APPENDIX 3:

Monopsony Power Over Hospital Workers: Evidence of a UPMC "Wage Penalty"

Monopsony Power Over Hospital Workers – Evidence of a UPMC "Wage Penalty"

Hal J. Singer and Ted Tatos[1]

Abstract

Over the last approximately four decades, antitrust enforcement in the United States has focused almost exclusively on anticompetitive injury to consumers via price and output effects. Recent developments in research and litigation have shone a spotlight on the existence and exercise of market power in input markets as well. While economic research has long acknowledged the injury that flows from the exercise of power over labor input providers in sports, the economic literature now approaches consensus on the breadth and scope of such monopsony power over workers in a much wider array of industries and positions. This paper focuses on one such industry where recent work has evinced market power over labor: healthcare. We investigate the existence and possible exercise of monopsony power by the University of Pittsburgh Medical Center (UPMC) conglomerate over hospital workers in a broad range of occupations. We find evidence of a nexus between UPMC's market power and lower wages at UPMC hospitals when compared to facilities in commuting zones with a comparable cost of living. Our results provide direct evidence that (1) UPMC has market power in labor markets where it operates, and (2) UPMC has leveraged its market power to artificially suppress wages for its workers, thus injuring competition.

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The Service Employees International Union (SEIU) commissioned this study to investigate whether the UPMC has market power over labor input providers and whether it has exercised that power to suppress wages. We compared wages UPMC paid its workers in various healthcare occupations in a given commuting zone, a commonly-used proxy for the geographic market, to the corresponding wages paid by other hospitals and systems in commuting zones with a comparable cost of living in four nearby states. We found direct evidence supporting the conclusions that (1) UPMC has market power in labor markets where it operates, and (2) UPMC has leveraged its market power to artificially suppress wages for its workers, thus injuring competition.

Across all general hospital worker job categories, we found that UPMC paid workers two percent less than comparable hospital systems. This disparity, which we call the UPMC "wage penalty," varies by occupational group and particularly affects hospital workers with direct patient care responsibilities. Considering nurse wages specifically, we also observed a wage penalty for nurses.

We then explored the relationship between market concentration and this wage penalty. Our econometric analysis finds an economically and statistically significant relationship between both market concentration in commuting zones where UPMC owns hospitals (as proxied by the Herfindahl-Hirschman Index) and UPMC's own market share and the wage penalty. Higher HHI and UPMC market share are both associated with a greater wage penalty (UPMC wages being lower than the comparison entities). These results provide direct evidence supporting the conclusions that (1) UPMC has market power in labor markets where it operates, and (2) increases in UPMC's market share (which may be the result of exclusionary conduct and its acquisition of

dozens of rival hospitals) have resulted in suppressed wages for its workers, thus injuring competition.

INTRODUCTION

Concerns over depressed wages, particularly in the nursing sector, and the attendant deleterious effects on patient care are by no means novel. The healthcare sector struggled with this problem for much of the twentieth century.[2] Indeed, by early to mid-1900s, reports began to document the dearth of nurses at prevailing wages and the deficient working conditions and mediocre compensation that contributed to it. Josephine Goldmark's landmark 1923 report, "Nursing and Nursing Education in the United States," illuminated this conundrum and presaged increasing awareness of the need to alleviate the problem that would follow in the next several decades.[3] The report asked the same question that remains relevant to this day: What material inducements would convince prospective nurses to embark on such a career with such demanding physical and mental requirements?[4]

Unfortunately, the next twenty-five years following Goldmark's report did little to alleviate the predicament facing the nursing sector. A 1947 report by the United States Department of Labor reiterated the same concerns.[5] Soliciting responses from nurses regarding their working conditions

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[2] Penn Nursing, *Where did all the nurses go*? University of Pennsylvania, available at https://www.nursing.upenn.edu/nhhc/workforce-issues/where-did-all-the-nurses-go/.

[3] Josephine Goldmark, *Nursing and Nursing Education in the United States* (New York: The Macmillan Co., 1923).

[4] Id. at 101. "Many organizations have set a definite scale with a minimum initial salary and a fixed upper limit beyond which no staff nurse can pass, no matter how long she remains in that capacity in the agency. Some have no minimum and maximum but pay all members of the staff at the same rate, regardless of experience or length of service." Also see Id. at 102, describing the wages offered at two hospitals on the east coast: "In both, the minimum beginning salary was also the maximum, and unless a staff nurse was promoted to the position of supervisor she had no prospect of an advance in salary no matter how long her period of service with the organization."

[5] United States Department of Labor, *The Economic Status of Registered Professional Nurses 1946-1947.*

and pay, the Department of Labor observed that "Lack of provision for retirement or illness and salaries that do not permit nurses to save toward retirement or for emergencies were frequently mentioned together."[6] The report further noted that "The leading complaints were related to financial returns both during nursing employment and after retirement. Specifically they referred to lack of retirement and employment security, rates of pay, and opportunities for and methods of awarding promotions."[7]

The University of Pennsylvania's School of Nursing penned a short, but detailed, exegesis of the problems that have plagued the U.S. nursing sector, and identified the obvious solution to the poor wage and working conditions affecting nurses, as detailed in the Department of Labor's report: "Given the consistent findings of the 1947 investigation, it seemed obvious that efforts to improve employment conditions for nurses would lessen the shortage. This presented a logical course of action. And key among those improvements was higher wages."[8] Of course, this obvious solution called for fair compensation to nurses, which would in turn cut into institutional profits. It should perhaps come as no surprise to those familiar with corporate history in the United States that hospitals declined to adopt this course of action. Instead, they increased recruitment efforts and broadened the use of "assistive personnel."[9]

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[6] *Id.* at 37.
[7] *Id.* at 36.
[8] Penn Nursing, *Where did all the nurses go*?
[9] *Id.*

Predictably, the imbalance in the nursing market and concomitant problems persisted. The 1961 Surgeon General's report succinctly detailed wage deficiencies, identified nearly forty years earlier in the Goldmark report. [10] The Surgeon General's Consultancy observed:[11]

> Economic rewards are important in attracting and holding members of a profession. Deficiencies in economic incentives for nurses must be eliminated as to both salaries and fringe benefits. Nursing does not compare favorably in this respect with other careers requiring equivalent capabilities and education…Salaries of hospital staff nurses are lower, on the average, than those of secretaries. There is little opportunity for advancement for the nurse who wants to continue to give direct patient care. Even in top administrative positions, monetary compensation is not commensurate with responsibility.

The solution appears as obvious now as it was in 1923, 1947, and 1961. A shortage of nurses at prevailing wages generally evinces a compensation deficiency; to attract more workers, economists commonly prescribe an increase in wages. This incentivization principle reveals itself in nearly every facet of the economy: (1) to compensate non-exempt workers for extra hours, the Department of Labor requires overtime pay; (2) higher pay and better conditions attract more teachers; (3) the Department of Agriculture subsidizes certain crops deemed economically valuable, and so on. Yet, this rudimentary economic concept has largely failed to gain traction in certain economic sectors, particularly where workers have little countervailing economic power. Of course, this same phenomenon has manifested itself in other industries characterized by economic exploitation, defined in the Pigouvian sense as the difference between labor's marginal product and real wages.[12]

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[10] Toward Quality in Nursing; Needs and Goals; Report of the Surgeon Generals' Consultant Group on Nursing. Public Health Service Publication No. 922, available at https://files.eric.ed.gov/fulltext/ED021994.pdf.

[11] *Id.* at 36-37. Also, ("In today's society, salaries and related benefits not only determine standards of living but also influence the prestige of an occupation. Until the economic status of the nursing profession is improved, nursing will be unable to compete successfully with other fields where pay and benefits are more attractive.").

[12] Joseph Persky and Herbert Tsang, Pigouvian Exploitation of Labor, The Review of Economics and Statistics , Feb., 1974, Vol. 56, No. 1 (Feb., 1974), pp. 52-57 [hereafter "Persky & Tsang"].

The role of market concentration in output and input markets, and its leverage through the exercise of monopoly and monopsony power, respectively, has drawn increasing attention as a contributing, if not determining, factor in wage suppression. While the previously largely somnambulant field of industrial organization has begun to awaken to this epiphany, labor and sports economists have long pointed to such power over labor input providers through vehicles such as the reserve clause in professional sports (baseball, football, basketball, and hockey) that restricted wages below competitive levels.[13] Even more recently, the long-standing battle to curtail if not outright eliminate monopsony power over college athletes reached a denouement (albeit a limited one) in the *NCAA v. Alston* case, a 9-0 unanimous Supreme Court decision in favor of athletes.[14]

As Krueger and Posner explained in 2018, "Until recently economists assumed that labor markets are fairly competitive… recent events—including agreements among technology companies not to poach engineers and among hospitals not to poach nurses—have led many economists and government officials to question this assumption."[15] Indeed, the Council of Economic Advisors' 2016 Report proffered some indication of this newfound realization on the

[13] The same general obliviousness to the exercise of market power to suppress wages that plagued the subfield of industrial organization thankfully did not extend to other fields (e.g., labor and sports economics) that acknowledged this nexus. For example, Persky and Tsang explain, "For empirical purposes it seems plausible to assume that the more concentrated an industry (and the more conscious firms are of their influence on price) the greater will be the divergence be- tween actual wages and marginal productivity. Hence, we expect that industries with higher concentration ratios should show higher levels of Pigouvian exploitation… Labor economists have increasingly treated corporations and other administrative units as internal labor markets in which employees have little mobility and hence employers have substantial monopsonistic power.") Likewise, Rodney Fort and James Quirk detail the wage effects of the reserve clause. See Rodney Fort and James Quirk, Journal of Economic Literature, Vol. 33, No. 3 (Sep., 1995), pp. 1265-1299 at 1275, ("To summarize, the effects of a reserve clause system with unrestricted cash sale of players are to decrease player salaries, increase league-wide profits, and in- crease profits for all teams…")

[14] 141 S. Ct. 2141 (2021).

[15] Alan Krueger and Eric Posner, A Proposal for Protecting Low-Income Workers from Monopsony and Collusion, The Hamilton Project, February 2018, at 5-6.

role of market concentration and its potential attendant exercise to suppress wages below competitive levels.[16] The report explained:

> There is also growing concern about an additional cause of inequity—a general reduction in competition among firms, shifting the balance of bargaining power towards employers. Such a shift could explain not only the redistribution of revenues from worker wages to managerial earnings and profits, but also the rising disparity in pay among workers with similar skills. These trends also have broader implications for the economy as a whole: instead of promoting growth, forces that undermine competition tend to reduce efficiency, and can lead to lower output, employment, and social welfare.

The implication of market concentration and monopsony power in the healthcare sector reflects the focus of this report. We begin with a simple descriptive statistical analysis aimed at investigating evidence of a "wage penalty" facing workers at UPMC facilities compared to workers at hospitals in commuting zones with a comparable standard of living. Finding such evidence, we perform an econometric analysis to explore whether changes in UPMC's market power have impacted this wage differential. As we explain in the subsequent section, the reasons for concern over UPMC's potential exercise of monopsony power are well-founded. We find a relationship between UPMC's market share and the wage penalty, indicating that the wage penalty likely reflects the exercise of increasing monopsony power. Together, these analyses indicate not only that UPMC has monopsony power, but that increases in that power (potentially as a result of exclusionary conduct and anticompetitive acquisitions) have enabled UPMC to suppression healthcare worker wages below competitive levels

RELEVANT LITERATURE

The recent interest in how monopsony power contributes to wage suppression and rising inequality represents a welcome change from the assumption of competitive labor markets that

[16] Council of Economic Advisers Issue Brief, Labor Market Monopsony: Trends, Consequences, and Policy Responses, October 2016, *available at* https://obamawhitehouse.archives.gov/sites/default/files/page/files/20161025_monopsony_labor_mrkt_cea.pdf.

prevailed for much of the 20th century. Recent literature reflects this realization. In his review of the monopsony literature, labor economist Alan Manning observed that "The bottom line from these studies is that there seems to be a large amount of monopsony power. If anything, there seems to be much more monopsony in the labor market than one might have expected a priori."[17] The aforementioned 2016 CEA report explored several factors that can contribute to the exercise of power over labor input providers:

> …larger size of employers relative to individual workers tends to give employers a natural advantage in bargaining leverage over workers in the labor market.
>
> Limited competition in a labor market also may facilitate implicit or explicit collusion among employers that allows a small number of them to act as one. Collusion can take the form of agreements not to hire each other's workers or the coordination of wage offers and raises in order to avoid competitive bidding.[18]

As a result of these developments, the U.S. Department of Justice has assumed an increasingly interventionist role in policing such anticompetitive behavior in input markets.[19] Moreover, recent worker harm arising from the widespread use of non-compete agreements has drawn the attention of the Federal Trade Commission. Under Chair Lina Khan, the FTC has commenced efforts to impose a ban on such agreements, an effort that has garnered overwhelming worker support. The FTC's solicitation of comments on its proposed rulemaking has drawn attention to the restraints non-competes place on hospital workers. A recent study found 98 percent of workers in the medical profession favor the ban on non-competes.[20]

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[17] Alan Manning, *Monopsony in Labor Markets: A Review*, 74(1), ILR REVIEW 3-26, 6 (January 2021).

[18] 2016 CEA Report at 6.

[19] *See, e.g.*, United States and the State of Arizona v. Arizona Hospital and Healthcare Association and AzHHA Service Corporation.

[20] Ted Tatos, *Prohibiting Non-Compete Agreements Isn't Just Procompetitive, It's Extremely Popular Public Policy*, THE SLING, February 1, 2023, *available at* https://www.thesling.org/prohibiting-non-compete-agreements-isnt-just-procompetitive-its-extremely-popular-public-policy/.

The tepid attention that monopsony power had received in competition circles prior to the current overdue epiphany should not be misconstrued as applying to other fields in economics, which had long raised alarm. Donald Sullivan explained in his 1989 paper that "The market for hospital nurses is literally the textbook example of monopsony in the labor market."[21] Simultaneously tipping the hat to sports and labor economists and noting the silence from those in the industrial organization field, Sullivan further observes that "only other example cited with any regularity in intermediate microeconomics or labor economics textbooks is the market for professional athletes."[22]

The exercise of monopsony power as an explanation for suppressed nurse wages and working conditions predates Sullivan by nearly twenty years. Health economist Donald Yett advanced this argument in his 1975 book, *An Economic Analysis of the Nurse Shortage*, explaining that:[23]

> Most local nurse markets are variants of two prototypes—one characterized by monopsony, and the other by oligopsony—with respect to their hospital sectors. Although diversity exists in terms of their non-hospital sectors, it exerts only minor influence on the general level of nurse salaries because hospitals, which employ 70 percent of all active nurses, are the dominant employers.

Studying the determinants of the dearth of nurses in the 1970s, Fagin explained that "Using principles of supply and demand alone and examining average nursing salaries at the staff-nurse level-the level considered at national crisis proportions, we must conclude that the nursing shortage

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[21] Donald Sullivan, Monopsony Power in the Market for Nurses, NBER Working Paper #3031, July 1989 at 1.

[22] *Id.* at n. 1

[23] DONALD YETT, AN ECONOMIC ANALYSIS OF THE NURSE SHORTAGE 224 (Lexington Books 1975). Yett further presaged the current nurse shortage conditions, ("When nurse demand is increasing relative to supply wages will not rise as much under conditions of monopsony or oligopsony as they would in more competitive labor markets.") *Id.* at 225.

is a *shortage at a price*."[24] In other words, the seeming shortage resulted in a reduction in the number of nurses as hospitals exercised their wage-setting power to over labor. To wit, we emphasize the distinction between an absolute shortage in nurses and an artificial shortage caused by nurses unwilling to accept sub-market wages that result from monopsony power.

Despite these warnings, the United States currently faces both an artificial shortage at prevailing wages and widespread geographic market concentration in healthcare. Recent research has documented the attendant results. Prager and Schmitt (2021) examined whether wage growth slowed due to increases in consolidation following hospital mergers.[25] They found that when mergers resulted in a high degree of concentration, the effects were most pronounced for medically skilled workers (including nursing jobs), but less so for a group of other skilled, mostly white collar, non-medical workers.[26] Allegretto and Graham-Squire (2023) found that increased hospital system consolidation in smaller Metropolitan Statistical Areas (MSAs) (i.e. MSAs with less than five hospitals, excluding the smallest not in the study) is adversely related to nurse wage growth.[27] In particular, they find a wage penalty for nurses of $0.70 to $0.90 per hour for every 0.1 increase in the HHI consolidation measure.[28] Schubert, Stansbury, and Taska (2022) found that "For occupations in the bottom quartile of occupational mobility, like registered nurses and security

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[24] Claire Fagin, *The Shortage of Nurses in the United States*, 1(4) PUBLIC HEALTH POLICY, 293-311, 295 (Dec. 1980) (emphasis added). *Id*. ("However, the national average remains low ($13,000 in 1977), and the salary progression for nurses in patient care is noncompetitive. It is important to identify possible reasons for the fact that nurses' salaries have not risen sufficiently to create a balance of supply and demand. Among the possibilities are the following:…that employers are, de facto, united as one although numerous (the market for nurses has been called a monopsony since it is dominated by one employer, the hospital)."

[25] Elena Prager and Matt Schmitt, *Employer consolidation and wages: Evidence from Hospitals,* 111(2) AMERICAN ECONOMIC REVIEW 397-427 (2021).

[26] *Id*.

[27] Sylvia A. Allegretto and Dave Graham-Squire, Monopsony in Professional Labor Markets: Hospital System Concentration and Nurse Wages, INET Working Paper No. 197, January 5, 2023, *available at* https://www.ineteconomics.org/uploads/papers/WP_197-Allegretto-HospCons.pdf.

[28] *Id*. The authors use a HHI of 1 to indicate a fully consolidated market rather than the usual, 10,000. This reporting convention does not affect their results or conclusions.

guards, moving from the median to 95th percentile HHI is associated with on average 7.3 log points lower wages."[29] The FTC has also noted the wage-depressive effects of market concentration. In its September 2020 public comment on a hospital merger in Hendrick, Texas, the FTC cautioned that "The impact of hospital consolidation on labor markets has garnered particular attention during recent merger reviews and is highly relevant to HHSC's analysis, as this can affect worker pay and community access to healthcare services."[30]

Our current study evaluates the potential nexus between such concentration and the exercise of monopsony power over labor input providers. UPMC's actions have come under the scrutiny of both researchers and lawmakers. In a recent report, the American Economic Liberties Project detailed the injurious effects of UPMC's monopoly power over workers and patients.[31] Congresswoman Summer Lee and State Representative Sara Innamorato have both focused attention on the healthcare workforce crisis in Pittsburgh hospitals and UPMC role therein. We hope this study sheds further light into the economic issues that impact both workers and patients.

DATA SOURCES

Data limitations frequently impede independent investigations of monopsony power, as much of the specific wage information rests with private employers and outside of the public domain. Fortunately, the federal government collects substantial data on workers through various

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[29] Gregor Schubert, Anna Stansbury, and Bledi Taska. Employer Concentration and Outside Options, Washington Center for Equitable Growth, March 2022 at 3.

[30] Federal Trade Commission, Federal Trade Commission Staff Submission to Texas Health and Human Services Commission Regarding the Certificate of Public Advantage Applications of Hendrick Health System and Shannon Health System, September 11, 2020 "FTC staff defined a potentially relevant geographic market for calculating labor concentration as the commuting zone for nursing labor, as developed by the U.S. Department of Agriculture.) Id. at 36-37. Available at https://www.ftc.gov/system/files/documents/advocacy_documents/ftc-staff-comment-texas-health-human-services-commission-regarding-certificate-public-advantage/20100902010119texashhsccopacomment.pdf.

[31] American Economic Liberties Project, Critical Condition: How UPMC's Monopoly Power Harms Workers and Patients, January 2023, available at http://www.economicliberties.us/wp-content/uploads/2023/01/AELP_2022_UPMC_Report_R2-3.pdf.

instruments such as the American Community Survey (ACS) and statutory reporting requirements that can provide significant insight into wage and occupational information. Previous research has leveraged these data to investigate the connection between increasing concentration and wage suppression. For example, Prager and Schmitt (2019) used data from the Center for Medicare Statistics (CMS) Healthcare Cost Report Information System (HCRIS), which includes the Hospital Cost Report Public Use Files. Allegretto and Graham-Squire (2023) used data from the American Community Survey to analyze the relationship between hospital concentration and nurse wages.

In this report, we leverage two publicly-available data sources for hospital workers' wages: (1) the annual Hospital Cost Report Public Use Files (i.e., the HCRIS data) and (2) the wage index files from the CMS Acute Inpatient Prospective Payment System. Specifically, with respect to the latter, we used the results of the triennial Occupational Mix Survey.[32] The HCRIS data contains data for a broad range of hospital workers organized into job categories, including cafeteria employees, nurse administration, and direct patient care workers. We analyzed the HCRIS data for years 2011 through 2020, the latest year for which data are available.

However, the HCRIS data do not contain wage information specifically for nurse categories other than the category "nurse administrators." Other researchers, such as Prager and Schmitt, have observed the same shortcoming. To address this gap, we also analyzed data available on a triennial basis from the CMS Occupational Mix Survey from 2008 to 2019, the latest year the survey was conducted. These data provide average wages by hospital for the following nurse

[32] Section 304(c) of Public Law 106-554 amended section 1886(d)(3)(E) of the Social Security Act and requires CMS to collect data every 3 years on occupational mix of employees for each short-term, acute care hospital participating in the Medicare program.

categories: (1) nurse assistants and orderlies, (2) medical assistants, (3) licensed practicing nurses (LPNs), (4) nurses, and (5) registered nurses (RNs).

While both data sources cover the United States, we limited our analysis to areas in Pennsylvania – where UPMC primarily operates – and to the nearby states of New York, Maryland, Ohio, and West Virginia for comparison purposes. In doing so, we sought to select geographic locations that were comparable to the areas containing one or more UPMC facilities. SEIU also provided additional information on HCRIS facilities that we used to supplement our data. These data included geocoding for hospital in the cost report (i.e., latitude and longitude coordinates) as well as county and state FIPS codes. We required FIPS codes to place hospitals into their corresponding commuting zones. Consistent with the literature, we used commuting zones to delineate the boundaries of labor input markets.[33]

Of 560 hospitals within the five-state dataset that we analyzed, only 421 contained FIPS codes. Because such missing data presented an impediment to any attempts to analyze geographic market concentration, we attempted to mitigate this issue in two ways. First, we extracted the provider information from the CMS database. These data included county and state names, which we could match to the FIPS code using a county-level crosswalk table from the U.S. Census Bureau. Second, for the hospitals where the above process did not result in a match but we had latitude and longitude coordinates for the hospital, we matched the latitude and longitude of the

[33] "The commuting zone is based on journey-to-work data and defines clusters of counties with strong commuting ties." https://usa.ipums.org/usa-action/variables/COMZONE#description_section. Research shows workers seeking jobs make no more than 20% of their applications outside their commuting zone and multiple studies of labor market concentration have used commuting zones as the boundaries of for relevant geographic labor markets. Ioana Marinescu & Eric A. Posner, *Why Has Antitrust Law Failed Workers?* 105 CORNELL L. REV. 1343, 1389 (2020) (proposing commuting zones should be presumptively valid geographic labor market definition); Elena Prager & Matt Schmitt, *Employer Consolidation and Wages: Evidence from Hospitals*, AM. ECON. REV. 111(2), at 10-11 & n.6 (Aug. 23, 2020) (relying on commuting zones as a "coarse measure" that was checked against a broader and narrower market definition for robustness).

hospital to the county boundary in which they were located.[34] These matching tools enabled us to successfully assign FIPS codes to 551 of the 560 hospitals in our dataset.

Next, we placed each hospital in its year 2000 commuting zone, data for which we obtained from the U.S. Department of Agriculture.[35] The commuting zone information also included population information for the commuting zone, as well as each county within it. In addition, if the commuting zone included a metropolitan area, the data provided its corresponding name. Some commuting zones covered a metropolitan statistical area (MSA), while other smaller ones did not. Each of the five commuting zones with a UPMC facility were located within a Pennsylvania MSA: Pittsburgh, Erie, Lancaster, Williamsport, and Johnstown.[36] To limit any potentially confounding effects of comparing wages within commuting zones of different sizes, we limited our analysis to only those commuting zones that include an MSA.

As a penultimate step, with assistance from SEIU, we calculated the cost of living for each commuting zone as the population-weighted contribution of each county within that zone.[37] This calculation permitted us to compare average hospital workers' wages in each commuting zone with a UPMC facility only to hospitals in commuting zones with a similar cost of living. We defined the term "similar cost of living" as within ten percent of the cost-of-living in a given UPMC-containing commuting zone. In other words, if a commuting zone's cost of living fell within ten percent of the cost of living within a given commuting zone where UPMC operates, we included it as a comparison group for that commuting zone containing UPMC. Thus, the same

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[34] To accomplish this matching, we translated the latitude/longitude coordinates to radians and used the GINSIDE procedure available in SAS Software.

[35] The specific file is available at https://www.ers.usda.gov/webdocs/DataFiles/48457/cz00_eqv_v1.xls?v=0.

[36] To the extent that one commuting zone encompassed more than one MSA, we assigned the name of the MSA with the largest population.

[37] Cost-of-living was calculated as of 2020, reflecting our assumption that changes in cost-of-living among commuting zones over the period of analysis occurred in parallel fashion leaving the relative positions unchanged.

commuting zone can serve as a comparison for multiple UPMC-containing commuting zones. Of course, other hospitals and systems also exist within the same commuting zone as UPMC. To effectuate the comparison, we considered only wages for workers at UPMC-owned facilities and eliminated wages from all other hospitals within a commuting zone containing a UPMC facility.

ANTICOMPETITIVE HYPOTHESES

Because our research aimed to investigate any relationship that may exist between wage differences and market concentration, we calculated the Herfindahl-Hirschman Index (HHI).[38] We calculated the HHI by first calculating the market share of each hospital system (or stand-alone hospital for unaffiliated entities) in each job category, by year, and by commuting zone using both HCRIS data for general hospital worker wages and CMS data for nurse wages. Concurrently, we computed UPMC's share of the market at each level mentioned above. As noted previously, we used the commuting zone to delineate geographic market boundaries. With respect to occupations, we treated each job category (e.g., cafeteria workers, nursing administration, various nursing levels) as its own labor input market within a given commuting zones. For example, registered nurses within the Pittsburgh, PA commuting zone were considered a relevant market for purposes of this analysis and used as a basis for calculating UPMC's market share for that job category. Both the HHI and UPMC market share were based on the total hours worked by employees in a given job category in a given year in a commuting zone.

The data organization detailed above resulted in two datasets, one for nurses for the 2010, 2013, 2016, and 2019 survey years, and another for general hospital workers in the job categories

[38] The HHI is simply the sum of the squared market shares of each buyer in the relevant labor market, multiplied by 10,000. Thus, a market with shares of 70 percent, 20 percent, and 10 percent would yield an HHI of 5,400 (equal to (.7^2 + .2^2 + .1^2) x 10,000). The antitrust agencies have established ranges of what they consider concentrated markets. *See* Department of Justice and Federal Trade Commission, Horizontal Merger Guidelines, Section 5.3, released Aug. 19, 2010.

contained in the Hospital Cost Reports annually from 2011 to 2020. Each dataset contained average wages, HHI, and UPMC market share by year, commuting zone, hospital category (UPMC v. Non-UPMC) and job category. We set out to test several anticompetitive hypotheses, including whether UPMC uniformly pays nurses lower wages than hospital systems in comparable commuting zones, and whether such a "wage penalty," assuming one exists, increases with UPMC's buying power in the relevant labor market.

RESULTS

We begin with a tabular analysis for various categories of nurses as reported in the CMS nurse wage data and for all other hospital employee categories as reported in the HCRIS data, comparing average wages at UPMC hospital facilities to average wages at non-UPMC facilities by year and commuting zone. We next present econometric models explaining hourly average wage differences between UPMC and other hospitals in commuting zones with comparable standards of living as a function of either UPMC's market share or the HHI. We present all hourly wage differences in this report as UPMC minus the comparison. Thus, negative numbers mean that UPMC pays less than non-UPMC facilities in comparable commuting zones while positive numbers represent the reverse.

Nurse Wage Comparison – Descriptive Statistics

First, as Table 1 below indicates, UPMC uniformly pays nurses lower average hourly wages than non-UPMC hospital systems in comparable commuting zones.[39] Such differences are

[39] The final analysis dataset consisted of UPMC vs. non-UPMC commuting zone pairings by job category, survey year, and commuting zone. For example, for nurses, average hourly wages were calculated as total nurse pay divided by total nurse hours by nurse classification (LPN, RN, etc.), survey year, and commuting zone. These averages by commuting zone that contained a UPMC hospital were compared with the corresponding non-UPMC hospital average in each commuting zone considered comparable to that specific commuting zone with a UPMC hospital.

particularly pronounced at lower wage categories. For example, LPNs at UPMC locations in the five commuting zones where UPMC has a presence received on average $1.31 per hour less than LPNs at hospitals in commuting zones with a comparable cost of living over the entire time period of analysis. Other categories of nurses also indicate significant wage penalties, including Nurses, with a $0.62 per hour wage difference, RNs with a $0.37 per hour wage difference, and Medical Assistants with a $0.56 per hour wage difference. These wage penalties are significant: Assuming full-time employment – a 40-hour work week and a 52-week work year – UPMC Nurses, for example, experience a penalty of, on average, $1,289.60 in annual income.

Table 1: Average Nurse Wages at UPMC and Non-UPMC Hospitals by Nurse Category, Survey Years 2008-2019

Nurse Category	UPMC Average Wage	Non-UPMC Average Wage	Wage Differential
LPNs	$19.97	$21.28	($1.31)
Nurses	$27.18	$27.80	($0.62)
Medical Assistants	$14.93	$15.49	($0.56)
RNs	$31.78	$32.15	($0.37)
Nurse Asst./Orderlies	$13.89	$14.10	($0.21)

***Note**: Wage differentials equal to average UPMC wage minus average non-UPMC wage; negative numbers imply average UPMC wages below average non-UPMC wages.*

Table 2 identifies the differences by the commuting zone where UPMC has a presence. In the four MSAs where UPMC has a least a 33 percent market share, average UPMC wages are below non-UPMC hospitals in nearly every instance; specifically, in 12 of the 15 nurse category-MSA combinations, UPMC nurses experience a wage penalty compared to nurses in non-UPMC facilities. Further, in the one MSA with UPMC market share below 33 percent – the Lancaster, PA

These data were subsequently averaged to arrive at further aggregated levels. For example, to arrive at the average across years, the averages in the pairing described above were again averaged. In other words, in this case, simple averages over the years were computed.

market – the opposite is true: UPMC offers higher wages relative to hospitals in comparable commuting zones for each of the five nurse categories.

Table 2: Average Wage Differentials between UPMC and Non-UPMC Nurses by Nurse Category in Select Pennsylvania Commuting Zones, Survey Years 2008-2019

Nurse Category	Williamsport CZ	Pittsburgh CZ	Erie CZ	Johnstown CZ	Lancaster CZ
UPMC Market Share	***91%***	***50%***	***43%***	***33%***	***25%***
LPNs	($0.58)	($1.51)	($4.07)	($1.71)	$2.07
Nurses	$1.74	($1.40)	($3.22)	($0.71)	$0.79
Medical Assistants	($0.88)	($0.47)	($1.51)	($1.46)	$1.66
RNs	$3.47	($1.54)	($3.40)	($1.05)	$0.89
Nurse Asst./Orderlies	($0.15)	$0.20	($1.72)	($0.15)	$1.07

***Notes**: Wage differentials equal to average UPMC wage minus average non-UPMC wage; negative numbers imply average UPMC wages below average non-UPMC wages. UPMC market shares were calculated based on UPMC's portion of workers in each job category as reported in HCRIS data as described above.*

Next, we inquired as to whether (and how) any wage disparities may have changed over time. Table 3 reports wage disparities at UPMC facilities by each survey year spanning 2008 through 2019. The results show that durable longitudinal pattern of underpayment by UPMC. Of the 25 nurse category-year combinations, 22 exhibit a wage penalty for UPMC hospital workers. In the most recent year available – 2019 – the Licensed Practical Nurses experience the most pronounced wage penalty of over $2 dollars.

Table 3: Average Annual Wage Differentials between UPMC and Non-UPMC Nurses by Nurse Category, Survey Years 2008-2019

Year	Nurse Asst. / Orderlies	Medical Assistants	Nurses	LPNs	RNs
2008	($0.16)	$0.16	($0.44)	($1.08)	($0.22)
2010	($0.57)	($1.17)	($0.54)	($1.22)	($0.06)
2013	($0.38)	($0.47)	($0.75)	($0.99)	($0.26)
2016	($0.41)	($1.35)	($0.85)	($0.98)	($0.85)
2019	$0.44	$0.03	($0.50)	($2.26)	($0.47)

Note: *Wage differentials equal to average UPMC wage minus average non-UPMC wage; negative numbers imply average UPMC wages below average non-UPMC wages.*

The results are consistent with other anecdotal evidence of a UPMC "wage penalty." For example, hospital workers have testified as to the dire economic straits in which they find themselves despite 1) their qualifications and 2) UPMC's solid financial position.[40] Further, employee reviews that reference the low wages that UPMC pays are commonplace.[41] Thus, the persistence of an economically significant UPMC wage penalty over time suggests that UPMC has some degree of market power that enables it to suppress wages for nurses in commuting zones where it operates.

General Hospital Worker Wage Comparison – Descriptive Statistics

The HCRIS data, which have formed the basis for analysis in previous literature, permit more granular historical analysis of hospital workers wages as the data are collected on an annual basis. However, in addition to omitting most nurse wage data as explained above, these data sacrifice the positional specificity of the nurse data since the HCRIS data aggregates positions that we would have preferred to analyze separately. For example, contracted hospital workers who

[40] Kim Lyons, UPMC has grown too big; Pa. lawmakers need to support its workers, new report finds, Pennsylvania Capital-Star, January 23, 2023, available at https://www.penncapital-star.com/government-politics/upmc-has-grown-too-big-pa-lawmakers-need-to-support-its-workers-new-report-finds/.

[41] For example, see Glassdoor reviews: https://www.glassdoor.com/Reviews/UPMC-Reviews-E14679.htm.

interact directly in the care of patients are grouped into a single "Contract Labor – Direct Patient Care" category. Nonetheless, these data have the important advantage of providing insight into the compensation to lower-wage workers such as those in housekeeping and cafeteria positions.

Using the HCRIS data, we also examined wages for general hospital workers overall and by occupation. First, considering wages across all job categories contained in the HCRIS data across all years 2011 to 2020, we find that UPMC paid workers approximately two percent less than comparable hospital systems. Next, our analysis by job category shows notable disparities between UPMC wages and wages at hospitals in comparable markets over the time period 2011-2020.[42] Table 4 presents these results.

[42] We removed the following job categories as too aggregated and/or not directly relevant to our analysis: "Total salaries", "Related organization salaries", "Home office and/or related organization personnel", "Home office and/or related organization salaries and wage-related costs", "Home office salaries".

Table 4: Average Hospital Worker Wages at UPMC and Non-UPMC Hospitals by Job Category, Survey Years 2011-2020

Job Category	UPMC Average Wage	Non-UPMC Average Wage	Wage Differential
Physician Administrative (under contract) (Part A Medicare)	$125.17	$135.79	($10.61)
Direct Patient Care (under contract)	$53.22	$61.90	($8.68)
Dietary (under contract)	$23.05	$29.05	($6.00)
Home office and Contract Physicians - Teaching (Part A Medicare)	$111.87	$116.69	($4.82)
Physician - Administrative (Part A Medicare)	$140.62	$145.38	($4.77)
Housekeeping (under contract)	$18.95	$23.12	($4.17)
Employee Benefits	$31.70	$34.12	($2.42)
Social Service	$27.59	$29.80	($2.21)
Nursing Administration	$35.55	$37.03	($1.48)
Pharmacy	$36.82	$37.66	($0.84)
Maintenance and Repairs	$23.91	$24.53	($0.62)
Laundry and Linen Service	$13.09	$13.64	($0.55)
Physician - Teaching (Part A Medicare)	$119.30	$119.33	($0.03)
Dietary	$15.30	$15.29	$0.01
Housekeeping	$13.61	$13.44	$0.16
Cafeteria	$14.98	$14.47	$0.51
Skilled Nursing Facility	$22.82	$22.30	$0.52
Physician and Non-Physician (Part B Medicare)	$126.63	$119.85	$6.78

***Note** : Wage differentials equal to average UPMC wage minus average non-UPMC wage; negative numbers imply average UPMC wages below average non-UPMC wages.*

Of the eighteen job categories analyzed, UPMC pays less on average in thirteen of these categories, and in twelve of those thirteen categories workers experienced more than a $.50 per hour wage penalty, or at least a $1,040 annual pay penalty for full-time workers.[43] Thus for example, UPMC contracted workers providing direct patient care experience, on average, a $8.68 per hour wage penalty compared to contracted workers at other hospitals, an $18,054 annual disparity assuming full-time work. UPMC Nursing Administrators are paid $1.48 per hour less, on average, compared

[43] Based on 40-hour work week and working 52 weeks per year.

to nursing administrators at comparable hospitals, which translates to an annual loss of $3,078 assuming full-time work.

Similar to the approach taken by Prager and Schmitt, we then grouped the positions above into broader occupational groupings: low-wage positions, maintenance, patient care, physician/nurse administration and teaching. We examined the dollar wage difference between UPMC and hospital wages in comparable commuting zones by commuting zone where UPMC has a presence. The overall results appear in Table 5. For each occupational grouping, UPMC workers experience a wage penalty ranging from $0.62 for Maintenance to $5.70 for Physician and Nurse administrative positions.

Table 5: Average Hospital Worker Wages at UPMC and Non-UPMC Hospitals by Occupational Grouping, Survey Years 2011-2020

Occupational Grouping	UPMC Average Wage	Non-UPMC Average Wage	Wage Differential
Low Wage	$15.92	$17.04	($1.12)
Maintenance	$23.91	$24.53	($0.62)
Patient Care	$57.85	$60.01	($2.16)
Phys/Nurse Admin	$93.73	$99.43	($5.70)
Teaching	$116.72	$118.41	($1.69)

Note: *Wage differentials equal to average UPMC wage minus average non-UPMC wage; negative numbers imply average UPMC wages below average non-UPMC wages.*

Table 6 below provides a further breakdown by commuting zone where UPMC operates a facility.

Table 6: Average Wage Differentials between UPMC and Non-UPMC Hospital Workers by Occupations Groupings in Select Pennsylvania Commuting Zones, Survey Years 2011-2020

Occupational Grouping	Williamsport CZ	Pittsburgh CZ	Erie CZ	Johnstown CZ	Lancaster CZ
UPMC Market Share	***88%***	***52%***	***51%***	***36%***	***27%***
Low Wage	($8.96)	$0.03	($0.89)	$0.91	($2.11)
Maintenance	($5.91)	$3.52	($3.05)	($2.00)	$3.85
Patient Care	($4.61)	($7.09)	$5.54	($5.49)	($1.05)
Phys/Nurse Admin	($14.20)	($4.33)	($3.27)	($4.68)	($3.88)
Teaching	($10.26)	($0.53)	($0.54)	$2.66	($4.02)

Notes *: Wage differentials equal to average UPMC wage minus average non-UPMC wage; negative numbers imply average UPMC wages below average non-UPMC wages. UPMC market shares were calculated based on UPMC's portion of workers in each job category as reported in HCRIS data as described above.*

The results raise reason for concern about UPMC's market dominance and its harm to competition and labor in the hospital sector. In Williamsport, UPMC enjoys a dominant market share of approximately 88 percent, and this commuting zone reveals a consistently high UPMC wage penalty across all wage categories. Notably, we found a nearly nine-dollar hourly wage difference for low-wage workers; much of this difference stems from the use of contract workers, who UPMC consistently underpays relative to comparison hospitals. We find this result particularly worrisome: To the extent that UPMC can leverage the use of contract workers as a tool to dampen employee wages, this can reflect an exercise of monopsony power.

Econometric Analysis – General Hospital Workers

We next investigated the critical question of whether market concentration—and UPMC's market share in particular—plays a role in any wage disparities between UPMC and other similarly situated hospitals. To do so, we relied on the HCRIS data, which contain annual information from 2011-2020 by wage category and hospital for general hospital workers. We aggregated these data at the commuting zone level by calculating the average wage by commuting zone and year and

hospital category (UPMC vs. Non-UPMC). The outcome variable of interest was the wage difference between UPMC and comparison hospitals within commuting zones with a similar cost of living. We posited two key independent variables, which we analyzed separately: the HHI (by year and occupation category) in UPMC's commuting zone and UPMC's market share in that commuting zone.

We estimated the following models:[44]

1. Pooled regression – aggregated effect of HHI across all occupations, years, and commuting zones.
2. Two-way fixed effects (TWFE) – fixed effects for occupations and years.
3. Pooled regression – occupation-clustered standard errors.
4. Two-way fixed effects (TWFE) – fixed effects for occupations and years, clustered standard errors at the job category level.
5. One-way fixed effects for job category.

Table 7 below provides the results for the equation regressing the wage difference in levels against the HHI in UPMC's commuting zone.

[44] All estimation performed using SAS. Clustered standard errors were estimated using the Surveyreg procedure. We excluded any instances reflecting an HHI of 10,000 or UPMC market share of 100%. After investigating these instances, these appear to be artifacts of data reporting rather than indicators of a fully-consolidated market. Removing these instances did not change our conclusions.

Table 7: HHI Regression Results Predicting General Hospital Worker Wage Differentials, 2011-2020

Model	HHI Coefficient Estimate	t-Value	P-Value
Pooled Reg.	-0.00159	-15.17	<.0001
TWFE	-0.00150	-13.33	<.0001
Pooled (Occupation Clustered SE)	-0.00160	-3.28	0.0042
TWFE (Occupation Clustered SE)	-0.00147	-2.80	0.0118
Year Fixed Effects	-0.00163	-17.65	<.0001
Occupation Fixed Effects	-0.00143	-13.02	<.0001

***Dependent Variable** : UPMC minus Comparison Group Wages*
***Independent Variable** : HHI in UPMC Commuting Zone*

Our results remain robust across these specifications. In each case, we find a negative, economically, and statistically significant effect on the wage differential from market concentration. In other words, as the market in which UPMC operates became more concentrated, UPMC paid workers lower wages relative to its comparison hospitals. The "estimate" column represents the regression coefficient, interpreted as the change in the wage penalty (UPMC minus comparison) associated with a one-point change in the HHI. For example, for every 1,000 increase in the HHI, UPMC wages fell by between $1.43 and $1.63 per hour relative to the comparison groups.

Next, we performed the same analysis using UPMC's market share as the treatment variable of interest. We begin with the overall results, shown in Table 8 below. The "estimate" column, which measures the correlation between increasing UPMC market share and UPMC's wage penalty under the five different regression specifications indicates that, as UPMC's market share increases, UPMC pays lower wages relative to comparison hospitals. For example, a ten-percent increase in UPMC's market share would yield a $0.30 to $0.57 increase (obtained by

multiplying the figures in the estimate column by ten) in the wage penalty that UPMC workers experienced.

Table 8: UPMC Market Share Regression Results Predicting General Hospital Worker Wage Differentials, 2011-2020

Model	UPMC Mkt Share Coeffi-cient Estimate	t-Value	P-Value	Implied UPMC Wage Impact per 10% UPMC Market Share Increase
Pooled Reg.	-0.05664	-7.07	<.0001	-$0.57
TWFE	-0.03083	-4.13	<.0001	-$0.31
Pooled (Occupation Clustered SE)	-0.05664	-2.20	0.0409	-$0.57
TWFE (Occupation Clustered SE)	-0.03078	-0.96	0.3482	-$0.31
Year Fixed Effects	-0.05736	-8.56	<.0001	-$0.57
Occupation Fixed Effects	-0.02989	-4.04	<.0001	-$0.30

Dependent Variable: *UPMC minus Comparison Group Wages*
Independent Variable: *UPMC Market Share*

Given the greater longitudinal scope of the HCRIS data, we also performed an analysis at the individual job category level, calculating market share by job category and year for each commuting zone with UPMC facilities, as shown in Table 9. These results offer some explanation for the earlier descriptive results showing pronounced wage disparities, particularly among contract workers. Our results demonstrate a consistent pattern across wage categories of UPMC underpaying contract workers relative to other hospitals, and an economically and statistically significant relationship between such underpayment and UPMC's market share. For example, the Housekeeping category shows a coefficient of -0.14215, indicating that for every ten percent increase in UPMC's market share, UPMC pays approximately $1.40 per hour less than the comparison group hospitals in commuting zones with a comparable cost of living.

Results are also concerning in the direct patient care categories. The coefficient on Contract Labor-Direct Patient Care equals -0.15761, meaning that a ten percent increase in UPMC's market share is associated with UPMC paying approximately $1.60 less than comparable hospitals. Further, we observe economically significant effects in Nursing Administration and Physician categories, although the effects of UPMC's market share on Part A Physician wage differentials did not meet standard thresholds of statistical significance. Nonetheless, the observed effect sizes are economically significant in both cases.[45]

Table 9: UPMC Market Share Regression Results Predicting General Hospital Worker Wage Differentials by Job Category, 2011-2020

Job Category	UPMC Mkt Share Coeffi-cient Estimate	t-Value	P-Value	Wage Impact per 10% UPMC Market Share Increase
Cafeteria	-0.00238	-0.68	0.4991	-$0.02
Direct Patient Care (under contract)	-0.15761	-9.92	<.0001	-$1.58
Physician Adminstrative (under contract) (Part A Medicare)	-0.09203	-2.98	0.003	-$0.92
Dietary	-0.01442	-4.46	<.0001	-$0.14
Dietary under contract	-0.16575	-6.46	<.0001	-$1.66
Employee Benefits Department	0.07641	3.36	0.0008	$0.76
Home office contract Physicians - Teaching (Part A Medicare)	0.38241	4.56	<.0001	$3.82
Housekeeping	-0.00581	-1.90	0.0578	-$0.06
Housekeeping (under contract)	-0.14215	-4.72	<.0001	-$1.42
Laundry and Linen Service	-0.02669	-6.22	<.0001	-$0.27
Maintenance and Repairs	0.01695	2.27	0.0232	$0.17
Nursing Administration	-0.04317	-6.65	<.0001	-$0.43
Pharmacy	-0.07065	-8.74	<.0001	-$0.71
Physician - Administrative (Part A Medicare)	-0.05403	-1.21	0.2252	-$0.54
Physician - Teaching (Part A Medicare)	-0.07985	-0.82	0.4118	-$0.80
Skilled Nursing Facilities	0.01077	1.24	0.2176	$0.11
Social Service	-0.08224	-11.54	<.0001	-$0.82

Dependent Variable: *UPMC minus Comparison Group Wages*
Independent Variable: *UPMC Market Share*

[45] For a distilled discussion of the difference between economic (i.e., practical) and statistical significance, see Ronald L. Wasserstein & Nicole A. Lazar. The ASA Statement on p-Values: Context, Process, and Purpose, The American Statistician, 70:2, (2016), 129-133, ("Statistical significance is not equivalent to scientific, human, or economic significance. Smaller *p*-values do not necessarily imply the presence of larger or more important effects, and larger *p*-values do not imply a lack of importance or even lack of effect.")

These results indicate that conduct that precipitated increases in UPMC's market share also enabled UPMC to suppress wages for its workers. Our fundings also provide strong support for the hypothesis that the UPMC wage penalty has resulted from UPMC's leverage of monopsony power, as opposed to other confounding variables, whether observable or unobservable. In particular, a variable that could plausibly confound the relationship between the *outcome* (the wage penalty, i.e., the wage differential between UPMC and the comparison hospitals) and the *treatment* (UPMC's market share in the commuting zone where it operates) would have to be correlated with both treatment and outcome.

Theoretical support for a confounding variable does not readily present itself, and we observe no such variable. For example, one might hypothesize that lower relative demand for hospitals services in UPMC's markets than in the comparison markets could explain the UPMC wage penalty. However, such a hypothesis would fail on two fronts. First, no apparent reason exists to posit any correlation between overall demand for hospital services in UPMC's market and its market share therein. Lacking such a relationship, demand would only serve to further explain variation in the wage penalty but would not confound the relationship between the market share and the wage penalty.[46] Second, record evidence does not support the depressed relative demand hypothesis. On the contrary, UPMC has further increased employee workloads.[47]

Finally, we emphasize that the focus should not rest on wage differentials alone but also the increasing workload, and in this respect the analysis of wages alone may understate the compensation disparities between UPMC and other hospitals. Increases in workload with no

[46] In other words, demand would be an explanatory variable but not a confounder, because it would not create a separate back door path between the treatment and the outcome.

[47] Courtney Murphy, UPMC nurses and patients still concerned over unsafe conditions, WTAJ, May 23, 2022, available at https://www.wtaj.com/news/local-news/upmc-nurses-and-patients-still-concerned-over-unsafe-conditions/.

commensurate pay adjustments represent an effective decrease in pay, but one that may remain unobserved in a wage analysis that does not account for such compositional changes. Currie et al. explain that such effects may explain the moderate or small effects of monopsony power in some earlier research papers, particularly when juxtaposed against actual worker experiences: "[S]urveys of nurses indicate that they associate takeovers primarily with increases in workload rather than with reductions in wages. We extend the standard monopsony model by considering an employer who sets minimum effort levels as well as wages and employment."[48] The authors found ambiguous effects of market power on wages but that increases in market power were associated with increases in effort. This suggests the conservative nature of our results, particularly in light of UPMC's reported plans to increase the patient workload nurses face from an earlier level of 4-1 to as much as 8-1.[49]

CONCLUSION

Our results evince cause for concern regarding UPMC's apparent "wage penalty" as well as its relationship with UPMC's increasing market power. Over the last twenty-two years, UPMC has acquired twenty-eight hospitals in Pennsylvania. This acquisition spree has increased of late; in 2016 and 2017 alone, UPMC acquired thirteen hospitals. We hope that the results presented herein will assist regulators in taking the appropriate action to protect both hospital workers and patients from the injury that has resulted from UPMC's increasing market power.

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[48] Janet Currie, Meddi Farsi, W. Bentley MacLeod, Cut to the Bone? Hospital Takeovers and Nurse Employment Contracts, NBER Working Paper #9428, December 2002.

[49] Shira Li Bartov, Nurses Allegedly Threatened for Refusal to Take 'Unsafe' Number of Patients, Newsweek, May 11, 2022, available at https://www.newsweek.com/nurses-allegedly-threatened-refusal-take-unsafe-number-patients-viral-tiktok-pennsylvania-1705671.