

Background report for Economic Policy Council on Public-private Mix in Provision of Hospital Care across European countries

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Summary

Objectives

This report reviews the economics and related literature on differences in hospital behaviour between public and private (profit and non-profit) providers across European countries. The report first reviews the theoretical literature highlighting possible mechanisms which induce public and private hospitals to provide different levels of quality and to contain costs. It then reviews the empirical literature published from 2000 onwards on differences in provider behaviour in relation to quality of care, costs/efficiency/productivity, and if available on patient casemix (cream skimming, selection) and possible spillover effects across sectors (from private to public and viceversa). The focus is on environments where public and private providers compete to treat publicly-funded patients.

Key findings

The review of the theoretical literature suggests that whether private hospitals provide higher or lower quality than public hospitals is a priori ambiguous. Different mechanisms have been identified that work in opposite directions. These mechanisms relate to the payment system, the demand responsiveness to quality, the degree of altruism or intrinsic motivation of the providers and its heterogeneity.

There is a limited number of studies on quality by ownership type in European countries. They are mostly for England with one study from France. Some studies suggest that there are no quality differences between public and private hospitals. Other studies suggest that quality is higher for private hospitals, though the latter are mostly in institutional settings where hospital payment differs between public and private providers.

The economic theory has more clear-cut predictions on differences in efficiency by ownership type. It suggests that private providers should have stronger incentives to contain costs and behave more efficiently than public hospitals if the latter have restrictions on use of financial surpluses or have soft budgets constraints. The empirical literature however does not seem to support this prediction. Several studies from Germany and Italy, and one from Switzerland suggest that private hospitals are as efficient or less efficient than public hospitals, with only one study from England suggesting the opposite. There is also some direct and indirect evidence that private hospitals have a lighter casemix of patients.

Conclusions

The existing limited evidence across European countries does not provide support for systematic differences in quality and efficiency across ownership type. This appears even more the case when public and private hospitals do not differ in reimbursement rule and are both paid with a DRG system.

1. Introduction

In several European countries, publicly funded patients can be treated by public or private hospitals. Private hospitals co-exist and compete with public hospitals for providing treatment to publicly funded patients. This is for example the case in England, France, Germany, Italy, Norway and Spain.

The mix of public and private providers varies greatly across European countries (Siciliani et al., 2017). Private hospitals are prominent in France and Germany. In France, private hospitals provide 60% of surgery. In Germany about 65% of hospitals are private (either for profit or non-profit). In England and Norway, public provision is dominant. In Norway, most hospitals are public with only few private hospitals. In England, private hospitals entered the NHS from 2003 and only for the provision of elective (non-emergency) services. The proportion of publicly-funded patients treated by private providers increased from almost zero in 2000 to 4.5% of all non-emergency treatments in 2013. Not all European countries have a public-private mix in provision. One example is the Netherlands, where all hospitals have private non-profit status.

The defining feature of private hospitals is that they have strong incentives to maximise profits. Public hospitals instead are restricted in the use of financial surpluses, which typically have to be re-invested, returned to the funder or used with limited discretion.

The diversity in public-private mix across European countries gives an opportunity to assess which of these two ownership types performs better in key dimensions and policy objectives such as the quality of care and efficiency of provision. Such assessment can inform future policy developments on whether a particular type of hospital ownership should be encouraged or mandated.

The report is organised as follows. Section 2 reviews the economic theoretical literature identifying possible mechanisms that induce public and private hospitals to provide different levels of quality and to contain costs. Section 3 reviews the empirical literature on differences in provider behaviour in relation to quality, efficiency, and patient casemix. Section 4 draws conclusions and key policy messages. Whenever possible we distinguish between private for profit and private non-profit hospitals. We do not cover the extensive empirical literature from the US since the health system is quite different, and moreover the literature has been already reviewed elsewhere with mixed findings (e.g. Eggleston et al., 2008).

2. Theoretical literature

The key defining feature of private hospitals is that they have generally strong incentives to maximise profits since they keep any financial surplus. Public hospitals instead are restricted in the use of financial surpluses, which have to be re-invested, returned to the funder or used with limited discretion.

In this section, we discuss different possible mechanisms that induce public and private hospitals to provide different levels of quality, to contain costs, and to avoid costly patients or to changes in the casemix of patients treated. We discuss these in turn.

2.1 *Quality*

Payment system. One source of differences in behaviour between public and private provider is their payment system, both at the hospital and doctor level. In the past, public hospitals have been paid in several European countries based on a fixed budget with no additional revenues related to the number of patients treated. Private hospitals have been paid (e.g. in France) by fee-for-service. Regardless of the ownership status, fixed budgets generate weak incentives to incentivise quality since additional quality is not rewarded with additional revenues. Hospitals with high quality will attract more demand and struggle even more to keep expenditure within the allocated budget. Fee-for-service systems reimburse care at a more granular level and may be associated with higher quality. The common criticism to fee-for-service systems is that they may incentive too much care, up to the point where patient benefits are below provider costs, even worse, where benefits to patients are negative (e.g. unnecessary X-rays).

Hospital payments are therefore a source of differences between public and private providers. In recent years, since the introduction of DRG payment systems (originated in the early eighties in the US within the Medicare programme) some European countries, like France, England or Germany, have paid public and private hospitals with a common tariff per patient treated. In such cases, differences in provider behaviour cannot be attributed due differential payment systems. The details of the financial arrangements can however be important. Although public hospitals may be paid by DRG, they may be constrained by volume restrictions if for example the purchaser drops the DRG tariff by 50% after a certain volume has been reached. These volume restrictions are generally motivated by purchasers concerns towards expenditure control. Even if public and private hospitals are paid similarly through a DRG system at the hospital level, there may still be differences in payment at the doctor level. For example, it is

typical for public hospitals to pay doctors by salary, and for private hospitals to pay doctors by fee for service. In turn, this may affect their incentives towards quality.

Profit constraints. As mentioned above, a key defining feature of private hospitals is their strong incentives to maximise profits, which can then be distributed to their shareholders, while public hospitals are generally restricted in the use of financial surpluses.

How do profit constraints of public hospitals affect quality? The theoretical analysis by Brekke et al. (2014) highlights two key mechanisms that work in opposite directions. On one hand, driven by their financial motive, private hospitals have a stronger incentive to increase quality in order to attract more patients, which will increase profits if the revenues from additional patients exceed their treatment costs. Conversely, profit constraints reduce the incentive to compete on quality for public hospitals as the additional revenues and profits from higher demand are less easily appropriated.

On the other hand, profit constraints increase the relative weight given to patients as opposed to profits inducing public hospitals to provide higher quality. The argument requires providers to be altruistic or intrinsically motivated so they have a non-monetary incentive to provide quality. Brekke et al. (2012) show that when providers are sufficiently altruistic or intrinsically motivated to provide quality, this effect dominates and public hospitals provide higher quality. Conversely, private hospitals may have a stronger incentive to skimp and therefore have lower quality than public hospitals. The assumption that healthcare providers are altruistic and intrinsically motivated is plausible. Doctors are dedicated workers who have to endure several years of training, and take the Hippocratic Oath. However, how high their degree of dedication is and how they trade off patients benefits against provider costs under hospital management is less clear.

The result that public hospitals provide higher quality is more likely when the demand responsiveness to quality is low which could arise if patients have strong preferences for close-by hospitals (i.e. they dislike to travel) or if quality is difficult for patients to observe or not verifiable. The latter case is illustrated by Glaeser and Shleifer (2001) who show that hospitals with profit constraints provide higher quality in a model where hospitals have reputational concerns, quality is costly for the provider and not verifiable by patients. The empirical literature on demand responsiveness to quality suggests that hospitals with higher quality do have more patients, but the demand responsiveness to quality is low (see review by Brekke et al., 2014) with elasticities of around 0.1 for some procedures.

Francois (2003) gives a different rationale for hospitals with profit constraints having higher quality when providers are altruistic. Providers with profit constraints are more effective than for-profit providers in obtaining care motivated effort (e.g. due to altruistic concerns) from health workers. Their profit constraints act as a commitment that donated labour effort, which caring workers give in addition to effort which is motivated by monetary incentives, actually affects service and will not be converted by the provider into profit. Because non-profit managers have weakened pecuniary incentives to cut costs elsewhere, non-profit employees know that only modest crowding occurs due to their donated effort. Knowing this, health workers who care about the service provided to patients will donate more effort than a non-profit employer than a for-profit one.

Profit constraints may differ across countries, so that public and private hospital may differ in this dimension to a different extent. In England, for example, before 2003 public hospitals had strong restrictions on how to spend surpluses, but after 2003 they could apply for a new status, known as Foundation Trust status, which implied greater flexibility in managing their financial surplus (Marini et al., 2008) and therefore weaker profit constraints. Similarly, public and non-profit private hospitals may differ less in behaviour since they both have forms of profit constraints relative to for-profit private hospitals.

Heterogeneity in the degree of motivation or altruism. If health workers differ in their degree of motivation or altruism, then public hospitals may attract more altruistic workers with a stronger preference for quality (Lakdawalla and Philipson, 2006). Since more altruistic providers are more likely to work at a negative profit margin, there are limited gains from being able to distribute profits therefore making non-profit institutions more appealing to them.

Soft budgets. Public hospitals may also differ in their degree of “softness” of the budget, with purchasers potentially willing to reimburse (a proportion) of hospital deficits if these arise (Duggan, 2000). DRG payment systems potentially help purchasers to make budgets *hard*. Compared to a fixed budget system, costs arising from higher volumes of patients are automatically addressed by higher revenues. However even under a DRG payment system hospital deficits may arise if hospitals have diseconomies of scale as a result of fixed short-run capacity (Brekke et al., 2015; Bordignon and Turati, 2009). Deficits have become a more prominent policy issue after the financial crisis, possibly due to lower DRG tariffs. The more a provider anticipates that part (or all) of the deficits will be covered if high demand arises, the more the provider is willing to invest in quality. Across health systems, it seems realistic to

assume that public hospitals are more likely to be bailed out than private ones, which in turn implies that public hospitals are more likely to provide a higher quality (Brekke et al., 2015).

In conclusion, differences in quality between public and private providers may be due to a number of factors, which are summarised in Table 1.

2.2 Cost containment

In terms of hospital incentives towards cost containment, which we can think of a form of allocative efficiency, the theory suggests that under a DRG payment system, private providers have a stronger incentive to exert cost-containment effort. Given that private providers can appropriate and distribute profits, any effort to contain costs translates into an increase in profits. Instead, public hospitals with profit restrictions anticipate that any financial surplus will be returned. Although they might still have an incentive to obtain a surplus to invest it in quality or managerial perks, such incentive is likely to be reduced compared to private hospitals (Brekke et al., 2012).

Similar arguments apply if public hospitals have a soft budget and are more likely to be bailed out compared to private hospitals. If hospitals anticipate that the purchaser might cover eventual deficits, they will have weaker incentives to contain costs (Brekke et al., 2015).

2.3 Casemix

DRG pricing is often designed to reflect (with a time lag) average costs, which is a form of yardstick competition (Shleifer, 1985). Within a given treatment or DRG, patients are likely to differ in severity and costs. Given that the DRG tariff is fixed, hospitals will make losses on severe patients, and profits on least severe ones. Driven by the profit motive, private hospitals may have a stronger incentive to avoid costly patients (sometimes referred to as “dumping”; Ellis, 1998).

Private hospitals may also have an excessive incentive to treat low-severity patients (known as “cherry picking” or “cream skimming”; Ellis, 1998) within a DRG. Across different DRGs, private hospitals may specialise in treatments where profit margins are higher and this incentive may be exacerbated when DRGs are split for a given treatment. General public hospitals may instead have less scope to specialise.

Patient selection across severity has implications for allocative efficiency. Ideally, from a societal perspective, patients should receive treatment when their health benefits are above the costs (Kifmann and Siciliani, 2017). But depending on the treatment, it could be that it is the patients with highest severity who may have the highest ability to benefit, or those with middle or lower severity. Differential incentives across public and private hospitals therefore will have implications for allocative efficiency.

“Cherry picking” is more likely to be present when public and private hospitals operate in the same market. This could arise if public hospitals have a public service obligation to treat everyone while private hospitals have some discretion over the patients they treat or specialise.

In some countries private providers do not provide emergency services while public providers do. In the case of severe complications patients may be transferred as emergencies from private to public providers if private providers lack adequate facilities. If differences in severity are not accounted by the DRG payment system, a more severe casemix for public hospitals will imply losses, and profits for private hospitals, keeping other factors constant. In principle, such differences could be accounted for by having differential tariffs between public and private providers. But differences in costs between public and private providers at the DRG level poses several data and analytical challenges. Moreover, public and private providers may also differ in tax regime, pension system, and legal institutional setting, which in principle should also be factored in (Street et al., 2010).

In summary, the theory suggests that public hospitals may have higher costs than private hospitals for two very different reasons. The first is that public hospitals have weaker incentives to contain costs and behave more efficiently. The second is that they treat a disproportional higher portion of severe patients. This in turn raises a challenge for the empirical analyses outlined in Section 3. It is only with adequate control for casemix that differences in costs can be attributed to differences in efficiency. Moreover, public and private hospitals may differ in the services that they provide which may generate scope and scale economies. This is particularly an issue if public hospitals have emergency departments while private hospitals do not so that the latter can benefit from scale economies arising from specialisation in non-emergency (planned) treatments only.

Table 1 summarises some key issues covered in this Section.

Table 1. Possible factors affecting differences in quality, costs and casemix between public and private hospitals.
Predictions from economic theory

*Hospital **quality** tends to be higher in private hospitals than in public hospitals when:*

- Demand responsiveness to quality is relatively high
- Doctor motivation and altruistic concerns are relatively low
- Private hospitals are paid by FFS and public hospitals are paid by a fixed budget
- Public hospitals have volume restrictions
- There is low heterogeneity in doctors' degree of altruistic concerns
- Other potential factors include: doctor payment (salary, FFS); availability of emergency department

*Hospital **efficiency** tend to be higher in private hospitals than in public hospitals when:*

- Public hospitals have restrictions on use of financial surpluses
- Public hospitals have soft budgets

*Hospital **casemix** tends to be higher in private hospitals than in public hospitals when:*

- Private hospitals have an incentive to select low severity patients
- Private hospitals do not have the facilities to treat the more severe patients
- Private hospitals do not provide emergency services

3. Empirical evidence

This section reviews the empirical literature published from 2000 in European countries. It focuses on differences in hospital behaviour in relation to quality of care, efficiency, and patient casemix.

3.1 Empirical evidence: quality

We focus on studies that employ large representative samples. The results are typically obtained from regression models with a cross-sectional (and, less frequently, a panel) framework. Quality, which is measured at hospital or patient level, is regressed against a dummy variable for private ownership and a vector of patient characteristics to control for differences in casemix. Other econometric strategies have also been employed to control for unobserved patient characteristics, which is a key concern given the possibility that private hospitals treat patients with low severity.

For **England**, Moscelli et al. (2018) find that there are no differences in emergency readmissions (their quality measure) for patients receiving 133 planned treatments across public and private hospitals in 2013-14 after controlling for unobserved patient severity (through an instrumental variable approach). Public and private (mostly for profit) hospitals were paid the same tariff for a given treatment. The study emphasises the importance of controlling for unobserved severity because private hospitals have fewer emergency readmissions even after controlling for extensive observable patient characteristics, while there are no differences in emergency readmissions once controlling for unobserved severity.

Perotin et al. (2013) also find no overall difference in patient satisfaction between public hospitals and private treatment centres in 2007, after controlling for patient characteristics. Patient satisfaction is measured from survey data collected by the Department of Health. The questions concern patients' experience in the areas of patient information and interpersonal care, respect for privacy, dignity, hospitality and delays. These data have the advantage of capturing other dimensions of quality which are distinct from clinical quality but are by its nature subjective and may reflect patient expectations. The study uses a switching regression model to allow for endogenous choice of type of provider.

Browne et al. (2008) find instead that in 2006-7 patients in private treatment centres (known as Independent Sector Treatment centres) undergoing cataract surgery or hip replacement

achieved a slightly greater improvement in functional status and quality of life than those treated in public (NHS) ones, while the opposite holds for patients undergoing hernia repair. No significant differences were found for the other procedures (knee replacement and varicose veins). Private patients had fewer post-operative complications for knee replacement, hernia repair and cataracts. The study used a relatively small sample (less than 3000 patients) across six private providers and 20 public providers. The analysis adjusted for casemix through observed pre-operative characteristics. The authors suggest that the results need to be interpreted with caution since casemix adjustment might have been insufficient.

Chard et al. (2011) report that private treatment centres in 2008/9 had higher quality for hip and knee and similar quality for varicose vein and hernia surgery. In more detail, patients treated by public providers had poorer outcomes on the Oxford hip score and the Oxford knee score. Hip and knee replacement patients also reported more complications. Relative to Browne et al. (2008) they use a larger sample with 14 private providers for hip and knee procedures, and 9 private providers for hernia and varicose vein against 51 and 49 public providers respectively. One limitation of the analysis is that provider participation in the study was voluntary. A possible concern is that only providers with higher quality may be more likely to participate. The analysis adjusted for casemix through observed pre-operative characteristics. In these two studies, public and private providers faced different payment regimes. Therefore, differences in quality may also reflect payment as opposed to public-private status.

For **France**, Milcent (2005) finds that, after controlling for observable differences in severity, public hospitals and private not-for-profit hospitals have similar AMI mortality. Private for-profit hospitals have instead lower AMI mortality rate and such differences can be explained by size and the number of procedures, such as PTCA (i.e. the difference is not statistically significant after inclusion of these variables). Public and private not-for-profit hospitals were subject to a global budget and private for-profit hospitals were paid by fee-for-service. Descriptive statistics suggest that the mortality rate is much higher in public hospitals (15 percent) than in for-profit ones (7 percent) or non-profit hospitals (10 percent). The authors emphasise that differences in mortality rates are much smaller after the inclusion of patient characteristics (age, gender, case mix, diagnoses, and other controls) in a duration analysis with multiple destinations.¹ Given that AMI is an emergency conditions, concerns about unobserved

¹ We do not include Bjorvatn (2018) in this section since quality is measured as length of stay, which could reflect also efficiency, neither Berta et al. (2010) since readmissions are used as a control variable in an efficiency equation.

severity should be reduced if hospitals have less (or no) discretion in admitting patients with differing severity.

This review focuses on European countries. However, we briefly mention the systematic review by Eggleston et al. (2008) on the extensive US literature. This meta-analysis reviews 31 studies since 1990. Overall, it reports mixed findings. It suggests that whether for-profit hospitals provide higher quality in the US, as measured by mortality rates and other adverse events, depends on the region, the data source and the period of analysis.

3.2 Empirical evidence: efficiency

Several empirical studies have been conducted on differences in efficiency between public and private providers in Germany and Italy, and to a lower extent in England, Switzerland, Spain and the Nordic countries. We review these studies in turn.

Herr (2008) finds that private and non-profit hospitals in **Germany** are less efficient than public hospitals, both in terms technical efficiency and allocative efficiency. The study uses a large sample of 1,500 hospitals in 2001-03 and employs a stochastic frontier approach. Technical efficiency is measured through deviations from the production function. Output is measured with the number of cases (weighted by casemix) and inputs with beds (as proxy of capital) and personnel. Cost efficiency is measured regressing total hospital costs on output and input price (eg doctor salary). Since the data set is a panel, weaker distributional assumptions on the error terms are required to estimate the degree of efficiency. The analysis controls for quality by including hospital mortality rates, though the inclusion of this variable makes little difference to the results indirectly suggesting that quality is not systematically correlated with efficiency.

The result that private hospitals are less efficient is also confirmed by Tienmann and Schreyogg (2009) with a large sample of more than 1000 hospitals in 2002-2006, but not by Herr et al. (2012) with a smaller sample of 541 hospitals over the same period where the differences in costs between public and private hospitals are not statistically significant. The DRG payment was introduced in 2004 in Germany and therefore difference in efficiency before 2004 may reflect differences in behaviour under a fee-for-service system. Herr (2008) shows that one of the reasons private hospitals were less efficient is that they had longer length of stay. (See Tiemann et al., 2012, for a detailed discussion of the German evidence). Although not directly related to efficiency, Augurzky et al. (2011) show that private hospitals have lower probability

of default than public ones, and Schwierz et al. (2011) finds that private for-profit hospitals adapt to (increasing or decreasing) demand more quickly than public and private non-profit hospitals.

Barbetta et al. (2007) find that private non-profit hospitals in **Italy** were more (technically) efficient than public ones before the introduction of the DRG system (when they differed in the payment system). Efficiency however converged once a DRG payment system was introduced. The study uses a sample of 500 Italian hospitals in 1995-2000 to analyse technical efficiency through Data Envelopment Analysis (a non-parametric approach) and a stochastic frontier (parametric) approach. It uses a multioutput (distance function) approach. Outputs are measured with the number of discharged patients, the number of emergency room cases, and the number of day case treatments. Six inputs are included: the number of beds for ordinary hospitalization, beds for daycase treatments, physicians, nurses, teaching staff and other employees. As a limitation, the study doesn't control explicitly for quality. Using similar methods, Berta et al. (2010) find that private for-profit hospitals have lower technical efficiency than not-for-profit and public hospitals in 1998-2007. This result is also confirmed by Daidone and D'Amico (2009) with a sample of hospitals in one Italian region (Lazio) in 2000-2005. Private for-profit hospitals appear less efficient compared to public and non-profit private hospitals due to higher nurses-per-bed ratio, and this is so even after controlling for quality differences through mortality and readmission rates.

Farsi and Filippini (2008) do not find differences in cost efficiency between public, for-profit, and non-profit hospitals in **Switzerland**. The study uses a sample of 148 hospitals in 1998-2003 and employs stochastic frontier techniques. The approach and data are similar to the one described in Herr (2008) for Germany with total hospital cost regressed against hospital output (number of hospitalisations) and input prices (eg personnel salary). Farsi (2008) also finds that when hospitals reduced costs as a result of new reforms aimed at containing costs, there were no systematic differences between public and private hospitals, which is consistent with the previous study.

Siciliani et al. (2013) find that in **England** private treatment centres and specialised public treatment centres have 40% and 18% shorter length of stay for hip replacement patients compared to NHS public hospitals. These differences hold after controlling for observable patient characteristics, such as age, gender, deprivation, number and type of diagnoses. Treatment centres (either public or private) specialised in the provision of elective (non-

emergency) treatments. Marini et al. (2008) do not compare public and private hospitals but instead investigate whether the change of hospital status from “public hospital” to “Foundation Trust”. The latter confers to public hospitals more financial independence in the management of surpluses, and involves less monitoring and control. It therefore makes public hospitals more similar to private hospitals in some dimensions. The study however finds that the new status, which involved more financial independence, had limited impact on costs and financial surpluses.

Bjorvatn (2018) finds that in **Norway** private non-profit hospitals, which treat about 20% of patients who need cardiovascular procedures, have shorter length of stay in 1999-2006 after controlling for age, gender and co-morbidities. No account for unobserved severity is made.

Although only indirectly related to efficiency, Clark and Milcent (2018) find that in **France**, using a panel over 2006–2010, employment of public hospitals is counter-cyclical. Higher local unemployment is associated with greater employment by the public hospital. This is not the case for hospitals with other ownership type. The result suggests that local authorities seem to respond to depressed local labour markets by increasing employment in public hospitals. The result holds for the period when public hospitals were reimbursed based on historical funding. Instead, after the introduction of a DRG payment system, the results only holds in high-unemployment areas but not in low-unemployment areas, which can be interpreted as an improvement in efficiency.

Rodriguez-Alvarez et al. (2011) investigate how demand uncertainty in **Spain** affects reserve service capacity to minimize the probability of excess queuing or turning away patients. Using data over the period 1996–2006 and using a distance frontier approach, they show that public hospitals generally react to a higher extent to demand uncertainty by increasing reserve capacity than private hospitals.

This report focuses on European studies. We however briefly mention the review by Hollingsworth (2008) of 317 published papers across a range of countries that concluded that public and non-profit hospitals tend to be more efficient than for-profit ones, though there was quite a lot of heterogeneity in the findings across countries and institutional settings.

3.3 Empirical evidence: casemix

Street et al. (2010) find that patients treated in public hospitals in **England** were more likely to come from more deprived areas, have more diagnoses, and to undergo significantly more procedures than patients seen by (public or private) treatment centers, suggesting that public hospitals are treating more complex cases. These results are derived within an institutional context where only a small proportion of elective care (2.3%) is contracted out to treatment centres, of which half were private.

Browne et al. (2008) find that in England in 2006/7 private patients were healthier and had a less severe primary condition than public ones. In more detail, cataract patients were less likely to be in poor/fair health or to suffer any comorbidity, and their visual function was better; hernia patients were younger, had fewer comorbidities, had shorter symptom duration, and were less likely to have undergone hernia repair before; varicose vein patients were younger and less likely to be in poor/fair health. Chard et al. (2011) have a similar finding and conclude that patients treated by private providers are on average healthier and have less severe primary conditions.

Bjorvatn (2018) finds that in **Norway** private non-profit hospitals have specialized in certain cardiovascular procedures such as angioplasty, bypass surgery and circulatory disorders in 1999-2006. Private hospitals have patients with similar (or marginally higher) number of comorbidities.

Table 2. Differences in quality, efficiency and casemix between public and private hospitals

Country	study	<i>quality measure</i>	quality is higher (>), lower (<), similar (=) in private hospitals
England	Moscelli et al. (2018)	readmissions	=
England	Perotin et al. (2013)	patient satisfaction	=
England	Chard et al. (2011)	health gain	>
England	Browne e al. (2008)	functional status complications	? >
France	Milcent (2005)	AMI mortality	= , >
		<i>efficiency measure</i>	efficiency is higher (>), lower (<), similar (=) in private hospitals
Germany	Herr (2008)	costs	<
Germany	Tiemann et al. (2009)	costs	<
Germany	Herr et al. (2011)	costs	=
Italy	Barbetta et al. (2007)	technical efficiency	=
Italy	Berta et al. (2010)	technical efficiency	= , <
Italy	Daidone et al (2009)	technical efficiency	= , <
Switzerland	Farsi et al. (2008)	costs	=
England	Siciliani et al. (2013)	length of stay	>
Norway	Bjorvatn (2018)	length of stay	>
		<i>casemix</i>	casemix is lighter (<), similar (=), heavier (>) in private hospitals
England	Street et al. (2010)	Patient characteristics	<
England	Browne e al. (2008)	Severity	<
England	Chard et al. (2011)	Severity	<
Norway	Bjorvatn (2018)	Co-morbidities	=

Key findings and conclusions

The review of the theoretical literature suggests that whether private hospitals provide higher or lower quality than public hospitals is a priori ambiguous. Different mechanisms have been identified that work in opposite directions. Differential payment across private and public providers (e.g. FFS vs fixed budget) is a possible mechanism. Recent policy developments have made payments by DRG uniform across ownership types therefore eliminating this source of heterogeneity. If both types of hospitals are paid by DRG, public and private hospitals may still differ depending on how demand responds to quality, the degree of altruism or intrinsic motivation of the providers and its heterogeneity. Low (high) demand responsiveness to quality and low (high) intrinsic motivation should induce, based on predictions from the economic theory, private hospitals to provide higher (lower) quality than public hospitals. On the one hand, private providers may skimp on quality to increase profits; on the other, in the presence of a for-profit motive they might compete more aggressively to attract demand by increasing quality. Heterogeneity in intrinsic motivation may also induce the more motivated to sort themselves into public hospitals, which favours higher quality in public hospitals.

There is only a handful of large scale studies that compare quality by ownership. They are mostly for England and one for France. Some studies suggest that there are no quality differences between public and private hospitals. Others suggest that quality is higher for private hospitals, though the latter are mostly in institutional settings where hospital payment differs between public and private providers.

The economic theory suggests that private providers should have stronger incentives to contain costs and behave more efficiently than public hospitals if the latter have restrictions on use of financial surpluses or have soft budget constraints. The empirical literature however does not seem to support this prediction. Several studies from Germany and Italy, and one from Switzerland suggest that private hospitals are as efficient or less efficient than public hospitals. One study from England and one from Norway though suggests the opposite. One possible explanation is that public hospitals have larger excess demands and respond to these higher volumes by improving the efficiency of their organisation. Alternatively, public hospitals are able to better exploit scale or scope economies.

There is some direct and indirect evidence that private hospitals have a lighter casemix of patients. This could be due to the financial motive of private hospitals to avoid costly patients, or in some institutional context the lack of facilities to deal with complex patients. In turn, this

has possible implications for tariff design across ownership type if casemix systematically differs.

In summary, the existing limited evidence across European countries does not suggest that there are systematic differences in quality and efficiency across ownership type. This seems to be even more the case if public and private hospitals are subject to the same payment system.

We conclude by discussing the extent to which the lessons drawn from secondary care could translate into primary care. Like secondary care, primary care provision has two key dimensions, namely quality and efficiency. Therefore, some of the lessons that hold for secondary care in relation to the public-private mix in provision might also hold for primary care. But there are also several differences between primary and secondary care. Primary care organisations are smaller compared to hospitals and are less capital intensive. In some countries, primary care doctors are self-employed rather than employees of large organisations such as hospitals. Second, the payment system is different. Hospital payment is mostly based on DRG payment across a range of countries. In primary care different systems are observed and vary from fee for service to capitation. Unfortunately, the literature on public-private mix in provision in primary care is not well developed. This is mostly for two reasons. First, primary care tends to be either public or private within a country. Second, accurate measures of quality and efficiency are much more difficult to obtain with primary care relative to secondary care (with some exceptions, eg the Quality and Outcome Framework in the UK).

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