Firm-Sponsored General Education and Mobility Frictions: Evidence from Hospital Sponsorship of Nursing Schools and Faculty

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Abstract. This study asks why hospitals provide direct financial support to nursing schools and faculty. This support is striking because nursing education is clearly general, clearly paid by the firm, and information asymmetries appear minimal. Using AHA and survey data, I find hospitals employing a greater share of their MSA's registered nurses are more likely to provide direct financial support to nursing schools and faculty, net of size and other institutional controls. Given the institutional context, I interpret this result

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as unusually-specific evidence that technologically-general skill training may be made *de facto*-specific by imperfect and costly mobility.

Why do hospitals provide direct financial support to local nursing schools and faculty? To hospital nursing officers, the answer is simple and intuitive: it is a long-term investment to fill nursing vacancies and address local nursing shortages. However, human capital theory implies these resources would be better-spent raising wages, given the literature's general consensus that nursing markets are competitive (Adamache and Sloan 1982; Sullivan 1989; Hirsch and Schumacher 1995, 2005).

Using unique data on staffing practices collected from surveys matched with American Hospital Association (AHA) data, this paper presents evidence that weak local competition prompts hospitals to provide direct financial support to nursing schools and faculty. This finding makes three distinct contributions. First, because this form of firm-sponsored general education supports students for whom information asymmetries appear to be minimal and for whom support cannot be deducted from wages, it corroborates Acemgolu and Pischke's (1999a) hypothesis that technologically-general skills may be made *de facto* specific by mobility frictions. Second, it infers monopsony rents in a market whose evidently highly-elastic labor supply calls to question monopsony's relevance to labor markets. Third, it poses an explanation for long stretches of perceived nursing shortages in the U.S. and abroad. In short, this study contributes a case of search-induced monopsony to the human capital literature, a case of firm-sponsored general education induced by search frictions to the monopsony literature, and by combining the human capital and monopsony literatures, this study contributes a set of policy recommendations.

In the classic human capital model, employers do not pay for general training because doing so requires raising wages commensurately to prevent competitors from opportunistically recruiting trained employees (Becker 1964). For incumbent employers to recoup training costs,

productivity must rise faster than wages with respect to training, implying imperfect competition and "wage compression" (Acemoglu and Pischke 1999a). Recent research emphasizes how private information may prompt employers to bear the costs of general skills training. In particular, incumbent firms may place more-informed bids than competitors following an investment in general skills because they possess private information of the quality of education (Katz and Ziderman 1990, Chang and Wang 1996) or workers' innate abilities (Acemoglu and Pischke 1997, 1998), or acquire private information through training (Autor 2001).

However, from the perspective of human capital theory, hospitals' direct financial support for nursing schools and faculty is remarkable; it overcomes the typical dilemmas of empirical human capital research and allows weak local competition to be largely-isolated from the firm-sponsored general education's usual explanations. Because nursing students are pursuing degree programs and a nationally-recognized nursing license, training is clearly general. Because grades, licensure, and the quality of the nursing school are largely publicly-observed, information asymmetries appear to be minimal. Because support for nursing schools benefits students who are not employees, training costs are clearly borne by employers and cannot be discounted from wages (although alternative support could be, such as tuition reimbursement for current employees pursuing nursing licensure). Because AHA data allow firms' local employment shares to be calculated, it is relatively-feasible to distinguish firms facing stark local competition from those facing weak local competition.

Using the matched surveys, I estimate that 45% of hospitals provide financial support to nursing schools (either independently or jointly), and about one-third pay for nursing faculty. Net of size and other institutional controls, I estimate that hospitals in the top quartile of nurse employment share are about three times as likely to support nursing schools and pay for nursing

faculty as hospitals in the bottom quartile of nurse employment share. I interpret these results as evidence that weak local competition motivates hospitals to pay for nurses' basic education. Lastly, I discuss how the applicability of human capital and monopsony models implied by these results can inform manpower policies designed to boost the supply of nurses.

I. Hospitals' Justifications for Nursing School Support

Unfortunately, much of the literature on hospitals' staffing practices is composed of descriptive studies of specific cases, with less attention to explaining the wide differences in nursing vacancies and staffing policies across hospitals and regions. Recent major studies of US hospitals' educational strategies include the Community Tracking Study (see May, Bazzoli, and Gerland 2006) and the Future of Nursing Study of the Institute of Medicine and Robert Wood Johnson Foundation (IOM 2010).

In 2008 (when this study's first survey was taken), the nursing administration literature and administrators interviewed for this study referred to support for local nursing education as an "investment" and a method of addressing a perceived nursing shortage.[2] While labor shortages are not a well-defined equilibrium concept, the belief in persistent local nursing shortages was widespread among the hospital administrators who pushed providing support to local schools. A majority of RNs (82%), physicians (81%), hospital CEOs (68%), and hospital Chief Nursing Officers (74%) surveyed by Buerhaus et al. (2007) believed their hospital is facing a nursing shortage. Similarly, 77% of Chief Nursing Officers surveyed in 2008 for this study believed their hospital "is currently experiencing a shortage of registered nurses."

[2] Perceptions of a nursing shortage have declined since the recession. From 2000 to 2008, registered nursing unemployment was between 1% and 2%, while about 10% of hospitals' budgeted positions for RNs were vacant. Despite the recession, health care and nursing has added jobs, and unemployment among RNs remained about 2-3% in 2009 and 2010 (Benson 2011; Buerhaus Auerbach, and Staiger 2003).

For hospital nursing officers, the shortage manifests in difficulty recruiting nurses, implicitly at prevailing wages. In July 2007, the AHA estimated that American hospitals posted 116,000 budgeted but vacant positions for FTE registered nurses, or 8.1% of all hospital registered nursing positions. In 2008, nursing officers surveyed for this study reported a mean of 10.5% of RN positions were "budgeted but vacant." To contrast, estimated unemployment among RNs was 1.5% in 2008. In a series of articles, Buerhaus, Staiger, and Auerbach (2000, 2003, 2007a, 2007b) projected the vacancy gap will be widened by accelerating retirement of RNs and the increased demand for health care among baby-boomers. The 2008-2009 edition of the BLS Occupational Outlook Handbook (2008) plainly declared a "shortage" for both clinical and faculty nurses. Several state and federal initiatives also sought to support nursing schools and boost the supply of nurses and nurse educators.[3] A study conducted by the Institute of Medicine (2010) concluded that employment numbers may understate a nursing skills deficiency, since technological changes in the practice of nursing are raising the demand for nurses familiar with electronic medical records, team nursing, and evidence-based practice.

Traditionally, nursing managers used loan forgiveness to attract new nurses. However, some managers view loan forgiveness with skepticism, noting that their local nursing schools are

[3] Examples include the Nursing Reinvestment Act of 2003, the President's 2003 High Growth Job Training Initiative, earmarks in the Graduate Assistance in Areas of National Need program of the Department of Education, and the health professions training grants in the American Recovery and Reinvestment Act. Firms hiring foreign nurses through the H1-B program are also given a special exemption to the requirement they demonstrate an inability to recruit a domestic nurse for the same position. Since 2008, the recession simultaneously reduced demand for preventative and elective procedures and increased the nursing supply by attracting nurses to re-enter the labor force. Unemployment among registered nurses rose to about 2% in 2009 and 2010, continuing its trend at one-fourth the national unemployment rate (Benson 2011; Buerhaus, Auerbach,and Staiger 2009). Surveyed nursing managers reporting a shortage of registered nurses dropped from 77% to 20% from 2008 to 2010, and the mean vacancy rate dropped from 10.5% to 4.1%.

often capacity constrained and that attractive wages and benefits may simply reward those who won a spot in a nursing program while doing little to increase the supply. Corroborating this claim, the American Association of Colleges of Nursing (2008, 2009) estimates that U.S. nursing schools denied admission to 40,285 qualified applicants in 2006 and 49,900 qualified applicants in 2009. Berlin, Wilsey, and Bednash (2005) estimate that 33,000 qualified applicants to nursing programs were declined admission in 2004-2005. As a result, hospitals became increasingly involved in local nursing education, including the provision of direct financial support for nursing schools and faculty.

Interviewees believed that direct financial support is more likely to be given by larger regional hospitals less prone to local competition—a claim consistent with survey results. In areas with several major hospitals, nursing officers may ask their counterparts at other area hospitals to "share the burden" by making commitments of their own. This concern is consistent with the contractual solution of the collective action problem under oligopsony, and is also explored in the empirical section. Evidence from this study's interviews and survey results, as well as existing literature, suggest that joint programs are not uncommon. One interviewed hospital administrator described a "nursing collaborative" between major regional hospitals and nursing schools that also included endowing a school of nursing education. Such partnerships, it was noted, may be organized by hospital systems or regional hospital associations.

II. Firm-Sponsored General Education, Monopsony, and Nursing Education

In the classic human capital model, firms do not finance general education because *ex post* wage competition between the incumbent firm and potential poachers eliminates potential rents (Becker 1964). Models of firm-sponsored general education therefore invoke market imperfections that allow firms to retain trained workers while paying wages below their

productivity, thereby compressing the wage profile relative to the productive returns to education (Acemoglu and Pischke 1999a).

In a series of papers, Acemoglu and Pischke (1997, 1999a, 1999b) hypothesize mobility frictions, oligopsony, or credit constraints may allow firms to pay trained workers less than their marginal product and recoup training investments. However, testing these models is challenging. One dilemma is that firm-sponsored general education may be discounted against workers' earnings—for example, firm that pay for employees' tuition in MBA programs typically require a "work commitment," as well as reimbursement if the worker reneges on the commitment to return. Tests for wage-discounting have been performed using the U.S. Equal Opportunity Pilot Project (Barron, Berger, and Black 1999; Grossberg and Sicilian 1999), National Longitudinal Survey of Youth (Loewenstein and Spletzer 1998), and British Household Panel Survey (Booth and Bryan 2005). These studies have generally found little or no evidence of wage discounting in the presence of firm-sponsored training. However, testing for wage discounting in these data remains problematic because it is not clear whether training is general, whether the provision of training is attributable to private information, or what the earnings would be in the absence of firm-sponsored training.

Rather than mobility frictions, recent research emphasizes the role of asymmetric information in inducing firms to sponsor general education. Theoretical models by Katz and Ziderman (1990) and Chang and Wang (1996) propose that firms may provide general training if its quality is unobserved by potential poachers. Acemoglu and Pischke (1998) hypothesize that employers enjoy *ex post* informational monopsony power if workers who quit after receiving education are expected by potential employers to be adversely-selected. Citing evidence from a temporary help agency, Autor (2001) hypothesizes firms providing general skills training enjoy

private information regarding trainees' aptitude, allowing them to pay less than workers' productivity until their tenure signals their aptitude to other employers.

However, asymmetric information does not appear to be driving hospitals' financial support to nursing schools and faculty. Direct financial support to nursing schools cannot be discounted against beneficiaries' wages and cannot be conditioned upon beneficiaries' abilities. Moreover, it seems unlikely that hospitals receive private information regarding graduates' aptitudes or quality of their training as a condition of their financial support, and also unlikely that non-sponsoring hospitals believe graduates who do not work for their sponsors are adversely-selected.[4] Indeed, in this case of firm-sponsored education, the beneficiaries of training subsidies include non-employees who may not even be aware that their education is being supported by a local employer.

Rather, hospital administration literature refers to such support as an "investment," implying their belief that local labor markets are partly-shielded from external competition (and thereby not perfectly elastic). As such, hospitals' provision of financial support for schools and faculty appears to be most-consistent with Acemoglu and Pischke's (1997) hypothesis that mobility frictions may allow firms to extract rents on newly-trained local workers and induce them to pay for general skills training.

Nursing's institutional and demographic features make it a classic setting for testing monopsonistic search frictions. Institutionally, hospitals are faced with the competing pressures of increasing scale to offer a wider variety of treatments and dispersing to be near the population,

[4] Although hospitals that offer clinical rotation sites for nursing programs may extract private information regarding nursing students' abilities, direct financial support for the school is typically not a precondition; in the data, two-thirds of hospitals that serve as clinical rotations sites do not provide direct financial support for nursing schools.

resulting in hospitals' geographic sparsity and a perception that single hospitals or hospital systems can be dominant employers within small metropolitan areas. This sparsity may inhibit nurses' inter-firm mobility since switching employers may involve longer commutes or the pecuniary and psychic costs of home relocation (Bhaskar and To 1999; Bhaskar, Manning, and To 2002; Manning 2003).

Recent research on "new" monopsony models emphasizes how firms may enjoy equilibrium monopsony rents due to workers' search costs, forfeited accumulated skills, and foregone earnings (Burdett and Mortensen 1998, Manning 2003). Furthermore, a majority of RNs are married (71%), are women (94%), and are supporting dependents (52%); these traits have been found to reduce the likelihood of relocation and potentially affect incumbent employers' decisions as to whether to match non-local wage offers (McKinnish 2008, Mincer 1978, Pixley and Moen 2003, Sandell 1977). Institutional and demographic features have thereby led researchers to hypothesize that regionally-powerful hospitals are able to "lock-in" nurses at lower wages than competitors are willing to bid.

However, research has generally concluded that nurse employment is too sensitive to wage changes in the long run for hospitals to enjoy significant monopsony power in wage-setting. Using non-federal hospital data in 1979, Adamache and Sloan (1982) find that, after controlling for population density and costs of living, entry-level real wages among RNs employed at non-federal hospitals are uncorrelated with hospital concentration. Using wages in MSAs and in rural state areas from the Current Population Survey, Hirsch and Schumacher (1995, 2005) find no evidence that nurse/non-nurse relative wage rates are correlated with hospital density or market size. Using a cross-section of nurse wage data from an AHA personnel survey, Sullivan (1989) estimates that the nurse labor supply is quite inelastic; however,

Sullivan's estimates do not differ from large and small markets, which on-face is contrary to "new" monopsony theory's predictions. Using an exogenous change in minimum nurse wages at Veterans Affairs hospitals, Staiger, Spetz and Phibbs (2010) find that non-VA hospitals rose short-run wages by about 12.8% the increase in VA wages, providing perhaps the strongest evidence for monopsonistic wage setting in the nursing market. Although evidence is mixed and evidently sensitive to the empirical strategy, a review by Boal and Ransom (2003) concludes that the rate of monopsonistic exploitation of nurses is "close to zero."

As Boal and Ransom (1997) note, skepticism toward the "classic" monopsony hypothesis in nursing poses a paradox in light of high sustained vacancy rates and perceived shortage for registered nurses. An upward-sloping supply for registered nurses would prompt the profit-maximizing hospital to post excess vacancies at the monopsony wage rate. Likewise, because this wage rate is below the "market" wage rate, Mincerian rents on workers' investments in a nursing education are inefficiently low, discouraging potential entrants—a result analogous to a worker's unwillingness to pay for firm-specific skills.

Hospital administrators' stated reasons for providing financial support to nursing schools rather than raising wages vary widely. Particularly in major regional hospitals, administrators express a deep awareness of the well-being and productivity of local nursing schools and are often involved in efforts to expand their programs. The implementation of support also varies widely. Support may involve lump sum financial transfers to create new programs or expand existing ones, paying for new nursing faculties' salaries (or providing new faculty with a supplementary "fellowship" or stipend), or providing schools with lecture or office space.

III. Testing for Firm-Sponsored General Education and Mobility Frictions

For the reasons described above, the provision of direct financial support from hospitals to nursing schools presents as a fruitful setting for testing the intersection of human capital and monopsony theory. On one hand, human capital theory implies some form of monopsony power must exist to induce wage compression. On the other, evidence for monopsony in nurse wage-setting is mixed and generally treated with skepticism.

While previous literature focused on estimating wage elasticities (i.e. Adamache and Sloan 1982; Hirsch and Schumacher 1995, 2005; Sullivan 1992; Staiger, Spetz and Phibbs 2010), the empirical strategy presented here provides evidence for monopsony rents in the form of hospitals' willingness to pay for nurses' education in a fashion consistent with monopsonistic mobility frictions and not with fluid cross-metropolitan competition for nurses. While inferring rents in this fashion may appear indirect, it also has key advantages. In particular, cost-of-living, non-wage compensation, and an absence of data on productivity (with respect to tenure, market size, or training) complicate estimation of wage inelasticity; this study abstracts from these concerns, using the willingness of hospitals with large employment share to sponsor nursing schools as evidence of monopsonistic rents.

In particular, I hypothesize hospitals pay for general skills training due to oligopsony rents and allocative efficiencies in the provision of training. Although both oligopsony rents and allocative efficiencies are strong assumptions, the former represents the wage compression shown to be a necessary condition for firm-sponsored general education by Acemoglu and Pischke (1999a), and the latter is perhaps the simplest explanation for why hospitals attract workers into nursing by paying for nursing schools and faculty rather than raising wages.[5] These

[5] Rents might also be explained in a "new monopsony" framework. In the absence of perfect wage discrimination, raising wages to attract new nurses may require raising wages for incumbent nurses for whom hospitals can extract rents (for example, due to firm-specific

assumptions are motivated both by earlier studies and by fieldwork investigating how financial support for nursing education is implemented.

Early studies hypothesized hospitals collude to fix nurse wages, either in the form of explicit "wage standardization" agreements or by using wages at major local hospitals as reference points when setting their own (Sullivan 1989, Hirsch and Schumacher 1995, Yett 1975). Wage-fixing has also been alleged in a series of lawsuits around the time of the first survey.[6]

Interviewed hospital administrators report that, even if hospitals do not explicitly exchange wage data, nursing managers are generally aware of salaries in their area's major hospitals and refer to them when setting their own hospitals' salaries. Federal law requires that the Centers for Medicare and Medicaid Services collect nurse wage data for hospitals participating in Medicare and publish geographically-adjusted wage indices.[7] Wage rates at local

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learning, psychic attachment to the firm, switching costs). As evidence of this, nursing compensation (particularly for new recruits) has risen rapidly since the early 1990s, leading some hospitals to "frontload" compensation to new recruits through immediate or deferred signing bonuses, tuition reimbursement, or other means. Bloom, Alexander, and Nuchols (1997) find that nurses' productivity grows more quickly with experience than do their earnings, consistent with the hypothesis hospitals may extract rents on experienced nurses. Using shocks from contract nurses, who are typically more costly to hospitals than staff nurses but with less (if any) within-unit experience, Bartel et al. (2011) show that nurses' within-unit tenure reduces patient length of stay, providing further evidence of wage compression.

6 From June 2006 to January 2008, class-action lawsuits were filed against seventy-three hospitals and sixteen health systems in Detroit, Albany, Chicago, Memphis, and San Antonio, alleging that they had violated Section 1 of the Sherman Act "by agreeing to fix or depress the wages they pay RNs and agreeing to exchange wage information about the amounts they were paying, and planned to pay, RNs working in area hospitals" (Miles 2007: 305). St. John's Health System's $13.6 million settlement with Detroit nurses has since led to increasing concern that hospitals pay practices will face increasing scrutiny.

7 These reports are available online and without fee at http://www4a.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/SNFPPS/WageIndex.html, accessed 04/27/12.

hospitals may also be available through collective bargaining agreements or explicitly reproduced through pattern bargaining. These factors result in a sentiment that major local hospitals act as "wage leaders." Wage-fixing would also be consistent with that the extent of shortages are particularly poignant and certain metropolitan areas (Bureau of Labor Statistics 2008; May, Bazzoli, and Gertrand 2006), and a class of temporary agency nurses (typically referred to by administrators as "travelers") work in geographic regions facing shortages (Bureau of Labor Statistics 2010).

Even in perfect monopsony, firms may not subsidize training because doing so is only as-appealing to workers as commensurately raising wages. However, nursing students may benefit more from a dollar spent by hospitals on their education than a dollar spent on their future wages. This may be the case in the event that external sources (such as the government or private foundations) match contributions by hospitals. Hospitals' support may also utilize slack resources, such as unused lecture hall space. Hospitals may also provide paid leave for nurses who teach during the off-season. As a result, subsidies may represent "allocative efficiencies," and some amount of hospital-sponsored training may also be efficient.

Second, potential nurses may discount the future more than hospitals, face credit constraints, possess imperfect information regarding the cost or benefits of a nursing education, or may be more averse to the risk of dropping out of nursing school. Each of these would result in an underinvestment by workers in general skills training (see Bennett, Glennerster, and Nevinson 1993 for a theoretical treatment).

To see how oligopsony and allocative efficiencies may induce firms to sponsor general education, consider the following model. In period 2, workers in a given metropolitan area produce y for their employer if they are trained and nothing otherwise. This seems reasonable

because all U.S. states require registered nurses to be licensed.[8] Suppose oligopsonists match competitors' wage offers in a "tit-for-tat" strategy, where they pay the greater of their competitors wages or the monopsonist's wage w_m, and assume workers facing identical wages sort into firms i in proportion to their existing labor share s_i. Let w denote the oligopsony wage rate, such that a firm's rents on trained nurses are $y - w$. Workers in period 1 may discount wages paid in period 2 at a different rate than hospitals, such that the present value of wage w in period 2 is δw in period 1.

In period 1, firms choose training subsidies. Let $t_i \geq 0$ denote per-worker training paid for by firm i, and let T denote the total per-worker training paid for by all firms. Training subsidies provided by firms may reduce trainees' costs by some multiplier (e.g. due to matching grants, use of slack physical or human resources, etc.), such that students benefit at a rate αT. Suppose workers pursue training if the net present value of the training subsidies and earnings exceed the worker's idiosyncratic outside option, such that the quantity of workers pursuing a nursing education is $q(\alpha T + \delta w)$.

In this environment, the monopsonist's wage w_m solves $\max_w (y - w)q(\alpha T + \delta w)$, and rents accruing to incumbent firms at this wage are $(y - w_m)s_i q(\alpha T + \delta w_m) - t_i$. Consider the marginal returns to raising wages and paying for training. Using subscripts to denote derivatives, when competitors match wage offers, paying for training is superior to raising wages if

$$s_i * (y - w)q_t(\alpha) - 1 > -s_i q(\alpha T + \delta w_m) + s_i(y - w)q_w(\delta) \quad (1)$$

and paying for training is superior to the status quo if

$$s_i * (y - w)q_t(\alpha) - 1 > 0 \quad (2)$$

[8] All state boards of nursing require registered nurses to graduate from an approved nursing program and pass the NCLEX-RN examination, which tests for basic competence.

Solving for s_i, firm i pays for general skills training if $s_i > [q + (y - w)(q_t(\alpha) - q_w(\delta))]^{-1}$ and $s_i > [(y - w)q_t(\alpha)]^{-1}$. If allocative efficiencies are positive and workers discount the future more than firms, $\alpha > 1$ and $\delta < 1$, implying $q_t(\alpha) - q_q(\delta) > 0$. Firms contribute a nonzero amount to general skills training if their local employment share is sufficiently great, and this critical threshold declines with oligopsony rents (ie. $y - w$), and nursing supply is sufficiently sensitive to training subsidies (ie. $q_t(\alpha)$). Firms prefer paying for general skills training rather than raising wages if the local employment share is sufficiently great, and this critical threshold decreases with an increase in oligopsony rents (ie. $y - w$) the gap between the allocative efficiencies and workers' excess discounting (ie. $q_t(\alpha) - q_q(\delta)$). Note that if either rents or the allocative efficiency-discount gap are nonpositive, no employment share is sufficiently great to induce a firm to pay for training. The empirical strategy is to infer rents and efficiencies by showing firms with high local employment shares often pay for general skills training.

In the research setting, firm-sponsored general skills training takes the form of independent and direct financial support for nursing schools and faculty. The model thereby yields the two following hypotheses:

H1: Metropolitan hospitals that enjoy a greater share of a metropolitan area's registered nurses (net of absolute size and other controls) are more likely to finance general skills training by independently providing direct financial support to local nursing schools.

H2: Metropolitan hospitals that enjoy a greater share of a metropolitan area's registered nurses (net of absolute size and other controls) are more likely to finance general skills training by independently paying or sponsoring local nursing faculty.

In addition, I examine the hypothesis using joint, rather than independent, financial support as the dependent variable. This hypothesis emerged due to interviewees' suggestion that major hospitals in semi-competitive markets may want to foster local nursing education, but not wish to do so alone. Joint sponsorship of nursing education also represents a contractual solution to free-ride on other hospitals' educational investments under oligopsony. Interviews and theory thereby inform the third hypothesis:

> H3: Metropolitan hospitals that enjoy a greater share of a metropolitan area's registered nurses (net of absolute size and other controls) are more likely to pay for general skills training by jointly providing direct financial support to nursing schools.

Alternative results could be that, contrary to existing (non-survey) studies, instances of hospitals financing nursing schools are exceedingly rare, regardless of hospital characteristics. This finding would imply that rents and allocative efficiencies, if they exist, are generally insufficient to induce firm-sponsored general skills training. Another alternative result would be that *not* rare, but that hospitals' metropolitan nurse employment share is independently a poor predictor of training, in which case mechanisms orthogonal to the hospital share (such as information access or visibility) may be more important.

IV. Methods and Results

Data include institutional, metropolitan, and local labor market characteristics of U.S. hospitals. Institutional characteristics come from the AHA Annual Survey of Hospitals. Nurse recruitment practices come from mail surveys conducted in the summers of 2008 and 2010.

For each survey, hospitals were randomly sampled from metropolitan hospitals included in the AHA hospital survey. For the 2008 survey, of 1,286 first-round surveys deliverable to

Chief Nursing Officers at hospitals with at least twenty-five beds, 140 were returned. A follow-up survey sent to non-respondents yielded 133 second-round respondents, for a cumulative response rate of 21.2%. The response rate was higher in 2010. Of 1,401 deliverable surveys in a single round, 304 were returned, for a response rate of 21.7% and a total of 577 hospital-year observations. Interviewees suggested the survey would more likely be filled by an administrative assistant rather than the Chief Nursing Officer personally.

Table 1 presents the response rates by round and hospital size. A chi-squared test suggests response rate depends on governance, but otherwise there is insufficient evidence to conclude, at a 10% significance level for either survey, that other variables predict response. Logistic regressions find that log-population and log-population density are not statistically significant predictors of response.

[TABLE 1]

The surveys were developed through an iterative process of referring to nursing management literature and consultation with chief nursing officers, labor representatives, and deans at geographically and institutionally-diverse hospitals and nursing schools. Rather than focusing only on practices relating to educational partnerships, the accompanying cover letter described the study as “a survey of hospital registered nurse recruitment strategies,” and asked chief nursing officers to identify whether they used a wide variety of nurse staffing practices. The surveys collected fifty-four items on registered nurse employment. In addition to questions related to training, the surveys collected data on: turnover, vacancies, collective bargaining representation, agency nurse utilization, scheduling, signing bonuses, relocation bonuses, international recruitment, magnet status, recruitment costs, and the numbers of local and non-local recruits. To mitigate response bias with respect to the dependent variable of interest, the

survey's cover letter did not explicitly express an interest in nursing education. In addition, education questions were posed near the end of the survey instrument, followed only by questions regarding vacancies, turnovers, and contact information. The cover letter offered summary statistics to respondents who left contact information. Table 2 presents dependent variables of interest.[9]

[TABLE 2]

Although nearly the same number of hospitals sponsor schools as sponsor faculty (ninety-seven versus ninety in 2008, and ninety-one versus eighty-five in 2010), these do not necessarily represent the same hospitals. Among respondents to both items, fifty-seven hospitals in 2008 and fifty hospitals in 2010 provided direct financial support to both schools and faculty. Three "yes-or-no" questions regarding hospital's independent and joint sponsorship of nursing schools and faculty were favored over the collection of continuous measures of financial support.
The staffing survey is matched with the AHA Survey, which provides the independent variables. The AHA survey is conducted at the establishment-level, and hospitals within the same system are treated as distinct hospitals for the purposes of data collection and the calculation of employment share, although findings are not sensitive to this choice.

The hospital's share of full-time equivalent registered nurses (FTE RNs) in the hospital's own MSA[10] is measured from the population of hospitals in the AHA survey.[11] Hospital bed size

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9 As a rudimentary check against alternative hypotheses (e.g. information asymmetries), the survey also asked nursing officers to identify whether their hospital provided direct financial support a non-local nursing school, of which only four reportedly did.

10 The Federal Office of Management and Budget uses the Metropolitan Statistical Area (MSA) to designate "a core area with a population nucleus [of at least 50,000 inhabitants], plus adjacent communities having a high degree of economic and social integration with that core," making it an appealing demarcation of a local labor market.

11 RNs also work in physicians' offices, residences, nursing care facilities, and other settings. CPS MORG data suggests about 40% of RNs work outside of hospitals, independently of

is an important control since larger hospitals may have more policies (such as support for nursing schools) net of employment share. Although larger hospitals may intuitively also have larger employment shares, the great variation in the population of US cities makes the correlation between log-beds and log-employment share positive but not particularly strong ($r = 0.47$). As a result, there are hospitals with more than 600 beds that employ less than 2% of their MSA's hospital nurses and hospitals with fewer than fifty beds that employ the majority of their MSA's hospital nurses. A hospital system is a group of hospitals that are owned and/or contract-managed by a central organization. A hospital network is a group of hospitals that formally coordinate the delivery of a broad spectrum of services, and may not be members of the same system. Lastly, I control for hospital governance with three classifications: government, for-profit, and non-profit (including church-affiliated).

[TABLE 3]

Table 3 disaggregates the share of hospitals sponsoring nursing schools and faculty for each independent variable. To construct the tabular presentation, hospital employment shares are made discrete by reporting above-median and below-median shares. A simple chi-squared test concludes that the three sponsorship rates are different ($p<0.01$) between hospitals with below-median and above-median employment shares in both 2008 and 2010.

[TABLE 4]

metropolitan characteristics (such as population). Although the CPS MORGs feature enough nurses to show the relation between non-hospital employment and metropolitan characteristics are weak, they do not feature enough nurses to calculate non-hospital employment share reliably for any individual MSA, potentially introducing measurement error. Including non-hospital employment in employment shares has little substantively effect on results.

Table 4 presents results from four multinomial logistic regressions predicting the likelihood of independent and joint direct financial support to local nursing schools, corresponding to hypotheses H1 and H3. Because hospital employment shares are highly skewed, I use its logarithm to avoid excessive statistical leverage. The log-share of FTE RNs has a mean of -3.294 (corresponding to a log-mean share of 3.71%), a standard deviation of 1.745, a minimum of -8.046, and a maximum of 0.

Consistent with hypothesis H1, hospitals with a greater share of metropolitan FTE RNs are more likely to provide independent direct financial support to nursing schools. In both the 2008 and 2010 regressions, the magnitude of the effect of hospital share is mildly reduced after controlling for the size of the hospital (as measured by the number of hospital beds) and other hospital characteristics.

Support for hypothesis H3 is mixed. Among hospitals surveyed in 2008, those with a greater employment share are more likely to sponsor nursing schools jointly (using a 5% significance test). Among hospitals surveyed in 2010, hospitals with a greater employment share are not significantly more likely to sponsor nursing schools jointly. It is also notable that control variables, including bed-size, have relatively mild effects on the likelihood of school sponsorship, net of employment share.

[TABLE 5]

Table 5 presents results from six binomial logistic regressions assessing hospitals' sponsorship of nursing faculty. Regression results using the 2008 survey show a strong relationship between hospital employment share with the propensity to pay or sponsor nursing faculty. This result is significant at 1% in all three models. However, regression results from 2010 suggest that the effect of hospital-share is captured by hospital size. Indeed, further analysis

reveals that large hospitals steeply increased their propensity to sponsor nursing faculty from 2008 to 2010, while smaller hospitals, including those that enjoy high local employment shares, became less-likely to sponsor nursing faculty. This shift poses a mystery, particularly given the robustness of the effect of hospital shares to controlling for hospital size for faculty sponsorship in 2008, and direct financial support to nursing schools in 2008 and 2010.

[TABLE 6]

Table 6 presents the estimated likelihood hospitals pay for nursing schools and nursing faculty by nurse employment. I calculate point estimates and standard errors using the delta method from the full regression models (i.e., Table 4, Regressions 2 and 4; and Table 5 Regressions 3 and 6). To isolate the independent effect of hospitals' employment share, I present point estimates at the mean value for control variables. Including infra-marginal hospitals, those in top quartile in local nurse employment share are about three times as likely to provide financial support than a hospital with the bottom quartile share, after hospital size and other institutional controls. The model predicts a hospital has a 50% probability of paying for nursing schools if it employs at least 30% of a metropolitan area's registered nurses.

[TABLE 7]

Table 7 presents results for three common alternative forms of firm-sponsored general education: tuition support for non-employees in exchange for work commitment, tuition support for Licensed Practical Nurses (LPNs) enrolled in Bachelor's of Science in Nursing (BSN) programs,[12] and tuition support for employees enrolled in Masters of Science in Nursing (MSN)

[12] Licensed Practical Nurses (LPNs) are also known as Licensed Vocation Nurses (LVNs) in the U.S., and are roughly equivalent to "enrolled nurses" (ENs or SENs) in other Anglo countries. LPNs have less formal skills than Registered Nurses, and LPN-to-BSN programs typically train LPNs to become RNs. In 2008, the survey finds these three programs are

Programs. Although these forms of firm-sponsored general education could, in principal, be discounted commensurately against workers' wages, recent empirical work suggests that employers that pay for workers' general education do not fully-discount wages by employers' contributions, contrary to the predictions of human capital theory under perfect competition (Barron, Berger, and Black 1999; Leuven 2005). If employers are partial-claimants on the returns to general skills training, and bear part of the training costs (in contrast to direct financial support for schools and faculty), then we may expect hospital share to be a positive, albeit weaker, predictor of these forms of support. Consistent with cost-sharing and rent-sharing, results for 2008 suggest that a hospital's local employment share predicts tuition support for a non-employee work-commitment, employees in BSN programs, and employees in MSN programs, net of the full controls. However, results for 2010 are not statistically significant, and both the shares of hospitals offering these forms of tuition support and its relationship to hospital share declined. One hypothesis is that the recession relaxed the market for nurses, and because wages are downwardly-rigid, hospitals reduced benefits such as tuition reimbursement instead.

As robustness checks, I test the hypotheses under alternative specifications and using instrumental variables for hospital share. Because the Herfindahl-Hirschman Index[13] is classically used as the independent variable in monopsony studies, all regressions were also run replacing the log-share with the employment log-HHI as the primary independent variable of interest. Consistent with hypothesis H1, hospitals in high-HHI metropolitan areas are

offered by 31%, 85%, and 79% of sampled hospitals, respectively; in 2009, the survey finds these three programs are offered by 20%, 75%, and 79% of sampled hospitals, respectively.

[13] In this case, the HHI for metropolitan area *j* is the summation of hospitals' squared shares of full-time equivalent registered nurses, taken from the universe of hospitals in the AHA database (rather than the sample frame). Intuitively, the HHI for MSA *j* gives the probability that two registered nurses chosen at random from MSA *j*'s hospitals are employed by the same hospital.

significantly more likely (at 1%) to provide independent financial support to nursing schools in both the 2008 and 2010 samples. Estimates for joint sponsorship are not statistically significant. Selecting an instrument that specifically affects hospital share is challenging, and three were used. First, using Census data, I used the MSA's log-population density as an instrument for both log-employment share and for the log-HHI. High population density is negatively correlated with low mean employment shares and HHIs; intuitively, low density MSAs tend to include very large rural areas with small metropolitan centroids where hospitals are sparse. I also used per capita income and Catholic hospital penetration (which may prompt struggling hospitals to merge) as instruments for the employment share and the HHI. Each instrument has no substantive effect on results, and Durbin-Wu tests performed for each of the full regressions and for each instrument failed to find evidence that either hospital share or HHI is endogenous.[14]

Some caveats deserve special mention.

First, while log-share intends to capture probabilistic monopsony rents, it may also be capturing the role of omitted metropolitan and institutional features positively correlated with financial support to schools and faculty. For example, hospitals with greater employment shares (net of the number of hospital beds) may simply be more bureaucratic, and therefore more likely to establish formal financial arrangements with nursing schools and faculty. While instrumental variables are the standard method for addressing this concern, it is difficult to find one that would narrowly affect hospital employment shares, particularly given that interviews and existing research provide little guidance as to what omitted variables may be a concern.

Second, although the challenges inherent to conducting an employer survey were anticipated and considered throughout the data-collection process, response bias remains a

[14] Technical details and results are available upon request.

concern. Hospital administrators may respond to the survey for a variety of reasons—due to an interest in academic research in nursing recruitment, for access to summary statistics, because they perceive a shortage at their own hospital to be a problem, or because they believe they are effectively avoiding one. Although response is not evidently conditioned on observable characteristics, these sources of response bias may lead to biased estimates of the levels at which hospitals are sponsoring nursing schools and faculty. More troubling is the possibility that these sources of response bias are positively correlated with both the propensity to sponsor education and the employment share, which would increase the likelihood of a Type I error.

Lastly, though financial support of local nursing programs is correlated with employment shares, it is still a common-enough practice in metropolitan areas to warrant consideration of the other reasons for sponsoring education. Financial support may expand the pool of nursing students whom hospitals screen through complementary training practices, such as clinical rotations or career ladders for LPNs. A hospital's interest in improving its visibility or its reputation is not captured in the model. Supporting nursing education might also promote loyalty and commitment among employed nurses, reducing turnover or improving productivity. If hospitals in competitive markets are compelled to pay for training by visibility or goodwill, the expected sign would be the opposite as that found in the results. If hospitals in competitive and non-competitive markets were equally-compelled by visibility or goodwill concerns, the effect would be neutral. If these motivations are positively correlated with hospital share and not captured by controls (such as size or non-profit status), they would increase the likelihood of committing a Type I error.

Although this study is subject to the usual challenges of conducting an employer survey, it confirms that hospital financial support for nursing schools and faculty is indeed fairly

common, and suggests that such support is generally provided by hospitals with large shares of local nursing employment, net of size and other institutional controls.

V. Policy Implications

Results lend support for the application of frictional search models to the study of nursing manpower. These models present a set of policy implications and offer directions for further evaluation. First, evidence that employers extract rents on locally-trained nurses suggests that the potential for non-competitive wage setting should be taken seriously. Indeed, extended and sustained shortages up to the most-recent recession are themselves theoretically surprising, as it appears that wage gains were not sufficient to entice workers into the nursing profession.

Second, this study suggests there may be efficiency gains to be made by improving collaboration and the allocation of resources between hospitals and nursing schools. As shown in the model, firm-sponsored general education requires not only frictional job search, but also some form of allocative efficiencies in the provision of nurse training, excessive discounting among students, or liquidity constraints among students. Likewise, interviews conducted for this study identified several methods by which hospitals used slack resources, such as hospital lecture space or non-seasonal work, to promote nurse training. Further study may identify other ways in which hospitals may efficiently coordinate nurse training, and other ways institutions may help ease students' credit constraints (such as through subsidized loans or work commitments).

Third, by providing evidence for monopsony in the nursing market, this study invites future research to consider whether monopsony may explain other supplementary staffing practices, such as the widespread extensive reliance of travelling contract nurses, mandatory overtime, and foreign recruitment.

Fourth, state or local institutions may help make nursing wages more competitive by improving the portability of their education. One way to do so is to adopt national training guidelines for transition-to-practice programs. The National Council of the State Boards of Nursing offers a model for doing so (for a discussion, see IOM 2010; NCSBN 2009).

Lastly, in areas with weak local competition for registered nurses, public subsidies designed to benefit nursing students (e.g. of the form taken the Nurse Reinvestment Act or most state nurse workforce initiatives) may be less effective than would be the case in perfect competition if part of the rents are captured by hospitals rather than potential students. While supporting local hospitals is not in itself an undesirable outcome, interventions intending to boost the supply of nurses in areas with weak local competition may require hospitals to increase their own contributions to nursing education.

VI. Concluding Remarks

Hospitals' provision of direct financial support to nursing schools and their faculty poses a striking exception both to the usual explanations for firm-sponsored general skills training and to evidence suggesting the market for hospital nurses is not subject to monopsony. Rather, the tendency of this support to be provided by hospitals enjoying weak local competition suggests that frictional search models at the intersection of human capital theory and the "new" monopsony literature are more applicable to nursing education. This finding makes two theoretical contributions.

First, this setting overcomes the typical empirical dilemmas in human capital theory and provides support for the hypothesis that mobility frictions may induce firms to pay for technologically-general skills. Hospitals' support for nursing education is an instance where the training is highly-general, clearly paid by the firm (rather than, for example, being discounted

against earnings), and is a setting in which private information is minimal. By associating financial support with hospital's employment share, the study suggests local employers expect to extract rents on locally-trained nursing graduates.

Second, hospital sponsorship of nursing schools implies the existence of monopsony rents by using a non-standard method (inference from patterns of firm-sponsored training). While recent studies generally reject that employers behave like monopsonists by estimating high labor supply elasticities, this conclusion has left open the puzzle of excessively high vacancy rates at prevailing wages. Results suggest that hospitals pattern compensation off of major employers, and use alternative practices to attract "marginal" nurses and to supplement staffing to fill nurse vacancies. These practices, such as aggressive relocation and signing bonuses, overtime, temporary nurses, and foreign nurses, are consistent with monopsonistic wage discrimination but are overlooked by traditional testing instruments. Hospital nursing may thereby be a rich setting to examine the human resource practices consistent with the market failure and the presence of rents.

By distinguishing nursing education as a case of firm-sponsored general education induced by mobility frictions, this study invites human capital and monopsony to be applied to the study of nursing markets. Specifically, this study implies that public support designed to increase the nursing supply should require that matching support hospitals when local labor markets appear to be weak; that hospitals, nursing schools, and the state should seek out methods of promoting nursing education that exploit allocative efficiencies and slack resources; and that interventions designed to promote the portability of a nursing education may promote wage competition and nursing employment.

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Table 1. Response Rates by Hospital Bed Size

2008	Respondent		Non-Resp.	Rate
	1st Rd	2nd Rd		
25-49	15	15	176	14.6%
50-99	19	32	215	19.2%
100-199	40	44	249	25.2%
200-299	28	15	204	17.4%
300-399	15	15	112	21.1%
400-499	10	5	57	20.8%
500+	13	7	102	16.4%
Total	140	133	1013	21.2%
2010	Respondent		Non-Resp.	Rate
	1st Rd.	(N/A)		
25-49	42		155	21.3%
50-99	53		229	18.8%
100-199	78		307	20.3%
200-299	55		169	24.6%
300-399	27		111	19.6%
400-499	22		49	31.0%
500+	27		77	26.0%
Total	304		1097	21.7%

Notes: Includes US Metropolitan Hospitals, Summer 2008 and 2010.

Table 2. Tabulations of Dependent Variables of Interest

	2008			2010		
Survey Wording	Yes	No	Pct.	Yes	No	Pct.
“Our hospital independently provides direct financial support for local nursing school(s)”	46	175	20.8%	81	214	27.5%
"Our hospital jointly (with other area hospitals) provides direct financial support to local nursing schools”	51	175	22.6%	45	243	15.6%
"Our hospital pays or sponsors nursing faculty"	90	180	33.3%	98	204	32.5%

Notes: Sampling errors < 6%.

Table 3. Summary Statistics

		Summary of Dependent Variables, 2008			Summary of Dependent Variables, 2010		
	Sample Shares	percent supporting nursing schools independently	percent supporting nursing schools independently or jointly	percent supporting nursing faculty	percent supporting nursing schools independently	percent supporting nursing schools independently or jointly	percent supporting nursing faculty
Metro RN FTE Share							
Above Median	50%	31.4%	47.1%	45.6%	39.2%	43.7%	39.8%
Below Median	50%	11.7%	25.2%	21.7%	12.6%	17.6%	23.3%
Bed Size							
25-49	11.0%	7.7%	20.0%	16.7%	7.7%	10.5%	7.5%
50-99	18.0%	18.2%	29.4%	28.6%	17.6%	22.0%	20.8%
100-199	30.8%	13.1%	35.4%	28.8%	20.8%	27.6%	23.7%
200-299	15.8%	32.3%	48.8%	44.2%	34.6%	38.8%	43.6%
300-399	11.0%	27.3%	42.9%	53.3%	37.0%	40.0%	48.1%
400-499	5.5%	35.7%	40.0%	35.7%	55.0%	55.6%	50.0%
500+	7.3%	38.9%	45.0%	42.1%	51.9%	59.3%	66.7%
Control							
Non-Profit/Church	59.7%	24.4%	39.6%	40.0%	30.0%	37.4%	39.1%
Government	21.6%	15.4%	24.1%	22.4%	31.0%	29.1%	30.5%
For-Profit	18.7%	18.9%	40.0%	27.7%	16.4%	18.5%	14.0%
System Membership							
Yes	56.4%	22.8%	39.1%	37.6%	31.4%	37.6%	37.0%
No	43.6%	20.0%	32.7%	29.3%	22.6%	24.6%	26.8%
Network Membership							
Yes	30.8%	23.4%	25.3%	34.1%	29.5%	30.1%	41.8%
No	69.2%	17.3%	41.3%	33.9%	26.8%	33.0%	28.7%

Table 4. Multinomial Logistic Regressions of Hospital Financial Support to Nursing Schools

	Direct Financial Support, 2008				Direct Financial Support, 2010			
	Regression 1		Regression 2		Regression 3		Regression 4	
	Jointly	Indep.	Jointly	Indep.	Jointly	Indep.	Jointly	Indep.
log-RN FTE Share	0.218*	0.488**	0.253*	0.461**	0.128	0.542**	0.0382	0.446**
	(0.098)	(0.111)	(0.113)	(0.122)	(0.149)	(0.0938)	(0.170)	(0.105)
log-Hospital Beds			0.114	0.287			0.328	0.425*
			(0.211)	(0.228)			(0.300)	(0.186)
Owner: Non-Profit			ref.	ref.			ref.	ref.
Owner: Government			-1.014*	-0.501			-0.968	0.0132
			(0.502)	(0.465)			(0.782)	(0.371)
Owner: For-Profit			-0.259	-0.115			-1.289	-0.485
			(0.456)	(0.550)			(0.818)	(0.461)
Member of System			0.853*	-0.143			0.630	0.560
			(0.392)	(0.392)			(0.523)	(0.314)
Member of Network			-1.528**	-0.786			-0.897	-0.455
			(0.454)	(0.414)			(0.613)	(0.330)
Constant	-0.484	0.126	-0.845	-0.946	-1.838**	0.829**	-3.564*	-1.735
	(0.349)	(0.338)	(1.240)	(1.330)	(0.580)	(0.307)	(1.858)	(1.120)
LR $\chi 2$	23.2**		49.5**		39.78**		57.36**	
n	267		267		290		290	

Notes: Standard errors are in parentheses. Reference dependent variable includes hospitals not providing financial support to nursing schools. * significant at 5%; ** significant at 1%; two-tailed tests.

Table 5. Binomial Logistic Regressions of Hospital Financial Support of Nursing Faculty

	Supports Faculty, 2008			Supports Faculty, 2010		
	(1)	(2)	(3)	(4)	(5)	(6)
log-RN FTE Share	0.372**	0.320**	0.329**	0.292**	0.120	0.0800
	(0.084)	(0.089)	(0.092)	(0.077)	(0.085)	(0.088)
log-Hospital Beds		0.263	0.196		0.816**	0.734**
		(0.167)	(0.173)		(0.176)	(0.176)
Owner: Non-Profit			ref.			ref.
Owner: Government			-0.768*			-0.251
			(0.372)			(0.346)
Owner: For-Profit			-0.673			-1.044**
			(0.421)			(0.448)
Member of System			0.486			0.514*
			(0.306)			(0.285)
Member of Network			-0.400			0.193
			(0.317)			(0.292)
Constant	0.478	-0.996	-0.521	0.251	-4.461**	-4.334**
	(0.280)	(0.972)	(1.017)	(0.273)	(1.054)	(1.072)
LR $\chi 2$	21.69**	24.23**	31.97**	15.54**	40.44**	49.70**
n	265	265	265	298	298	298

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%; two-tailed tests.

Table 6. Estimated Likelihood of Supporting Nursing Schools and Faculty by Own-Metropolitan Employment Share Percentile, Controlling for Bed Size, Governance, System, and Network Status

		Hospital Local Employment Share Percentile				
YEAR	Outcome	10th	25th	50th	75th	90th
2008	Pays for Schools	0.165	0.224	0.303	0.409	0.524
		(0.086)	(0.08)	(0.067)	(0.07)	(0.106)
	Pays for Faculty	0.155	0.207	0.275	0.369	0.474
		(0.082)	(0.075)	(0.064)	(0.066)	(0.103)
2010	Pays for Schools	0.135	0.183	0.248	0.341	0.447
		(0.071)	(0.066)	(0.058)	(0.068)	(0.112)
	Pays for Faculty	0.258	0.271	0.287	0.305	0.324
		(0.1)	(0.076)	(0.059)	(0.065)	(0.098)

Notes: Standard errors in parentheses. Point estimates and standard errors calculated by the delta method from the full logistic regressions. By their respective row, models used to construct point estimates are: Table 4, Regression 2; Table 5, Regression 3; Table 4, Regression 4; and Table 5, Regression 6.

Table 7. Binomial Logistic Regressions Predicting Other Forms of Educational Support

	2008			2010		
	Commit	LPN-BSN	BSN-MSN	Commit	LPN-BSN	BSN-MSN
	(1)	(2)	(3)	(4)	(5)	(6)
log-RN FTE Share	0.195*	0.292**	0.214*	0.190	-0.173	-0.0565
	(0.089)	(0.107)	(0.099)	(0.097)	(0.092)	(0.103)
log-Hospital Beds	-0.015	-0.198	-0.149	0.085	0.249	0.627**
	(0.168)	(0.217)	(0.187)	(0.177)	(0.163)	(0.182)
Owner: Non-Profit	ref.	ref.	ref.	ref.	ref.	ref.
Owner: Government	-0.528	-0.991*	-0.718*	-0.210	-0.852*	-1.065**
	(0.359)	(0.418)	(0.361)	(0.383)	(0.333)	(0.367)
Owner: For-Profit	-1.021*	-0.251	0.282	0.171	-0.969*	-1.052*
	(0.436)	(0.555)	(0.511)	(0.435)	(0.376)	(0.413)
Member of System	0.511	0.170	0.223	0.149	0.407	0.915**
	(0.302)	(0.411)	(0.346)	(0.311)	(0.289)	(0.327)
Member of Network	-0.450	0.752	0.293	0.573	0.233	0.159
	(0.313)	(0.492)	(0.373)	(0.313)	(0.324)	(0.373)
Constant	0.019	3.900**	2.800*	-1.467	-0.599	-1.832
	(0.989)	(1.306)	(1.111)	(1.086)	(0.986)	(1.081)
LR $\chi 2$	15.11	17.74	12.78	12.50	17.63	38.23
n	264	270	269	308	303	309

Notes: Standard errors in parentheses. "Commit" denotes tuition support for non-employees for work commitment. "LPN-BSN" denotes tuition support for employee Licensed Practitioner Nurses to pursue Bachelor's of Science in Nursing degrees. "BSN-MSN" denotes tuition support for employees to pursue Masters of Science in Nursing degrees.
* significant at 5%; ** significant at 1%; two-tailed tests.