Organizational Form and the Adoption of New Medical Technologies in the Hospital Industry

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March 10, 2012

PRELIMINARY AND INCOMPLETE

Abstract

This paper investigates the effects of organizational form on the adoption of new medical technologies in the hospital industry. There are significant differences in the technology adoption rates of not-for-profit and for-profit hospitals, with not-for-profit hospitals having higher adoption rates. The results in this paper indicate that, once we control for (i) market characteristics and (ii) hospital characteristics, organizational form has little effect on the decision to adopt a new technology. The main determinants of the adoption of new medical technologies include location, teaching status, scale of operations, and the share of Medicare patients.

1. Introduction

The co-existence of public, private non-profit, and private for-profit health care organizations has been a prominent topic of interest in health policy research. Research seeks to explain to what extent non-profit or for-profit status determines the incentives and, consequently, the behavior and performance of hospitals. Discerning the difference, if one exists, is crucial for understanding the health care industry as it changes over time. Historically, the hospital industry has been dominated by non-profit and public hospitals. However, during the last three decades, the market share of for-profit hospitals has been increasing. As discussed in Cutler (2000), the changing composition of the hospital industry could have important implications for the costs and quality of health if for profit hospitals behave differently than do non-profit and public hospitals.

Alongside trends in organizational form, another phenomenon that receives attention in the literature is the nature of adoption and utilization of technology. The decision to adopt new technologies in hospitals is multi-faceted and many studies have forwarded different possible factors which motivate this process. For instance, competition for physicians and patients, the provision of high quality healthcare, and gains from increased efficiency and effectiveness are just a few of the reasons a hospital might seek to acquire a new technology (Friedman and Goes 2000).

The intersection of these two topics motivates the basic question in this paper: Is there a difference between non-profit and for-profit hospitals in the decision to adopt a new medical technology? Discovering the difference, if any exists, holds implications for health care costs and quality. Estimates on technology-related increases in the growth of healthcare spending are varied, but substantial across the board (Smith, Heffler, and Freeland 2006). The question of whether technology is worth the cost is a source of much debate. Regardless, the rising cost of health care has become a dominant issue among political and scholarly pundits alike. Given the relation between technology adoption and higher costs, a potential difference in non-profits and for-profits impacts the direction of cost growth as conversions in organizational form increase. The same idea holds true for the quality of care. While the quality of care is difficult to measure and quantify, the general perception is that better technology equals better care.

The last change in the health care system from retrospective to prospective payment spurred the conversion of many hospitals from non-profit to for-profit status as a response to future uncertainty about revenue (Cutler and Horwitz 1999). In light of the Patient Protection and Affordable Care Act of 2010, discerning the difference between the two organizational forms becomes all the more pertinent to an informed understanding of the health sector as it evolves. Knowing how that difference impacts the adoption of technology, one of the largest if not the largest vehicle of change within the sector, is the crucial contribution this paper hopes to make to the current literature.

2. Literature Review

The Decision to Adopt Technology:

As primary providers of health care, hospitals must respond to the needs of the population they serve, the physicians they employ, and pressures from funding sources. At the same time, hospitals must fight to survive in a competitive environment in part determined by their ability to balance not only the benefits of new innovations but also the vast costs. It is in this context that hospitals must decide what and how much technology to adopt. Researchers often look to market pressures, organizational attributes, and environmental characteristics for an explanation of hospital's decisions to adopt new technologies.

Environmental conditions represent the category comprised of demand factors such as the needs of the local population, physician influence, competition, and regulation to name a few. The significance of population medical need, as well as physician-induced demand, is generally low but positive. The role of competition between hospitals has mixed effects. First, competition for patients may instigate the use of technology as a signal to potential customers of high-quality service. Second, lower insurance compensation might have the opposite effect of lowering innovation; generally, higher managed care penetration is associated with lower adoption of high-tech innovation (Baker 2001, Rye and Kimberly 2007).

In investigating environmental characteristics, geographic links tends to encourage the adoption of technology, particularly forcing late-adopters to adapt their pace to match the early-adopters (Kimberly and Rye 2007, Goes and Park 1997). One exception however is in Multiple Hospital Systems (MHS) where singular ownership may lead groups of hospitals to avoid the duplication of expensive technology. While Dranove and Shanley (1995) and Dranove, Durkac and Shanley (1996) find no decrease in high-tech services for MHS, their study focuses only on California hospitals which are notoriously technology oriented (Friedman et al 2000).

More so than any other correlate, organizational factors are the focal point of literature on technology adoption. Perhaps the two features found most significant and positively related to innovation are size and slack resources. Larger organizations have more resources to draw upon, more people to serve, and operate under economies of scale and therefore stand more to gain from innovation (Nystrom et al 2002); Slack resources protect organizations from financial hazards and encourage creativity while allowing for more latitude in spending decisions; unsurprisingly more slack accompanies are more innovation (Rye and Kimberly 2007). For instance, Cutler et al (2009) find that hospitals with higher operating margins were more likely to adopt multislice spiral computed tomography (MSCT).

Finally, the type of organization is an attribute, which figures heavily in the literature as a proposed determinant in the adoption of new technology. Type of organization includes "teaching status, control status, specialty/primary care practice, religious affiliation, and government ownership" (Kimberly and Rye 2007). Government ownership tends to have a negative impact, if any, on technology adoption, attributed to the bureaucratic nature of its organization as well as a tighter budget (Friedman 2000). Teaching status seems to have little actual impact although the theoretical argument would be teaching hospitals might have higher adoption because of the higher physician influence and Romeo et al (1984) does find some supporting evidence to this link (Friedman 2000, Lenzo 2007, Teplensky 1995). Included under the heading of type of organization is non-profit/for-profit status, the topic of the next two sections, which discuss (i) the difference in non-profit and for-profit decision making and (ii) direct evidence on differences in technology adoption based upon organizational status.

Differences in non-profit and for-profit decision making

The modeling of differences in behavior of non-profit versus for-profit firms has been a focal point of research in industrial organization, particularly in the sector of health care. What makes the issue worth interest is the co-existence of three different forms (non-profit, for-profit, and publically owned) in significant proportions (Burgess and Wilson 1996). Why no form has come to dominate leads researchers to probe the potential differences in incentives and through incentives, behavior. At the heart of the distinction is the existence of the non-distribution constraint for non-profit hospitals, i.e. they are legally prevented from retaining profits.

Modeling profit-maximizing behavior has been the business of economics from the beginning, but non-profit activity represents a territory less understood by classical economics. In his article investigating the role of uncertainty in medical care markets, Arrow (1963) noted the surprising predominance of non-profits, and that it "implies a preference on the part of some group, whether donors or patients, against the profit motive in the supply of hospitals". In looking at the role of altruism and organization, Rose-Ackerman (1996) noted three reasons a non-profit might have an advantage over a for-profit; 1) donors might be more willing to donate to non-profit institutions and tax exemptions lower costs, 2) Non-profits may be a response to asymmetries faced by consumers (which would be consistent with Arrow's theory) and therefore attract more customers, and 3) non-profits might provide more product differentiation, providing a more valuable range of products.

This explains why non-profits may persist in a market but leaves the question of why an entrepreneur would choose the form. Anticipating this, Rose-Ackerman (1996) writes "potential entrepreneurs and funding sources will select the sector only if they have goals other than single-minded profit maximization." Glaeser and Shleifer (2001) look specifically at this issue and conclude that non-profits are a way of committing to "softer incentives," i.e. less incentive to profit maximize, which will be most useful when quality is difficult to observe, altruism or public concern motivates decisions, or it is costly for consumers and donors to change firm; unsurprisingly, the health care sector displays characteristics which correspond to these incentives.

Theory seems to indicate an expected difference between non-profits and for-profits because of factors such as differences in objectives and environmental conditions. Empirically, the data is mixed. In examining the increased trend in conversions of non-profit hospitals, Needleman (1999) concluded that generally, non-profits provided higher amounts of both community care and quality, but acknowledged that the reasons were poorly understood. Sloan (1998) argues the opposite, that the organizational status of the hospital is independent of the charitable care provided or the quality of care. Additionally, Sloan (1998) finds that conversion from non-profit to for-profit has little effect on either measure. In general, neoclassical theory suggests that non-profits will offer higher quality than for-profits (Burgess and Wilson 1996). These findings represent merely the tip of the iceberg on organizational literature, however they provide the valuable insight that theory expects a difference in behavior, whether or not data confirms it.

The impact of organizational form on technology adoption

Taking into account the intersection between theories on why hospitals adopt technology and how non-profits differ from for-profits, different conclusions may be reached. In general, there seems to be more support to the belief that non-profits will have higher adoption of technology. Perhaps the strongest argument lies in the belief that non-profits are motivated by some sort of mission to fulfill public needs and as such, will adopt more technology in order to provide the maximum social benefit (Burgess and Wilson 1996, Needleman 1999). Similar to this is the idea that non-profits are less commercial than for-profits, desire to provide more product differentiation, and therefore might adopt technology that may not be strictly profitable (Needleman 1999, Sloan 1998, Rose-Ackerman 1996). For instance, Horwitz (2005) finds that non-profits more likely than for-profit hospitals to offer a greater number of services which are labeled "relativly unprofitable." Conversely, in looking at the adoption of cost-increasing vs cost-decreasing technologies, Romeo, Wagner, and Lee (1984) found profit status to have no significant effect.

As to the impact of hospital characteristics, both size and slack resources are positively associated with technology adoption (Kimberly and Rye 2007); Non-profits tend to be larger than for-profits, although that trend has significantly decreased over time, and as of 2000, were 30% larger by bed size (David 2005); additionally, at looking at technological efficiency differences, Burgess and Wilson (1996) note that non-profits tend to have more slack resources. All these indicate an environment more conducive to greater innovation.

Glaeser (2002) theorized that non-profit organizations, including hospitals, may be captured by the interests of their employees over time. Given the consideration previous literature has paid to the possible effects of physician-induced demand for technology, if non-profit hospitals cater more to their physicians, one would expect to see a more tech-heavy organization. Less recently, Hoffman, Irwin, and Digman (1996) argued that non-profits were more attuned to the political climate created by outside stakeholders, rather than physicians as Glaeser suggested, but confirmed a similar hypothesis, that non-profits seem to adopt more technology.

The impact of competition on both technology adoption and organizational form are mixed and therefore explanation of its effect is limited. The penetration of HMOs has been shown to have a negative impact on the adoption of technology, but if, as suggested, non-profits have objective functions which are less sensitive to revenue, the impact would be lower (Rose-Ackerman 1996, Hirth, Chernew, and Orzol 2000). Schlesinger et al (1997), following the previous literature, believed that in the presence of more competition on price such as a cut in reimbursement, behavior would converge; the study determined that non-profit hospitals were more likely to offer innovative services in the absence of competition. In the presence of competition however, non-profits as well as for-profits were likely to not only drop some services, but also to offer more innovative services.

At the same time, many researchers have posited that the behavior of non-profits and for-profit hospitals is slowly converging; Cutler and Horwitz (1999) find that non-profits follow for-profits in exploiting Medicare loopholes, which leads them to question whether they might follow suit if for-profits cut costs. Indeed, Sloan (1998) labels non-profits increasingly commercial and in response to higher competitive pressures, finds that they might reduce the amount of charity care provided, an action which could imply a decreased commitment to the mission of providing public service. However, the same study concluded that "with rare exceptions, there were no statistically significant differences in adoption rates between nonprofit and for-profit hospitals." Particularly pertinent, Duggan (2002) studied the effects of competition between non-profit and for-profits and concluded that non-profits tend to mimic the behavior of for-profits when there is "active" competition.

In light of recent trends, an investigation into the topic of technological adoption would yield significant benefits. Theory indicates divergent incentives between the two forms that should translate into different behaviors, with implications for cost, quality and access of care. Literature on the topic is varied in terms of method, findings, and significance. The goal of this article is to improve upon the knowledge surrounding the issue of the decision to adopt medical technology between non-profits and for-profits by conducting a study that 1) more carefully controls for maker characteristics and 2) investigates a relatively large set of technologies (as most studies look at a single technology such as MRI).

3. The Data

The sample

The data comes from American Hospital Association Annual Survey of Hospitals for the year 2006. Observations were dropped if missing data on outcome or control variables. The sample is restricted to all "general and medical surgical" community hospitals which responded to the AHA survey and operated for the full year. A community hospital refers to a non-federal, short-term, general or specialty hospital open to the public (American Hospital Association). To more carefully estimate the effect of organizational form, we restricted the sample to “General Medical and Surgical Hospitals”. Hence, the sample of hospitals used in this paper contains 3841 hospitals. The sample selection is illustrated in Table 1.

[Table 1]

Hospital Characteristics

The hospital characteristics used in this study include organizational form (for-profit (FP), non-prifit (NFP), and public (PUB)), total admissions as measures of scale of operations (ADMSSIONS), location (RURAL), teaching status (TEACHING), system or network membership (SYSTEM, NETWORK), the number of Medicare and Medicaid admissions as a fraction of total admissions (MEDICARE, MEDICARE), and whether the hospital is contract managed (CONTRACT MANAGED).

The distribution of hospitals across organizational form and hospital characteristics such as location, teaching status, and system and network membership is summarized in the Table 2. The distribution of hospitals across organizational form and measures of scale of operations is illustrated in Table 3.

Table 4 presents summary statistics for the hospital control variables (mean and standard deviation). As illustrated in the table, FP hospitals are more likely to locate in urban areas, less likely to be teaching hospitals, more likely to be members of a system, less likely to be members of a network, and less likely to be contract managed. In addition, FP hospitals tend to be smaller than NFP hospitals but bigger than PUB hospitals.

[Table 4]

Technology variables

In addition, we collected information on the types of technologies offered by a hospital. There a total 15 technology variables. Each variable is a binary variable equal to one if the hospital offers or has the given technology. The technology variables include Image-Guided radiation therapy (IGRT), Robotic surgery (ROBO), and Positron emission tomography/CT (PETCT), to name a few. The full list of the technology variables used in this study is contained in in Table 5, which in addition contains the percentage of hospitals with the given technology, for all hospitals and across organizational form.

[Table 5]

For the most part, the technologies involve the use of radiation (i) as a treatment for cancer or (ii) as a diagnostic procedure. The difference in technology adoption rates is computed and summarized in Table 6, which indicates that adoption rates are highest for NFP hospitals. In addition, FP hospitals have higher adoption rates than PUB hospitals. Moreover, the differences in adoption rates are statistically significant for most technology variables. Hence, it appears that NFP hospitals are more likely to adopt a given technology than FP hospitals.

[Table 6]

4. Empirical Analysis

The differences in technology adoption rates between not-for-profit and for-profit hospitals cannot be necessarily attributed to organizational form, mainly because the location decision, scale of operations, and organizational form are endogenous. As is well known, for-profit hospitals are less likely to be teaching hospitals, on average have a smaller scale of operations, and are more likely to locate in certain markets. In addition, markets differ in terms of their characteristics such as population, income, and rates of uninsured individuals, all of which may affect the decision to adopt a given technology.

Therefore, the approach we take in this paper is to estimate a market fixed effects model and to control for hospital characteristics. In particular, we estimate the following model:

$$Y_i^k = \alpha_j + \beta HCON_i + \delta X_i + \epsilon_{ij} \qquad (1)$$

where Y_{ij}^k is a binary variable equal to one if hospital i adopts technology k, α_j is a market fixed effect, $HCON_i = (NFP, PUB)$ is the organizational form of the hospital (FP is the omitted category), X_i is a vector of control variables for the hospital characteristics and $\beta = (\beta_{NFP}, \beta_{PUB})$ is the vector of coefficients of interest to be estimated, which measures the effects of organizational form on the decision to adopt a given technology. Finally, we used three different variables for the market fixed effects, which are the Hospital Referral Region (HRR), the Hospital Service Area (HSA), and Core Based Statistical Area (CBSA) of the hospital (This is similar to a metropolitan statistical area).

The model described in Equation (1) was estimated separately for each technology variable $k \in \{1, \cdots, 15\}$. In the base estimation, we use HRR to control for market characteristics. The estimated coefficients for NFP and PUB are listed in Table 7a, where columns (1) and (2) contain the estimates with no controls, columns (3) and (4) contain the estimates controlling for market characteristics, and columns (5) and (6) contain the estimates controlling for market and hospital characteristics. For simplicity, we only report the estimated coefficient and the level of statistical significance. The complete regression results, for each technology variable, can be found in the Appendix in Tables A1-A15, columns (1), (2) and (4).

[Table 7a]

As a robustness check, we also estimated the model using HSA to control for market characteristics. The results are presented in Table 7b, where again columns (1) and (2) contain the estimates with no controls, columns (3) and (4) contain the estimates controlling for market characteristics, and columns (5) and (6) contain the estimates controlling for market and hospital characteristics.

[Table 7b]

Examination of the individual technology regressions indicates that HSA may be a better control for market characteristics. The estimated coefficients in Table 5b, columns (5) and (6) are all statistically insignificant, except for SPECT. Therefore, we conclude that, once we control for the type of hospital, scale of operations, and market characteristics, organizational form has little effect on the decision to adopt a given technology.

As an additional robustness check, we estimated the model only for urban hospitals. The results are presented in Table 8, where columns (1) and (2) use HRR to control for market characteristics, columns (3) and (4) use HSA to control for market characteristics, and columns (5) and (6) use CBSA to control for market characteristics.

[Table 8]

Finally, we constructed a technology index T measuring the total number of the technologies in this study adopted by a hospital. Formally,

$$T_i = \sum_{k=1}^{15} Y_i^k$$

Then, we estimated the following model

$$T_i = \alpha_j + \beta HCON_i + \delta X_i + \epsilon_{ij} \quad (2)$$

The results are presented in Table 9a, which restricts the sample to urban hospitals. There is some evidence that, overall, not-for-profit hospitals may have higher rates of adoption and public hospitals may have lower rates of adoption than for-profit hospitals. However, the variables that are consistently statistically significant are the teaching variable and the scale of operations variable. In particular, teaching hospitals and hospitals with a greater scale of operations are more likely to adopt a given technology and have a higher overall technology index.

[Table 9a]

Finally, we estimated a similar technology index only for "Therapeutic technologies" (Technologies 1-5) and of "Diagnostic Technologies" (Technologies 7-15). The results are presented in Table 9b and Table 9c, respectively. As a summary, compared to NFP hospitals, FP hospitals are more likely to offer "Robotic Surgery" (ROBO) and less likely to offer "Intensity Modulated Radiation Theraphy" (IMRT), "Shaped Beam Ratiadion System" (SBRS), "Diagnostic Radioisotope Facility" (DRF), and "Single Photon Emission Computed Tomography" (SPECT).

5. Conclusion

The weak significance of organizational form in the regression makes it unlikely it is in itself is a large factor in the decision to adopt a new technology. The defining characteristic of a non-profit is the non-distribution constraint that makes it illegal for hospitals to redistribute profits. In addition to the legal constraint, non-profit status has a moral connotation that leads some to predict that a more community-oriented organization will adopt technology associated with higher societal gain. However, non-profits, while experiencing some tax breaks, essentially face the same competitive market pressures as for-profits to survive in any industry. While non-profits may be motivated by more altruistic goals, the long-term success of either organizational form depends upon their ability to provide a valuable service to society.

Based off the results of the regression, teaching hospitals are more likely to adopt new medical technologies. In addition, as expected, the scale of operations is positively related to the adoption of new medical technologies. The extent to which these variable associated with higher technology adoption are intertwined makes it difficult to determine the independent impact of any variable. While teaching status is more significant than non-profit status in the regressions, the vast majority of teaching hospitals are non-profits; the high-tech nature of teaching hospitals is unsurprising, but does not capture the relationship between non-profits, teaching hospitals, and innovation. If teaching hospitals are more likely to be non-profits as the result of some characteristic specific to non-profits, then the regression lacks a significant explanatory variable. The same is true for other variables such as the scale of operations. While these may better predict the likelihood of a certain technology being adopted, they may not be independent of organizational status.

The results of the regression indicate that observed differences in technology adoption between non-profits and for-profits depend heavily on the scale of operations and the teaching status of a hospital. The regression results would indicate that a simple conversion alone to for-profit status would have little impact upon a hospitals likelihood of adopting a technology.

Table 1: Distribution of hospitals across organizational form and type of hospital

N Row Column	FP	NFP	PUB	ALL
All	781 18.10 100.00	2578 59.75 100.00	956 22.16 100.00	4315 100.00 100.00
General Medical and Surgical Hospitals	504 13.12 64.53	2400 62.48 93.10	937 24.39 98.01	3841 100.00 89.02
Specialty Hospitals	80 69.57 10.24	30 26.09 01.16	5 04.35 00.52	115 100.00 02.67
Children's Hospitals	1 01.47 00.13	66 97.06 02.56	1 01.47 00.10	68 100.00 01.58
Rehabilitation Hospitals	81 61.83 10.37	44 33.59 01.71	6 04.58 00.68	131 100.00 03.04
Long-Term Acute Care Hospitals	115 71.88 14.72	38 23.75 01.47	7 04.38 00.73	160 100.00 03.71

Notes: There were a total of 5,350 community hospitals and approximately 80% responded to the survey (of the non-responders, 43% were FP, 39% were NFP, and 18% were PUB), for a total of 4,315 community hospitals.

Table 2: Percent distribution of hospitals across organizational form and other hospital characteristics

Row Column	FP	NFP	PUB	ALL
	504 13.12	2400 62.48	937 24.39	3841 100.00
URBAN				
YES	15.50 87.90	66.90 79.67	17.60 53.68	74.41
NO	06.21 12.10	49.64 20.33	44.15 46.32	25.59
TEACHING				
YES	07.70 11.51	78.49 24.63	13.81 11.10	19.60
NO	14.44 88.49	58.58 75.38	26.98 88.90	80.40
SYSTEM				
YES	21.58 87.50	66.88 56.96	11.55 25.19	53.22
NO	03.51 12.50	57.48 43.04	39.01 74.81	46.78
NETWORK				
YES	09.31 26.39	69.28 41.25	21.41 32.66	37.20
NO	15.38 73.61	58.46 58.75	26.16 67.34	62.80

There are 3,841 hospitals in the sample. The top number is the “row” percentage and the bottom number is the “column” percentage for the relevant category.

Table 3: Measures of scale of operations, by organizational form

	FP	NFP	PUB	ALL
	13.12	62.48	24.39	100.00
ADMISSIONS [1]				
ADM < p25	09.78 18.65	44.12 17.67	46.10 47.28	25.00
p25 < ADM < p75	17.92 68.25	62.86 50.29	19.22 39.38	50.00
p75 < ADM	06.88 13.10	80.10 32.04	13.02 13.34	25.00
MEAN	10636 (8738)	16268 (15391)	8374 (11820)	13603 (14294)
MEDICARE	2829 (2566) 26.34	3996 (4072) 23.34	1633 (2400) 20.73	3566 (3693) 23.10
MEDICAID	1300 (1615) 10.71	1574 (2248) 07.93	1084 (2556) 07.56	1418 (2266) 08.20
BEDS	150 (132)	181 (193)	95 (150)	156 (180)
OPERATIONS	5481 (5646)	7209 (8144)	3288 (6248)	6026 (7607)
DAYS	50546 (45950)	87119 (85188)	53318 (72710)	74074 (79894)
CONTRACT MANAGED				
YES	08.65 08.53	50.30 10.42	41.05 21.77	12.94
NO	13.79 91.47	64.29 89.58	21.92 78.23	87.06

There are 3,841 hospitals in the sample.
[1] Total adjusted admissions (based on inpatient/outpatient revenue). The p25 and p75 refer to the 25th and 75th percentiles, respectively.

Table 4: Descriptive statistics by organizational form

	FP	NFP	PUB	
	13.12	62.48	24.39	
RURAL	0.121 (0.326)	0.203 (0.403)	0.463 (0.499)	0.256 (0.436)
TEACHING	0.115 (0.319)	0.246 (0.431)	0.111 (0.314)	0.196 (0.397)
ADMISSIONS	10636 (8738)	16268 (15391)	8374 (11820)	13603 (14294)
MEDICARE	0.263 (0.105)	0.233 (0.082)	0.207 (0.088)	0.231 (0.088)
MEDICAID	0.107 (0.083)	0.080 (0.060)	0.076 (0.068)	0.082 (0.066)
SYSTEM	0.875 (0.331)	0.570 (0.495)	0.252 (0.434)	0.532 (0.499)
NETWORK	0.264 (0.441)	0.412 (0.492)	0.327 (0.469)	0.372 (0.483)
CONTRACT MANAGED	0.085 (0.280)	0.104 (0.306)	0.218 (0.413)	0.129 (0.336)

There are 3,841 hospitals in the sample.

Table 5: Technologies and adoption rates by organizational form

		FP	NFP	PUB	ALL
1	Radiation Therapy (RT)	0.359 (0.480)	0.444 (0.497)	0.249 (0.432)	0.385 (0.487)
2	Image-Guided radiation therapy (IGRT)	0.067 (0.251)	0.149 (0.356)	0.073 (0.260)	0.120 (0.325)
3	Intensity-Modulated radiation therapy (IMRT)	0.137 (0.344)	0.301 (0.459)	0.125 (0.331)	0.236 (0.425)
4	Shaped beam Radiation System (SBRS)	0.091 (0.288)	0.251 (0.434)	0.096 (0.295)	0.192 (0.394)
5	Stereotactic radiosurgery (SRS)	0.141 (0.348)	0.198 (0.399)	0.093 (0.290)	0.165 (0.371)
6	Robotic surgery (ROBO)	0.057 (0.233)	0.103 (0.303)	0.047 (0.212)	0.083 (0.276)
7	Diagnostic radioisotope facility (DRF)	0.702 (0.458)	0.730 (0.444)	0.442 (0.497)	0.656 (0.475)
8	Computed-Tomography scanner (CT)	0.948 (0.221)	0.964 (0.186)	0.910 (0.286)	0.949 (0.220)
9	Magnetic resonance imaging (MRI)	0.758 (0.429)	0.730 (0.444)	0.542 (0.498)	0.688 (0.463)
10	Positron emission tomography (PET)	0.111 (0.315)	0.211 (0.408)	0.093 (0.290)	0.169 (0.375)
11	Positron emission tomography/CT (PETCT)	0.097 (0.297)	0.201 (0.401)	0.102 (0.303)	0.163 (0.370)
12	Single photon emission CT (SPECT)	0.325 (0.469)	0.515 (0.500)	0.267 (0.443)	0.429 (0.495)
13	Electron Beam Computed Tomography (EBCT)	0.054 (0.225)	0.086 (0.281)	0.054 (0.227)	0.074 (0.262)
14	Multislice spiral computed tomography (MSCT)	0.649 (0.478)	0.733 (0.443)	0.542 (0.498)	0.675 (0.468)
15	Full-field digital mammography (FFDM)	0.145 (0.352)	0.245 (0.430)	0.149 (0.357)	0.209 (0.407)

Table 6: Differences in adoption rates

		FP-NFP Difference	%	FP-PUB Difference	%	Mean
1	RT	-0.085*** (0.024)	22.08	0.110*** (0.027)	28.57	0.385
2	IGRT	-0.082*** (0.016)	68.33	-0.005 (0.018)	04.17	0.120
3	IMRT	-0.164*** (0.020)	69.49	0.012 (0.023)	05.08	0.236
4	SBRS	-0.160*** (0.019)	83.33	-0.005 (0.021)	02.60	0.192
5	SRS	-0.057*** (0.018)	34.55	0.048** (0.020)	29.09	0.165
6	ROBO	-0.045*** (0.013)	54.22	0.011 (0.015)	13.25	0.083
7	DRF	-0.028 (0.023)	04.27	0.261*** (0.025)	39.79	0.656
8	CT	-0.016 (0.011)	01.69	0.038*** (0.012)	04.00	0.949
9	MRI	0.028 (0.022)	04.07	0.216*** (0.025)	31.40	0.688
10	PET	-0.100*** (0.018)	59.17	0.018 (0.021)	10.65	0.169
11	PETCT	-0.104*** (0.018)	63.80	-0.005 (0.020)	03.07	0.163
12	SPECT	-0.189*** (0.024)	44.06	0.059** (0.027)	13.75	0.429
13	EBCT	-0.033** (0.013)	44.59	-0.001 (0.014)	01.35	0.074
14	MSCT	-0.084*** (0.023)	12.44	0.107*** (0.025)	15.85	0.675
15	FFDM	-0.101*** (0.020)	48.33	-0.005 (0.022)	02.39	0.209

Table 7a: Regression results full sample (HRR)

		(1)	(2)	(3)	(4)	(5)	(6)
		NFP	PUB	NFP	PUB	NFP	PUB
		NO CONTROLS		MARKET (HRR)		MARKET (HRR) CONTROLS	
		NFP	PUB	NFP	PUB	NFP	PUB
1	(RT)	0.085***	-0.110***	0.091***	-0.060*	0.009	0.001
		(0.023)	(0.026)	(0.031)	(0.035)	(0.027)	(0.028)
2	(IGRT)	0.082***	0.005	0.072***	0.008	0.003	-0.001
		(0.016)	(0.018)	(0.016)	(0.017)	(0.015)	(0.018)
3	(IMRT)	0.164***	-0.012	0.148***	0.005	0.052***	0.027
		(0.020)	(0.023)	(0.025)	(0.027)	(0.020)	(0.020
4	(SBRS)	0.160***	0.005	0.158***	0.032	0.071***	0.048**
		(0.019)	(0.021)	(0.021)	(0.021)	(0.019)	(0.019)
5	(SRS)	0.058***	-0.048**	0.051**	-0.026	-0.041*	-0.043*
		(0.018)	(0.020)	(0.026)	(0.024)	(0.023)	(0.022)
6	(ROBO)	0.045***	-0.015	0.034**	0.007	-0.039***	-0.009
		(0.013)	(0.015)	(0.014)	(0.015)	(0.013)	(0.015)
7	(DRF)	0.028	-0.261***	0.056**	-0.172***	0.044*	-0.069**
		(0.022)	(0.025)	(0.027)	(0.031)	(0.024)	(0.030)
8	(CT)	0.016	-0.038***	0.029**	-0.008	0.024*	-0.001
		(0.011)	(0.012)	(0.012)	(0.017)	(0.012)	(0.018)
9	(MRI)	-0.028	-0.216***	0.024	-0.127***	0.002	-0.050*
		(0.022)	(0.025)	(0.029)	(0.031)	(0.026)	(0.030)
10	(PET)	0.100***	-0.018	0.103***	0.027	0.024	0.028
		(0.018)	(0.020)	(0.022)	(0.022)	(0.020)	(0.023)
11	(PETCT)	0.104***	0.005	0.087***	0.031	0.015	0.038*
		(0.018)	(0.020)	(0.021)	(0.021)	(0.019)	(0.019)
12	(SPECT)	0.189***	-0.059**	0.176***	0.009	0.120***	0.070**
		(0.024)	(0.027)	(0.027)	(0.034)	(0.027)	(0.032)
13	(EBCT)	0.033**	0.001	0.034**	0.019	-0.004	0.008
		(0.013)	(0.014)	(0.015)	(0.018)	(0.015)	(0.020)
14	(MSCT)	0.084***	-0.107***	0.064**	-0.077**	0.025	-0.028
		(0.023)	(0.025)	(0.028)	(0.036)	(0.026)	(0.035)
15	(FFDM)	0.101***	0.005	0.106***	0.045*	0.042*	0.043*
		(0.020)	(0.022)	(0.023)	(0.023)	(0.022)	(0.024)

There are 3,841 hospitals in the sample. *** p<0.01, ** p<0.05, * p<0.1

Table 7b: Regression results full sample (HSA)

		(1)	(2)	(3)	(4)	(5)	(6)
		NFP	PUB	NFP	PUB	NFP	PUB
		NO CONTROLS		MARKET (HSA)		MARKET (HSA) CONTROLS	
		NFP	PUB	NFP	PUB	NFP	PUB
1	(RT)	0.085*** (0.023)	-0.110*** (0.026)	0.173** (0.083)	0.056 (0.114)	-0.039 (0.080)	-0.047 (0.105)
2	(IGRT)	0.082*** (0.016)	0.005 (0.018)	0.132** (0.059)	0.090 (0.081)	-0.013 (0.054)	-0.012 (0.085)
3	(IMRT)	0.164*** (0.020)	-0.012 (0.023)	0.244*** (0.076)	0.140 (0.090)	0.037 (0.070)	0.028 (0.090)
4	(SBRS)	0.160*** (0.019)	0.005 (0.021)	0.249*** (0.071)	0.150* (0.085)	0.054 (0.065)	0.017 (0.087)
5	(SRS)	0.058*** (0.018)	-0.048** (0.020)	0.090 (0.068)	0.109 (0.094)	-0.104 (0.068)	-0.019 (0.092)
6	(ROBO)	0.045*** (0.013)	-0.015 (0.015)	0.086 (0.058)	0.090 (0.076)	-0.071 (0.056)	-0.001 (0.073)
7	(DRF)	0.028 (0.022)	-0.261*** (0.025)	0.179** (0.076)	-0.136 (0.090)	0.090 (0.070)	-0.102 (0.090)
8	(CT)	0.016 (0.011)	-0.038*** (0.012)	0.050 (0.035)	-0.034 (0.046)	0.028 (0.037)	-0.024 (0.056)
9	(MRI)	-0.028 (0.022)	-0.216*** (0.025)	0.127** (0.061)	-0.089 (0.089)	0.034 (0.064)	-0.070 (0.091)
10	(PET)	0.100*** (0.018)	-0.018 (0.020)	0.200*** (0.068)	0.113 (0.087)	0.019 (0.070)	0.010 (0.087)
11	(PETCT)	0.104*** (0.018)	0.005 (0.020)	0.132* (0.072)	0.126 (0.089)	-0.015 (0.073)	0.083 (0.087)
12	(SPECT)	0.189*** (0.024)	-0.059** (0.027)	0.304*** (0.076)	0.009 (0.034)	0.149** (0.070)	0.090 (0.104)
13	(EBCT)	0.033** (0.013)	0.001 (0.014)	0.065 (0.052)	0.086 (0.073)	-0.013 (0.053)	0.025 (0.078)
14	(MSCT)	0.084*** (0.023)	-0.107*** (0.025)	0.173** (0.067)	-0.017 (0.098)	0.060 (0.068)	-0.037 (0.105)
15	(FFDM)	0.101*** (0.020)	0.005 (0.022)	0.183** (0.076)	0.132 (0.089)	0.028 (0.081)	0.040 (0.099)

There are 3,841 hospitals in the sample. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Regression results for urban hospitals

		(1)	(2)	(3)	(4)	(5)	(6)
		MARKET (HRR) CONTROLS		MARKET (HSA) CONTROLS		MARKET (CBSA) CONTROLS	
		NFP	PUB	NFP	PUB	NFP	PUB
1	(RT)	0.021 (0.030)	0.027 (0.032)	-0.037 (0.077)	-0.023 (0.109)	0.024 (0.038)	0.016 (0.050)
2	(IGRT)	-0.010 (0.019)	-0.010 (0.025)	-0.019 (0.054)	-0.004 (0.090)	-0.009 (0.026)	0.012 (0.038)
3	(IMRT)	0.056** (0.024)	0.023 (0.026)	0.041 (0.068)	0.044 (0.095)	0.083*** (0.031)	0.046 (0.035)
4	(SBRS)	0.076*** (0.023)	0.052** (0.026)	0.054 (0.064)	0.023 (0.091)	0.073*** (0.028)	0.035 (0.038)
5	(SRS)	-0.036 (0.025)	-0.045* (0.027)	-0.111* (0.067)	-0.022 (0.098)	-0.056 (0.034)	-0.038 (0.040)
6	(ROBO)	-0.051*** (0.016)	-0.009 (0.020)	-0.074 (0.055)	0.008 (0.032)	-0.060*** (0.022)	0.008 (0.032)
7	(DRF)	0.054** (0.027)	-0.035 (0.036)	0.099 (0.067)	-0.088 (0.089)	0.077** (0.034)	-0.030 (0.049)
8	(CT)	0.019 (0.014)	0.007 (0.017)	0.013 (0.034)	-0.023 (0.049)	0.027* (0.016)	0.012 (0.022)
9	(MRI)	0.013 (0.028)	-0.019 (0.034)	0.022 (0.061)	-0.061 (0.092)	0.030 (0.036)	-0.017 (0.047)
10	(PET)	0.029 (0.025)	0.035 (0.032)	0.016 (0.070)	0.012 (0.093)	0.022 (0.030)	0.031 (0.039)
11	(PETCT)	0.012 (0.023)	0.040 (0.026)	-0.015 (0.073)	0.096 (0.092)	0.016 (0.073)	0.077** (0.037)
12	(SPECT)	0.125*** (0.030)	0.105** (0.042)	0.166** (0.067)	0.101 (0.105)	0.140*** (0.038)	0.116** (0.055)
13	(EBCT)	-0.007 (0.018)	0.005 (0.028)	-0.015 (0.053)	0.028 (0.084)	0.000 (0.023)	0.032 (0.035)
14	(MSCT)	0.026 (0.029)	-0.002 (0.037)	0.069 (0.066)	-0.023 (0.104)	0.057* (0.034)	-0.001 (0.049)
15	(FFDM)	0.048* (0.027)	0.064** (0.032)	0.026 (0.080)	0.054 (0.103)	0.063 (0.039)	0.059 (0.049)

There are 2,858 hospitals in the sample. *** p<0.01, ** p<0.05, * p<0.1

Table 9a: Technology index (Urban Hospitals)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		HRR	HSA	CBSA	HRR	HSA	CBSA
H_CON_NFP	1.710***	1.662***	2.534***	2.072***	0.376**	0.236	0.489**
	(0.175)	(0.214)	(0.544)	(0.277)	(0.168)	(0.430)	(0.204)
H_CON_PUB	0.397*	0.571**	1.800**	0.931**	0.234	0.121	0.358
	(0.217)	(0.247)	(0.773)	(0.367)	(0.197)	(0.640)	(0.276)
H_D_TEACH					1.060***	1.668***	1.235***
					(0.173)	(0.433)	(0.208)
H_ADMTOT					0.134***	0.123***	0.130***
					(0.00806)	(0.0131)	(0.00774)
H_D_SYS					-0.0656	-0.308	-0.0754
					(0.117)	(0.387)	(0.164)
H_D_NET					0.142	0.204	0.0703
					(0.112)	(0.348)	(0.149)
H_D_MNGT					-0.590***	-1.740***	-1.162***
					(0.191)	(0.594)	(0.235)
H_MCR_PER					3.713***	5.281**	3.631***
					(0.796)	(2.085)	(0.962)
H_MCD_PER					-0.801	-2.792	-1.861
					(0.884)	(2.371)	(1.390)
Constant	4.921***	4.923***	4.123***	4.585***	2.496***	2.690***	2.635***
	(0.158)	(0.176)	(0.438)	(0.228)	(0.265)	(0.752)	(0.361)
Observations	2,858	2,858	2,858	2,858	2,858	2,858	2,858
R-squared	0.044	0.180	0.667	0.338	0.561	0.828	0.653

There are 2,858 hospitals in the sample. *** p<0.01, ** p<0.05, * p<0.1

Table 9b: Technology index for radiation therapy (Urban Hospitals)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		HRR	HSA	CBSA	HRR	HSA	CBSA
H_CON_NFP	0.750*** (0.0889)	0.702*** (0.101)	0.939*** (0.275)	0.828*** (0.134)	0.107 (0.0853)	-0.0720 (0.237)	0.115 (0.109)
H_CON_PUB	0.219** (0.110)	0.226** (0.109)	0.853** (0.365)	0.354** (0.168)	0.0430 (0.0868)	0.0189 (0.347)	0.0717 (0.134)
H_D_TEACH					0.503*** (0.0903)	0.680*** (0.242)	0.586*** (0.108)
H_ADMTOT					0.0602*** (0.00352)	0.0540*** (0.00645)	0.0575*** (0.00350)
H_D_SYS					-0.0664 (0.0640)	-0.217 (0.218)	-0.0333 (0.0793)
H_D_NET					0.0335 (0.0663)	-0.0369 (0.187)	-0.0299 (0.0856)
H_D_MNGT					-0.263*** (0.0936)	-0.831*** (0.309)	-0.446*** (0.115)
H_MCR_PER					1.564*** (0.408)	1.545 (1.071)	1.346** (0.523)
H_MCD_PER					-0.924* (0.520)	-1.544 (1.258)	-1.139 (0.725)
Constant	0.880*** (0.0801)	0.911*** (0.0821)	0.643*** (0.219)	0.805*** (0.109)	-0.0551 (0.138)	0.355 (0.393)	0.0491 (0.186)
Observations	2,858	2,858	2,858	2,858	2,858	2,858	2,858
R-squared	0.032	0.167	0.659	0.325	0.465	0.775	0.569

There are 2,858 hospitals in the sample. *** p<0.01, ** p<0.05, * p<0.1

Table 9c: Technology index for radiation diagnostic (Urban Hospitals)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		HRR	HSA	CBSA	HRR	HSA	CBSA
H_CON_NFP	0.897***	0.916***	1.502***	1.185***	0.320***	0.382	0.434***
	(0.101)	(0.137)	(0.319)	(0.168)	(0.121)	(0.284)	(0.137)
H_CON_PUB	0.156	0.321**	0.835*	0.517**	0.199	0.0941	0.279
	(0.125)	(0.162)	(0.459)	(0.230)	(0.154)	(0.415)	(0.203)
H_D_TEACH					0.474***	0.907***	0.566***
					(0.105)	(0.286)	(0.136)
H_ADMTOT					0.0645***	0.0586***	0.0622***
					(0.00468)	(0.00771)	(0.00453)
H_D_SYS					-0.0001	-0.0889	-0.0318
					(0.0774)	(0.234)	(0.111)
H_D_NET					0.103	0.217	0.100
					(0.0665)	(0.215)	(0.0896)
H_D_MNGT					-0.346**	-0.924**	-0.720***
					(0.134)	(0.413)	(0.173)
H_MCR_PER					1.983***	3.402***	2.046***
					(0.517)	(1.312)	(0.583)
H_MCD_PER					0.251	-0.880	-0.568
					(0.591)	(1.430)	(0.844)
Constant	3.975***	3.933***	3.451***	3.719***	2.625***	2.423***	2.665***
	(0.0912)	(0.113)	(0.258)	(0.140)	(0.178)	(0.470)	(0.222)
Observations	2,858	2,858	2,858	2,858	2,858	2,858	2,858
R-squared	0.039	0.188	0.689	0.360	0.458	0.813	0.585

There are 2,858 hospitals in the sample. *** p<0.01, ** p<0.05, * p<0.1

Table A1: Regressions for technology T_HOS_1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0850***	0.0913***	0.173**	0.00893	-0.0394	0.0209	-0.0370	0.0243
	(0.0235)	(0.0309)	(0.0831)	(0.0275)	(0.0802)	(0.0301)	(0.0770)	(0.0380)
H_CON_PUB	-0.110***	-0.0601*	0.0559	0.000736	-0.0466	0.0226	-0.0230	0.0165
	(0.0265)	(0.0350)	(0.114)	(0.0277)	(0.105)	(0.0318)	(0.109)	(0.0500)
H_D_RURAL				-0.166***	-0.224**			
				(0.0201)	(0.0963)			
H_D_TEACH				0.0832***	0.135*	0.0871***	0.143**	0.110***
				(0.0257)	(0.0743)	(0.0266)	(0.0704)	(0.0331)
H_ADMTOT				0.0146***	0.0126***	0.0143***	0.0123***	0.0132***
				(0.00111)	(0.00192)	(0.00113)	(0.00174)	(0.00114)
H_D_SYS				0.0177	-0.0104	0.00545	-0.0170	0.0198
				(0.0173)	(0.0643)	(0.0208)	(0.0621)	(0.0260)
H_D_NET				0.0181	0.0101	0.0167	0.0166	0.00984
				(0.0159)	(0.0546)	(0.0204)	(0.0534)	(0.0263)
H_D_MNGT				-0.0628***	-0.212**	-0.109***	-0.295***	-0.193***
				(0.0204)	(0.0908)	(0.0320)	(0.0982)	(0.0413)
H_MCRDSC_PER				0.351***	0.299	0.546***	0.410	0.399**
				(0.100)	(0.309)	(0.125)	(0.322)	(0.161)
H_MCDDSC_PER				0.132	-0.00861	0.159	-0.00622	0.140
				(0.139)	(0.373)	(0.164)	(0.357)	(0.208)
Constant	0.359***	0.343***	0.264***	0.107***	0.242**	0.0551	0.199	0.105
	(0.0214)	(0.0266)	(0.0719)	(0.0360)	(0.122)	(0.0441)	(0.123)	(0.0677)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.029	0.157	0.739	0.388	0.817	0.349	0.782	0.510

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A2: Regressions for technology T_HOS_2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0817***	0.0716***	0.132**	0.00272	-0.0133	-0.00962	-0.0190	-0.00916
	(0.0158)	(0.0159)	(0.0587)	(0.0154)	(0.0545)	(0.0189)	(0.0541)	(0.0263)
H_CON_PUB	0.00511	0.00819	0.0905	-0.000885	-0.0120	-0.0103	-0.00359	0.0124
	(0.0178)	(0.0171)	(0.0809)	(0.0184)	(0.0848)	(0.0249)	(0.0900)	(0.0376)
H_D_RURAL				-0.0504***	-0.0733			
				(0.0110)	(0.0683)			
H_D_TEACH				0.0486**	0.0924	0.0505**	0.0876	0.0612**
				(0.0198)	(0.0650)	(0.0212)	(0.0613)	(0.0279)
H_ADMTOT				0.00904***	0.00839***	0.00916***	0.00837***	0.00871***
				(0.000703)	(0.00185)	(0.000727)	(0.00172)	(0.000882)
H_D_SYS				-0.0211	-0.0470	-0.0375**	-0.0560	-0.0307
				(0.0129)	(0.0543)	(0.0168)	(0.0547)	(0.0226)
H_D_NET				-0.00324	-0.0312	-0.0129	-0.0262	-0.0231
				(0.0119)	(0.0491)	(0.0157)	(0.0484)	(0.0235)
H_D_MNGT				-0.00354	-0.0711	-0.0143	-0.0907	-0.0340
				(0.0133)	(0.0652)	(0.0207)	(0.0744)	(0.0258)
H_MCRDSC_PER				0.0902	0.0597	0.145	0.135	0.142
				(0.0629)	(0.234)	(0.0879)	(0.239)	(0.111)
H_MCDDSC_PER				-0.215**	-0.374	-0.222*	-0.354	-0.267*
				(0.104)	(0.325)	(0.119)	(0.313)	(0.154)
Constant	0.0675***	0.0730***	0.0151	0.00840	0.0803	0.0102	0.0564	0.0172
	(0.0144)	(0.0130)	(0.0469)	(0.0262)	(0.0944)	(0.0342)	(0.0940)	(0.0415)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.014	0.111	0.621	0.258	0.682	0.257	0.674	0.412

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A3: Regressions for technology T_HOS_3

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	URBAN HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.164***	0.148***	0.244***	0.0525***	0.0372	0.0556**	0.0413	0.0826***
	(0.0204)	(0.0255)	(0.0765)	(0.0197)	(0.0696)	(0.0238)	(0.0684)	(0.0314)
H_CON_PUB	-0.0120	0.00536	0.140	0.0275	0.0282	0.0232	0.0440	0.0456
	(0.0230)	(0.0266)	(0.0900)	(0.0201)	(0.0900)	(0.0257)	(0.0947)	(0.0352)
H_D_RURAL				-0.0872***	-0.0799			
				(0.0149)	(0.0807)			
H_D_TEACH				0.0956***	0.162**	0.106***	0.171**	0.143***
				(0.0253)	(0.0722)	(0.0257)	(0.0681)	(0.0304)
H_ADMTOT				0.0145***	0.0119***	0.0142***	0.0116***	0.0132***
				(0.000888)	(0.00201)	(0.000911)	(0.00185)	(0.000873)
H_D_SYS				0.00113	-0.0192	-0.0101	-0.0287	0.00885
				(0.0148)	(0.0616)	(0.0189)	(0.0618)	(0.0246)
H_D_NET				-0.0125	-0.0550	-0.0157	-0.0546	-0.0375
				(0.0148)	(0.0560)	(0.0197)	(0.0546)	(0.0243)
H_D_MNGT				-0.0412**	-0.127	-0.0626**	-0.155*	-0.0765*
				(0.0159)	(0.0828)	(0.0271)	(0.0915)	(0.0399)
H_MCRDSC_PER				0.350***	0.329	0.442***	0.428	0.360**
				(0.0826)	(0.288)	(0.116)	(0.294)	(0.153)
H_MCDDSC_PER				-0.306**	-0.564	-0.293**	-0.556*	-0.340*
				(0.119)	(0.351)	(0.138)	(0.336)	(0.186)
Constant	0.137***	0.142***	0.0495	-0.0429	0.0505	-0.0598	0.0351	-0.0533
	(0.0186)	(0.0214)	(0.0617)	(0.0297)	(0.107)	(0.0393)	(0.107)	(0.0514)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.038	0.178	0.699	0.425	0.777	0.392	0.759	0.525

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4: Regressions for technology T_HOS_4

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.160***	0.158***	0.249***	0.0709***	0.0544	0.0763***	0.0542	0.0731***
	(0.0190)	(0.0210)	(0.0715)	(0.0190)	(0.0655)	(0.0230)	(0.0638)	(0.0280)
H_CON_PUB	0.00478	0.0317	0.150*	0.0485**	0.0172	0.0525**	0.0232	0.0354
	(0.0214)	(0.0208)	(0.0846)	(0.0191)	(0.0871)	(0.0257)	(0.0914)	(0.0383)
H_D_RURAL				-0.0655***	-0.0602			
				(0.0143)	(0.0770)			
H_D_TEACH				0.143***	0.181***	0.154***	0.186***	0.168***
				(0.0250)	(0.0690)	(0.0259)	(0.0648)	(0.0300)
H_ADMTOT				0.0118***	0.0103***	0.0117***	0.0101***	0.0116***
				(0.000758)	(0.00186)	(0.000770)	(0.00171)	(0.000806)
H_D_SYS				0.00866	-0.0329	0.00124	-0.0413	0.00164
				(0.0149)	(0.0589)	(0.0193)	(0.0593)	(0.0261)
H_D_NET				0.00716	-0.0240	0.00468	-0.0137	0.00514
				(0.0135)	(0.0552)	(0.0182)	(0.0532)	(0.0231)
H_D_MNGT				-0.0463***	-0.146*	-0.0638***	-0.183**	-0.0960***
				(0.0143)	(0.0775)	(0.0235)	(0.0854)	(0.0310)
H_MCRDSC_PER				0.219***	0.178	0.299***	0.273	0.269**
				(0.0707)	(0.264)	(0.0997)	(0.271)	(0.119)
H_MCDDSC_PER				-0.266**	-0.306	-0.279**	-0.275	-0.311*
				(0.105)	(0.329)	(0.124)	(0.315)	(0.160)
Constant	0.0913***	0.0855***	0.000261	-0.0659**	0.0227	-0.0870**	-0.00105	-0.0717
	(0.0172)	(0.0170)	(0.0570)	(0.0283)	(0.102)	(0.0380)	(0.103)	(0.0452)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.037	0.162	0.676	0.390	0.755	0.371	0.743	0.512

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5: Regressions for technology T_HOS_5

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0575***	0.0510**	0.0901	-0.0408*	-0.104	-0.0365	-0.111*	-0.0557
	(0.0181)	(0.0256)	(0.0678)	(0.0229)	(0.0681)	(0.0253)	(0.0669)	(0.0345)
H_CON_PUB	-0.0480**	-0.0265	0.109	-0.0427*	-0.0192	-0.0451*	-0.0217	-0.0383
	(0.0204)	(0.0238)	(0.0939)	(0.0220)	(0.0925)	(0.0268)	(0.0983)	(0.0404)
H_D_RURAL				-0.0266**	-0.0575			
				(0.0120)	(0.0740)			
H_D_TEACH				0.0974***	0.0863	0.107***	0.0929	0.103***
				(0.0240)	(0.0785)	(0.0251)	(0.0742)	(0.0323)
H_ADMTOT				0.0111***	0.0119***	0.0109***	0.0117***	0.0109***
				(0.000816)	(0.00214)	(0.000850)	(0.00199)	(0.000956)
H_D_SYS				-0.0192	-0.0675	-0.0255	-0.0744	-0.0328
				(0.0155)	(0.0634)	(0.0189)	(0.0644)	(0.0218)
H_D_NET				0.0352***	0.0278	0.0406**	0.0410	0.0157
				(0.0128)	(0.0565)	(0.0166)	(0.0553)	(0.0221)
H_D_MNGT				0.00293	-0.0436	-0.0133	-0.108	-0.0470
				(0.0152)	(0.0859)	(0.0230)	(0.0998)	(0.0309)
H_MCRDSC_PER				0.134*	0.278	0.132	0.299	0.176
				(0.0706)	(0.286)	(0.102)	(0.296)	(0.137)
H_MCDDSC_PER				-0.239**	-0.338	-0.288**	-0.353	-0.362**
				(0.105)	(0.348)	(0.123)	(0.333)	(0.173)
Constant	0.141***	0.140***	0.0822	0.0236	0.0650	0.0264	0.0651	0.0522
	(0.0164)	(0.0210)	(0.0581)	(0.0279)	(0.107)	(0.0341)	(0.109)	(0.0486)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.015	0.126	0.620	0.309	0.702	0.299	0.683	0.423

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A6: Regressions for technology T_HOS_6

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0450***	0.0343**	0.0856	-0.0393***	-0.0713	-0.0508***	-0.0742	-0.0599***
	(0.0135)	(0.0138)	(0.0583)	(0.0127)	(0.0561)	(0.0156)	(0.0554)	(0.0222)
H_CON_PUB	-0.0106	0.00686	0.0905	-0.00910	-0.00104	-0.00860	0.00833	0.00774
	(0.0152)	(0.0153)	(0.0765)	(0.0148)	(0.0735)	(0.0203)	(0.0786)	(0.0319)
H_D_RURAL				0.0297***	0.0814*			
				(0.00721)	(0.0456)			
H_D_TEACH				0.0774***	0.0805	0.0816***	0.0804	0.0828***
				(0.0181)	(0.0647)	(0.0196)	(0.0613)	(0.0280)
H_ADMTOT				0.00969***	0.00997***	0.00980***	0.0100***	0.01000***
				(0.000726)	(0.00202)	(0.000758)	(0.00187)	(0.000975)
H_D_SYS				-0.000787	0.00193	0.000881	-0.00156	-0.0104
				(0.0104)	(0.0482)	(0.0138)	(0.0503)	(0.0202)
H_D_NET				0.00568	0.0195	0.00508	0.0244	6.61e-05
				(0.00970)	(0.0505)	(0.0131)	(0.0504)	(0.0194)
H_D_MNGT				0.0154	0.0195	0.0193	0.0159	0.00494
				(0.00962)	(0.0593)	(0.0159)	(0.0713)	(0.0268)
H_MCRDSC_PER				0.131***	0.282	0.166**	0.334	0.238**
				(0.0468)	(0.219)	(0.0694)	(0.233)	(0.100)
H_MCDDSC_PER				-0.128	-0.367	-0.127	-0.368	-0.154
				(0.0872)	(0.301)	(0.101)	(0.291)	(0.135)
Constant	0.0575***	0.0600***	0.00750	-0.0681***	-0.0901	-0.0742***	-0.0880	-0.0796**
	(0.0122)	(0.0116)	(0.0485)	(0.0203)	(0.0869)	(0.0267)	(0.0907)	(0.0391)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.008	0.118	0.543	0.345	0.639	0.344	0.632	0.404

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A7: Regressions for technology T_HOS_7

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0276	0.0563**	0.179**	0.0445*	0.0898	0.0543**	0.0994	0.0775**
	(0.0225)	(0.0266)	(0.0760)	(0.0237)	(0.0699)	(0.0270)	(0.0670)	(0.0341)
H_CON_PUB	-0.261***	-0.172***	-0.136	-0.0688**	-0.102	-0.0352	-0.0882	-0.0300
	(0.0254)	(0.0307)	(0.0904)	(0.0302)	(0.0902)	(0.0365)	(0.0895)	(0.0490)
H_D_RURAL				-0.253***	-0.430***			
				(0.0208)	(0.0936)			
H_D_TEACH				-0.0213	0.0302	-0.0116	0.0345	-0.00329
				(0.0213)	(0.0615)	(0.0215)	(0.0580)	(0.0276)
H_ADMTOT				0.00804***	0.00612***	0.00716***	0.00569***	0.00707***
				(0.000834)	(0.00144)	(0.000780)	(0.00130)	(0.000822)
H_D_SYS				0.0371**	0.00355	0.0213	-0.00709	0.0210
				(0.0167)	(0.0521)	(0.0190)	(0.0501)	(0.0261)
H_D_NET				-0.00316	0.0350	0.00674	0.0421	0.0194
				(0.0153)	(0.0511)	(0.0163)	(0.0493)	(0.0222)
H_D_MNGT				-0.0716***	-0.181*	-0.115***	-0.227**	-0.173***
				(0.0220)	(0.101)	(0.0371)	(0.113)	(0.0492)
H_MCRDSC_PER				0.155	0.504*	0.381***	0.588*	0.347**
				(0.103)	(0.306)	(0.124)	(0.301)	(0.136)
H_MCDDSC_PER				0.630***	0.354	0.538***	0.341	0.478***
				(0.146)	(0.377)	(0.150)	(0.356)	(0.180)
Constant	0.702***	0.663***	0.577***	0.508***	0.509***	0.483***	0.458***	0.480***
	(0.0205)	(0.0225)	(0.0626)	(0.0367)	(0.116)	(0.0424)	(0.108)	(0.0479)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.066	0.239	0.820	0.368	0.863	0.249	0.787	0.450

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A8: Regressions for technology T_HOS_8

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0158	0.0291**	0.0502	0.0241*	0.0276	0.0194	0.0134	0.0272*
	(0.0107)	(0.0124)	(0.0354)	(0.0125)	(0.0372)	(0.0140)	(0.0340)	(0.0165)
H_CON_PUB	-0.0381***	-0.00762	-0.0342	-0.00103	-0.0240	0.00716	-0.0234	0.0119
	(0.0121)	(0.0173)	(0.0458)	(0.0184)	(0.0559)	(0.0171)	(0.0492)	(0.0220)
H_D_RURAL				-0.0417***	-0.107			
				(0.0124)	(0.0840)			
H_D_TEACH				-0.000359	0.0303	-0.00159	0.0262	-0.00464
				(0.00976)	(0.0311)	(0.00791)	(0.0260)	(0.0105)
H_ADMTOT				0.00101***	0.00150**	0.000985***	0.00149**	0.000884***
				(0.000280)	(0.000742)	(0.000286)	(0.000647)	(0.000264)
H_D_SYS				0.0104	0.0196	-0.00328	0.00287	-0.00329
				(0.00859)	(0.0359)	(0.00751)	(0.0250)	(0.0100)
H_D_NET				0.00227	-0.0144	0.0164**	-0.00432	0.0131
				(0.00853)	(0.0318)	(0.00807)	(0.0264)	(0.00979)
H_D_MNGT				0.0216	0.00162	0.0271**	-0.00473	0.0127
				(0.0133)	(0.0632)	(0.0137)	(0.0612)	(0.0196)
H_MCRDSC_PER				-0.166**	0.0762	-0.0375	0.121	-0.0519
				(0.0681)	(0.210)	(0.0760)	(0.194)	(0.0936)
H_MCDDSC_PER				0.0452	0.0209	0.0173	-0.00793	0.0351
				(0.0721)	(0.189)	(0.0587)	(0.173)	(0.0683)
Constant	0.948***	0.933***	0.926***	0.957***	0.914***	0.942***	0.907***	0.942***
	(0.00975)	(0.0111)	(0.0287)	(0.0202)	(0.0721)	(0.0242)	(0.0676)	(0.0312)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.010	0.155	0.749	0.170	0.761	0.165	0.627	0.389

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A9: Regressions for technology T_HOS_9

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	-0.0279	0.0240	0.127**	0.00237	0.0341	0.0134	0.0216	0.0302
	(0.0223)	(0.0287)	(0.0614)	(0.0263)	(0.0643)	(0.0278)	(0.0607)	(0.0358)
H_CON_PUB	-0.216***	-0.127***	-0.0890	-0.0505*	-0.0698	-0.0191	-0.0613	-0.0173
	(0.0252)	(0.0313)	(0.0889)	(0.0301)	(0.0913)	(0.0338)	(0.0917)	(0.0469)
H_D_RURAL				-0.229***	-0.403***	0.0235	0.0620	0.0343
				(0.0226)	(0.120)	(0.0238)	(0.0559)	(0.0308)
H_D_TEACH				0.0173	0.0630			
				(0.0237)	(0.0606)			
H_ADMTOT				0.00736***	0.00613***	0.00667***	0.00604***	0.00651***
				(0.000824)	(0.00171)	(0.000810)	(0.00155)	(0.000915)
H_D_SYS				0.0302*	0.0500	0.0181	0.0326	0.0262
				(0.0174)	(0.0481)	(0.0179)	(0.0465)	(0.0260)
H_D_NET				-0.0239	0.00782	-0.0152	0.0107	-0.0153
				(0.0161)	(0.0474)	(0.0161)	(0.0451)	(0.0213)
H_D_MNGT				-0.0484*	-0.0694	-0.0841**	-0.123	-0.153***
				(0.0273)	(0.113)	(0.0398)	(0.115)	(0.0492)
H_MCRDSC_PER				-0.0419	0.108	0.154	0.234	0.0935
				(0.0987)	(0.287)	(0.117)	(0.283)	(0.148)
H_MCDDSC_PER				0.379*	0.0650	0.234	0.0581	0.0504
				(0.196)	(0.399)	(0.207)	(0.380)	(0.249)
Constant	0.758***	0.704***	0.630***	0.631***	0.640***	0.608***	0.594***	0.629***
	(0.0203)	(0.0239)	(0.0515)	(0.0386)	(0.111)	(0.0419)	(0.111)	(0.0533)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.032	0.194	0.822	0.305	0.859	0.229	0.792	0.425

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A10: Regressions for technology T_HOS_10

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.100***	0.103***	0.200***	0.0242	0.0189	0.0288	0.0162	0.0221
	(0.0182)	(0.0222)	(0.0683)	(0.0203)	(0.0705)	(0.0249)	(0.0698)	(0.0302)
H_CON_PUB	-0.0183	0.0275	0.113	0.0281	0.0101	0.0349	0.0118	0.0310
	(0.0205)	(0.0224)	(0.0872)	(0.0231)	(0.0870)	(0.0324)	(0.0929)	(0.0389)
H_D_RURAL				-0.0299**	-0.0412			
				(0.0127)	(0.0754)			
H_D_TEACH				0.0923***	0.157**	0.108***	0.168***	0.100***
				(0.0250)	(0.0668)	(0.0263)	(0.0619)	(0.0326)
H_ADMTOT				0.0105***	0.00991***	0.0102***	0.00980***	0.0104***
				(0.000847)	(0.00198)	(0.000886)	(0.00183)	(0.000999)
H_D_SYS				0.00150	-0.00199	-0.00389	-0.0135	-0.0106
				(0.0156)	(0.0593)	(0.0203)	(0.0594)	(0.0245)
H_D_NET				0.0186	0.0539	0.0242	0.0643	0.0248
				(0.0134)	(0.0549)	(0.0185)	(0.0541)	(0.0235)
H_D_MNGT				-0.000448	-0.0461	-0.0170	-0.0786	-0.0441
				(0.0174)	(0.0759)	(0.0257)	(0.0835)	(0.0342)
H_MCRDSC_PER				0.170***	0.212	0.231**	0.288	0.270**
				(0.0648)	(0.256)	(0.0907)	(0.264)	(0.113)
H_MCDDSC_PER				-0.229**	-0.383	-0.279**	-0.413	-0.298
				(0.107)	(0.359)	(0.124)	(0.341)	(0.201)
Constant	0.111***	0.0981***	0.0164	-0.0344	-0.0306	-0.0447	-0.0448	-0.0415
	(0.0165)	(0.0182)	(0.0564)	(0.0283)	(0.107)	(0.0368)	(0.107)	(0.0468)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.021	0.143	0.655	0.307	0.728	0.297	0.710	0.422

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A11: Regressions for technology T_HOS_11

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.104***	0.0871***	0.132*	0.0154	-0.0151	0.0118	-0.0154	0.0158
	(0.0180)	(0.0208)	(0.0720)	(0.0192)	(0.0733)	(0.0232)	(0.0726)	(0.0307)
H_CON_PUB	0.00523	0.0308	0.126	0.0379*	0.0832	0.0399	0.0959	0.0771**
	(0.0202)	(0.0208)	(0.0886)	(0.0198)	(0.0869)	(0.0260)	(0.0919)	(0.0369)
H_D_RURAL				-0.0467***	-0.0943			
				(0.0124)	(0.0777)			
H_D_TEACH				0.0882***	0.147**	0.0953***	0.148**	0.106***
				(0.0243)	(0.0726)	(0.0261)	(0.0681)	(0.0339)
H_ADMTOT				0.00928***	0.00773***	0.00913***	0.00753***	0.00887***
				(0.000753)	(0.00194)	(0.000795)	(0.00177)	(0.000873)
H_D_SYS				-0.00500	0.0227	-0.0109	0.0117	-0.00568
				(0.0153)	(0.0605)	(0.0185)	(0.0611)	(0.0252)
H_D_NET				0.0321***	0.0466	0.0365**	0.0595	0.0278
				(0.0118)	(0.0552)	(0.0149)	(0.0540)	(0.0221)
H_D_MNGT				-0.0177	-0.0857	-0.0296	-0.135*	-0.0817***
				(0.0150)	(0.0676)	(0.0223)	(0.0722)	(0.0299)
H_MCRDSC_PER				0.275***	0.392	0.347***	0.500*	0.390***
				(0.0658)	(0.283)	(0.0920)	(0.292)	(0.111)
H_MCDDSC_PER				-0.320***	-0.497	-0.359***	-0.489	-0.450***
				(0.103)	(0.317)	(0.118)	(0.303)	(0.157)
Constant	0.0972***	0.101***	0.0501	-0.0315	-0.0256	-0.0406	-0.0548	-0.0450
	(0.0163)	(0.0169)	(0.0594)	(0.0278)	(0.0989)	(0.0363)	(0.102)	(0.0463)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.017	0.133	0.665	0.278	0.723	0.269	0.703	0.420

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A12: Regressions for technology T_HOS_12

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.189***	0.176***	0.304***	0.120***	0.149**	0.125***	0.166**	0.140***
	(0.0236)	(0.0274)	(0.0762)	(0.0266)	(0.0705)	(0.0303)	(0.0670)	(0.0382)
H_CON_PUB	-0.0586**	0.00950	0.112	0.0702**	0.0901	0.105**	0.101	0.116**
	(0.0267)	(0.0340)	(0.115)	(0.0321)	(0.104)	(0.0417)	(0.105)	(0.0550)
H_D_RURAL				-0.163***	-0.283***			
				(0.0202)	(0.105)			
H_D_TEACH				0.0580**	0.137	0.0688**	0.132	0.0884**
				(0.0274)	(0.0873)	(0.0290)	(0.0821)	(0.0371)
H_ADMTOT				0.0113***	0.00973***	0.0107***	0.00951***	0.0101***
				(0.00106)	(0.00229)	(0.00106)	(0.00210)	(0.00107)
H_D_SYS				0.00613	-0.00772	0.00507	-0.0311	-0.0104
				(0.0182)	(0.0604)	(0.0232)	(0.0594)	(0.0268)
H_D_NET				0.00805	-0.00151	0.0141	-0.00180	0.0246
				(0.0185)	(0.0627)	(0.0227)	(0.0624)	(0.0281)
H_D_MNGT				-0.0461**	-0.0710	-0.0625*	-0.140	-0.105**
				(0.0208)	(0.0930)	(0.0337)	(0.101)	(0.0472)
H_MCRDSC_PER				0.389***	0.854***	0.607***	0.988***	0.664***
				(0.0858)	(0.290)	(0.114)	(0.290)	(0.151)
H_MCDDSC_PER				0.337**	0.268	0.280*	0.319	0.138
				(0.135)	(0.328)	(0.148)	(0.308)	(0.177)
Constant	0.325***	0.317***	0.212***	0.0962***	0.0217	0.0535	-0.0288	0.0544
	(0.0215)	(0.0235)	(0.0666)	(0.0358)	(0.119)	(0.0452)	(0.113)	(0.0636)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.051	0.213	0.769	0.364	0.830	0.312	0.792	0.493

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A13: Regressions for technology T_HOS_13

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0327**	0.0343**	0.0646	-0.00412	-0.0129	-0.00686	-0.0151	0.000210
	(0.0128)	(0.0155)	(0.0515)	(0.0154)	(0.0530)	(0.0183)	(0.0531)	(0.0228)
H_CON_PUB	0.000858	0.0193	0.0856	0.00796	0.0247	0.00495	0.0281	0.0322
	(0.0145)	(0.0183)	(0.0730)	(0.0202)	(0.0782)	(0.0277)	(0.0844)	(0.0352)
H_D_RURAL				-0.00975	-0.0312			
				(0.0102)	(0.0571)			
H_D_TEACH				0.0589***	0.0968*	0.0650***	0.101**	0.0745***
				(0.0180)	(0.0539)	(0.0198)	(0.0507)	(0.0243)
H_ADMTOT				0.00428***	0.00350**	0.00420***	0.00341**	0.00423***
				(0.000587)	(0.00152)	(0.000612)	(0.00140)	(0.000745)
H_D_SYS				-0.0143	-0.0348	-0.0206	-0.0508	-0.0168
				(0.0105)	(0.0483)	(0.0142)	(0.0491)	(0.0179)
H_D_NET				0.00965	0.0129	0.0134	0.0184	0.0127
				(0.0114)	(0.0524)	(0.0151)	(0.0518)	(0.0203)
H_D_MNGT				-0.00384	-0.0499	-0.00910	-0.0930	-0.0260
				(0.0106)	(0.0579)	(0.0175)	(0.0711)	(0.0218)
H_MCRDSC_PER				0.00171	0.117	0.0174	0.148	0.0267
				(0.0523)	(0.216)	(0.0760)	(0.219)	(0.0935)
H_MCDDSC_PER				0.0365	-0.0959	0.0331	-0.104	-0.0995
				(0.0948)	(0.278)	(0.111)	(0.268)	(0.127)
Constant	0.0536***	0.0481***	0.0130	0.00871	0.0186	0.0115	0.0224	0.00858
	(0.0117)	(0.0132)	(0.0417)	(0.0231)	(0.0828)	(0.0298)	(0.0855)	(0.0376)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.004	0.127	0.626	0.195	0.655	0.200	0.642	0.339

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A14: Regressions for technology T_HOS_14

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.0837***	0.0641**	0.173**	0.0251	0.0604	0.0256	0.0695	0.0575*
	(0.0226)	(0.0279)	(0.0673)	(0.0263)	(0.0680)	(0.0288)	(0.0662)	(0.0344)
H_CON_PUB	-0.107***	-0.0768**	-0.0173	-0.0276	-0.0372	-0.00217	-0.0234	-0.00143
	(0.0255)	(0.0359)	(0.0983)	(0.0348)	(0.105)	(0.0367)	(0.104)	(0.0490)
H_D_RURAL				-0.184***	-0.302**			
				(0.0256)	(0.120)			
H_D_TEACH				0.0445*	0.0973	0.0514*	0.0996	0.0804**
				(0.0248)	(0.0668)	(0.0270)	(0.0629)	(0.0344)
H_ADMTOT				0.00734***	0.00652***	0.00695***	0.00639***	0.00613***
				(0.000781)	(0.00150)	(0.000780)	(0.00138)	(0.000852)
H_D_SYS				0.00521	0.0136	-0.000830	0.000852	-0.0150
				(0.0181)	(0.0607)	(0.0202)	(0.0576)	(0.0246)
H_D_NET				0.00953	0.0404	0.00311	0.0290	0.00289
				(0.0165)	(0.0552)	(0.0188)	(0.0521)	(0.0252)
H_D_MNGT				-0.0440	-0.0494	-0.0607	-0.0785	-0.0890*
				(0.0275)	(0.117)	(0.0380)	(0.121)	(0.0500)
H_MCRDSC_PER				0.0526	0.170	0.186	0.211	0.139
				(0.107)	(0.264)	(0.130)	(0.250)	(0.149)
H_MCDDSC_PER				0.148	-0.0371	0.0862	-0.106	0.0268
				(0.140)	(0.372)	(0.145)	(0.345)	(0.170)
Constant	0.649***	0.654***	0.571***	0.580***	0.564***	0.561***	0.536***	0.574***
	(0.0206)	(0.0242)	(0.0588)	(0.0430)	(0.113)	(0.0468)	(0.110)	(0.0571)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.029	0.169	0.809	0.260	0.842	0.224	0.780	0.436

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A15: Regressions for technology T_HOS_15

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							URBAN	
	NO CONTROLS	HRR	HSA	HRR CONTROLS	HSA CONTROLS	HRR CONTROLS	HSA CONTROLS	CBSA CONTROLS
H_CON_NFP	0.101***	0.106***	0.183**	0.0417*	0.0284	0.0482*	0.0264	0.0634
	(0.0198)	(0.0227)	(0.0763)	(0.0223)	(0.0815)	(0.0271)	(0.0796)	(0.0395)
H_CON_PUB	0.00457	0.0454*	0.132	0.0434*	0.0401	0.0644**	0.0538	0.0592
	(0.0223)	(0.0235)	(0.0890)	(0.0241)	(0.0988)	(0.0316)	(0.103)	(0.0493)
H_D_RURAL				-0.0484***	-0.0384			
				(0.0182)	(0.0798)			
H_D_TEACH				0.0678**	0.128*	0.0760***	0.135*	0.0904**
				(0.0263)	(0.0751)	(0.0281)	(0.0704)	(0.0355)
H_ADMTOT				0.00845***	0.00879***	0.00849***	0.00873***	0.00792***
				(0.000886)	(0.00198)	(0.000931)	(0.00185)	(0.00101)
H_D_SYS				-0.00618	-0.0280	-0.00507	-0.0344	-0.0173
				(0.0156)	(0.0642)	(0.0197)	(0.0651)	(0.0296)
H_D_NET				0.00340	-0.00768	0.00393	-0.00121	-0.00988
				(0.0152)	(0.0627)	(0.0198)	(0.0616)	(0.0273)
H_D_MNGT				-0.00898	-0.00369	0.00465	-0.0437	-0.0609
				(0.0196)	(0.103)	(0.0306)	(0.119)	(0.0434)
H_MCRDSC_PER				0.0433	0.255	0.0957	0.325	0.168
				(0.0745)	(0.271)	(0.110)	(0.282)	(0.146)
H_MCDDSC_PER				-0.197	-0.452	-0.299*	-0.479	-0.449*
				(0.152)	(0.353)	(0.181)	(0.343)	(0.232)
Constant	0.145***	0.131***	0.0622	0.0656**	0.0429	0.0520	0.0347	0.0634
	(0.0180)	(0.0185)	(0.0611)	(0.0313)	(0.119)	(0.0423)	(0.119)	(0.0562)
Observations	3,841	3,841	3,841	3,841	3,841	2,858	2,858	2,858
R-squared	0.014	0.143	0.699	0.234	0.743	0.237	0.712	0.401

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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