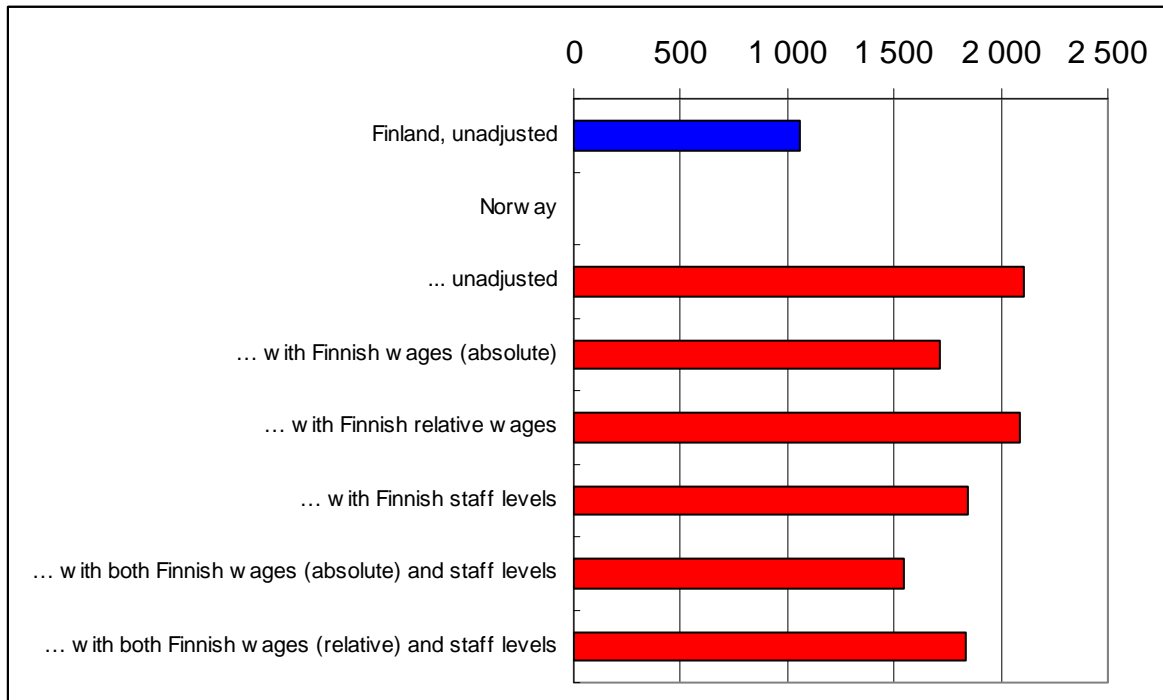
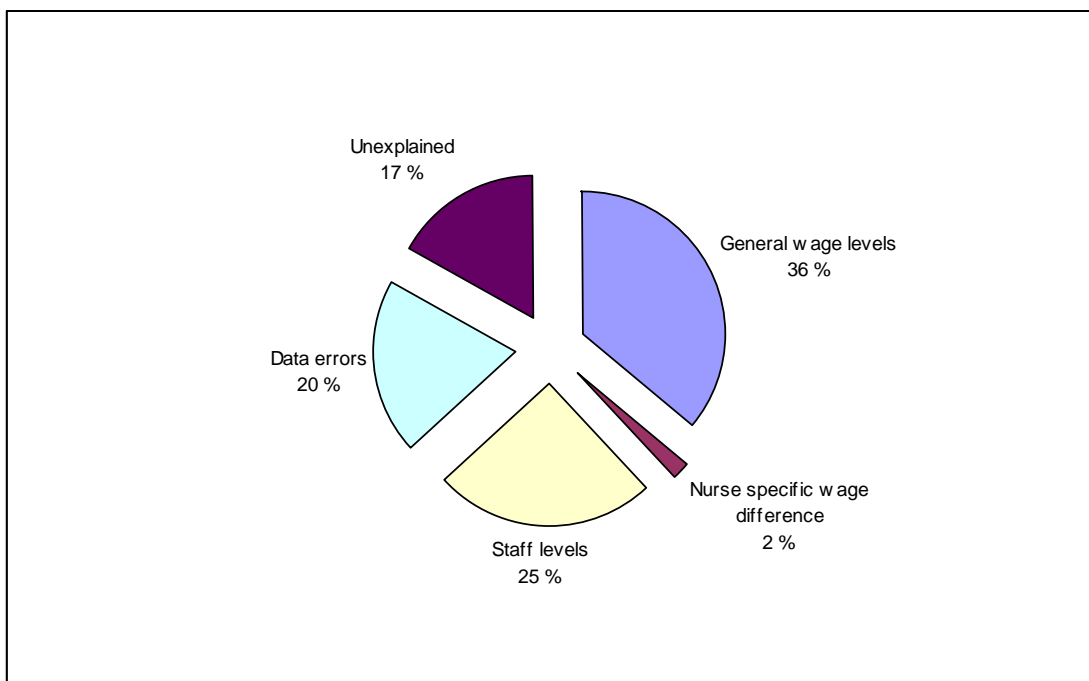


Figure 3: The extent to which the various factors explain costs differences between Norway and Finland (Scenarios)



3.5 Investments with low, no or negative return on traditional indicators

A recent report from the Norwegian Directorate for Health Affairs suggests that the reason Norway appears to get less out of its health investments than other countries is that Norway spends much money in areas not captured by traditional health output indicators. Examples include spending on nursing homes, terminally ill patients, psychiatric treatment and care, improving the situation for the disabled and individuals addicted to alcohol and illegal drugs. This argument is important not only for Norway, but for comparisons of health outcomes more generally.

The general problem is not only that countries could choose to spend money in areas not measured by traditional output indicators. It could also be that rich countries naturally tend to have a lower return because they are rich enough to give priority to expensive health treatments with a lower return. At the same time they already have a high health status from which it is more difficult to improve. In this case the return from the last few billions invested is lower than the first and the extra spending does not increase the health outcome very much. This is a common phenomenon and it may explain some of the difference between Norway and other countries.

Standard economic theory predicts that the marginal return to investment will decrease as one invests more. There is an additional and more surprising possibility that could arise in health on the aggregate level: More spending could in some cases lead to a *reduction* on the average reported level of health. This sounds paradoxical, but the intuition is easy to understand. Increases in spending may help save or extend the lives of people who sometimes will have very poor health. For instance, a person who has had a stroke will often have a worse health situation after the stroke than before. If increased spending enables us to save more people who have strokes, this implies that we now have more individuals in the population who tend to have health problems. In this case some average indicators of health in the whole population (e.g. – like self-reported health status) will go down as spending goes up. In addition these patients often require additional and costly treatment and medication, thus generating a feedback-loop: higher spending generates even higher spending.

As a starting point to examine this issue more formally consider a health production function, inspired by Doyle (2008), in which health status (H) for an individual (i) is a function of her health spending (S), observable illness severity or status (I) and a number of other observable (X) and unobservable characteristics (U).

$$H = H(S, I, X, U)$$

In this model we are interested in the effect of spending on health and to make it simple we could distinguish between two possible spending states: high and low spending. In this case the causal effect of spending on health status would be:

$$E(H|S=High, I, X, U) - E(H|S=Low, I, X, U)$$

For the sake of illustration, we may consider a linear model in which causal effect of higher spending is measured by a parameter (b1)

$$H = b_0 + b_1 S + b_2 I + b_3 X + U$$

In this model one would probably observe a negative correlation between spending and health outcome: Individuals spending lots of money on treatment probably have a severe illness which implies a low health status. This does, of course, not imply that spending decreases health status. The problem is simply that the true effect of spending is masked by the spurious relationship caused by selection effects. This is obvious to most researchers, but it still makes it very difficult to measure the effect of spending on health empirically. The unobserved factors could be correlated with both spending and health status, which creates a bias in the estimate of the effect of spending.

The empirical problems lead to disagreement about the marginal return to investments in health. For instance, in a review of the literature, Nixon and Ullman (2006) concluded that "health care expenditure has made relatively marginal contributions to improvements in life expectancy in the EU ...". Some well known economists also claim that increases in health spending has no effect on health status and Milton Friedman (2001) even argued that the return was negative since increased spending tended to increase bureaucracy which meant that even less got done than before. More recently, and more convincingly, Robin Hanson (2008) has

argued that increases in health spending has very low or zero return. His main evidence is the Rand Health Insurance Experiment (Manning et al 1987). In this randomized experiment two thousand US families to plans with different copayment rates. The individuals who paid a low price – essentially free care - for going to physicians went more often, receiving about 30% more worth of health services - but there were few differences in health status between this group and the group that paid more and went less often. Since this was a randomized controlled experiment the problem of spurious correlation described above is less of a worry. There are, however, some other problems. The group was relatively homogeneous in the sense that the experiment did was not conducted on poor people without insurance. Also, although the differences were few, there were some potentially important exceptions: average blood pressure was lower for those going more often to the doctor and they were more likely to get eyeglasses and tooth fillings. However, the experiment clearly shows that the marginal return was low and that we should be careful not to make the automatic and intuitive assumption that increases in health spending always improves health status.

The empirical problems in estimating the return to health can be reduced by an experiment, but in the last decades there has also been an improvement both in data availability and econometric methods that have allowed more sophisticated tests. Some of these tests challenge the conclusion of low marginal return. For instance Martin et al (2008) take advantage of the fact that different health regions in the UK differ in their spending on different diseases. This allows them to test the hypothesis that those areas that spends a lot per capita on certain diseases also has better results in terms of mortality, than areas spending less per capita. To do so one must take into account that areas also differ in terms of disease incidence and other characteristics that could affect both spending and mortality. However, it is possible to take account of this using a two stage regression design and after doing this they conclude that increases in health spending tend to improve health status as measured by mortality. For instance, they estimate that a marginal spending of about £8000 in the area of circulatory diseases was associated with one life year saved. Although this is evidence in favour of the "increases in spending should have a significant health effect" argument, it relies on observational evidence and it is difficult to know whether the method managed to eliminate all the non-causal containments. The authors also admit that the point estimate was very uncertain and that the confidence interval was large.

Another very recent study that also investigated the issue using a novel approach, is Doyle (2007). He argues that the causal effect of spending can be identified by observing health outcomes for people who become sick while visiting another state. More specifically he examines people who on vacation in Florida who were hospitalized for heart problems, usually acute myocardial infarction. He then examines whether the mortality rate for the individuals hospitalized in high health spending counties was lower than for those hospitalized in low spending counties. The conclusion, after controlling for a large number of other potentially confounding variables, was that visitors in areas with higher health spending had 1.6% lower mortality. This, in turn, is estimated to mean that an increase of spending in the order of 50 000 USD would save a statistical life. Once again this seems to point in the direction that increases in health spending should increase health status.

Instead of arguing that the evidence above points that health spending has a low or moderately high marginal return, I believe the best conclusion is to question the usefulness of discussing the question at this level of aggregation. It is perfectly possible that some investments have little effects, while others have a stronger effect. Indeed, the study by Martin et al (2007) from the UK found that in some areas increases in spending seemed to generate larger effects than in others. Spending on cancer, for instance, was estimated to cost £13 100 for every life year saved, while circulatory diseases required £8000. It could also differ from country to country and different types of investments could have different effects in different systems. For instance, the two studies mentioned above that show a generally positive relationship between spending and health compare results within one country. Comparisons between spending between countries tend to find a weaker effect of spending on health and in general the larger the unit of comparison, the weaker the relationship seems to be. At the level of aggregation to make cross-country comparisons it becomes less and less sensible to expect to be able to identify the relationship between health spending and status.

Not all health spending has negative or decreasing marginal return, but some of it probably does. For instance, it has been estimated that a large share of the Medicare budget (30%) in the US is spent on individuals in their last year of life (Lubitz, J.B. and Riley, G.F., 1993). Similarly, it has been estimated that 5% of the old individuals gets half of the total health

spending on old individuals in the US (Garber et al., 1998) and that about 25% of all health care spending (private and public) is used in the last year of a persons life (Hogan et al., 2000).

In contrast to the US literature, there is no systematic overview of how much different countries in the OECD spends towards the end of a life. There is some data on spending by age category, and for instance Zweifel et al (1999) has estimated the growth of spending on the old in Switzerland, but little has been done on different disease categories. This is an important issue because of the large importance of some diseases in the health care budgets, but also because of its potential for explaining differences between countries. If some countries, like Norway, give this kind of treatment a high priority, spending many resources on the terminally or permanently ill, this could explain why they seemingly do not have as good results as others. To some extent such a comparison may also function as an eye-opener, revealing an emphasis that was not intended or desired, but it could also simply reflect different political and normative priorities on how to use health resources.

Estimating the cost-feedback effect is or the cost of end of life treatment is, of course, not to suggest that the treatment is a waste. It has been argued by economists that society have a high willingness to pay for such spending (Becker, Murphy & Philipson, 2007). More information in this area could provide a basis for better decisions and it may also help explain why countries seems to differ greatly when it comes to the return on their health investment.

4. Pulling the threads together

Listing and quantifying various factors that seems to be important in order to explain the gap between spending and outcomes in Norway compared to other countries may be a worthwhile exercise for some policy purposes. For instance, the results so far suggests that a large part is explained by high wages and this, in turn, is not something that can be solved by reorganizing the health care system. In this way research can prevent a futile attempt to fight wind-mills. Another large share of the extra spending was caused by staffing levels which might seem more like a finding with a valuable policy implication: Reorganizations and rationalizations. However, it is difficult to draw policy implication from this fact alone since the staffing levels could be caused

by many factors other than organizational slack. For instance, a country with a higher level of disease prevalence would require more personnel in order to maintain the same health status. Also, a country with large distances and few inhabitants may require a health structure which entails more health personnel per capita than a smaller and more densely populated country. In this way the policy implications all depends on why staff levels are high and simply arguing that it is high just shifts the relevant explanatory burden one step down in the chain. More generally, the example above illustrates the limits of the approach that lists and examines various explanations without a formal and unified theoretical model.

As economists we would like to start with a model which organize the different variables - like demand and supply side effects - and allows us to derive explanations from the model that can be quantified and tested. The explanation of why health spending has increased would then be framed in terms of variables that have shifted demand and supply. For instance, in this frame technological change would be viewed as a potentially important variable since this would affect the supply of health care both by inventions that reduce costs and inventions that increase costs by opening up markets that did not exist previously. The model would also highlight income as an important variable since increases in income tend to increase demand. One might then argue that the exceptionally high Norwegian health spending is explained by the increases in demand as a result of increased income. In short, the explanation behind the exceptionally high Norwegian spending is the exceptionally high income and the fact that the income elasticity for health care is above one. Indeed, the argument has been made frequently by well known economists to explain why American health care spending has increased - and why we should not worry about it: It just reflects people's preferences for more health services when income increases.

Although appealing at first sight, the story using income or gdp increases to explain health spending also has many problems. First of all the explanation sounds tautological. An income elasticity above one is just the name of an empirical correlation and what we want to know is to what extent the connection is causal and more details about the mechanisms causing the empirical correlation. Second, when other variables and mechanisms are included there is some doubt as to whether the income elasticity of health care really is significantly above one. On the individual level the connection between income and health spending is weak, possibly due to the institutional feature of the health care system in which individuals due not pay for all the

expenses. The aggregate connection seems to be stronger, but there are both theoretical and empirical problems (Parkin et al 1987). Third, the story does not take into account the institutional features of health care spending. Much of it is politically determined and to explain it we either need a political-economy model which says something about why voters and politicians intentionally have increased health budgets or a model which explains the mechanisms by which it has happened unintentionally. Fourth and finally, the model can only explain half of the equation. It says something about why spending has increased, but it does not explain the paradoxical fact that the increases in spending has not been accompanied by a similar increase in health status. Diminishing marginal returns might be part of the story, but using this as an explanation raise a new question: Why would increased income make us throw more and more money into a sector with low marginal return?

A rational individual trying to maximize her utility would consider the return to investments in health as predicted by the health production function compared to the return from other activities. The marginal return on investments would certainly be influenced by many factors (age, education, income, price, interest rate), but given the institutional fact that individuals tend to pay only a small share of health care costs directly, it may be more interesting to focus on the political level at which demand and supply decisions often are made in the health care sector. One way of doing so would be to work out individual demand in a Grossman like model and argue that individuals vote for the candidate that promises to invest the sum that is closes to the Grossman derived preferred per capita investment in health care system, given the voter's beliefs about the return from the health production function. However, this seems needlessly complicated and narrow in the current context. Complicated because it would lead to a dynamic optimization problem which is difficult to solve. Narrow because the model does not take into account the fact that many seem to believe and treat health as a special good. The motive for decisions and voting about health care seems to be much wider than just concern about ones own well being. Instead health care is often treated as a special good and the motives behind decisions about how much health care to supply often seems to be driven by motivations other than narrow self-interest. If so, a realistic model of demand and supply decisions at the aggregate level should take these motives into account.

One of the health economists who have examined the relationship between health care decisions and motivations, is Robin Hanson (2008). His argument is that health care is treated very differently from other goods because we have very different moral intuitions and norms about health care than other goods. These origins of these intuitions, he claims, is the type of behaviour that was favourable for survival in a hunter and gatherer society. For instance, he claims that the tendency to over-supply medical care is the result of an entrenched norm in which we signal our loyalty to the group by providing medical help to others. Such loyalty was very important to improve your own network, make alliances and to increase your own status. Once the provision of medical care is interpreted as a signal, it is possible to explain both over-supply and the relative lack of concern for the actual marginal return. As Hanson writes: "Over-care is a feature common of all the models above. This is because everyone want to be thought of as someone who will remain in an alliance." And the important element of a signal is not the actual care itself - the output, but the effort and investment that goes into making the signal. In this way one may true to explain the growth of health care spending as the result of a special preference about health care that evolved in a society in which excessive provision of health care was a profitable signal.

It is difficult to evaluate the evolutionary story behind the excessive supply story above. Evolution can plausible explain many types of behaviour. For instance, as Hanson writes in order to convince the reader "we can profitable understand current tendencies to eat too much salt or fat in terms of preferences which were adapted to an environment where such foods were rare, and labour was more physical." The problem in the case of health is that there are many possible stories that could be told to justify an evolutionary explanation of a preference. Regardless of the plausibility of the story, however, it does seem true that health is governed by moral intuitions and preferences that seem to be different from many other goods. This includes beliefs that money should not govern the access to health care and that money should not be a consideration when it comes to saving a life or improving health in a specific situation. This then, may be the ultimate explanation of why Norway and many other countries tend to see great increases in health care spending as they get richer, at the same time that the return seems to be quite low. In short, we have intuitions and preferences that leads us to invest more and more in the sector when increases in income makes it possible even if - a this is still a big if - there is relatively low return.

5. Conclusion

The paradox that Norway spends much more than Finland while not having better results can, to a large extent, be explained by data errors, general differences in wages and income and staffing levels. This can most likely explain more than 70% of the observed difference. However, although quantifying the relevance of wage and staff levels is useful, it also seems to just shift the explanatory burden one step down. The next question becomes why it has the high wage levels and why it has chosen to employ more and more health personnel. To answer this, in turn, one may point out that both trends can be explained by the fact that as countries become richer, they tend to spend more and more on health care i.e. that the income elasticity of aggregate health care spending to GDP is at least one. But, this too only raises a new question: Why do we keep investing in health services when we become richer when these investments seem to give little if any returns? The real paradox, then, is more why many countries in general, and Norway in particular, seems to spend more and more on health when the marginal return is questionable. To answer this question it is not enough to examine each variable separately or run large ad-hoc regressions. Instead we need to explain why voters and politicians have preferences and beliefs that create the spending trend. More knowledge about this link would represent a deeper understanding of spending patterns and it may also suggest ways to contain the spending and whether this is desirable.

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