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Do Hospitals Respond to Greater Autonomy? Evidence from the English NHS

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Do Hospitals Respond to Greater Autonomy? Evidence from the English NHS

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Abstract

Foundation Trusts (FTs) were introduced in the English NHS in 2004/5 and gave NHS Trusts the opportunity to become independent not-for-profit public benefit corporations. Whilst remaining in the public sector, FTs were granted greater autonomy than non-FTs. The reform was intended to create incentives for providers to deliver higher quality services in the most efficient way. This paper examines the impact of the FT policy on hospital performance, as proxied by measures of financial management, quality of care and staff satisfaction. Results suggest that generally FTs perform better than non-FTs. However, these differences appear to be long-standing rather than the effect of the FT policy per se and we find some evidence of a convergence in hospital performance between FTs and non-FTs.

Keywords: Foundation Trusts; hospital reform; performance indicators.

JEL classification: I11; I18.

1. Introduction

Hospital reform is a constant feature of health care systems across the world. The ownership, management, organisation and financing of the provider function are all subject to frequent adjustments, often involving substantial upheaval and significant resource implications. However, the empirical evaluation of such reforms is often absent, which may be due in part to the methodological challenges associated with the evaluation of policy interventions in a non-experimental context. In this paper we examine the effect of a recent hospital reform on the performance of hospitals in the English NHS, using robust econometric methods that allow us to control for the influence of potential confounding factors.

Foundation Trust (FT) status gives NHS hospital Trusts the opportunity to become independent not-for-profit public benefit organisations which, whilst remaining in the public sector, are granted greater autonomy from central control (Health and Social Care Act, 2003). The initial reform was part of a general strategy to shift away from a centrally managed system to one managed locally, being more responsive to patients' needs and allowing NHS staff and local citizens to share in the governance of the organisation through their membership rights.

Applying for FT status has been voluntary to date, but access is dependent on the performance of Trusts: only the best performing Trusts are allowed to apply for FT status. The first phase of policy implementation occurred in 2004/5 when 25 acute Trusts became FTs. The number of FTs increased after 2004/5 rising to 83 acute Trusts in 2008/9. Currently, out of 230 NHS hospitals, 137 have FT status (as at May 2011). It is now intended that all hospitals will eventually become FTs and there are suggestions that further expansion of their freedoms may be forthcoming in future (Department of Health, 2010).

With greater control and flexibility over financial, management and organizational matters, staffing and reward policies, FTs are expected to perform well financially and meet national quality targets. They are also expected to make use of their governance structure and their organisational freedoms to create a good working environment and enhance staff morale. Previous analysis (Marini et al, 2007) investigated whether the policy intervention produced any difference in the financial management of FTs compared with non-FTs. The results suggested that there had not been any significant change following the introduction of FT status. The analysis, however, covered only one year of post policy implementation, with only 10 Trusts being FTs for the entire financial year 2004/5. Thus, these results may have reflected the relatively early stage of the FT process.

FTs as a group are generally reported by their regulator, Monitor, to be doing well in terms of meeting national quality and performance standards. For example, based on clinical quality and service performance, 59% of FTs were rated as low risk for governance concerns and only 8% as high risk at 30 September 2010 (Monitor, 2010). The most significant quality issues were identified as meeting target waiting times for cancer and targets for hospital acquired infection rates. There is limited evidence on 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 (Healthcare Commission, 2005). There is some anecdotal evidence of better staff satisfaction due to conditions such as enhanced roles and more freedom for nursing staff and the potential to grant national pay awards earlier than non-FTs (Taylor, 2007). However, it is not possible through simple comparisons to attribute the above differences to FT status per se.

The aim of this study is to examine whether the new freedoms enjoyed by FTs have produced any difference in the performance of FTs compared with non-FTs since the introduction of the FT policy in 2004/5. We add to the existing evidence on FTs in three ways: a) by updating previous estimates of the impact of the policy on financial performance with the inclusion of a larger number of FTs operating over a longer period of time which has given them greater scope for exploiting their freedoms; b) by examining differences between FTs and non-FTs on aspects of quality, including 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 policy has had any impact on staff and their experience of how their organization works.

Changes similar to those in England have been introduced in other countries, where independently managed hospital organizations have been created over the last two decades. For example, in the 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 (Magnussen et al., 2009). In Italy, major hospitals (so-called *Aziende Ospedaliere*) have been given greater financial and decision-making autonomy, and granted the status of semi-independent hospital firms (France et al., 2005). Similarly, various forms of autonomous hospitals have been created in Spain and Portugal (Saltman et al., 2003).

Sections 2 and 3 present the methods and data. Section 4 describes the results. Section 5 concludes with some observations and discussion.

2. Methods

We use a difference in difference (DID) methodology to test whether there are any differences in the variables of interest between FTs and non-FTs as a response to the FT policy:

$$y_{it} = \beta_0 + \beta_1 FT_i + \sum_{t=1}^{6} \beta_{2t} D_t + \beta_3 X_{it} + \sum_{t=1}^{6} \delta_t FT_i D_t + \varepsilon_{it}$$

where *y* is the key policy indicator for Trust *i* in period *t* and *t* covers the period 2002/3 to 2008/9, FT_i is a dummy variable for FT status where $FT_i = 1$ if the Trust is a FT and 0 otherwise, D_t is a year dummy with the baseline year set to 2003/4 (the year prior to the introduction of FTs), and X_{it} is a vector of covariates. The coefficient β_1 is the effect of being an FT, rather than a non-FT, in 2003/4. The DID coefficients δ_t measure the difference in average performance between FTs and non-FTs in year t, compared with the difference between FTs and non-FTs in 2003/4. Therefore, the difference between FTs and non-FTs in year t is given by $\beta_1 + \delta_t$.

The effect of FT status on FTs is tested by comparing the difference between FTs and non-FTs when the policy intervention was in effect (i.e. in 2004/5 to 2008/9) with the difference between FTs and non-FTs in the year before the introduction of FTs (i.e. in 2003/4). Since 2003/4 is our baseline year, δ_t is the difference between FTs and non-FTs in t against 2003/4, where t = 2004/5 to 2008/9. This is the effect of FT status relative to 2003/4. The effect of FT status in 2002/3 relative to our baseline year is given by: $\delta_t - \delta_{2002/03}$.

An important shortcoming of the DID method is that it relies on the crucial assumption that assignment of Trusts to the treatment and control groups (the FTs and non-FTs, respectively) is not random. However, in the context of the reform under study, this assumption is violated as Trusts can volunteer for FT status (subject to performance requirements). Thus, the estimates provided by the DID method may be biased by the existence of confounding factors. The propensity score matching method gives a useful way to control for the existence of these confounding factors based on the idea that the bias is reduced when the comparison of outcomes is performed using treated and control Trusts that are as similar as possible (Becker and Ichino, 2002). In our study, we use this method to match FTs with non-FTs following the same approach proposed by Marini et al (2008). This method summarizes pre-treatment characteristics of each Trust into a single propensity score, which describes the conditional probability of receiving FT status conditional on pre-treatment characteristics. The balancing property of pre-treatment variables ensures that Trusts with the same propensity score have the same distribution of characteristics independent of treatment status. We therefore use two comparator groups to estimate the effect of the policy intervention: all non-FTs (86 Trusts) and a matched control group of non-FTs generated by the propensity score matching (79 Trusts). We use the Stata program *pscore* by Becker and Ichino (2002) to obtain a propensity score that satisfies the common support assumption. This condition restricts the set of data points over which the test of the balancing property is satisfied to those belonging to the intersection of the supports of the propensity score of treated and control units. Using both control groups of: a) all non-FTs and b) matched non-FTs, we estimate a variety of panel data models.

We ran three types of estimation techniques: pooled ordinary least squares (OLS), fixed-effects (FE) and random-effects (RE) models. Robust standard errors clustered by hospital are employed to account for both heteroskedasticity and the correlation between observations of the same Trust. The fixed-effects specification captures all unobserved inefficiency and quality through individual fixed effects. This model works well if there is sufficient variation in the covariates over time. However, it does not produce any estimates of the time-invariant variables. Moreover, the fixed-effects provide inefficient estimates of the time-variant variables if they do not vary to a great extent across periods. In this study, there is little variation in the covariates over time and the random-effects might provide a more efficient alternative to the fixed-effects. We present results only for random-effects and fixed-effects estimations since OLS results were qualitatively similar to those provided by the random-effects models.

3. Data

The data used for this study cover all acute Trusts in England for the 7 year-period 2002/3 to 2008/9. The database includes 2 years of data prior to the introduction of FTs (2002/3 and 2003/4) and 5 years of data post policy intervention (2004/5 to 2008/9).

3.1 Dependent variables

Over the period of this study, the health quality inspectorate, formerly the Healthcare Commission (subsequently the Care Quality Commission from 2009), developed a system of report cards for hospital Trusts as part of its performance monitoring regime. This was initially reported as a composite measure of success for each organization, namely a "star rating" (zero to three stars). Trusts with a higher "star rating" could apply for FT status. The Care Quality Commission abandoned the star rating system in 2008 in favor of a more general annual "health check." A central theme throughout this period has been the focus on key targets such as financial management, hospital cleanliness and a range of measures around waiting times. Once Trusts obtain FT status, their regulation is taken over by Monitor, the independent regulator.

3.1.1 Measures of financial management

In order to explore the financial management aspect of the FT policy, we focus on two measures: the retained surplus (deficit) measured as a proportion of total expenditure and the Reference Cost Index. Under FT status, the increased freedoms allow FTs to have easier access to public and private sources of capital, to retain financial surpluses and equally to choose not to run a financial surplus every year (Department of Health, 2002). This gives FTs greater autonomy compared with non-FTs, which have more constraints on their access to capital and are required to break even on an annual basis. It might be expected that the greater financial freedoms granted to FTs enables them to take a longer planning horizon when it comes to borrowing and investment decisions, and may give them long run financial advantages. Existing studies suggest that FTs have been successful in generating and accumulating financial surpluses, a process which appears to have been aided by FT status creating an incentive for improved financial practices. However, accumulation has been uneven across FTs (Bojke and Goddard, 2010). FTs have not been using credit facilities to the anticipated extent either, primarily due to a lack of larger-scale investment. Instead, limited investment has been mostly funded from existing surpluses. This has led to stockpiled and unused surplus held by FTs. We wish to test therefore, whether the introduction of the new financial regime has led to any systematic change in the behaviour of decision-makers and subsequently whether retained financial surplus as a proportion of total expenditure is different for FTs relative to non-FTs.

Both retained surplus (deficit) and total expenditure were obtained from the Trust Financial Returns from the Department of Health for non-FTs. This data also covers 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.

Our second choice of financial management measure, the Reference Cost Index (RCI), is an activity weighted average of a Trust's Healthcare Resource Group (HRG) unit costs relative to the national average. With the introduction of HRG casemix funding under Payment by Results, Reference Costs are used to set the national tariff on which Trusts are reimbursed (Audit Commission, 2004). The RCI can be used to determine a Trust's relative efficiency - low cost Trusts will have an RCI below 100, representing higher efficiency, while a high cost Trust will have an RCI above 100 (Department of Health, 2006). FTs with lower casemix costs may be able to exploit benefits from economies of scope (focusing on the mix of services with costs below national tariff) and economies of scale (expanding the volume of activity for services with costs below national tariff). Trusts have strong incentives to increase activity since this will increase income by much more than it increases costs in the short-term and so can help to achieve annual financial balance (Palmer, 2006). These incentives are even stronger in HRGs where marginal cost is below tariff. We therefore test the effect of the FT policy on hospital efficiency by analysing whether HRG weighted unit costs are different for FTs relative to non-FTs before and after the new regime.

Data on RCI for all FTs and non-FTs were compiled from the Department of Health. 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 lengths 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.

3.1.2 Measures of quality of care

We wish to test whether the introduction of FT status has produced any impact in terms of quality of care, especially as there is potential for hospitals to trade-off efficiency and quality where the latter is not easy to observe (Farrar et al., 2009). We use MRSA infection rates, waiting times and NHS staff reports of "near misses" and errors as indicators of quality of care. FTs generally score more highly in quality dimensions than non-FTs. However, this may be more a function of the self-selection of the best-performing Trusts to FT status, rather than a function of FT status per se (Bojke and Goddard, 2010). The methods used in this study allow us to systematically investigate the differences in quality between FTs and non-FTs.

Methicillin-resistant Staphylococcus aureus (MRSA) infection rates have been a major concern to patients and the public in recent years. Acute Trusts have been reporting MRSA rates on a voluntary basis to the Health Protection Agency since 1990. As this data shows, MRSA infections increased dramatically during the 1990s: from fewer than 100 in 1990, to more than 5,000 in 2001 (Health Protection Agency, 2007). Concern about this rise led to the introduction of a mandatory system of reporting since April 2001 and a national target, announced in November 2004, to halve the number of MRSA infections by March 2008 from a 2003/4 baseline. Low MRSA prevalence is often used as a marker for general quality (Ananda-Rajah et al., 2010) and a strong focus on the performance target cleanliness and MRSA prevalence has underscored its policy priority. MRSA infection rates are measured as the reported number of patients diagnosed with MRSA bacteraemia per 10,000 bed-days within the Trust.

Targeting waiting times for elective care has been a salient feature of the English NHS over many years. NHS hospitals were to have no patients waiting for inpatient treatment for more than 15 months by March 2002, 12 months by March 2003, and 3 months by the end of 2008. Performance against target was widely disseminated and managers of poorly performing hospitals were subject to direct penalties (Propper et al., 2010). Previous studies suggest that the imposition of targets led to a fall in waiting times for elective care (Propper et al, 2010; Dimakou et al, 2009). 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.

Near misses and errors are measured by the percentage of staff witnessing potentially harmful errors, near misses or incidents and are derived from the NHS National Staff Survey undertaken by the Care Quality Commission. Data are available from 2003/4 and this indicator 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.

3.1.3 Measures of working environment and staff morale

In order to investigate whether the FT policy has had any impact in terms of working environment and staff morale, we use two further indicators derived from the NHS Staff Survey, namely job satisfaction and intention to leave. FTs are public benefit organisations in which NHS staff share in the governance of the organisation through their membership rights, although staff engagement in FT management has been found to be low (Healthcare Commission, 2005). Nevertheless, FTs are able to recruit and reward staff with more competitive salaries. Also they have more control over appointing directors and have more freedom in employment of new staff. This, along with the potential for staff to have greater local control shaping the business and adapting to local needs, should in principle offer NHS staff in FTs greater job satisfaction. Staff related 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 patient care.

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 Trust 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 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 Trust contributed an amount to the total that was directly proportional to the number of staff employed by that Trust.

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 Trust level to make our analysis more robust by allowing for the influence of potential confounding factors. The data were collected from several sources, including the Hospital Episode Statistics (HES), Hospital Activity Statistics (HAS), the Department of Health (DH) and the Care Quality Commission (CQC). Table 1 provides descriptive statistics of these variables. They include measures on activity (totspells), efficiency in use of resources (alos, daycase_spell and ipd_spell), capital inputs (avbeds), case-mix (emerg_spell, propfem, age014p, age60p), key targets (wait6pv and outwt13wkpc), performance indicators (meanwait, mrsa_rate, surplus_1 and rci_ex_excess) and type of Trust (specialist, teaching). We include the retained surplus from the Trust 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 of care) in the following year, since they may be able to buy extra activity (Jacobs and Dawson, 2003). We also use a dummy variable for Strategic Health Authorities to account for further regional differences in the country. We use different sets of covariates X_{it} in each regression depending on their significance and to avoid endogeneity.

We calculate the variance inflation factors (VIFs) from pooled OLS models to test for signs of multicollinearity (as the regressors do not change when using fixed-effects, random-effects or OLS, we can use collinearity diagnostics from pooled OLS to test for this). Previous studies suggest that values of VIF greater than 10 are signals of a high degree of collinearity (Wooldridge, 2006). This indicates that more than 90% of the variation in that variable is explained by other variables. In our specifications, all the explanatory variables were well below 10.

We therefore explore the robustness of our results using the seven dependent variables, two different control groups and three estimation methods.

4. Regression results

Table 2 presents the results from the logit model used to match FTs with non-FTs. A wide range of variables were explored to estimate the propensity score. These include performance measures, key targets, staffing data, activity, capacity, expenditure, salaries and income. As Table 2 shows, the final model yields a Pseudo R-squared of 0.265. The probability of becoming an FT in the pre-treatment year (2003/4) is associated with a shorter length of stay (as proxied by total inpatient days/total inpatient spells) and higher financial management (achievement of the financial position shown in the 2003/4 Plan, submitted to the Department of Health, without the need of unplanned financial support). FTs also perform better in terms of hospital cleanliness and both measures of waiting times (higher proportion of patients waiting less than 6 months for inpatient or day case visit and higher proportion of outpatients seen within 13 weeks of GP referral).

The matching method produced five blocks of 142 Trusts for which the average propensity score of treated and control units does not differ. The five blocks of Trusts under common support were pooled together to produce a matched control group of 74 non-FTs against 68 FTs with the balancing property satisfied.

Tables 3-8 compare the results from the random-effects with those derived from the fixed-effects to check the stability of the coefficient estimates across specifications.

4.1 Retained surplus (deficit)

Figure 1 (a) plots the raw data for FTs and the comparator groups over time for retained surplus (deficit) as a proportion of total expenditure. As this figure shows, between 2002/3 and 2005/6 surplus remains relatively stable for FTs, whereas it declines rapidly for non-FTs. Over the period 2006/7-2008/9, both FTs and non-FTs experience a rise in surplus and this increase is higher for non-FTs than for FTs. Overall, retained surplus is always higher (and mostly positive) for FTs.

Table 3 presents the results of the regression analysis for retained surplus. As this table shows, the FT coefficients are always positive and highly significant, suggesting that in 2003/4 FTs have on average a higher surplus than non-FTs. Relative to the baseline year (2003/4), the difference between FTs and the control groups is significantly lower in the pre-treatment period (2002/3), but increases significantly in 2004/5 and 2005/6. This trend is reversed over the period 2006/7 to 2008/9, when the difference between FTs and non-FTs tends to converge to the pre-treatment level and the differences are insignificant. Results are very similar when using different control units.

Figure 3 (a) plots the retained surplus of FTs relative to all non-FTs between 2002/3 and 2008/9. We use the estimated coefficients from the RE regression models. As this graph shows, in 2003/4 FTs experience a better financial performance relative to all non-FTs. The difference between FTs and non-FTs increases until 2005/6 and then declines again thereafter and converges to the pre-treatment level. These estimates are always significant except in 2002/3 (when the confidence intervals overlap zero).

4.2 Reference Cost Index (RCI)

Figure 1 (b) shows the raw data for the RCI. From 2003/4 to 2004/5, the RCI decreases for FTs, whereas it remains relatively stable for the comparator units. There is an increase in the RCI for all groups between 2004/5 and 2005/6. The RCI also rises for non-FTs from 2005/6 to 2006/7. Finally, between 2007/8 and 2008/9 non-FTs experience a decline in the RCI, while for FTs the trend remains relatively stable over time. Overall, the RCI is always lower (and mostly below 100) for FTs.

Table 4 reports the regression results for the RCI. As this table shows, the FT coefficients are always negative and insignificant, suggesting that in 2003/4 FTs achieve on average a lower RCI than their comparator groups (i.e. are more efficient) but not significantly. The DID estimates indicate that the difference in the RCI between FTs and non-FTs remains relatively stable between 2002/3 and 2003/4, then increases significantly in 2004/5 and 2006/7, and then declines again from 2007/8.

Figure 3 (b) graphs the difference in the RCI between FTs and all non-FTs in each year between 2002/3 and 2008/9. The plot suggests that FTs perform better than non-FTs in terms of a lower RCI

during the whole period of study and that this difference becomes significant from 2004/5. The difference between these types of organisations increases significantly to 2006/7 and then converges to the pre-treatment level in the last period of analysis.

4.3 MRSA rates

The raw data plotted in Figure 1 (c) show that the MRSA rates are relatively stable for all groups of Trusts between 2002/3 and 2006/7. The difference between FTs and the comparator groups slightly declines in 2007/8 and 2008/9, when MRSA rates decrease in all hospitals but slightly more in non-FTs than in FTs. Overall, FTs always have lower MRSA rates.

Table 5 gives the regression results for the MRSA rates. As this table indicates, the FT coefficients are always negative and highly significant with respect to all comparator groups. This suggests that in 2003/4 FTs have on average lower MRSA rates than non-FTs. The DID coefficients are insignificant, suggesting that, relative to the baseline year 2003/4, there are no significant changes over time.

Figure 3 (c) graphs the difference in the MRSA rates between FTs and all non-FTs between 2002/3 and 2008/9. As this graph shows, FTs achieve significantly lower MRSA rates than all non-FTs over the entire period of study. The difference ranges from -0.24 to -0.35 between 2002/3 and 2006/7. The gap slightly decreases in the last years of analysis (from -0.23 to -0.15 between 2007/8 and 2008/9).

4.4 Mean waiting times (days)

The raw data in Figure 1 (d) shows that both FTs and non-FTs experience a dramatic reduction in waiting times over the period. However, the decrease is higher for non-FTs than for FTs and the gap tends to vanish in 2008/9.

Table 6 presents the regression results for waiting times. As this table shows, in 2003/4 waiting times are on average significantly lower for FTs than for non-FTs. The gap between FTs and non-FTs is relatively stable between 2002/3 and 2003/4, whereas it declines in the following years. Relative to 2003/4, the difference in waiting times between these types of organisations reduces significantly in 2004/5, 2005/6, 2007/8 and 2008/9.

Figure 3 (d) plots the estimated difference in waiting times between FTs and non-FTs over the period of study. Consistent with the results shown in Table 6, FTs report significantly shorter waiting times than non-FTs in 2002/3 and 2003/4. However, this difference reduces over time and becomes insignificant in 2008/9.

4.5 Staff witnessing potentially harmful errors

Figure 2 (a) plots the raw data for “staff witnessing potentially harmful errors, near misses or incidents”. As this figure shows, between 2003/4 and 2007/8 both FTs and non-FTs experience a sharp decrease in the proportion of NHS staff witnessing errors. In 2006/7, the reduction is higher for non-FTs than for FTs. Between 2007/8 and 2008/9, the proportion of NHS staff witnessing errors slightly increases for all Trusts, but more for FTs than for non-FTs.

Table 7 presents the regression results for the proportion of staff witnessing errors. As this table shows, the FT coefficients are negative and significant relative to all comparator groups, suggesting that in 2003/4 NHS staff at FTs witness a significantly lower proportion of errors. The difference between FTs and non-FTs decreases over time and the DID coefficients are statistically significant in 2006/7 and 2008/9.

Figure 4 (a) plots the difference between FTs and all non-FTs for each year between 2003/4 and 2008/9. As this graph shows, FTs have a lower proportion of staff witnessing “potentially harmful errors, near misses or incidents” over the whole period of study. The difference is statistically significant in 2003/4, 2004/5, 2005/6 and 2007/8, but declines over time and converges to zero in 2008/9.

4.6 Staff job satisfaction

Figure 2 (b) graphs the overall mean scores of the various aspects of NHS staff job satisfaction, which includes the recognition that they receive and the extent to which their work is valued by the Trust. All Trusts follow the same trend over time. For both FTs and non-FTs, job satisfaction decreases between 2003/4 and 2007/8, and then increases again in the last year of analysis. Overall, job satisfaction is higher in FTs.

Table 8 gives the regression results for job satisfaction. The FT coefficients are always positive and statistically significant, suggesting that in 2003/4 on average NHS staff are more satisfied in FTs than in non-FTs. The DID coefficients are always insignificant, indicating that the difference between FTs and non-FTs does not change significantly over time relative to the baseline year.

Figure 4 (b) graphs the difference between FTs and all non-FTs over the period 2003/4 to 2008/9. FTs report higher job satisfaction scores than all non-FTs and results are significant over the whole period of study. The trend remains fairly stable between 2003/4 and 2006/7 and slightly increases in the last period of analysis.

4.7 Intention of staff to leave

Finally, Figure 2 (c) plots the trends on intention of staff to leave for FTs and the control groups between 2003/4 and 2008/9. All Trusts experience an increase in the intention of staff to leave until 2007/8, and this rise is higher for non-FTs than for FTs. Intention of staff to leave decreases for all Trust groups during the last year of analysis. Overall, the intention of staff to leave is lower in FTs than non-FTs.

Table 9 reports the regression results for intention of staff to leave. As the FT coefficients show, on average there is a significantly lower intention to leave in FTs than non-FTs in 2003/4. The DID coefficients are always negative suggesting that the difference between FTs and non-FTs increases over time relative to 2003/4. This effect is also significant in 2007/8 and 2008/9.

Figure 4 (c) graphs the difference between FTs and all non-FTs for each year between 2003/4 and 2008/9. The gap increases over time and the difference is always negative and statistically significant over the whole period of study.

5. Discussion and conclusions

Using a panel of data over the period 2002/3 to 2008/9, this study has tested whether the FT policy has produced any difference in the performance of FTs relative to non-FTs. Our methods ensure that we are isolating the impact of the policy in a robust way by controlling for selection bias and separating out pre-existing differences between groups and trends over time affecting all Trusts. As such, we avoid spurious results that may be obtained through simple comparisons between FT and non-FT groups or from before and after studies. Although our method requires us to restrict our choice of variables to those where comparable data are available for the entire period for FTs and non-FTs, we are nevertheless able to focus on key financial, quality and staff satisfaction indicators which represents a major advance on previous analyses.

FTs were expected to achieve higher financial performance by enjoying greater control and flexibility over financial, management and organisational matters. Previous studies suggest that there had not been any significant change in the financial performance of hospitals following the introduction of FT status (Marini et al., 2008). In this study, we have tested whether previous results reflected the relatively early stage of the policy implementation by the inclusion in our analysis of a larger number of FTs operating over a longer period of time. Results confirm that the FT policy per se has made no change in the financial performance of FTs relative to non-FTs, as measured in terms of surplus and RCI. The increasing difference between FT and non-FT groups that we find in the first period of analysis (before 2007/8) can be interpreted as the result of long-standing differences between these types of organisations, which might have played a more important role in a challenging financial environment. The gap between FTs and non-FTs gradually disappears in the last period of study, as non-FTs achieve greater improvements in terms of higher surplus and lower RCI.

We also tested whether the introduction of FT status has produced any impact in terms of quality of patient care. This is an important consideration if FTs are potentially able to achieve enhanced financial performance by skimping on quality. A high-profile investigation of failures in one FT concluded that the focus of the Board was mainly on financial savings and securing FT status and that it lost sight of its responsibilities to deliver acceptable standards of health care (Healthcare Commission 2009), a finding which led to subsequent tightening of the regulation of quality by Monitor. Using data on MRSA infections reported by acute Trusts between 2002/3 and 2008/9, we explored the trends of MRSA rates over time and tested the difference between FT and non-FT groups before and after the introduction of the FT policy. We find that FTs perform significantly better than non-FTs during the whole period of study. Both these types of organisations achieve a noticeable reduction in MRSA rates in 2007/8 and 2008/9, halving the rates reported in 2003/4. The reduction in MRSA infections is slightly higher for non-FTs than for FTs and the difference between these types of organisations declines in the last period of analysis but not significantly. These findings suggest that the introduction of the FT policy has made no impact on the quality of patient care as measured by lower MRSA rates. The difference in MRSA rates between FTs and non-FTs pre-exist the introduction of FT status, and the general decline is probably due to greater pressure on all acute Trusts to reduce their infection rates and closer monitoring.

We examine whether the introduction of FT status has made any difference in the performance of hospitals as measured by waiting times. Results suggest that over time both FTs and non-FT groups have experienced better performance in terms of shorter waiting times, and this reduction is higher for non-FTs than for FTs. As a result, the difference between FTs and non-FTs, which was negative and statistically significant in the first period of analysis, is narrowed over time and becomes insignificant in 2008/9. We infer that the FT policy has made no difference on the ability of FTs to shorten waiting times for elective care. There were long-standing differences between FTs and non-FTs, which appear to reduce over time as non-FTs achieve greater improvements under higher waiting time pressure.

Similar results are also found in terms of witnessing near misses and errors. We find that the average proportion of NHS staff witnessing “potentially harmful errors, near misses or incidents” declines over time for both FT and non-FT groups. This effect is higher for non-FTs than for FTs and the difference between the two types of organisations converges to zero and becomes insignificant in 2008/9.

Finally, we find that both FT and non-FT groups experience better performance in terms of higher staff job satisfaction and lower intention of staff to leave in 2008/9, reversing the previous trend between 2003/4 and 2007/8. On average, FTs report significantly better scores than non-FTs during the whole period of study. Relative to the difference between FTs and non-FTs in 2003/4, over time there were no significant changes in terms of staff job satisfaction, whereas the difference in terms of intention of staff to leave seems to increase significantly in the last two periods of analysis, although in 2008/9 this is only at the 10% level. For staff job satisfaction these results suggest that, once again, the FT policy per se appears to have made no change as the difference between FTs and non-FTs pre-exist the introduction of the policy. The positive and significant impact that we find on the staff intention to leave indicator suggests that to the degree that such intentions may in part reflect quality of the environment and the care provided, then FT policy may have had a positive effect, albeit very small. FTs may be able to attract and retain more satisfied and positive staff who also provide higher quality care (Dixon, 2002). The fact that the other indicator of staff satisfaction which relates to the type of environment in which staff work (e.g. feedback from managers, freedom over work, responsibility level) shows no significant differences, suggests that perhaps lower intention to leave in FTs is related instead to differences in other terms of employment such as salary levels, but there is limited evidence on the extent of such differences in FTs (Healthcare Commission, 2005; Taylor, 2007).

The current policy focus on extending FT status to all Trusts is based to a substantial extent on the belief that FTs will deliver "high productivity, greater innovation, better care and greater job satisfaction" (Department of Health, 2010). The precise mechanisms through which these gains are to be achieved are not transparent and our analysis has shown that, with the possible exception of staff intention to leave, there is little evidence that the superior performance of FTs that may be inferred from simple comparisons is a true reflection of FT performance. Indeed, in terms of the variables used as measures of efficiency, quality of patient care and staff satisfaction with the working environment, differences between FTs and non-FTs appear to be the result of long-standing differences between these groups, rather than being attributable to the FT policy per se. The tendency for performance of FTs and non-FTs to converge in the last period of analysis may reflect the impact of parallel policies, including Payment by Results and the extension of Patient Choice. In a system of nationally fixed prices (PbR), both FTs and non-FTs receive incentives to manage costs more efficiently. The complementary policy of increased patient choice might have fostered competition between providers on the basis of quality.

Despite not being able to identify a substantial positive "FT effect", our analysis certainly does not suggest that FTs are doing any worse than non-FTs. So the issue perhaps is more one of whether the extra costs involved in setting up and regulating FTs are justified. In terms of the latter, the new regulatory structures propose that the FT regulator, Monitor, will take on the economic regulation of all Trusts in future, which is likely to be a more efficient approach than having the separate regulatory bodies that have existed to date. However, the governance arrangements required for FTs have not been trivial and the running costs of the governance process were estimated at '*circa* £200,000 per Trust' leading to estimated annual costs of over £25 million (House of Commons Health Committee, 2008). Our analysis could not test whether FTs bring other benefits such as service innovation and, although there are indeed examples of FTs introducing novel treatment paths and service arrangements (Audit Commission, 2008; House of Commons Health Committee, 2008), the problem of attributing these to the FT policy remains, as it is difficult to know whether the Trusts would have been able to make such changes anyway. There is also limited robust research evidence to date on the degree to which the broader aims of "social ownership" as expressed by the government at the launch of FTs have been achieved, especially in terms of accountability to local communities (Bojke and Goddard, 2010).

The FT reform was part of the general strategy to shift away from a centrally managed system and devolve freedom and responsibility to lower levels of decision-making. Delegating greater operational and financial freedoms from central government to local health care providers has been a theme echoed by health care system reforms around the world in recent years. Therefore, the evaluation of the FT policy is of importance beyond the UK context and for all health care systems that are currently experiencing similar transitions, or plan to, in the future.

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Table 1. Descriptive statistics and variable definitions, pooled data, years 2002/3-2008/9

Variable	Definition	Source	N	Mean	Std dev	Min	Max
Surplus	Retained surplus (deficit) as proportion of total expenditure (£s)	DH and Annual Accounts	1193	-0.002	0.031	-0.217	0.112
Rci_excess	Reference Cost Index excluding excess bed days adjusted by the Market Forces Factor (MFF)	DH	1204	100.437	10.561	74.674	165
Mrsa_rate	MRSA patients per 10,000 bed-days	CQC	1186	1.419	0.788	0	5.469
Meanwait	Mean waiting time (days)	HES	1190	77.344	31.749	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	3.110	3.730
Staff_turnover	Intention of staff to leave in next 12 months	CQC	1028	2.667	0.140	2.150	3.170
FT	Dummy = 1 if Trust = FT, 0 otherwise	Derived-time invariant	1204	0.483	0.500	0	1
FT_matched	Dummy = 1 if Trust = FT, 0 otherwise in the matched control group	Derived-time invariant	1158	0.502	0.500	0	1
2002/3	Dummy = 1 if year = 2002/3, 0 otherwise	Derived-time invariant	1204	0.146	0.353	0	1
2003/4	Dummy = 1 if year = 2003/4, 0 otherwise	Derived-time invariant	1204	0.144	0.351	0	1
2004/5	Dummy = 1 if year = 2004/5, 0 otherwise	Derived-time invariant	1204	0.144	0.351	0	1
2005/6	Dummy = 1 if year = 2005/6, 0 otherwise	Derived-time invariant	1204	0.144	0.351	0	1
2006/7	Dummy = 1 if year = 2006/7, 0 otherwise	Derived-time invariant	1204	0.142	0.349	0	1
2007/8	Dummy = 1 if year = 2007/8, 0 otherwise	Derived-time invariant	1204	0.140	0.348	0	1
2008/9	Dummy = 1 if year = 2008/9, 0 otherwise	Derived-time invariant	1204	0.140	0.348	0	1
Totspells	Total inpatient spells	HES	1192	70955	39861	1040	232033
Daycase_electives	Day cases as proportion of elective admissions	Derived from HES	1192	0.518	0.114	0	0.969
Emerg_spell	Emergency admissions per total inpatient spells	Derived from HES	1192	0.348	0.099	0.002	0.618
Alos	Average length of stay	HES	1192	5.245	1.714	0.7	23.1
Propfem	Proportion of female patients	HES	1192	0.528	0.072	0.125	0.882
Age014p	Proportion of patients under 15 years of age	HES	1186	0.136	0.124	0	0.942
Age60p	Proportion of patients 60 years or older	HES	1186	0.412	0.102	0	0.704
Specialist	Dummy = 1 if Trust = specialist, 0 otherwise	Derived-time invariant	1204	0.116	0.321	0	1
Teaching	Dummy = 1 if Trust = teaching, 0 otherwise	Derived-time invariant	1204	0.141	0.348	0	1
London	Dummy = 1 if Strategic Health Authority = London, 0 otherwise	Derived-time invariant	1204	0.184	0.388	0	1
Ipdays_spell[a]	Inpatient days per spell	Derived from HES	173	3.858	0.959	0.505	8.313
Finman[a]	Indicator of financial management	CQC	173	0.5145	0.782	-1	1
Cleanliness[a]	Indicator of hospital cleanliness	CQC	173	3.5316	0.638	2	5
Wait6m[a]	Percentage of patients waiting less than 6 months for an inpatient or day-case admission	DH	173	92.304	5.103	64.71	100
Outwt13wk[a]	Percentage of outpatients seen within 13 weeks of GP referral	DH	173	92.304	5.103	64.71	100

[a] *Covariates used in the Logit model, 2003/4 data only. Annual Accounts: FT Annual Report and Accounts. DH: Department of Health. CQC: Care Quality Commission. HES: Hospital Episode Statistics.*

Table 2. Logit model for the selection of the appropriate comparator group

lpdays_spell	-0.449**
	(-2.04)
Finman	1.022***
	(3.64)
Cleanliness	0.973***
	(2.65)
Wait6m	0.079*
	(1.68)
Outwt13wk	0.057**
	(2.27)
Constant	-13.970***
	(-3.14)
N	173
R-squared	0.265

t statistics in parentheses.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 3. Regression results for difference in difference model: Average effect of Foundation status on retained surplus (deficit)

	Retained surplus (deficit)			
	All Non-FTs		Matched Non-FTs	
	RE	FE	RE	FE
FT	0.00824***	0	0.00688**	0
	(3.06)	(.)	(2.57)	(.)
2002/3	0.00716*	0.00640	0.00519	0.00431
	(1.84)	(1.55)	(1.32)	(1.03)
2004/5	-0.0104**	-0.00918**	-0.0105***	-0.00939**
	(-2.56)	(-2.20)	(-2.74)	(-2.37)
2005/6	-0.0293***	-0.0257***	-0.0303***	-0.0275***
	(-4.96)	(-4.33)	(-5.20)	(-4.69)
2006/7	-0.000818	0.000459	-0.00122	-0.00106
	(-0.18)	(0.09)	(-0.26)	(-0.20)
2007/8	0.0179***	0.0204***	0.0174***	0.0186***
	(4.54)	(3.87)	(4.21)	(3.51)
2008/9	0.0174***	0.0213***	0.0178***	0.0200***
	(3.56)	(3.34)	(3.48)	(3.10)
DID 2002/3-2003/4	-0.00738*	-0.00842**	-0.00552	-0.00613
	(-1.82)	(-2.01)	(-1.34)	(-1.46)
DID 2004/5-2003/4	0.00744*	0.00620	0.00765*	0.00641
	(1.65)	(1.34)	(1.76)	(1.43)
DID 2005/6-2003/4	0.0306***	0.0296***	0.0319***	0.0312***
	(4.80)	(4.57)	(5.01)	(4.83)
DID 2006/7-2003/4	0.00673	0.00625	0.00708	0.00725
	(1.14)	(1.09)	(1.16)	(1.21)
DID 2007/8-2003/4	0.00589	0.00495	0.00651	0.00606
	(1.33)	(1.04)	(1.44)	(1.26)
DID 2008/9-2003/4	-0.00112	-0.00236	-0.00151	-0.00194
	(-0.23)	(-0.44)	(-0.29)	(-0.35)
Constant	0.0369*	0.0356	0.0294	0.0418
	(1.85)	(0.90)	(1.57)	(1.02)
N	1112	1112	1072	1072
R-squared (overall)	0.278	0.104	0.284	0.202

t statistics in parentheses.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.
FT is a dummy variable for FT hospitals.
2002/3, etc. are dummy variables for 2002/3, etc. (baseline year is 2003/4).
DID 2002/3-2003/4, etc. are interactions of FT dummy and year dummies.
Covariates used in the models: Totspells, Alos, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Meanwait, Rci_excess, Mrsa_rate, Specialist, Teaching, London.

Table 4. Regression results for difference in difference model: Average effect of Foundation status on RCI

	RCI			
	All Non-FTs		Matched Non-FTs	
	RE	FE	RE	FE
FT	-1.850	0	-1.525	0
	(-1.56)	(.)	(-1.25)	(.)
2002/3	-0.306	-0.107	0.161	0.329
	(-0.35)	(-0.12)	(0.19)	(0.35)
2004/5	0.605	0.331	0.590	0.421
	(0.94)	(0.50)	(0.87)	(0.62)
2005/6	2.035**	1.760**	1.696*	1.569*
	(2.36)	(2.02)	(1.91)	(1.73)
2006/7	4.270***	3.635**	3.572***	3.129**
	(3.21)	(2.54)	(2.67)	(2.18)
2007/8	2.915**	1.927	2.553*	1.854
	(2.04)	(1.22)	(1.75)	(1.15)
2008/9	2.213	1.090	2.006	1.248
	(1.35)	(0.59)	(1.21)	(0.67)
DID 2002/3-2003/4	-0.685	-0.896	-1.165	-1.408
	(-0.60)	(-0.77)	(-1.03)	(-1.23)
DID 2004/5-2003/4	-2.054*	-1.998*	-2.085*	-2.075*
	(-1.84)	(-1.79)	(-1.85)	(-1.84)
DID 2005/6-2003/4	-1.685	-1.503	-1.409	-1.275
	(-1.50)	(-1.38)	(-1.24)	(-1.15)
DID 2006/7-2003/4	-3.053**	-2.919**	-2.505*	-2.424*
	(-2.12)	(-2.06)	(-1.74)	(-1.71)
DID 2007/8-2003/4	-1.733	-1.410	-1.570	-1.317
	(-1.24)	(-1.02)	(-1.10)	(-0.93)
DID 2008/9-2003/4	-0.447	-0.0393	-0.514	-0.179
	(-0.31)	(-0.03)	(-0.35)	(-0.12)
Constant	91.46***	95.25***	90.06***	96.12***
	(11.20)	(9.36)	(11.14)	(9.14)
N	1149	1149	1109	1109
R-squared (overall)	0.354	0.120	0.328	0.109

t statistics in parentheses.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.
FT is a dummy variable for FT hospitals.
2002/3, etc. are dummy variables for 2002/3, etc. (baseline year is 2004/5).
DID 2002/3-2004/5, etc. are interactions of FT dummy and year dummies.
Covariates used in the models: Totspells, Alos, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Meanwait, Surplus_1, Mrsa_rate, Specialist, Teaching, London.

Table 5. Regression results for difference in difference model: Average effect of Foundation status on MRSA rates

	MRSA cases per 10,000 bed-days			
	All Non-FTs		Matched Non-FTs	
	RE	FE	RE	FE
FT	-0.309***	0	-0.308***	0
	(-2.90)	(.)	(-2.81)	(.)
2002/3	0.0304	0.00203	0.0379	0.0168
	(0.47)	(0.03)	(0.56)	(0.23)
2004/5	-0.0828	-0.0536	-0.0678	-0.0407
	(-1.20)	(-0.77)	(-0.96)	(-0.57)
2005/6	-0.0586	0.00578	-0.0302	0.0340
	(-0.75)	(0.07)	(-0.38)	(0.43)
2006/7	-0.118	-0.0875	-0.0705	-0.0454
	(-1.36)	(-1.00)	(-0.80)	(-0.51)
2007/8	-0.546***	-0.514***	-0.535***	-0.516***
	(-6.31)	(-5.85)	(-6.12)	(-5.78)
2008/9	-0.906***	-0.869***	-0.873***	-0.857***
	(-8.60)	(-7.78)	(-8.00)	(-7.45)
DID 2002/3-2003/4	0.0497	0.0519	0.0429	0.0351
	(0.58)	(0.60)	(0.49)	(0.40)
DID 2004/5-2003/4	0.0743	0.0498	0.0623	0.0385
	(0.80)	(0.54)	(0.66)	(0.41)
DID 2005/6-2003/4	0.0961	0.0639	0.0698	0.0385
	(1.06)	(0.71)	(0.76)	(0.42)
DID 2006/7-2003/4	-0.00499	-0.0302	-0.0432	-0.0687
	(-0.05)	(-0.28)	(-0.39)	(-0.62)
DID 2007/8-2003/4	0.0790	0.0490	0.0817	0.0557
	(0.77)	(0.47)	(0.78)	(0.53)
DID 2008/9-2003/4	0.177	0.140	0.161	0.133
	(1.47)	(1.14)	(1.31)	(1.06)
Constant	1.867***	1.353*	1.904***	1.305*
	(4.06)	(1.89)	(3.98)	(1.80)
N	1149	1149	1109	1109
R-squared (overall)	0.423	0.050	0.416	0.046

t statistics in parentheses.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.
FT is a dummy variable for FT hospitals.
2002/3, etc. are dummy variables for 2002/3, etc. (baseline year is 2004/5).
DID 2002/3-2004/5, etc. are interactions of FT dummy and year dummies.
Covariates used in the models: Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Meanwait, Surplus_1, Specialist, Teaching, London.

Table 6. Regression results for difference in difference model: Average effect of Foundation status on mean waiting time

	Mean waiting time (days)			
	All Non-FTs		Matched Non-FTs	
	RE	FE	RE	FE
FT	-20.00***	0	-16.26***	0
	(-4.54)	(.)	(-4.04)	(.)
2002/3	8.416***	8.016***	9.206***	8.627***
	(4.63)	(4.25)	(4.80)	(4.41)
2004/5	-12.43***	-12.53***	-12.30***	-12.42***
	(-5.93)	(-5.92)	(-5.66)	(-5.60)
2005/6	-20.44***	-20.25***	-20.13***	-19.91***
	(-8.87)	(-8.42)	(-8.48)	(-7.96)
2006/7	-19.05***	-19.23***	-18.64***	-18.54***
	(-4.65)	(-4.47)	(-4.30)	(-4.08)
2007/8	-35.27***	-34.91***	-34.59***	-33.79***
	(-12.46)	(-11.13)	(-11.72)	(-10.16)
2008/9	-51.05***	-50.14***	-49.65***	-48.00***
	(-14.41)	(-12.27)	(-13.59)	(-11.36)
DID 2002/3-2003/4	-0.547	-0.511	-1.296	-1.024
	(-0.23)	(-0.22)	(-0.55)	(-0.44)
DID 2004/5-2003/4	4.507*	4.703*	4.336*	4.526*
	(1.86)	(1.90)	(1.74)	(1.77)
DID 2005/6-2003/4	5.981**	6.138**	5.497**	5.654**
	(2.22)	(2.25)	(1.99)	(2.01)
DID 2006/7-2003/4	3.410	3.688	2.857	3.070
	(0.75)	(0.81)	(0.60)	(0.64)
DID 2007/8-2003/4	8.326**	8.575**	7.398*	7.687*
	(2.12)	(2.17)	(1.85)	(1.92)
DID 2008/9-2003/4	16.94***	17.25***	15.25***	15.51***
	(2.99)	(3.00)	(2.66)	(2.68)
Constant	123.7***	130.4***	113.9***	132.9***
	(7.37)	(4.57)	(7.64)	(4.50)
N	1149	1149	1109	1109
R-squared (overall)	0.417	0.208	0.436	0.208

t statistics in parentheses.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.
FT is a dummy variable for FT hospitals.
2002/3, etc. are dummy variables for 2002/3, etc. (baseline year is 2004/5).
DID 2002/3-2004/5, etc. are interactions of FT dummy and year dummies.
Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Surplus_1, Specialist, Teaching, London.

Table 7. Regression results for difference in difference model: Average effect of Foundation status on staff witnessing potentially harmful errors, near misses or incidents

	Staff witnessing potentially harmful errors, near misses or incidents (%)			
	All Non-FTs		Matched Non-FTs	
	RE	FE	RE	FE
FT	-2.339***	0	-2.271***	0
	(-3.41)	(.)	(-3.30)	(.)
2004/5	-3.415***	-3.486***	-3.250***	-3.380***
	(-8.22)	(-8.09)	(-7.61)	(-7.57)
2005/6	-7.846***	-7.740***	-7.578***	-7.524***
	(-17.60)	(-16.96)	(-17.63)	(-16.82)
2006/7	-12.30***	-12.18***	-12.14***	-12.11***
	(-19.76)	(-19.55)	(-19.20)	(-19.07)
2007/8	-17.05***	-17.11***	-16.87***	-17.08***
	(-31.28)	(-29.28)	(-29.96)	(-28.30)
2008/9	-14.68***	-14.99***	-14.27***	-14.85***
	(-22.70)	(-21.56)	(-22.69)	(-21.13)
DID 2004/5-2003/4	0.715	0.683	0.591	0.572
	(1.11)	(1.04)	(0.91)	(0.85)
DID 2005/6-2003/4	1.076	1.011	0.857	0.811
	(1.55)	(1.45)	(1.24)	(1.17)
DID 2006/7-2003/4	1.831**	1.659**	1.764**	1.580*
	(2.25)	(2.03)	(2.12)	(1.91)
DID 2007/8-2003/4	1.105	1.024	1.070	0.981
	(1.47)	(1.39)	(1.39)	(1.31)
DID 2008/9-2003/4	2.606***	2.585***	2.380***	2.428***
	(3.22)	(3.23)	(2.92)	(2.99)
Constant	58.93***	42.65***	59.59***	42.91***
	(20.16)	(5.67)	(19.79)	(5.61)
N	993	993	960	960
R-squared (overall)	0.735	0.470	0.735	0.462

t statistics in parentheses.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.
FT is a dummy variable for FT hospitals.
2002/3, etc. are dummy variables for 2002/3, etc. (baseline year is 2004/5).
DID 2002/3-2004/5, etc. are interactions of FT dummy and year dummies.
Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Meanwait, Surplus_1, Specialist, Teaching, London.

Table 8. Regression results for difference in difference model: Average effect of Foundation status on job satisfaction of staff

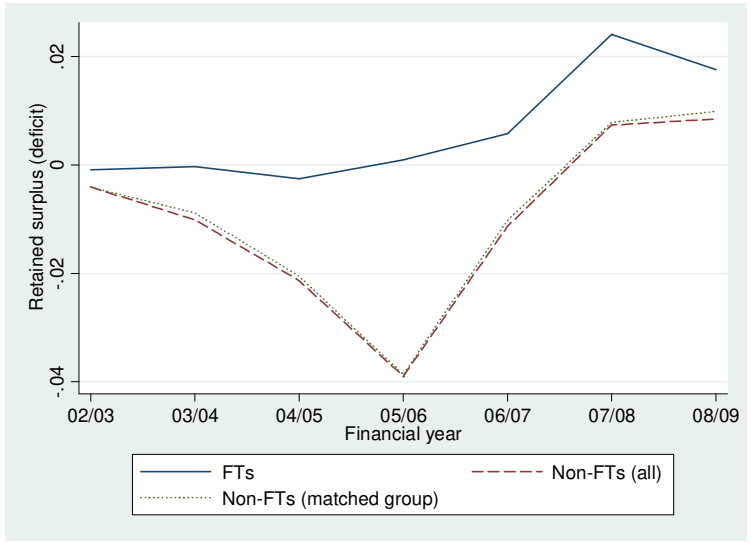
	Job satisfaction of staff			
	All Non-FTs		Matched Non-FTs	
	RE	FE	RE	FE
FT	0.0271**	0	0.0252*	0
	(2.02)	(.)	(1.87)	(.)
2004/5	-0.00833	-0.00855	-0.00608	-0.00557
	(-0.88)	(-0.90)	(-0.62)	(-0.57)
2005/6	-0.0790***	-0.0806***	-0.0798***	-0.0799***
	(-8.52)	(-8.42)	(-8.23)	(-8.09)
2006/7	-0.0793***	-0.0814***	-0.0834***	-0.0835***
	(-6.80)	(-6.69)	(-6.82)	(-6.60)
2007/8	-0.0919***	-0.0906***	-0.0960***	-0.0937***
	(-7.35)	(-6.77)	(-7.35)	(-6.82)
2008/9	-0.0159	-0.0102	-0.0183	-0.0112
	(-1.15)	(-0.67)	(-1.26)	(-0.73)
DID 2004/5-2003/4	0.00370	0.00324	0.00152	0.000911
	(0.30)	(0.26)	(0.12)	(0.07)
DID 2005/6-2003/4	0.00219	0.00312	0.00325	0.00368
	(0.19)	(0.27)	(0.27)	(0.31)
DID 2006/7-2003/4	0.00214	0.00304	0.00569	0.00583
	(0.16)	(0.22)	(0.40)	(0.41)
DID 2007/8-2003/4	0.0152	0.0150	0.0184	0.0188
	(1.10)	(1.08)	(1.31)	(1.33)
DID 2008/9-2003/4	0.00730	0.00575	0.00899	0.00756
	(0.53)	(0.41)	(0.63)	(0.53)
Constant	3.549***	3.684***	3.540***	3.680***
	(69.18)	(29.96)	(70.09)	(29.85)
N	993	993	960	960
R-squared (overall)	0.356	0.141	0.349	0.172

t statistics in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.
FT is a dummy variable for FT hospitals.
2002/3, etc. are dummy variables for 2002/3, etc. (baseline year is 2004/5).
DID 2002/3-2004/5, etc. are interactions of FT dummy and year dummies.
Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Meanwait, Surplus_1, Specialist, Teaching, London.

Table 9. Regression results for difference in difference model: Average effect of Foundation status on staff intention to leave

	Staff intention to leave			
	All Non-FTs		Matched Non-FTs	
	RE	FE	RE	FE
FT	-0.0496***	0	-0.0483***	0
	(-2.83)	(.)	(-2.73)	(.)
2004/5	-0.00514	0.0000234	-0.00834	-0.00364
	(-0.39)	(0.00)	(-0.62)	(-0.27)
2005/6	0.0367***	0.0476***	0.0347**	0.0440***
	(2.69)	(3.41)	(2.49)	(3.08)
2006/7	0.0601***	0.0696***	0.0653***	0.0720***
	(3.80)	(4.14)	(3.93)	(4.14)
2007/8	0.0994***	0.108***	0.100***	0.107***
	(5.48)	(5.45)	(5.31)	(5.15)
2008/9	-0.0299	-0.0210	-0.0273	-0.0212
	(-1.60)	(-0.91)	(-1.38)	(-0.90)
DID 2004/5-2003/4	-0.00327	-0.00417	0.000191	-0.000805
	(-0.18)	(-0.23)	(0.01)	(-0.04)
DID 2005/6-2003/4	-0.00881	-0.0114	-0.00694	-0.00875
	(-0.48)	(-0.63)	(-0.38)	(-0.47)
DID 2006/7-2003/4	-0.0276	-0.0288	-0.0314	-0.0314
	(-1.30)	(-1.35)	(-1.44)	(-1.44)
DID 2007/8-2003/4	-0.0466**	-0.0469**	-0.0454**	-0.0462**
	(-2.24)	(-2.28)	(-2.12)	(-2.18)
DID 2008/9-2003/4	-0.0374*	-0.0379*	-0.0372*	-0.0370*
	(-1.82)	(-1.85)	(-1.85)	(-1.85)
Constant	2.651***	2.582***	2.663***	2.605***
	(32.66)	(11.77)	(32.82)	(11.77)
N	993	993	960	960
R-squared (overall)	0.367	0.035	0.366	0.051

t statistics in parentheses.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.
FT is a dummy variable for FT hospitals.
2002/3, etc. are dummy variables for 2002/3, etc. (baseline year is 2004/5).
DID 2002/3-2004/5, etc. are interactions of FT dummy and year dummies.
Covariates used in the models: Totspells, Daycase_electives, Emerg_spell, Propfem, Age014p, Age60p, Meanwait, Surplus_1, Specialist, Teaching, London.



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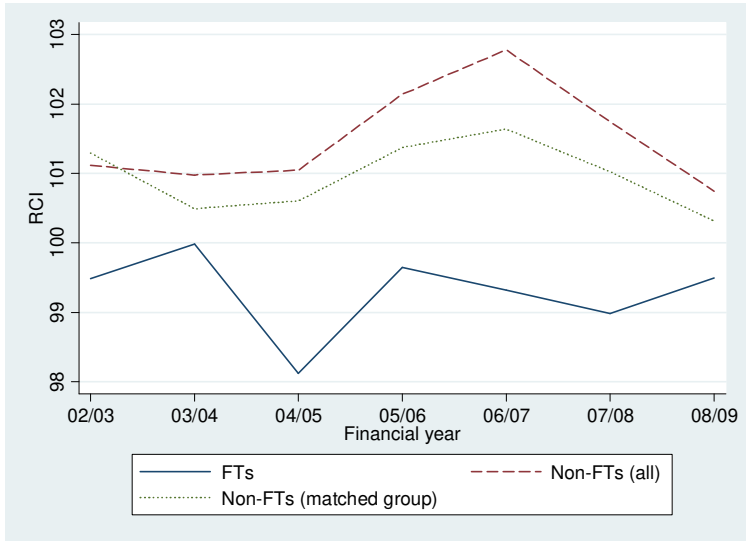

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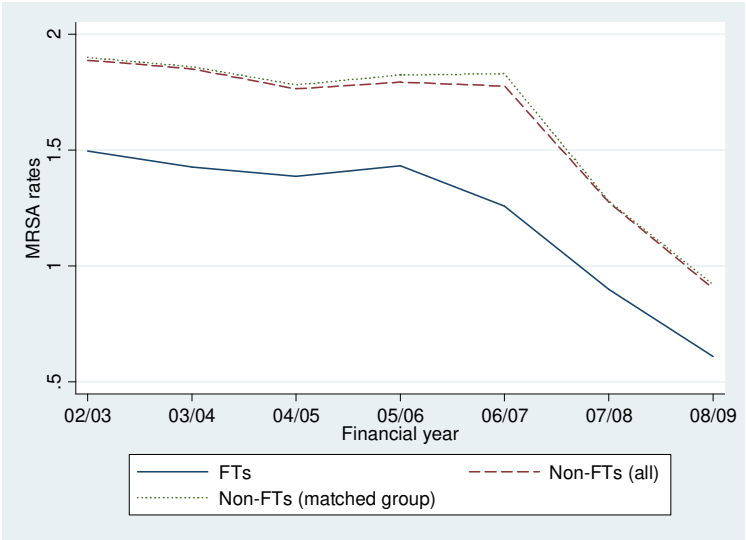

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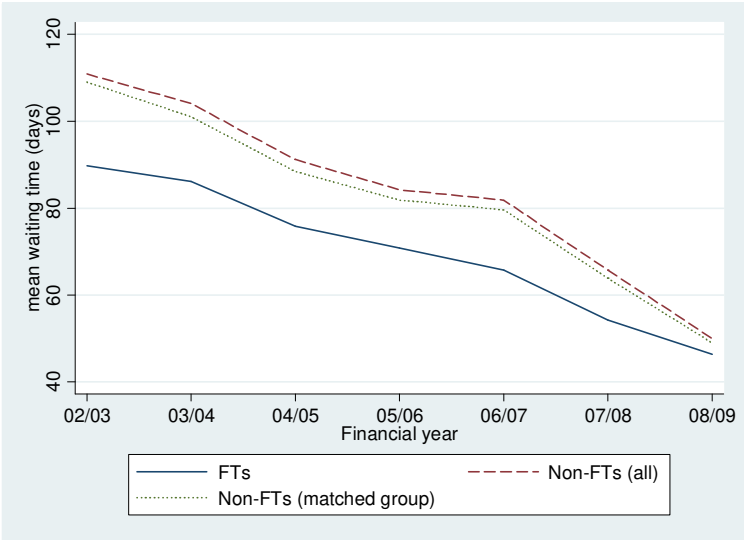
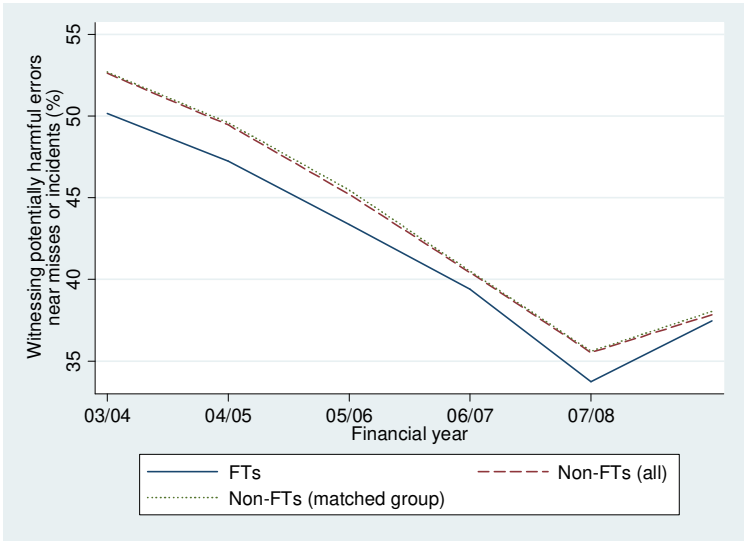


(d)

Figure 1. Trends in performance for FTs and the control groups in 2002/3-2008/9:(a) retained surplus (deficit), (b) RCI, (c) MRSA rates, and (d) mean waiting time (days).



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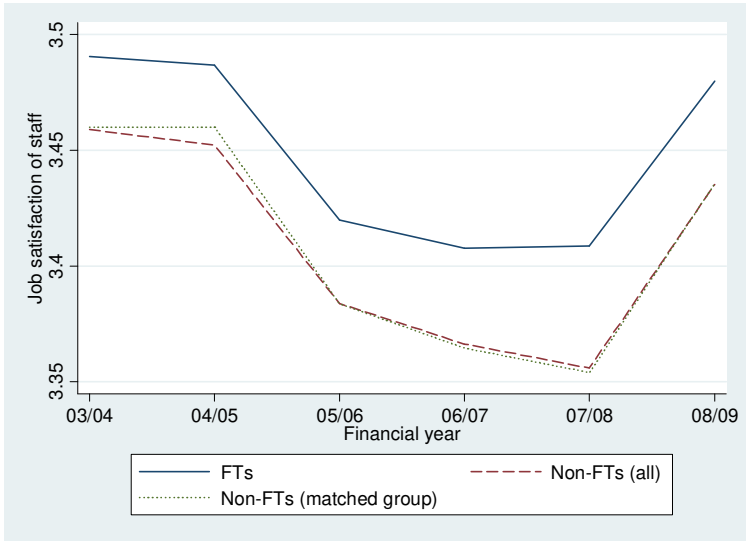

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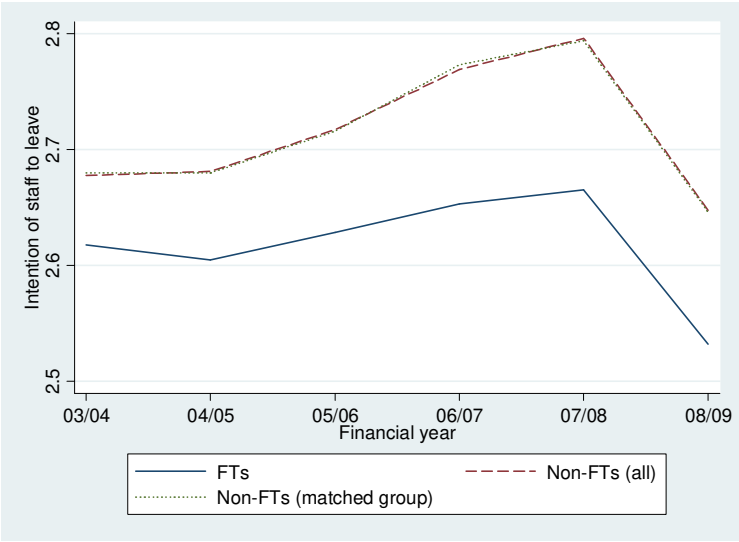
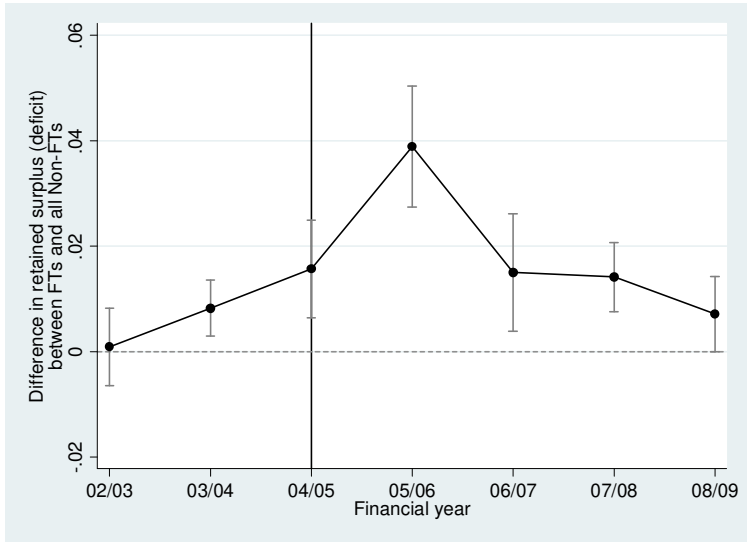
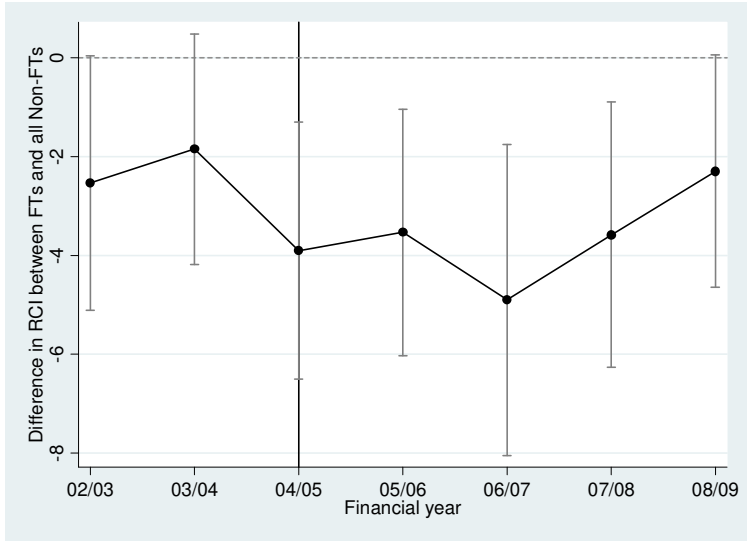


(c)

Figure 2. Trends in performance for FTs and the control groups 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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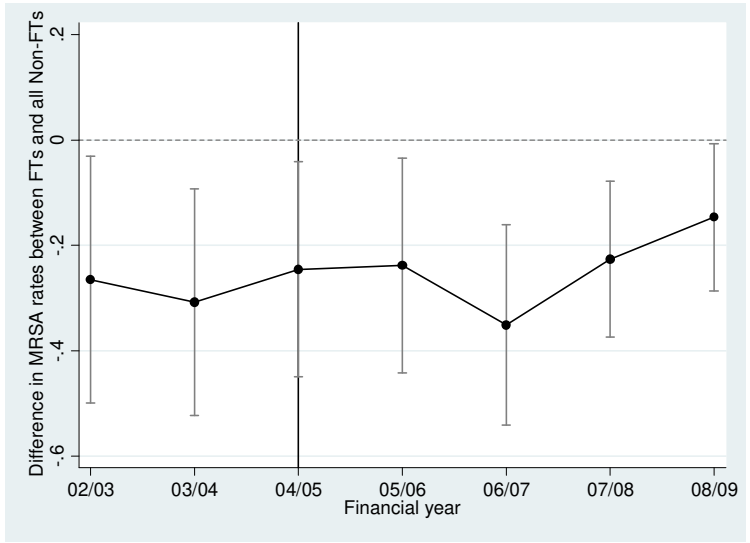

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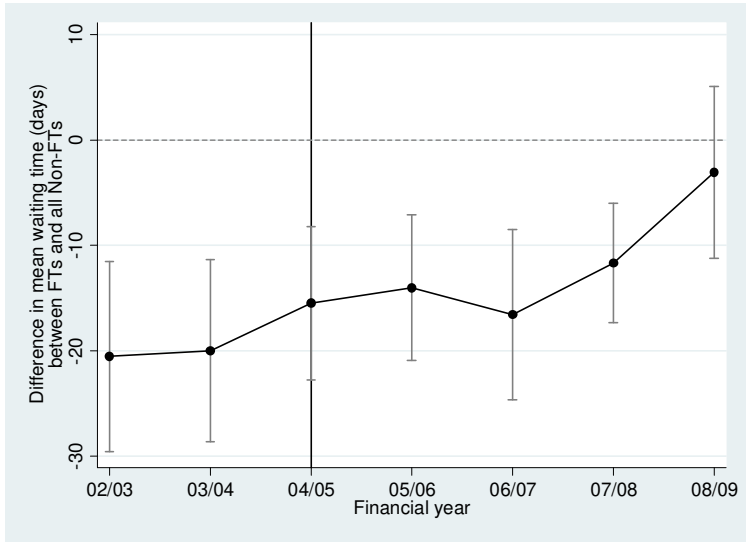
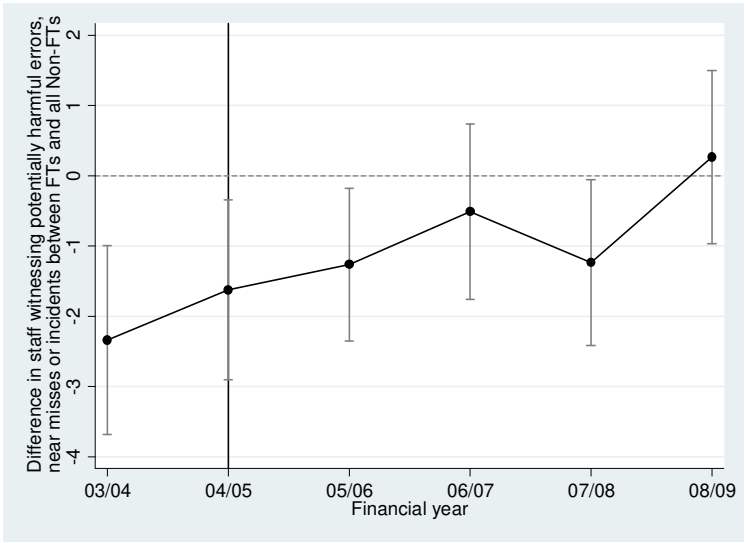


(d)

Figure 3. Estimated differences between FTs and all Non-FTs: RE results for (a) retained surplus (deficit), (b) RCI, (c) MRSA rates, and (d) mean waiting time (days).



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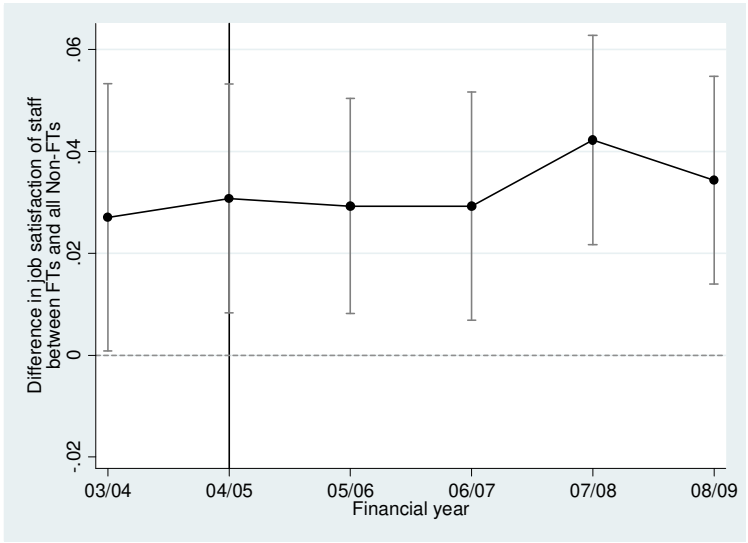

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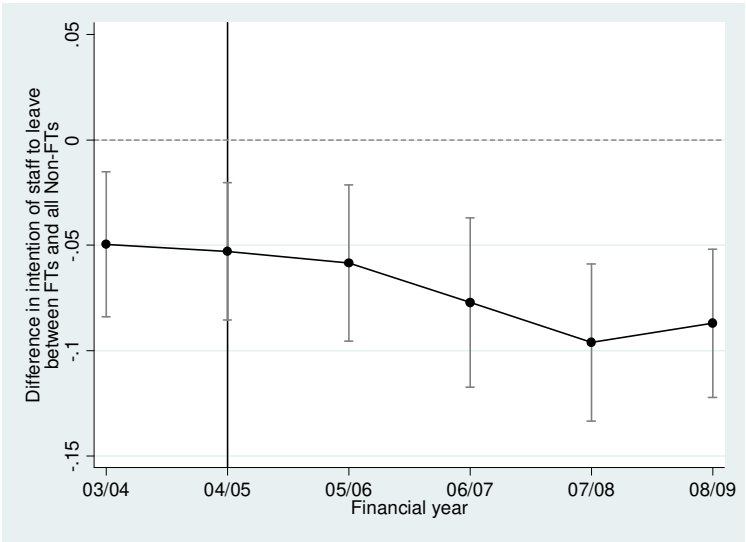

(c)

Figure 4. Estimated differences between FTs and all Non-FTs: RE results for (a) witnessing potentially harmful errors (b) job satisfaction of staff and (c) intention of staff to leave.