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Autonomy and performance in the public sector:

The experience of English NHS hospitals

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Abstract

Since 2004, English NHS hospitals have been given the opportunity to acquire a more autonomous status known as a Foundation Trust (FT), whereby regulations and restrictions over financial, management and organisational matters were reduced in order to create incentives to deliver higher quality services in the most efficient way. Using difference-in-difference models, we test whether achieving greater autonomy (FT status) improved hospital performance, as proxied by measures of financial management, quality of care and staff satisfaction. Results provide little evidence that the FT policy *per se* has made any difference to the performance of hospitals in most of these domains. Our findings have implications for health policy and inform the trend towards granting greater autonomy to public sector organisations.

Keywords. Foundation Trusts; hospital reform; autonomy; hospital performance; treatment effects; policy evaluation.

JEL classification. I11; I18.

1. Introduction

Reform in the English NHS has for some time been aimed at giving healthcare providers greater independence and freedom from central government control in a number of ways. One element of the reform was the introduction of Foundation Trust (FT) status. This gives NHS hospitals the opportunity to become independent not-for-profit public benefit corporations which, whilst remaining in the public sector, are granted greater autonomy over financial, management and organizational matters. Similar changes have also been introduced in other countries, where quasi-autonomous or autonomous hospital organizations have been created over the last two decades. For example, in Nordic countries a substantial number of publicly financed hospitals have been reorganised into quasi-independently managed public firms. The trend of decentralizing decision structures appears particularly evident in Norwegian hospitals, where responsibilities for personnel and capital have been delegated to the department level of the hospital enterprise [1]. In Italy, major public hospitals (so-called *Aziende Ospedaliere*) have been given greater financial and decision-making autonomy, and granted the status of semi-independent hospital firms [2]. Similarly, various forms of autonomous hospitals have been created in Spain and Portugal [3].

Saltman et al [4] suggest three possible inter-connected factors driving this organizational shift towards greater autonomy: first, rapid technological improvement in clinical and information capacity among hospitals; second, growing patient expectations around quality, safety, responsiveness and choice of healthcare providers; and consequently, third, growing political pressures on public authorities to restructure the command and control relationships embedded within traditional governance models of publicly owned institutions.

In the English NHS, applying for FT status has been voluntary to date, but access is dependent on the performance of hospital Trusts (hereafter referred to as hospitals): only those meeting the criteria of the regulator are allowed to apply for FT status. The assessment process for approval to become an FT involves a number of detailed criteria which are documented at length by Monitor, the independent regulator of FTs [5-6].[1] However, in brief, three main questions are asked: Is the hospital well governed? Is the hospital financially viable? Is the hospital legally constituted? There are numerous specific requirements in each of these three areas and Monitor uses a risk rating procedure to assess whether the hospital meets the criteria. The first phase of policy implementation occurred in 2004/5 when 25 acute hospitals became FTs. The number of FTs increased after 2004/5, rising to 83 acute hospitals in 2008/9 (Table 1) and 101 acute hospitals in 2015/6 (about 65% of total acute hospitals). The policy focus on extending FT status to all NHS hospitals is based to a substantial extent on the belief that FTs will deliver "high productivity, greater innovation, better care and greater job satisfaction" [7].

[Table 1 about here]

Despite the increasing trends towards devolved hospital governance in several European countries, little is yet known about the effects on hospital performance. In this paper, we address that research gap by examining the effects of introducing greater autonomy (FT status) to English NHS hospitals on their performance, as proxied by measures of financial performance, quality of care and staff satisfaction. Achieving FT status may create incentives for performance improvement via a number of mechanisms. FTs are allowed to have easier access to public and private sources of capital, to retain financial surpluses as well as to

[1] From April 2016, Monitor has changed its name to NHS Improvement.

decide not to run a financial surplus every year [8]. One may expect the greater financial freedoms granted to FTs to give them financial advantages by taking a longer planning horizon in borrowing and investment decisions. Moreover, FTs have the freedom to develop local recruitment and retention initiatives, they can alter terms by agreement or by reissuing new contracts, and they can choose their own pay rates. In principle, this may serve to attract a more able workforce from other providers, with potential benefits in terms of staff job satisfaction and quality of care. Whilst acknowledging there may also be a risk of some initiatives such as pay rises to producing unintended effects by attracting staff who are less likely to have a vocation [9], overall the freedom to set terms and conditions was intended to be positive. Such effects on quality may be dampened or amplified by the lower profit constraints of FTs. On the one hand, reducing profit constraints may increase hospital incentives to compete on quality since additional revenues from higher demand can be appropriated more easily. On the other hand, however, it may induce hospitals to provide lower quality by strengthening their profit motive [10], which may have the effect of "crowding out" the intrinsic motivation of public service workers.

FTs differ from non-FTs also with respect to their governance structure. With the opportunity for local people, staff and patients to participate in the decision-making process of their hospitals, FTs are expected to increase the relative weight given to community views and to enhance staff morale. Moreover, a lower degree of regulation and monitoring may increase the workers' "intrinsic" motivation to perform their work activity with potential positive effects on hospital performance [11]. Evaluating the impact of FT status on staff morale is an important issue with implications for the level of effort exerted to deliver quality services. Some studies show that if public service motivation exists, employees are more likely to increase their effort to deliver a valued social service [12]. Thus, if FTs are more altruistic

and motivated than non-FTs, the willingness of workers to exert higher effort (and produce better services) may be positively affected by the more autonomous governance arrangements.

Although FTs have historically been successful in generating and accumulating financial surpluses, the extent to which surpluses are a function of FT status is debatable [13]. Previous comparisons of the financial performance of FTs and non-FTs suggested that there had not been any significant change following the introduction of FT status [14]. However, the analysis covered only one year of post policy implementation, with only 10 hospitals being FTs for the entire financial year 2004/5. Thus, these results may have reflected the relatively early stage of the FT process. A later study found that one of the greatest advantages perceived by FTs was the ability to build their surpluses and to re-invest in order to expand and develop services [15]. But the analysis focused on only four FTs and it was not possible to conclude that the more autonomous governance structure was the specific mechanism responsible for the enhanced financial performance of hospitals.

So far, only a small number of studies have explored the impact of FT status on working environment and staffing policies, with early reviews showing no positive impact on staff morale, and levels of staff engagement in FT management found to be low [16-17]; and research failing to find a link between the extended freedoms and motivation of senior hospital managers [18]. There is some anecdotal evidence showing better staff satisfaction due to conditions such as enhanced roles, the introduction of organisational bonus schemes [19], more freedoms for nursing staff, and the potential to grant national pay awards earlier than non-FTs [20]. However, it is not possible through simple comparisons to attribute the above differences to FT status *per se*.

This is, to our knowledge, the first comprehensive and robust evaluation of the effect of FT status on hospital performance. Our empirical analysis improves on previous work [14] in that we explicitly deal with the fact that hospitals became FTs at different times during the study period, and we take into account possible differences between the effect of recently becoming an FT (i.e. in the first year when a hospital actually became an FT) from the effect in later years. Moreover, this paper contributes to the existing literature in three ways: a) by offering additional evidence on the impact of FT status on financial performance [14] with the inclusion of a larger number of hospitals that became FTs over a longer period of time (between 2004/5 and 2008/9), which might have given greater scope for FTs to exploit their freedoms; b) by examining differences between FTs and non-FTs on aspects of quality, including Methicillin-Resistant Staphylococcus Aureus (MRSA) infection rates, waiting times and reported instances by staff witnessing potentially harmful errors; and c) by using staff satisfaction measures to test whether the opportunity to engage in hospital management has had any impact on staff morale.

Overall, our results provide little evidence that the FT policy *per se* has made any impact on hospital performance. We mostly find no significant differences between the effect in the first year in which hospitals became FTs and in subsequent years, suggesting that the greater autonomy granted to FTs did not translate either into transitory or permanent improvements in hospital performance. Decentralisation and a move towards more devolved systems with greater autonomy is echoed across public sector organisations more generally, for instance in relation to academy schools in England (e.g. [21-23]). Hence, the results of this study, although specific to the experience of FTs in England, may be of some interest also for a wider literature concerned with the effects of granting greater independence and freedom from central government control to publicly funded providers.

2. Methods

Using panel data over the period 2001/2 to 2008/9, we employ a difference-in-difference (DID) methodology to test whether there are any differences in hospital performance between FTs and non-FTs as a response to the FT policy. Our baseline econometric specification can be represented formally as follows:

$$y_{it} = \beta_0 + \beta_1 X_{it} + \gamma_i + \gamma_t + \delta_1 After_{it} \times FT_i + \varepsilon_{it} \quad (1)$$

where y_{it} is the key policy indicator for hospital *i* in period *t*, and *t* covers the period 2001/2 to 2008/9 for our measures of financial performance and quality of care, and the period 2003/4 to 2008/9 for our measures of staff satisfaction; X_{it} is a vector of controls which measure observable time-varying characteristics of hospitals; γ_i and γ_t are the hospital and year fixed-effects, respectively; FT_i is a dummy variable for FT status, being equal to 1 if the hospital earned the status of FT during the period of study, and 0 otherwise (this means that if, for example, a hospital became an FT in the year 2008/9, then the treatment variable for this hospital will take value 1 for every year over the period 2004/5 to 2008/9); $After_{it}$ is a dummy variable equal to 1 if a hospital has become an FT by time *t*, and 0 otherwise; and ε_{it} is the white noise error term.

Using Eq. (1), we control for fixed differences between hospitals that became FTs and those that never acquired the FT status through the hospital fixed-effects, which account for any time-invariant hospital-specific factors that may influence hospital performance. The year fixed-effects absorb the effects of unobserved factors that are common to all hospitals in a given year. The impact of the FT policy is estimated by δ_1, which captures performance

changes related to hospitals after they actually became FTs. Our control group is represented by all hospitals at time *t* that have not (at least yet) become FTs.[2]

The implicit restriction made in Eq. (1) is that the impact of the FT policy is assumed to be the same in all years once hospitals became FTs. To relax this assumption, we allow the effect in the first year when a hospital actually became an FT to be separated from the effect in later years, by estimating the following regression model:

$$y_{it} = \beta_0 + \beta_1 X_{it} + \gamma_i + \gamma_t + \delta_1 After'_{it} \times FT_i + \delta_2 After''_{it} \times FT_i + \varepsilon_{it} \quad (2)$$

where $After'_{it}$ is a dummy variable taking value 1 in the year in which a hospital became an FT, and 0 otherwise; and $After''_{it}$ is a dummy variable taking value 1 in the period subsequent to the year in which a hospital became an FT, and 0 otherwise. Hence, the estimated coefficient δ_1 in Eq. (2) gives the effect of just being an FT, whereas δ_2 captures the effect of being an FT in subsequent years.

In order to correctly identify the impact of the FT policy using the specifications given by Eq. (1) and (2), the DID approach crucially relies on the assumption that assignment of hospitals to the treatment and control groups is random. However, in the context of the reform under study, this assumption is violated as hospitals can volunteer for FT status (subject to performance requirements). Therefore, we are concerned with addressing the potential bias arising from self-selection, and the related issue of possible unobserved factors which may

[2] An example of this approach is the paper by Propper et al [24], which investigates the impact of the general practitioner (GP) fundholder scheme on hospital waiting times in the UK NHS. The fundholder policy is similar to the FT policy in several ways (e.g. it was voluntary and practices joined the scheme at different times), hence the methodological approach takes these factors into account.

have driven the decision of hospitals to become FTs, and which are correlated with hospital performance.

We partly account for potential self-selection of FT status by including hospital fixed effects in the regression models given by Eq. (1) and (2). Hospital fixed-effects allow us to control for fixed (i.e. temporally invariant) differences in hospital performance: if hospitals that opted to become FTs have had a higher performance than other hospitals through the entire period of study, then the effect will be captured by the hospital fixed-effects. However, the hospital fixed-effects do not capture unobserved factors that may vary both across hospitals and over time, and may, in turn, be correlated with hospital performance. In particular, we identify the impact of the FT policy under the assumption that time trends in hospital performance caused by unobserved factors are the same between hospitals that became FTs and those that did not. This condition will not hold if, for example, hospitals that were already experiencing increases in their performance before acquiring the status of FT were also more likely to become FTs in subsequent years. If this is the case, then the estimated effects provided by Eq. (1) and (2) will simply reflect a continuation of pre-existing trends.

In section 4, we formally account for possible pre-existing trends by adding to the specifications given in Eq. (1) and (2) the interaction between FT_i and the dummy variable Pre_{it}, which equals 1 in all years prior to the year in which a hospital actually became an FT, and 0 otherwise (the omitted category is the first year of observation). In this way, we isolate the impact of the FT policy from the potential effect of pre-existing trends. For our staff satisfaction measures, data are only available from year 2003/4 onwards, and thus we run this specification with the inclusion of the pre-trend control variable after excluding the first wave of FTs, which comprises hospitals that became FTs in year 2004/5.

3. Data

Conditional on availability of longitudinal hospital data, we focus on measures of financial performance, quality of care, and staff satisfaction as described in detail in section 3.1 below. All the selected dimensions of performance were those that policy makers have focused on when explaining the rationale for the FT policy. Thus, the choice of our indicators, while restricted by the need for a robust methodology that requires longitudinal hospital data, still allow us to test whether these expectations were met. The data used for our measures of financial performance and quality of care cover all acute hospitals in the English NHS for the 8 year-period from 2001/2 to 2008/9, whereas data availability is restricted to years 2003/4-2008/9 for our measures of staff satisfaction.[3] Table A1 in the web appendix provides the variable definitions and some descriptive statistics for the hospital performance measures and the explanatory variables used in the regression analysis.

3.1 Dependent variables

We examine the financial management aspect of the FT policy by using two indicators. The first one is the retained surplus (deficit), measured as a proportion of total expenditure. As in previous studies (e.g. [25]), we use surplus of the hospital as a key measure of performance for the government. Indeed, policymakers and regulators view surplus as an indicator of the financial "health" of organisations and a key performance measure against which all hospitals are assessed. Whilst in some contexts, spending surpluses in priority areas (e.g. on temporary staff to cover shortages) may be a positive rather than a negative event, there is a very strong policy signal that surpluses are associated with good financial conditions, and regulatory intervention is triggered when surpluses shift [26]. In this study, both retained surplus

[3] Both for-profit and not-for-profit independent providers are excluded from our analysis, which refers to public hospital Trusts only.

(deficit) and total expenditure were obtained from the Trust Financial Returns (TFRs) provided by the Department of Health (DH) for non-FTs. These data also cover FTs for the fraction of the year in which FTs were non-FTs. For the remaining months of the financial year and for all years in which FTs were fully operational, data for FTs were drawn from the annual Income and Expenditure Accounts provided by the Finance Department of each FT. The lack of a central data return, such as TFRs, to the DH, is one of the freedoms enjoyed by FTs, which makes policy evaluation more challenging. Our second measure of financial performance is the Reference Cost Index (RCI), defined as an activity weighted average of a hospital's Healthcare Resource Group (HRG) unit costs relative to the national average.[4] Data on RCI for all FTs and non-FTs were compiled from the DH. The RCI can be used as a measure of relative hospital efficiency, as it compares the actual average cost of an organisation's aggregate activity with that same activity delivered at the national average cost**,** allowing for differences in terms of patients' case-mix and local input prices - low cost (more efficient) hospitals will have an RCI below 100, while high cost (less efficient) hospitals will have an RCI above 100 [27].

The quality of care measures we use are MRSA infection rates, waiting times, and the witnessing of "near misses" and errors by NHS staff. Low MRSA prevalence is often used as a marker for general quality [28]. In England, concerns about increasing trends in the MRSA infection rates led to the introduction of a national target, announced in November 2004, to halve the number of MRSA infections by March 2008. In our analysis, MRSA infection rates are measured as the reported number of patients diagnosed with MRSA bacteraemia per

[4] Like Diagnosis Related Groups (DRGs), HRGs contain clinically similar treatments with similar costs. All inpatient elective and non-elective schedules used for the reference cost dataset are based on data truncation, excluding bed days that fall outside of nationally set length of stay trimpoints. The costs of any days beyond these trimpoints are excluded to provide a like-for-like comparison of activity and costs. The RCI was also adjusted by the market forces factor (MFF) in order to take account of some areas of the country with higher costs for staff, land or buildings.

10,000 bed-days within the hospital. Targeting waiting times for elective care has been a salient feature of the English NHS over many years, and previous studies suggest that the imposition of targets led to a fall in waiting times for elective care [29-30]. In line with previous empirical studies (e.g. [25]), we interpret longer waiting times as a negative form of quality, with the better performing hospitals being those ensuring shorter waiting times on average. Waiting times are measured as the average number of days between the decision to be admitted on the waiting list and the actual admission for elective treatment. Our final indicator of quality of care is derived from the NHS National Staff Survey undertaken by the Care Quality Commission and is defined as the proportion of staff who, in the previous month, had witnessed at least one error or near miss that could have potentially hurt patients or staff.

As measures of working environment and staff morale, we use two further indicators derived from the NHS National Staff Survey, namely job satisfaction and intention to leave. Both these variables can also be seen as instruments of hospital quality in terms of what they suggest about the work environment and culture, but are not direct measures of quality of care.[5] Staff job satisfaction is a composite measure derived from the following items: satisfaction in terms of recognition for good work; support from immediate managers and colleagues; freedom to choose methods of working; amount of responsibility; opportunities to use skills; and the extent to which the hospital is seen to value the work of staff. A score ranging from 1 ("strongly disagree") to 5 ("strongly agree") was given to each answer, and

[5] Earlier studies have shown that intentions of staff to quit is negatively related to job satisfaction (e.g. [31]). In line with this finding, in our sample we find a negative correlation between job satisfaction and intention to leave. The correlation between the two variables is equal to – 0.66. Higher levels of job dissatisfaction raise concerns on the level of effort exerted by staff professionals and hence on the provided quality of care. Moreover, high staff turnover may lead to over-reliance on temporary and agency staff in hospitals and, as such, is one of the "organizational health" indicators used by the regulator as a signal of possible governance concerns. Consistent with this interpretation, and following previous work that has linked higher staff intentions to leave to poorer quality of management (e.g. [32]), in our study we consider lower intentions of staff to quit as an indicator of better hospital performance.

the average score of each response was derived. The final measure was then calculated by summarizing the average score for each respondent and using a weighting procedure such that responses from each hospital contributed an amount to the total that was directly proportional to the number of staff employed by that hospital. Finally, intention to leave is a measure of the extent to which staff are considering leaving their organization and looking for a new job either within or outside of the NHS. This variable asks staff to indicate on a scale from 1 (“strongly disagree”) to 5 (“strongly agree”) to what extent they agree with the following questions: “I often think about leaving this Trust”; “I will probably look for a new job at a new organization in the next 12 months”; “as soon as I can find another job, I will leave this Trust”. The final index was then calculated following the same weighting procedure used to derive staff satisfaction.

3.2 Explanatory variables

We use a number of explanatory variables at provider level to make our analysis more robust by allowing for the influence of a wide range of time-varying observed confounders. The data were collected from several sources including Hospital Episode Statistics (HES), Hospital Activity Statistics (HAS), the Department of Health (DH) and the Care Quality Commission (CQC). The variables that we use in the regression analysis comprise measures on activity (totspells), efficiency in use of resources (daycase_spell and ipd_spell) and case-mix (emerg_spell, propfem, age014p, age60p). We also use the retained surplus in the previous year (surplus_1) to test whether hospitals that end in surplus one year find it easier to achieve better performance (lower costs or higher quality care) in the following year, given that they may be able to buy extra activity [33].

3.3 Graphical analyses

Appendix Figures A1-A2 display time trends in each of our dependent variables, separately by FT status. To plot these graphs, we grouped all hospitals that opted to become FTs during the sample period into one category, and compare them with all hospitals that never acquired FT status during the years of observation. As these graphs show, we find no evidence of any obvious breaks in hospital performance after the FT policy was implemented. FTs were always performing better than non-FTs, both before and after the introduction of the reform, suggesting that there were long-standing differences in hospital performance between the two groups of hospital organisations. While these graphs offer descriptive information about hospital performance by FT status, they do not control for important differences across hospitals and years included in our regression models, the results of which are discussed in the next section.

4. Regression results

Tables 2-8 present the results on the effect of being an FT in terms of each of our performance measures separately. Column 1 shows the impact of the FT policy on average over time (Eq. (1)), whereas column 3 separates the effect in the year in which a hospital became an FT from the effect in later years (Eq. (2)). Finally, columns 2 and 4, show our estimates after accounting for pre-existing trends. All regressions include year and hospital fixed-effects, with robust standard errors clustered at hospital level to account for heteroscedasticity and possible serial correlation in the error term. We used a version of the Hausman test extended to heteroscedasticity [34] in order to test the null hypothesis that covariates are uncorrelated with the individual-specific effects. Results rejected this hypothesis, thus supporting the FE over the RE specification. The only exceptions were

obtained for the intention of staff to leave variable, for which our estimates from using the FE and RE specifications are very similar (results available upon request).

The results on surplus reported in Table 2 show that the coefficient on being an FT is positive but not significant, suggesting that on average the FT policy had no impact on this indicator. A higher effect is observed in the year in which hospitals became FTs than in later years, although the two estimated coefficients are not significantly different from each other. The significance of the post-policy coefficients increases after accounting for pre-existing trends. However, also the coefficients on the pre-trend control variable are positive and significant, indicating that hospitals that became FTs achieved a higher financial surplus already before they entered the FT programme. The post- and pre-policy coefficients are not significantly different from each other, providing no evidence that hospitals increased their financial surplus in response to the FT policy. Our second measure of financial performance in Table 3 shows we never find a significant effect of the FT policy on the RCI. The coefficients on the pre-trend control variable are never significant, providing no evidence of differential trends before policy implementation.

[Tables 2-3 about here]

The estimates in Table 4 suggest that the FT policy had no impact on the MRSA rates either: the coefficients on the difference between FTs and non-FTs are insignificant both after hospitals became FTs and over the pre-reform period. Table 5 shows the results for waiting times. On average, relative to the pre-policy years, the difference in waiting times between hospitals that became FTs and those that never acquired the FT status is positive and significant. Specifically, this effect is significant at the 10% level in the first year in which

hospitals became FTs, and increased both in absolute levels and significance in later years. Once we control for pre-existing trends, the coefficient on the interaction with the first year of being an FT, $FT_i \times After'_{it}$, becomes insignificant at conventional levels, whereas the coefficient on the interaction with later years, $FT_i \times After''_{it}$, is still positive and significant at the 5% level. These results are consistent with the trends plotted in Figure A1 (d), showing that waiting times reduced in all hospitals over time, but this reduction was greater for non-FTs than for FTs, especially in the last years of observation. As for our final measure of quality of care, the estimates in Table 6 provide no evidence that, after controlling for pre-existing trends, being an FT affected the proportion of staff witnessing errors.

[Tables 4-6 about here]

Finally, Tables 7-8 show the results in terms of our measures of working environment and staff morale. While we find no evidence that being an FT affected staff job satisfaction, it appears that the staff intention to leave decreased in response to the FT policy. Once controlling for pre-existing trends, this effect is significant at the 10% level in the period following the first year in which hospitals became FTs. Moreover, there is no evidence of a significant effect before hospitals entered the FT programme. The estimated effect for the staff intention to leave is, however, small in magnitude: being an FT appears to have decreased staff intention to leave by only 0.05 points in the period subsequent to the year in which hospitals became an FT (as shown in Table A1, the sample mean and standard deviation of the intention of staff to leave variable are 2.7 and 0.14, respectively).

[Tables 7-8 about here]

4.1 Robustness checks

To further confirm the validity of our results, we also examine whether hospitals have responded in anticipation to the FT policy, by changing our pre-policy control variable so that it equals 1 in the year before hospitals became FTs. In addition, we also add a pre-trend control variable taking the value 1 in the period prior to the anticipation year, and 0 otherwise. The results from these robustness checks are provided in the web appendix Tables A2-A8. As these tables show, our findings remain qualitatively unchanged, providing little evidence that the FT policy *per se* had any impact on hospital performance. Again, the only possible exception is for the staff intention to leave variable: as compared with non-FTs, the response of hospitals that opted to become FTs was to decrease the intention of staff to leave after the first year in which they actually became FTs. However, as before, the estimated coefficients indicate that this effect, albeit statistically significant, is small in magnitude.

Finally, we also used Propensity Score Matching (PSM) as in Marini et al [14] to further address concerns that the group of non-FTs may not be a valid counterfactual for the treatment hospitals. The PSM method allows one to summarise pre-treatment characteristics of hospitals into a single propensity score, which describes the probability of receiving FT status conditional on pre-treatment characteristics. Based on this probability, we identified alternative matched control groups with "similar" propensity scores, by using *Nearest-Neighbour Matching*, *Kernel Matching* and *Stratification Matching* as possible methods to match treated and control units [35]. We find that overall using alternative comparator groups provides results that are qualitatively very similar to those presented herein (results available on request).

5. Discussion and conclusions

FTs are expected to achieve higher financial performance by enjoying greater control and flexibility over financial, management and organisational matters. Our results confirm earlier evidence provided by Marini et al [14] that the FT policy *per se* has made no significant change to the financial performance of FTs relative to non-FTs, as measured in terms of retained surplus and relative hospital efficiency (RCI). The positive and significant difference in financial surplus that we find between FT and non-FT groups before policy implementation can be interpreted as the result of long-standing differences between the two types of hospital organisations. Relative to the differential trends estimated over the pre-reform period, we find no evidence that hospitals increased their financial surplus after becoming FTs.

Further, we go beyond financial measures studied in earlier work by also testing whether the introduction of FT status has produced any impact in terms of quality of patient care and staff morale. Overall, our findings suggest that the introduction of the FT policy has had no significant impact on the quality of patient care as measured by lower MRSA rates, shorter waiting times, or lower proportions of NHS staff witnessing "potentially harmful errors, near misses or incidents". With respect to waiting times in particular, we find that while both FT and non-FT groups experienced better performance over time, reductions in waiting times were larger in non-FTs than in FTs, especially in the last period of observation when non-FTs achieved greater improvements under higher waiting time pressure. Lastly, our measures of staff satisfaction show only small changes in hospitals with FT status. Whilst the FT policy may have positive or negative effects on worker morale [36], this does not appear to have happened. This may also be because, although FTs have the freedom to go outside of national

workforce contracts, there is limited evidence that they have done so [20 37], largely because of the risks of legal challenges on equal pay grounds [19].

We acknowledge that the use of a panel data methodology restricted the possibility of exploring all the relevant dimensions of hospital performance due to the limited information available over the entire period of study. For example, aspects of quality including patients' responsiveness and satisfaction beyond the domain of waiting times could not be explored in our analysis. However, the selected set of indicators are those that have received great attention by policymakers, and the use of a panel data approach has allowed us to test whether the effect of the FT policy was in line with these expectations. Moreover, there is evidence from the NHS that various elements of staff satisfaction (which we include as a measure) is linked positively to better patient outcomes (e.g. [38]). Thus, we may be capturing indirectly aspects of patient outcomes through the use of this measure as well.

Despite not being able to identify a substantial positive "FT effect", our analysis does not suggest that FTs are doing any worse than non-FTs in terms of our performance measures. So the issue perhaps is more one of whether the extra costs involved in setting up and regulating FTs are justified. The governance arrangements required for FTs have not been trivial and the running costs of the governance process estimated in the first phase of policy implementation were at '*circa* £200,000 per Trust' leading to estimated annual costs of over £25 million [39]. On the other hand, we find little evidence that the FT policy has led to improvements in hospital performance, although it is possible that FT status brings other benefits which we could not test (such as service innovation).[6]

[6] There are indeed examples of FTs introducing novel treatment paths and service arrangements [37 39], although it is difficult to know whether the hospitals would have been able to make such changes anyway without FT status.

Finally, rather than indicating that more autonomy has had no or little impact *per se*, it is possible that the way in which the FT policy has been implemented has limited the degree to which FTs have exercised real autonomy in practice, which in turn may have limited the gains made. Indeed, an "implementation gap" between policy and practice has been identified, indicating that, whilst FTs have been given the ability technically to exercise autonomy, they have in practice been unwilling to do so, pursuing autonomy to a limited extent, especially in relation to financial and personnel issues [40], although there are some very recent signals – for example in relation to the controversial junior doctors contract [41] – that FTs could decide to exercise those freedoms more often in future.

Enhancing autonomy to publicly funded institutions has recently been a common trend in many regulated markets across the public sector. In addition to healthcare, similar plans to pilot greater autonomy for prisons in England are also being discussed. Another example is the education sector, since new types of publicly funded schools with greater autonomy than regular public schools have been developed in different countries such as the US, England and Sweden. A large amount of research has produced mixed evidence on the impact of such policies on educational standards (see, among others, [21-23], [42-49]) and there may be scope for further empirical testing on differences between short- and long-run effects. In our analysis in the healthcare context, overall we find no significant differences between the effect in the first year in which hospitals became FTs and in subsequent years, suggesting there were neither transitory nor permanent improvements in hospital outcomes that can be causally associated with the greater autonomy allowed by FT status. While recognising that these results are context specific, our research topic may be of some importance also beyond the UK context, and for all regulated markets across the public sector that are currently experiencing similar transitions, or plan to, in the future. Finally, it is interesting to note that

as pressures in the English NHS become more acute, there are recent signals that the extra financial autonomies granted to FTs are now being eroded as regulators seek to re-assert control and intervene in both FTs and non-FTs [26]. As with many policy initiatives however, there is a tendency for them eventually to come full circle, so there will no doubt be further future developments relating to autonomy in the health system.

References

[1] Magnussen J, Vranbaek K, Saltman R (2009) Nordic Health Care Systems. Recent reforms and current policy challenges, Open University Press, Maidenhead and New York.

[2] France G, Taroni F, Donatini A (2005) The Italian health-care system. Health Economics 14: S187–S202.

[3] Saltman R, Bankauskaite V, Vrangbaek K (2007) Decentralization in health care: strategies and outcomes. Open University Press/McGraw-Hill Education, London.

[4] Saltman RB, Durán A, Dubois HFW (2011) Governing Public Hospitals: Reform strategies and the movement towards institutional autonomy. World Health Organization, on behalf of the European Observatory on Health Systems and Policies.

[5] Monitor (2008) Applying for NHS Foundation Trust Status: Guide for Applicants.

[6] Monitor (2010) Amendments to Applying for NHS Foundation Trust status: Guide for Applicants.

[7] Department of Health (2010) Equity and Excellence: Liberating the NHS. Department of Health, London.

[8] Department of Health (2002) A guide to NHS Foundation Trusts. Department of Health, London.

[9] Heyes A (2005) The economics of vocation or 'why is a badly paid nurse a good nurse'? Journal of Health Economics 24(3): 561-9.

[10] Brekke KR, Siciliani L, Straume OR (2012) Quality competition with profit constraints. Journal of Economic Behavior & Economic Organization 84: 642-659.

[11] Frey B (1997) A constitution for knaves crowds out civic virtues. Economic Journal 107, 1043-1053.

[12] Francois P (2000) 'Public service motivation' as an argument for government provision. Journal of Public Economics 78: 275-299.

[13] Bojke C, Goddard M (2010) Foundation Trusts: A retrospective review. CHE research paper 58, University of York, York.

[14] Marini G, Miraldo M, Jacobs R, Goddard M (2008) Giving greater financial independence to hospitals – does it make a difference? The case of English NHS Trusts. Health Economics 17: 751-77.

[15] Allen P, Keen J, Wright J, Dempster P, Townsend J, Hutchings A, Street A, Verzulli R (2012) Investigating the governance of autonomous public hospitals in England: multi-site case study of NHS Foundation Trusts. Journal of Health Services Research and Policy 17(2): 94-100.

[16] Healthcare Commission (2005) The Healthcare Commission's Review of NHS Foundation Trusts. Healthcare Commission, London.
[17] Monitor (2011) Current practice in NHS Foundation Trust member recruitment and engagement Monitor. Electoral Reform Services Research, London.
[18] Mannion R, Goddard M, Bate A (2007) Aligning incentives and motivations in health care: The case of Earned Autonomy. Financial Accountability & Management 23 (4): 401-420.
[19] Edwards N (2011) England. In: Saltman RB, Durán A, Dubois HFW (eds.) Governing public hospitals. World Health Organization, on behalf of the European Observatory on Health Systems and Policies.
[20] Taylor J (2007) Why nurses are thriving at Foundation Trusts. Nursing Times 103 (29): 16-18.
[21] Clark D (2009) The performance and competitive effects of school autonomy. Journal of Political Economy 117(4): 745-783.
[22] Allen R (2010) Does school autonomy improve educational outcomes? Judging the performance of foundation secondary schools in England. Dept of Quantitative Social Science Working Paper 10-02, Institute of Education, University of London.
[23] Machin S, Vernoit J (2011) Changing school autonomy: Academy schools and their introduction to England's education system. Centre for the Economics of Education Discussion Paper 123, CEE, London School of Economics.
[24] Propper C, Croxson B, Arran S (2002) Waiting times for hospital admissions: the impact of GP fundholding. Journal of Health Economics 21: 227-252.
[25] Gaynor M, Laudicella M, Propper C (2012) Can governments do it better? Merger mania and hospital outcomes in the English NHS. Journal of Health Economics 31: 528-543.
[26] NHS Improvement. 2016. Strengthening financial performance & accountability in 20016/17.
[27] Department of Health (2006) Reference costs 2004-05. Department of Health, London.
[28] Ananda-Rajah MR, McBryde ES, Buising KL, Redl L, Macisaac C, Cade JF, Marshall C (2010) The role of general quality improvement measures in decreasing the burden of endemic MRSA in a medical-surgical intensive care unit. Intensive Care Medicine 36 (11): 1890-8.
[29] Propper C, Sutton M, Whitnall C, Windmeijer F (2010) Incentives and targets in hospital care: Evidence from a natural experiment. Journal of Public Economics 94: 318-335.
[30] Dimakou S, Parkin D, Devlin N, Appleby J (2009) Identifying the impact of government targets on waiting times in the NHS. Healthcare Management Science 12: 1-10.
[31] Shields MA, Ward M (2001) Improving nurse retention in the National Health Service in England: the impact of job satisfaction on intentions to quit. Journal of Health Economics 20(5): 677-701.
[32] Bloom N, Propper C, Seiler S, Van Reenen J (2015) The impact of competition on management quality: Evidence from public hospitals. The Review of Economic Studies 82(2): 457-489.
[33] Jacobs R, Dawson D (2003) Hospital efficiency targets. Health Economics, 12: 669-684.
[34] Schaffer ME, Stillman S (2006) XTOVERID: Stata module to calculate tests of overidentifying restrictions after xtreg, xtivreg, xtivreg2 and xthtaylor. Statistical Software Components S456779, *mimeo*, Boston College, Department of Economics, Boston, MA, revised 4 October 2007.

[35] Becker SO, Ichino A (2002) Estimation of average treatment effects based on propensity scores. Stata Journal 2: 358-337.
[36] Dixon J (2002) Foundation hospitals. The Lancet 360: 1900-1901.
[37] Audit Commission (2008) Is the treatment working? Progress with the NHS system reform programme. Audit Commission and Healthcare Commission, London.
[38] Powell M, Dwson J, Topakas A, Durose J, Fewtrell C. 2014. Staff satisfaction and organisational performance: Evidence from a longitudinal secondary analysis of the NH staff survey and outcome data. Health Services and Delivery Research. N. 2.50.
[39] House of Commons Health Committee (2008) Foundation Trusts and Monitor. Sixth Report of Session 2007-08, Vol 1, The Stationery Office Limited, London.
[40] Exworthy M, Frosini F, Jones L (2011) Are NHS Foundation Trusts able and willing to exercise autonomy? 'You can take a horse to water…'. Journal of Health Services Research and Policy 16 (4): 232-37.
[41] Rimmer A (2016) Junior contract will be imposed, Hunt announces. BMJ 352: i885.
[42] Bifulco R, Ladd HF (2006) The impacts of charter schools on student achievement: Evidence from North Carolina. Education Finance and Policy 1(1): 123-138.
[43] Sass TR (2006) Charter schools and student achievement in Florida. Education Finance and Policy 1(1): 123-138.
[44] Zimmer R, Buddin R (2006) Charter school performance in two large urban districts. Journal of Urban Economics 60(2): 307-326.
[45] Booker K, Gilpatric SM, Gronberg T, Jansen D (2007) The impact of charter school attendance on student performance. Journal of Public Economics 91: 849-876.
[46] Hanushek EA, Kain JF, Rivkin SG, Branch GF (2007) Charter school quality and parental decision making with school choice. Journal of Public Economics 91: 823-848.
[47] Zimmer R, Blanc S, Gill B, Christman J (2008) Evaluating the performance of Philadelphia's charter schools, Rand Working Paper.
[48] Hoxby CM, Murarka S (2009) Charter schools in New York City: Who enrols and how they affect their students' achievement, NBER working paper no. 14852.
[49] Bölmark A, Lindahl M (2015) Independent Schools and Long-run Educational Outcomes: Evidence from Sweden's Large-scale Voucher Reform. Economica 82(327): 508-551.

Table 1
Number of hospitals with FT status, 2004/5 to 2008/9

	2004/5	2005/6	2006/7	2007/8	2008/9
Number of FTs in this year	25	32	54	68	83
(% of total number of acute hospitals)	(14)	(19)	(32)	(40)	(49)
Number of acute hospitals becoming FTs in this year	25	7	22	14	15
(% of total number of acute hospitals)	(14)	(4)	(13)	(8)	(9)

Table 2

Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on retained surplus (deficit)

	(1)	(2)	(3)	(4)
Years before becoming an FT	-	0.011***	-	0.011***
(FT × Pre)		(0.002)		(0.002)
		[0.007; 0.016]		[0.007; 0.016]
Once a FT	0.005	0.014***	-	-
(FT × After)	(0.003)	(0.003)		
	[-0.001; 0.010]	[0.007; 0.021]		
Year became an FT	-	-	0.006*	0.015***
(FT × After')			(0.003)	(0.004)
			[-0.000; 0.011]	[0.008; 0.023]
Year(s) after becoming an FT	-	-	0.004	0.013***
(FT × After'')			(0.004)	(0.004)
			[-0.004; 0.011]	[0.005; 0.021]
R^2	0.365	0.369	0.365	0.369
N	1347	1347	1347	1347

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 3

Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on RCI

	(1)	(2)	(3)	(4)
Years before becoming an FT	-	0.501	-	0.363
(FT × Pre)		(1.512)		(1.501)
		[-2.481; 3.483]		[-2.597; 3.324]
Once a FT	0.377	0.798	-	-
(FT × After)	(0.904)	(1.719)		
	[-1.405; 2.160]	[-2.592; 4.188]		
Year became an FT	-	-	-0.772	-0.459
(FT × After')			(0.829)	(1.597)
			[-2.406; 0.862]	[-3.609; 2.690]
Year(s) after becoming an FT	-	-	1.357	1.655
(FT × After'')			(1.183)	(1.905)
			[-0.975; 3.689]	[-2.102; 5.412]
R2	0.691	0.691	0.693	0.693
N	1331	1331	1331	1331

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 4

Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on MRSA rates

	(1)	(2)	(3)	(4)
Years before becoming an FT	-	0.000	-	0.004
(FT × Pre)		(0.109)		(0.108)
		[-0.215; 0.215]		[-0.209; 0.218]
Once a FT	-0.047	-0.047	-	-
(FT × After)	(0.074)	(0.136)		
	[-0.194; 0.099]	[-0.316; 0.221]		
Year became an FT	-	-	-0.015	-0.011
(FT × After')			(0.066)	(0.126)
			[-0.144; 0.115]	[-0.260; 0.239]
Year(s) after becoming an FT	-	-	-0.075	-0.071
(FT × After'')			(0.097)	(0.150)
			[-0.266; 0.117]	[-0.368; 0.226]
R2	0.711	0.711	0.711	0.711
N	1288	1288	1288	1288

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 5

Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on mean waiting time

	(1)	(2)	(3)	(4)
Years before becoming an FT	-	0.284	-	0.777
(FT × Pre)		(2.519)		(2.489)
		[-3.683; 6.251]		[-4.132; 5.684]
Once a FT	7.892**	8.973**	-	-
(FT × After)	(3.130)	(4.467)		
	[1.721; 14.064]	[0.164; 17.781]		
Year became an FT	-	-	3.676*	4.346
(FT × After')			(2.058)	(3.558)
			[-0.381; 7.734]	[-2.671; 11.364]
Year(s) after becoming an FT	-	-	11.49**	12.13**
(FT × After'')			(4.576)	(5.544)
			[2.463; 20.512]	[1.193; 23.059]
R2	0.769	0.769	0.771	0.771
N	1326	1326	1326	1326

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 6

Fixed effects regression results for difference-in-difference model: Average effect of Foundation status on staff witnessing potentially harmful errors, near misses or incidents

	(1)	(2)	(3)	(4)
Years before becoming an FT	-	0.941	-	0.927
(FT × Pre)		(0.734)		(0.745)
		[-0.509; 2.391]		[-0.546; 2.400]
Once a FT	0.629	1.368	-	-
(FT × After)	(0.482)	(0.961)		
	[-0.323; 1.581]	[-0.530; 3.267]		
Year became an FT	-	-	0.321	1.267
(FT × After')			(0.496)	(1.020)
			[-0.658; 1.299]	[-0.749; 3.282]
Year(s) after becoming an FT	-	-	0.987*	1.472
(FT × After'')			(0.575)	(0.984)
			[-0.149; 2.122]	[-0.473; 3.417]
R2	0.857	0.855	0.857	0.855
N	995	847	995	847

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Columns (2) and (4) present the estimates without the first wave of FTs. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 7

Fixed effects regression results for difference-in-difference model: Average effect of Foundation status on job satisfaction of staff

	(1)	(2)	(3)	(4)
Years before becoming an FT	-	0.007	-	0.006
(FT × Pre)		(0.013)		(0.013)
		[-0.018; 0.032]		[-0.019; 0.031]
Once a FT	0.011	0.019	-	-
(FT × After)	(0.008)	(0.015)		
	[-0.006; 0.027]	[-0.010; 0.049]		
Year became an FT	-	-	0.012	0.015
(FT × After')			(0.008)	(0.015)
			[-0.005; 0.028]	[-0.015; 0.046]
Year(s) after becoming an FT	-	-	0.010	0.023
(FT × After'')			(0.011)	(0.016)
			[-0.011; 0.030]	[-0.009; 0.055]
R2	0.704	0.683	0.704	0.683
N	995	847	995	847

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Columns (2) and (4) present the estimates without the first wave of FTs. standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

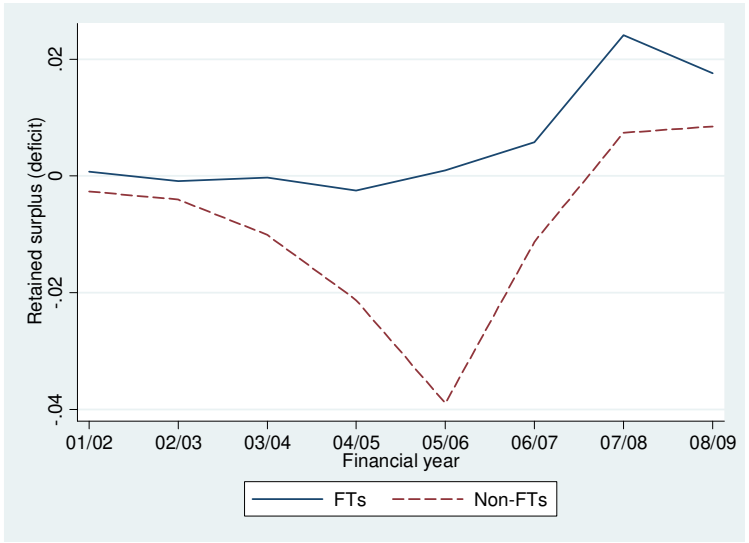
Table 8
Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on staff intention to leave

	(1)	(2)	(3)	(4)
Years before becoming an FT	-	-0.002	-	-0.001
(FT × Pre)		(0.019)		(0.019)
		[-0.039; 0.035]		[-0.039; 0.036]
Once a FT	-0.035***	-0.041*	-	-
(FT × After)	(0.012)	(0.022)		
	[-0.058; -0.012]	[-0.084; 0.001]		
Year became an FT	-	-	-0.028**	-0.037
(FT × After')			(0.013)	(0.023)
			[-0.053; -0.003]	[-0.083; 0.008]
Year(s) after becoming an FT	-	-	-0.043***	-0.046*
(FT × After'')			(0.015)	(0.024)
			[-0.073; -0.014]	[-0.092; 0.001]
R2	0.708	0.696	0.708	0.696
N	995	847	995	847

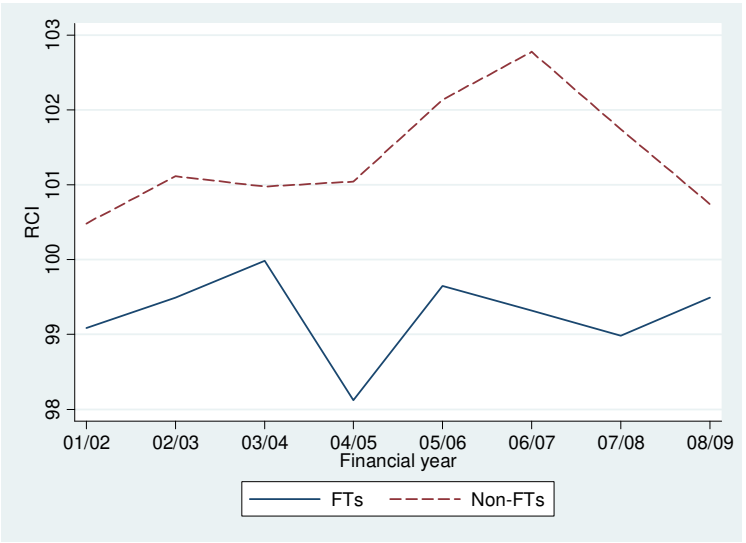
Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Columns (2) and (4) present the estimates without the first wave of FTs. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Figure A1

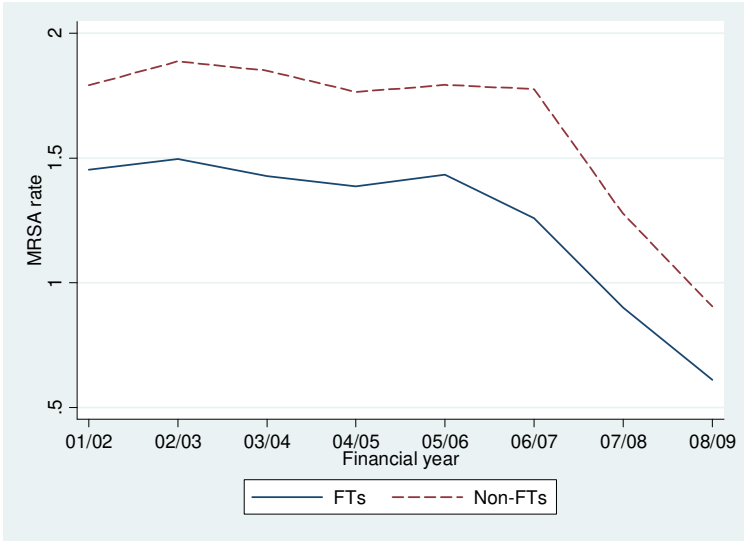
Trends in performance for FTs and non-FTs in 2001/2-2008/9:
(a) retained surplus (deficit), (b) RCI, (c) MRSA rates, and (d) mean waiting time (days)



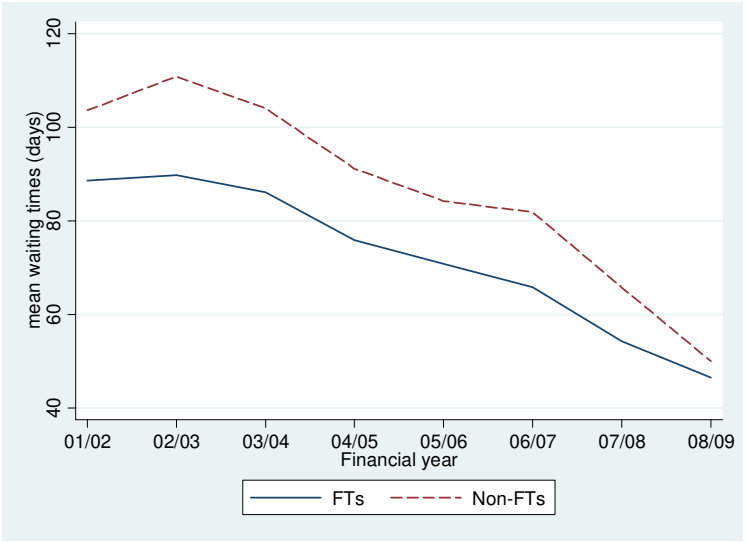
(a)



(b)



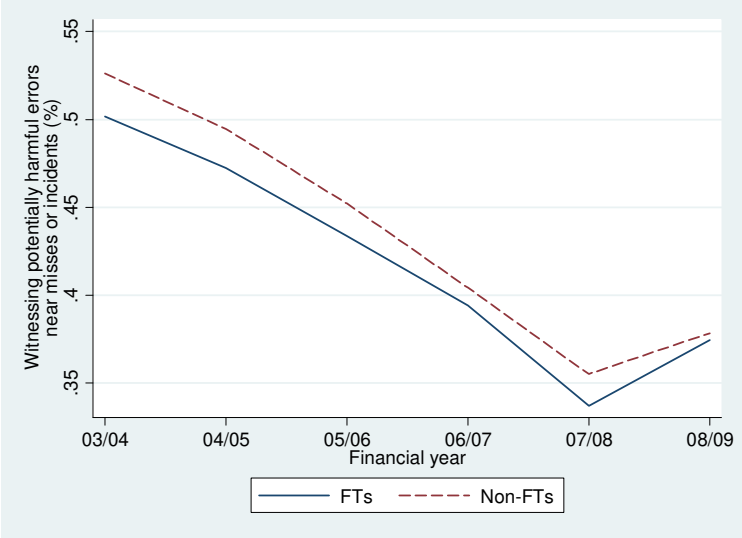
(c)



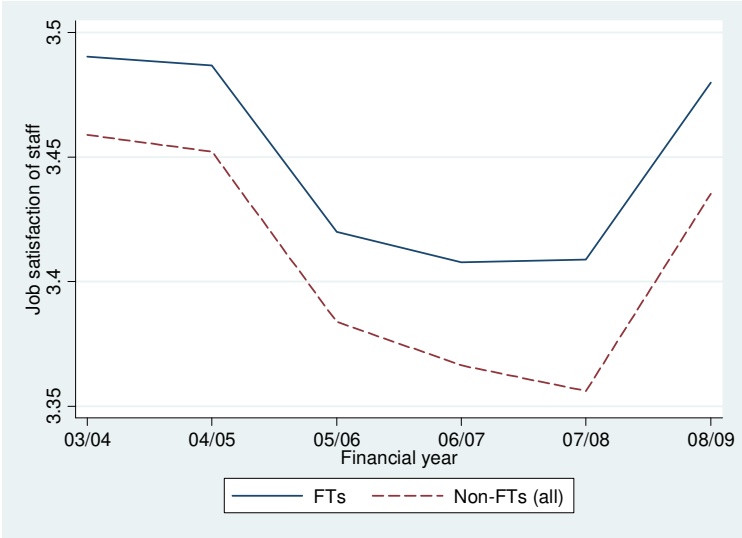
(d)

Figure A2

Trends in performance for FTs and non-FTs in 2003/4-2008/9:
(a) witnessing potentially harmful errors (b) job satisfaction of staff and (c) intention of staff to leave



(a)



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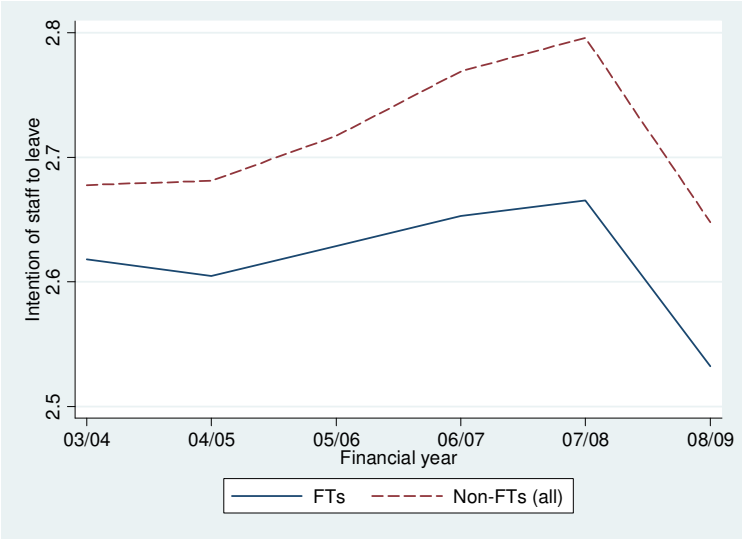

(c)

Table A1

Descriptive statistics and variable definitions, years 2001/2-2008/9

Variable	Definition	Source	N	Mean	Std dev	Min	Max
Surplus	Retained surplus (deficit) as proportion of total expenditure (£s)	DH and Annual Accounts	1379	-0.002	0.029	-0.217	0.112
Rci_excess	Reference Cost Index excluding excess bed days adjusted by the Market Forces Factor (MFF)	DH	1391	100.364	10.783	68.794	165.817
Mrsa_rate	MRSA patients per 10,000 bed-days	CQC	1337	1.538	2.852	0	94.458
Meanwait	Mean waiting time (days)	HES	1374	79.999	32.315	0	339
Witnessing_errors	Percentage of staff witnessing potentially harmful errors, near misses or incidents	CQC	1028	42.790	7.326	22	71
Job_satisfaction	Job satisfaction of staff	CQC	1028	3.428	0.087	3.11	3.73
Staff_turnover	Intention of staff to leave in next 12 months	CQC	1028	2.667	0.140	2.15	3.17
FT	Dummy = 1 if hospital = FT, 0 otherwise	DH	1397	0.472	0.499	0	1
2001/2	Dummy = 1 if year = 2001/2, 0 otherwise	Authors' calculation	1397	0.138	0.345	0	1
2002/3	Dummy = 1 if year = 2002/3, 0 otherwise	Authors' calculation	1397	0.126	0.332	0	1
2003/4	Dummy = 1 if year = 2003/4, 0 otherwise	Authors' calculation	1397	0.124	0.330	0	1
2004/5	Dummy = 1 if year = 2004/5, 0 otherwise	Authors' calculation	1397	0.124	0.330	0	1
2005/6	Dummy = 1 if year = 2005/6, 0 otherwise	Authors' calculation	1397	0.124	0.330	0	1
2006/7	Dummy = 1 if year = 2006/7, 0 otherwise	Authors' calculation	1397	0.122	0.328	0	1
2007/8	Dummy = 1 if year = 2007/8, 0 otherwise	Authors' calculation	1397	0.121	0.326	0	1
2008/9	Dummy = 1 if year = 2008/9, 0 otherwise	Authors' calculation	1397	0.121	0.326	0	1
Totspells	Total inpatient spells	HES	1379	69034.73	39166.46	1040	232033
Daycase_electives	Day cases as proportion of elective admissions	HES	1379	0.515	0.114	0	0.969
Emerg_spell	Emergency admissions per total inpatient spells	HES	1379	0.347	0.098	0.002	0.618
Propfem	Proportion of female patients	HES	1379	0.526	0.071	0.125	0.882
Age014p	Proportion of patients under 15 years of age	HES	1371	0.142	0.137	0	0.990
Age1559p	Proportion of patients between 15 and 59 years of age	HES	1371	0.448	0.090	0.001	0.815
Age60p	Proportion of patients 60 years or older	HES	1371	0.410	0.108	0	0.989

DH: Department of Health. Annual Accounts: FT Annual Reports and Accounts. CQC: Care Quality Commission. HES: Hospital Episode Statistics.

Table A2

Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on retained surplus (deficit)

	(1)	(2)	(3)	(4)
Before anticipation year	-	0.010***	-	0.010***
(FT × Pre-anticipation)		(0.003)		(0.003)
		[0.005; 0.015]		[0.005; 0.015]
Anticipation year	0.006***	0.015***	0.006***	0.015***
(FT × Anticipation)	(0.002)	(0.003)	(0.002)	(0.003)
	[0.001; 0.011]	[0.009; 0.020]	[0.001; 0.011]	[0.009; 0.020]
Once a FT	0.007**	0.015***	-	-
(FT × After)	(0.003)	(0.003)		
	[0.001; 0.013]	[0.008; 0.021]		
Year became an FT	-	-	0.008**	0.016***
(FT × After')			(0.003)	(0.004)
			[0.001; 0.014]	[0.008; 0.023]
Year(s) after becoming an FT	-	-	0.006	0.014***
(FT × After'')			(0.004)	(0.004)
			[-0.001; 0.014]	[0.006; 0.022]
R2	0.367	0.370	0.368	0.370
N	1347	1347	1347	1347

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table A3

Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on RCI

	(1)	(2)	(3)	(4)
Before anticipation year	-	1.044	-	0.852
(FT × Pre-anticipation)		(1.556)		(1.536)
		[-2.025; 4.114]		[-2.176; 3.881]
Anticipation year	-1.538*	-0.677	-1.361	-0.663
(FT × Anticipation)	(0.926)	(1.622)	(0.914)	(1.623)
	[-3.363; 0.288]	[-3.876; 2.521]	[-3.163; 0.441]	[-3.864; 2.538]
Once a FT	-0.197	0.612	-	-
(FT × After)	(1.078)	(1.737)		
	[-2.323; 1.930]	[-2.814; 4.038]		
Year became an FT	-	-	-1.208	-0.523
(FT × After')			(1.019)	(1.608)
			[-3.217; 0.800]	[-3.694; 2.647]
Year(s) after becoming an FT	-	-	0.787	1.423
(FT × After'')			(1.333)	(1.928)
			[-1.841; 3.415]	[-2.380; 5.225]
R2	0.692	0.692	0.693	0.694
N	1331	1331	1331	1331

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table A4

Fixed effects regression results for difference-in-difference model: Average effect of Foundation status on MRSA rates

	(1)	(2)	(3)	(4)
Before anticipation year	-	-0.008	-	-0.001
(FT × Pre-anticipation)		(0.107)		(0.105)
		[-0.218; 0.203]		[-0.209; 0.206]
Anticipation year	0.022	0.016	0.017	0.016
(FT × Anticipation)	(0.065)	(0.125)	(0.067)	(0.125)
	[-0.107; 0.152]	[-0.231; 0.263]	[-0.114; 0.148]	[-0.231; 0.263]
Once a FT	-0.039	-0.045	-	-
(FT × After)	(0.083)	(0.138)		
	[-0.203; 0.126]	[-0.317; 0.227]		
Year became an FT	-	-	-0.009	-0.010
(FT × After')			(0.074)	(0.127)
			[-0.154; 0.136]	[-0.261; 0.240]
Year(s) after becoming an FT	-	-	-0.068	-0.069
(FT × After'')			(0.108)	(0.153)
			[-0.280; 0.145]	[-0.371; 0.233]
R2	0.711	0.711	0.711	0.711
N	1288	1288	1288	1288

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table A5

Fixed effects regression results for difference-in-difference model: Average effect of Foundation status on mean waiting time

	(1)	(2)	(3)	(4)
Before anticipation year	-	0.780	-	-0.016
(FT × Pre-anticipation)		(2.386)		(2.339)
		[-3.926; 5.486]		[-4.628; 4.597]
Anticipation year	1.731	2.374	2.447	2.434
(FT × Anticipation)	(2.264)	(3.337)	(2.275)	(3.332)
	[-2.734; 6.196]	[-4.207; 8.956]	[-2.040; 6.934]	[-4.136; 9.005]
Once a FT	8.541**	9.146**	-	-
(FT × After)	(3.621)	(4.586)		
	[1.401; 15.680]	[0.103; 18.189]		
Year became an FT	-	-	4.463*	4.450
(FT × After')			(2.666)	(3.627)
			[-0.795; 9.721]	[-2.703; 11.604]
Year(s) after becoming an FT	-	-	12.51**	12.50**
(FT × After'')			(5.080)	(5.721)
			[2.496; 22.533]	[1.221; 23.785]
R2	0.769	0.769	0.771	0.771
N	1326	1326	1326	1326

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table A6

Fixed effects regression results for difference-in-difference model: Average effect of Foundation status on staff witnessing potentially harmful errors, near misses or incidents

	(1)	(2)	(3)	(4)
Before anticipation year	-	0.695	-	0.667
(FT × Pre-anticipation)		(0.793)		(0.813)
		[-0.873; 2.263]		[-0.939; 2.273]
Anticipation year	0.767	1.241	0.785	1.237
(FT × Anticipation)	(0.602)	(0.817)	(0.603)	(0.820)
	[-0.423; 1.957]	[-0.373; 2.856]	[-0.407; 1.977]	[-0.384; 2.858]
Once a FT	0.979	1.409	-	-
(FT × After)	(0.681)	(0.962)		
	[-0.367; 2.324]	[-0.493; 3.310]		
Year became an FT	-	-	0.846	1.281
(FT × After')			(0.687)	(1.020)
			[-0.511; 2.203]	[-0.733; 3.296]
Year(s) after becoming an FT	-	-	1.161	1.542
(FT × After'')			(0.795)	(0.989)
			[-0.409; 2.731]	[-0.411; 3.496]
R2	0.855	0.855	0.855	0.855
N	847	847	847	847

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Estimates are obtained without the first wave of FTs. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table A7

Fixed effects regression results for difference-in-difference model: Average effect of Foundation status on job satisfaction of staff

	(1)	(2)	(3)	(4)
Before anticipation year	-	0.007	-	0.006
(FT × Pre-anticipation)		(0.014)		(0.014)
		[-0.020; 0.034]		[-0.021; 0.033]
Anticipation year	0.002	0.007	0.003	0.007
(FT × Anticipation)	(0.009)	(0.013)	(0.009)	(0.013)
	[-0.015; 0.020]	[-0.019; 0.033]	[-0.014; 0.021]	[-0.019; 0.033]
Once a FT	0.015	0.019	-	-
(FT × After)	(0.011)	(0.015)		
	[-0.006; 0.037]	[-0.010; 0.049]		
Year became an FT	-	-	0.012	0.015
(FT × After')			(0.011)	(0.015)
			[-0.011; 0.034]	[-0.015; 0.046]
Year(s) after becoming an FT	-	-	0.020	0.024
(FT × After'')			(0.013)	(0.016)
			[-0.005; 0.046]	[-0.008; 0.056]
R2	0.683	0.683	0.683	0.683
N	847	847	847	847

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Estimates are obtained without the first wave of FTs. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table A8

Fixed effects regression results for difference-in-difference model:
Average effect of Foundation status on staff intention to leave

	(1)	(2)	(3)	(4)
Before anticipation year	-	0.002	-	0.003
(FT × Pre-anticipation)		(0.020)		(0.020)
		[-0.037; 0.041]		[-0.037; 0.042]
Anticipation year	-0.008	-0.007	-0.008	-0.006
(FT × Anticipation)	(0.015)	(0.021)	(0.015)	(0.021)
	[-0.037; 0.021]	[-0.048; 0.035]	[-0.037; 0.021]	[-0.048; 0.035]
Once a FT	-0.043***	-0.042*	-	-
(FT × After)	(0.016)	(0.022)		
	[-0.075; -0.011]	[-0.085; 0.001]		
Year became an FT	-	-	-0.039**	-0.038
(FT × After')			(0.017)	(0.023)
			[-0.073; -0.006]	[-0.083; 0.008]
Year(s) after becoming an FT	-	-	-0.048**	-0.047*
(FT × After'')			(0.020)	(0.024)
			[-0.088; -0.009]	[-0.094; 0.000]
R2	0.696	0.696	0.696	0.696
N	847	847	847	847

Notes: All models include year and hospital fixed-effects. Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1. Estimates are obtained without the first wave of FTs. Robust standard errors clustered by hospital in parentheses; and confidence intervals in brackets. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.