RESEARCH ARTICLE

Factors associated with federally qualified health center financial performance

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Abstract

Objectives: To understand factors associated with federally qualified health center (FQHC) financial performance.

Study Design: We used multivariate linear regression to identify correlates of health center financial performance. We examined six measures of health center financial performance across four domains: margin (operating margin), liquidity (days cash on hand [DCOH], current ratio), solvency (debt-to-equity ratio), and others (net patient accounts receivable days, personnel-related expenses). We examined potential correlates of financial performance, including characteristics of the patient population, health center organization, and location/geography.

Data Sources: We use 2012–2017 Uniform Data System (UDS) files, financial audit data from Capital link, and publicly available data.

Data Collection/Extraction Methods: We focused on health centers in the 50 US states and District of Columbia, which reported information to UDS for at least 1 year between 2012 and 2017 and had Capital link financial audit data.

Principal Findings: FQHC financial performance generally improved over the study period, especially from 2015 to 2017. In multivariate regression models, a higher percentage of Medicaid patients was associated with better margins (operating margin: 0.06, $p < 0.001$), liquidity (DCOH: 0.67, $p < 0.001$; current ratio: 0.28, $p = 0.001$), and solvency (debt-to equity ratio: -0.08, $p = 0.004$). Moreover, a staffing mix comprised of more nonphysician providers was associated with better margin (operating margin: 0.21, $p = 0.001$) and liquidity (current ratio: 1.12, $p < 0.001$) measures. Patient-centered medical home (PCMH) recognition was also associated with better liquidity (DCOH: 19.01, $p < 0.001$; current ratio: 4.68, $p = 0.014$) and solvency (debt-to-equity ratio: -2.03, $p < 0.001$).

Conclusions: The financial health of FQHCs improved with provisions of the Affordable Care Act, which included significant Medicaid expansion and direct funding support for health centers. FQHC financial health was also associated with key staffing and operating characteristics of health centers. Maintaining the financial health of

FQHCs is critical to their ability to continuously provide affordable and high-quality care in medically underserved areas.

What is known on this topic
- Previous studies on factors associated with federally qualified health center (FQHC) financial performance focused on a limited set of financial performance measures, including overall costs, revenues, and net revenues of health centers.
- More than half of the respondents from a recent survey of FQHC chief executive officers reported difficulty in maintaining financial sustainability.

What this study adds
- This study focuses on various dimensions of FQHC financial performance, including liquidity and solvency measures, providing a more comprehensive understanding of the financial health of FQHC.
- The study results suggest that provisions of the ACA, including Medicaid expansion and direct funding support for health centers helped health centers to achieve better margin, liquidity, and solvency.
- Key staffing and operating characteristics of FQHC were associated with financial performance of health centers.

1 | INTRODUCTION

Federally qualified health centers (FQHCs or "health centers") are an important source of primary care for medically underserved populations.[1] Health centers share some financial and operating features such as receipt of federal grants under section 330 of the US Public Health Service Act to support care for uninsured and underinsured patients, approximately accounting for 30% to 35% percent of health centers' revenue.[2–4] Yet, each health center is an independently operated organization that must maintain adequate financial health in order to sustain operations and fulfill its mission.

Health centers with poor financial performance are at risk of having to reduce their clinical volume, scope, and/or quality of services, or in the worst-case, close operations completely. A recent survey of health center chief executive officers found that more than half of respondents reported moderate or extreme challenges in maintaining financial sustainability.[5] The COVID-19 pandemic has also had profound negative effects on the financial health of provider organizations, which is a cause for particular concern among health centers, given their role in caring for populations disproportionately burdened by the disease.[6–8] Thus, there is an urgent need to expand our understanding of the various dimensions of FQHC financial performance and identify the long-term factors associated with good financial health.

Previous studies have focused on a limited set of financial performance measures, including overall costs, revenues, and net revenues of health centers.[9,10] For example, Martin et al. found that urban centers were more likely to report higher net revenues compared to rural centers, and centers with a larger number of patients were associated with higher net revenues.[5] While measures such as cost and revenue are important measures of financial health, evaluating a broader range of financial measures is important to understanding how centers may achieve short- and long-term financial sustainability. For example, operating margin directly integrates revenue and cost into a measure of the amount of revenue in excess of costs that a health center may reinvest back into the organization.[11,12] Liquidity measures such as the days cash on hand (DCOH) provide insight into whether a health center's assets are sufficient to meet its financial obligations.

Prior studies of health center financial performance have also been limited to analysis of data in the years before the passage of the Affordable Care Act (ACA). Under the ACA, millions of people gained Medicaid coverage across the United States—both through direct expansion of Medicaid eligibility in some states and through increased enrollment among previously eligible populations.[13] Health Resources and Services Administration (HRSA) provided over $500 million in funding to support behavioral health integration, expansion of substance use disorder services, and enabling services.[14–16] The federal government also increased funding for health centers and provided incentives to offer behavioral and nonmedical services as a part of the Medicaid expansion in the ACA.[17] While the ACA and Medicaid expansions have been major changes in the health centers' environment, we have limited information on the role of these policy changes in the health centers' financial health.

In this study, we set out to identify health center, market, and state/regional-level factors associated with health center financial performance by linking a contemporary federal database of health center characteristics (the Uniform Data System, or UDS) with a comprehensive health center financial audit statements. Unlike prior studies, we utilized multiple financial performance measures beyond costs and revenues that have the potential to provide a more comprehensive picture. Our study provides new insights on pre- and post-ACA and provides a baseline for future studies to understand the economic impacts of COVID-19.

2 | METHODS

2.1 | Data sources

We used the UDS data for health center characteristics and Capital Link Database of health center financial audit statements for health center financial performance measures from 2012 to 2017. UDS data includes a core set of health center information, such as patient demographics and services provided, which is collected and maintained annually by the Bureau of Primary Health Care, HRSA, US Department of Health and Human Services.[18] All health centers that receive federal funding from the Bureau of Primary Health Care are required to report health center information through UDS.[18] Data from health center financial audit statements data have been collected annually and maintained by Capital Link since 2005, including approximately 75% of health centers nationwide.[19,20] We linked (1) County Health Rankings data[21] and (2) Rural–Urban Commuting Area codes[22] to UDS for area-level information. We also used and merged 340B Office of Pharmacy Affairs Information System data for information on entities covered under 340B of the Public Health Service Act.[23]

2.2 | Study Sample

This study focused on 7615 health-center-year observations representing 1394 unique health centers in the 50 US states and District of Columbia, which reported information to UDS for at least 1 year between 2012 to 2017. All health centers included in the study received grant funding under Section 330 of the US Public Health Service Act and reported health center information to the UDS. Among these health-center-year observations, 5825 (76%) had Capital link financial audit data. Also, 137 were excluded due to missing information on financial measures, and 73 observations were excluded due to missing information on neighborhood-level measures in County Health Rankings data. Our final analytic study sample included 5615 observations from 1229 unique health centers.

Excluded health-center-observations reported fewer number of patients, a higher percentage of uninsured patients and a lower percentage of Medicaid patients, lower quality of care, and lower productivity of nonphysician providers, compared to included observations

(Appendix 1). Excluded health-center-observations were also more likely to be located in rural areas.

2.3 | Financial performance measures

We used six outcomes to measure health center financial performance: operating margin, DCOH, current ratio, debt-to-equity ratio, net patient accounts receivable days, and personnel-related expenses.

We used operating margin to measure health centers' margins—the revenue in excess of costs in a given year, expressed as a percent of operating revenue. Since all health centers are nonprofit organizations, any health center margins could be reinvested to further the organization's mission and/or retained for financial stability, as opposed to being paid out to shareholders. While health centers' margins are typically small, sustained negative operating margins are a sign of poor financial health.[11,12]

DCOH and current ratio reflect health centers' liquidity (i.e., how quickly assets can be converted to cash). DCOH shows the number of days that a health center can cover its daily cash operating expenses with current levels of cash and investments, and the current ratio measures a health center's ability to pay short-term obligations.

The debt-to-equity ratio is a measure of solvency; it evaluates a health center's financial leverage, showing the degree to which a health center's assets are financed through debt. While higher DCOH and current ratio are financially preferred and indicate stronger liquidity, the lower debt-to-equity ratio indicates less balance sheet risk and thus financially preferred.

Net patient accounts receivable days measures, health centers' ability to bill and collect its accounts receivable and receive payments in a timely fashion. Health centers aim to turn receivables into cash as quickly as possible; therefore, lower receivable days are preferred. Personnel-related expenses are measured as a percentage of total revenues and are considered the largest component of a health center's operating budget.[19] Personnel-related expenses include salaries, fringe benefits, and professional/contracted services.

Appendix 2 provides metrics on how each financial performance measure is calculated.

2.4 | Independent variables

We developed a conceptual model of factors that influence health center financial performance based on previous studies. We categorized health center characteristics into four domains: patient, health center, market and neighborhood, and regional characteristics.

We selected patient characteristics, including percentages of (1) pediatric patients, (2) African American patients, (3) Hispanic/Latino patients, (4) Asian patients, (5) other minority patients, (6) patients best served in a language other than English, (7) and medical visits related to chronic conditions. We also included percentages of (1) uninsured patients, (2) Medicaid patients, and (3) Medicare patients.

TABLE 1 Characteristics of health-center observations by year (n = 5615)

	Overall 5615	2012–2013 1425	2014–2015 2024	2016–2017 2166	p-Value
n					
Patient characteristics					
Age ≤ 18% (mean [SD])	28.62 (12.99)	29.62 (12.76)	28.44 (13.24)	28.13 (12.88)	0.002
African American% (mean [SD])	25.50 (26.10)	25.82 (26.16)	25.02 (26.12)	25.74 (26.04)	0.582
Hispanic/Latino% (mean [SD])	19.02 (23.63)	18.73 (23.21)	19.16 (24.01)	19.07 (23.57)	0.864
Asian% (mean [SD])	3.18 (9.94)	2.89 (9.45)	3.27 (10.24)	3.28 (9.96)	0.448
Other minority% (mean [SD])	11.89 (15.71)	10.99 (13.79)	12.25 (16.59)	12.14 (16.02)	0.044
Language% (mean [SD])	17.35 (20.45)	17.81 (20.62)	16.99 (20.35)	17.39 (20.43)	0.515
Uninsured adults% (mean [SD])	28.55 (18.21)	36.14 (18.39)	27.33 (17.72)	24.71 (17.01)	<0.001
Medicaid% (mean [SD])	41.58 (18.16)	36.36 (16.05)	42.91 (18.28)	43.78 (18.68)	<0.001
Medicare% (mean [SD])	10.05 (6.75)	9.05 (6.22)	10.05 (6.73)	10.69 (7.02)	<0.001
Chronic conditions visit% (mean [SD])	28.34 (9.90)	27.31 (9.73)	28.40 (9.79)	28.96 (10.07)	<0.001
Health center characteristics					
Visit volume per provider					
Physician visits Avg. by 100s (mean [SD])	29.57 (9.70)	31.79 (8.89)	29.55 (9.94)	28.13 (9.71)	<0.001
Nonphysician provider visits Avg. by 100s (mean [SD])	25.73 (10.96)	27.62 (14.55)	25.34 (10.09)	24.85 (8.61)	<0.001
Size					
Patient volume by 1000s (mean [SD])	20.37 (23.17)	20.96 (22.66)	19.61 (22.80)	20.69 (23.82)	0.174
Mix of services					
Dental service% (mean [SD])	14.08 (12.72)	13.70 (12.12)	13.70 (12.80)	14.69 (13.00)	0.018
Vision service% (mean [SD])	0.50 (1.49)	0.46 (1.47)	0.47 (1.43)	0.57 (1.56)	0.025
Mental/substance abuse service% (mean [SD])	8.16 (11.00)	7.12 (10.41)	8.00 (11.24)	9.01 (11.08)	<0.001
CM and education specialist service% (mean [SD])	5.38 (8.59)	5.68 (8.20)	5.36 (8.57)	5.19 (8.87)	0.24
Quality of care					
Control diabetes% (mean [SD])[a]	68.58 (12.35)	70.08 (12.06)	68.99 (13.07)	67.22 (11.68)	<0.001
Staffing mix					
Staff: Nonphysician provider% (mean [SD])	6.54 (3.55)	6.23 (3.61)	6.57 (3.60)	6.71 (3.46)	<0.001
Staff: Physician% (mean [SD])	6.01 (3.28)	6.70 (3.31)	6.12 (3.45)	5.45 (2.99)	<0.001
Staff: Admin% (mean [SD])	1.02 (0.52)	1.01 (0.43)	1.04 (0.54)	1.01 (0.56)	0.25
Funding					
BPHC—Migrant grant% (mean [SD])	1.19 (5.69)	1.15 (5.64)	1.03 (5.02)	1.37 (6.27)	0.139
BPHC—Community center grant% (mean [SD])	22.38 (15.82)	18.26 (13.30)	22.51 (16.18)	24.98 (16.43)	<0.001
BPHC—Homeless grant% (mean [SD])	2.54 (10.14)	2.59 (10.41)	2.63 (10.69)	2.41 (9.40)	0.753
BPHC—Housing grant% (mean [SD])	0.34 (2.58)	0.26 (2.24)	0.31 (2.20)	0.42 (3.07)	0.151
Other grants% (mean [SD])	14.00 (13.61)	17.50 (14.54)	14.33 (14.01)	11.38 (11.96)	<0.001
340B Grant—Yes (N [%])	3067 (54.6)	754 (52.9)	1080 (53.4)	1233 (56.9)	0.022
Health information technology					
EHR (N [%])					<0.001
No	99 (1.8)	71 (5.0)	21 (1.0)	7 (0.3)	
All sites and for all providers	5223 (93.0)	1220 (85.6)	1898 (93.8)	2105 (97.2)	
At some sites or for some providers	293 (5.2)	134 (9.4)	105 (5.2)	54 (2.5)	
Location					
Urban area (N [%])	3980 (70.9)	1033 (72.5)	1434 (70.8)	1513 (69.9)	0.234
Care delivery model					
PCMH (N [%])	3880 (69.7)	736 (53.6)	1444 (71.3)	1700 (78.5)	<0.001

T A B L E 1   (Continued)

n	Overall 5615	2012–2013 1425	2014–2015 2024	2016–2017 2166	p-Value
Workforce stability					
Tenure of leadership—Years (mean [SD])	7.69 (5.58)	7.86 (5.61)	7.51 (5.57)	7.75 (5.56)	0.158
Tenure of medical staffs—Years (mean [SD])	4.46 (2.44)	4.77 (2.77)	4.42 (2.45)	4.30 (2.17)	<0.001
Market/neighborhood characteristics					
65 or older adults% (mean [SD])	14.53 (3.92)	13.58 (3.48)	14.43 (3.90)	15.24 (4.06)	<0.001
Uninsured adults% (mean [SD])	20.42 (7.06)	20.89 (6.76)	21.39 (7.14)	19.21 (7.01)	<0.001
Unemployment% (mean [SD])	7.78 (2.71)	9.55 (2.72)	8.14 (2.46)	6.29 (2.02)	<0.001
PCP per 1000 (mean [SD])	79.00 (35.46)	87.41 (44.03)	75.90 (30.90)	76.37 (32.11)	<0.001

Abbreviations: BPHC, Bureau of Primary Health Care; CM, case management; EHR, electronic health record; Language%, percentage of patients whose primary language is other than English; PCMH, patient-centered medical home recognition; PCP, primary care provider.
[a]Change in denominator definition since 2016: "seen in the clinic for medical visits at least twice during the reporting year" to "Had at least one medical visit during the measurement year."

Health center characteristics were selected in the following domains: (1) productivity, (2) size, (3) mix of services, (4) quality of care, (5) staffing mix, (6) funding, (7) location, (8) health information technology, (9) patient-centered medical home (PCMH) recognition, and (10) workforce stability (for further details, refer to Table 1).

We also included the number of primary care physicians per 100,000 population and neighborhood demographic and socioeconomic characteristics to capture a proxy for the amount of competition between providers within the market and neighborhood characteristics.

2.5 | Statistical analysis

First, we examined the baseline characteristics of health centers and unadjusted financial performance measures by year. Next, to determine factors associated with financial performance outcomes, we used multivariate linear regression models controlling for patient, health center, and neighborhood/market with time fixed-effect and robust SE clustered at the state level. Statistical significance was defined as $p < 0.05$, and we used R Studio 3.3.2 for the analyses.

Due to skewness in the distribution of some financial performance measures, we used log transformation for personnel-related expenses, net patient accounts receivable days, DCOH, current ratio, and debt-to-equity ratio to normalize the distributions. For results, we exponentiated the coefficient, subtracted one from this number, and multiplied by 100. The exponentiated coefficients in the result table (Table 2) should be interpreted as β percent change in the outcome variable per one unit increase in the independent variable. We did not apply any transformation for operating margin, as there was no skewness issue.

We performed several sensitivity tests to assess the robustness of our results. We ran the analysis with health centers that reported full years of 2012–2017 data to check whether missing data or new health centers during the data years affected the study results (Appendix 3). While there were multiple measures that could be used

as an indicator for overall quality of care, they were highly correlated, so we used diabetes care as an indicator for overall quality of care and ran sensitivity analyses using alternate quality measures: cervical cancer screening measure (i.e., percentage of women 21–64 years of age who received one or more pap tests to screen for cervical cancer) and high blood pressure control measure (i.e., percentage of patients 18–85 years old who had a diagnosis of hypertension and whose blood pressure was adequately controlled—less than 140/90 mm Hg) in place of diabetes care (Appendix 4–5). We also conducted lagged regression models with one-year lagged independent variables and financial performances of health centers to examine possible causal relationships (Appendix 6). Also, while we did not include regional characteristics due to collinearity in the main analysis, we examined characteristics and financial performances of health centers by regional division to explore potential policy implications (Appendix 8–9). Furthermore, we included the social deprivation index (SDI), a composite measure of area-level deprivation, replacing health center percentage of race/ethnicity groups,[24] to examine a potential underlying mechanism that could explain the association between health center race/ethnicity and financial performances.

3 | RESULTS

Table 1 describes the characteristics of the health-center-year observations. The average number of patients was 20,370. The national average of all health centers across all years showed 29% of patients having no insurance, 42% enrolled in Medicaid, and 10% enrolled in Medicare. On average, the numbers of visits per physician FTE and per nonphysician provider FTE were 2957 and 2573, respectively. Physicians and nonphysician providers among total staff represented 6.01% and 6.54% of overall staff, respectively. Health centers also reported that the BPHC grant represented 26% of total revenues.

Figure 1 displays the distribution of each financial performance measure by year. The median health center operating margin was 2.9%, which increased continuously from 1.29% in 2013 to 4.21% in

TABLE 2 Association between factors and financial performance measures ($n = 5615$)

Variable	Operating margin Coef	p	Days cash on hand[a] Exp. Coef	p	Current ratio[a] Exp. Coef	p	Debt-to-equity ratio[a] Exp. Coef	p	Accounts receivable days[a] Exp. Coef	p	Personnel related expenses[a] Exp. Coef	p
Year												
2012	Ref		Ref		Ref		Ref		Ref		Ref	
2013	−0.77		4.14		−0.24		0.07		−0.52		0.96	
2014	−0.68		3.93		1.68		−0.97		0.54		0.46	
2015	2.30	***	28.85	***	11.82	***	−2.34	**	−6.46		−0.54	
2016	2.85	***	41.02	***	19.48	***	−3.24	**	−2.58		−0.89	
2017	3.00	***	52.25	***	26.55	***	−4.74	***	−8.15		−0.57	
Patient characteristics												
Age ≤ 18%	−0.03		−0.21		−0.28	**	−0.01		−0.25		0.02	
African American%	−0.06	***	−0.82	***	−0.44	***	0.09	***	0.19	**	0.01	
Hispanic/Latino%	−0.04	***	−0.41	***	−0.39	***	0.09	***	−0.06		0.03	**
Asian%	0.06	**	0.73	***	0.19		−0.03		−0.41	**	0.00	
Other minority%	−0.01		0.18		−0.22	**	0.02		0.39	***	−0.04	**
Language%	0.01		−0.08		0.20	**	−0.02		0.27	**	0.00	
Uninsured%	−0.01		0.46	**	0.20		−0.17	***	−0.27		0.03	**
Medicaid%	0.06	***	0.67	***	0.28	**	−0.08	**	0.26		0.01	
Medicare%	−0.05		1.06	**	0.15		−0.15	**	−0.12		0.06	
Chronic conditions visit%	0.02		−0.96	***	−0.52	***	0.14	**	−0.42		−0.04	
Health center characteristics												
Visit volume per provider												
Physician visits Avg. by 100s	0.06	**	0.15		0.26	**	−0.05		0.36	**	−0.03	
Nonphysician Provider visits Avg. by 100s	0.04		0.62	**	0.23	**	0.00		0.08		−0.01	
Size												
Patient volume by 1000s	−0.01		0.03		−0.23	***	0.07	***	0.01		0.01	
Mix of services												
Dental service%	−0.01		−0.56	**	−0.22	**	0.01		0.03		−0.02	
Vision service%	−0.02		0.40		−0.11		0.36	**	−0.35		0.04	
Mental/substance abuse service%	−0.03		−0.42	**	−0.14		0.13	***	0.27		−0.01	
CM and education specialist service%	0.01		0.38		0.26	**	0.01		0.32		−0.05	**
Quality of care												
Control diabetes%[b]	−0.02		0.08		−0.01		0.02		−0.09		0.00	
Staffing mix												
Staff: Nonphysician provider%	0.21	**	0.94		1.12	***	−0.01		2.70	***	−0.15	**
Staff: Physician%	−0.04		−0.75		0.53		0.32	**	0.84		−0.04	
Staff: Admin%	0.13		3.21		2.07		−0.28		−2.38		−0.21	
Funding												
BPHC—Migrant grant%	0.03		1.12	***	−0.05		−0.01		−0.19		0.02	
BPHC—Community center grant%	−0.01		0.10		0.23	**	−0.04		0.96	***	0.04	**
BPHC—Homeless grant%	−0.11	***	−0.10		−0.19		0.08	**	−0.53		−0.03	
BPHC—Housing grant%	0.18	**	0.85		0.60		−0.04		2.11	***	0.00	
Other grants%	0.02		0.19		0.20	**	−0.05	**	0.45	**	−0.04	**
340B Grant—Yes	−0.15		−1.82		−3.54	**	0.79		0.83		−0.08	

TABLE 2 (Continued)

Variable	Operating margin Coef	p	Days cash on hand[a] Exp. Coef	p	Current ratio[a] Exp. Coef	p	Debt-to-equity ratio[a] Exp. Coef	p	Accounts receivable days[a] Exp. Coef	p	Personnel related expenses[a] Exp. Coef	p
Health information technology												
EHR												
At some sites or for some providers	Ref		Ref		Ref		Ref		Ref		Ref	
No	−10.79		−5.91		4.97		5.50		−41.11		3.16	
All sites and for all providers	0.90		27.32	**	6.39		−4.70	***	−4.76		0.01	
Location												
Urban area	−0.75		1.30		3.85		−0.70		−7.91	**	−0.16	
Care delivery model												
PCMH	0.51		19.01	***	4.68	**	−2.03	***	−4.19		−0.21	
Workforce stability												
Tenure of leadership	0.03		0.36		0.23		−0.24	***	0.19		−0.02	
Tenure of medical staffs	−0.35	***	0.86		−0.29		−0.08		0.70		0.27	***
Market/neighborhood characteristics												
65 or older adults%	0.01		−1.73	**	−0.25		0.18	**	0.16		−0.06	
Uninsured adults%	0.10	***	0.73	**	0.51	***	−0.17	***	−0.53	**	−0.10	***
Unemployment%	0.21	**	0.04		0.34		0.10		1.37	**	0.01	
PCP per 1000	0.00		−0.01		−0.06	**	0.00		0.09	**	0.01	

Abbreviations: BPHC, Bureau of Primary Health Care; CM, case management; Coef, Coefficient; EHR, electronic health record; Exp, exponentiated; Language%, percentage of patients whose primary language is other than English; PCMH, patient-centered medical home recognition; PCP, primary care provider.

[a]As we applied log transformation for the dependent variable, we exponentiated the coefficient, subtracted one from this number, and multiplied by 100.

[b]Change in denominator definition since 2016: "seen in the clinic for medical visits at least twice during the reporting year" to "Had at least one medical visit during the measurement year."

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

2016 but decreased to 3.56% in 2017. However, the 25th percentile of health centers reports around a zero to negative operating margin each year. The median of DCOH and current ratio were 51.67 and 2.74, respectively, which generally increased during the years 2011 to 2017. In contrast, the median of the debt-to-equity ratio (0.31) and net patient accounts receivable days (41.46 days) generally decreased across the years. The median percentage of personnel-related expenses was 71.86%, decreasing from 73.53% in 2013 to 70.59% in 2016, although increasing to 72.1% in 2017.

3.1 | Cross-cutting findings

The following result sections highlight factors that are significantly associated with four or more financial outcomes (Table 2). The models confirm the importance of secular improvements in financial outcomes, especially in the years 2015, 2016, and 2017, compared to 2012.

Among patient characteristics, the percentages of African American patients and Hispanic/Latino patients were associated negatively with all margin, liquidity, and solvency measures. Health centers with a higher percentage of African American patients were associated with greater net patient account receivable days (0.19, $p = 0.017$), and health centers with a higher percentage of Hispanic/Latino patients were associated with higher personal-related expenses (0.03, $p = 0.005$). Conversely, health centers with a higher percentage of Medicaid patients were associated with better financial outcomes. A higher percentage of Medicaid patients was associated with a higher operating margin (0.06, $p < 0.001$), DCOH (0.67, $p < 0.001$), and current ratio (0.28, $p = 0.001$), and lower debt-to equity ratio (−0.08, $p = 0.004$). Greater DCOH, higher current ratio, and lower debt-to-equity ratio each reflect better financial performance.

Among health center characteristics, a higher percentage of nonphysician providers to total staff was associated with positive financial outcomes, including higher operating margin (0.21, $p = 0.001$) and current ratio (1.12, $p < 0.001$), and lower personnel-related expenses (−0.15, $p = 0.007$). However, health centers with higher percentage of nonphysician providers to total staff were associated with greater net patient account receivable days (2.70, $p < 0.001$). With respect to BPHC grant funding, findings differed by specific grants. A higher proportion of revenues from the homeless health care grant was associated with worse profitability (operating margin: −0.11, $p < 0.001$) and solvency (debt-to-equity ratio: 0.08, $p < 0.01$). In contrast, higher proportions of revenues from the migrant
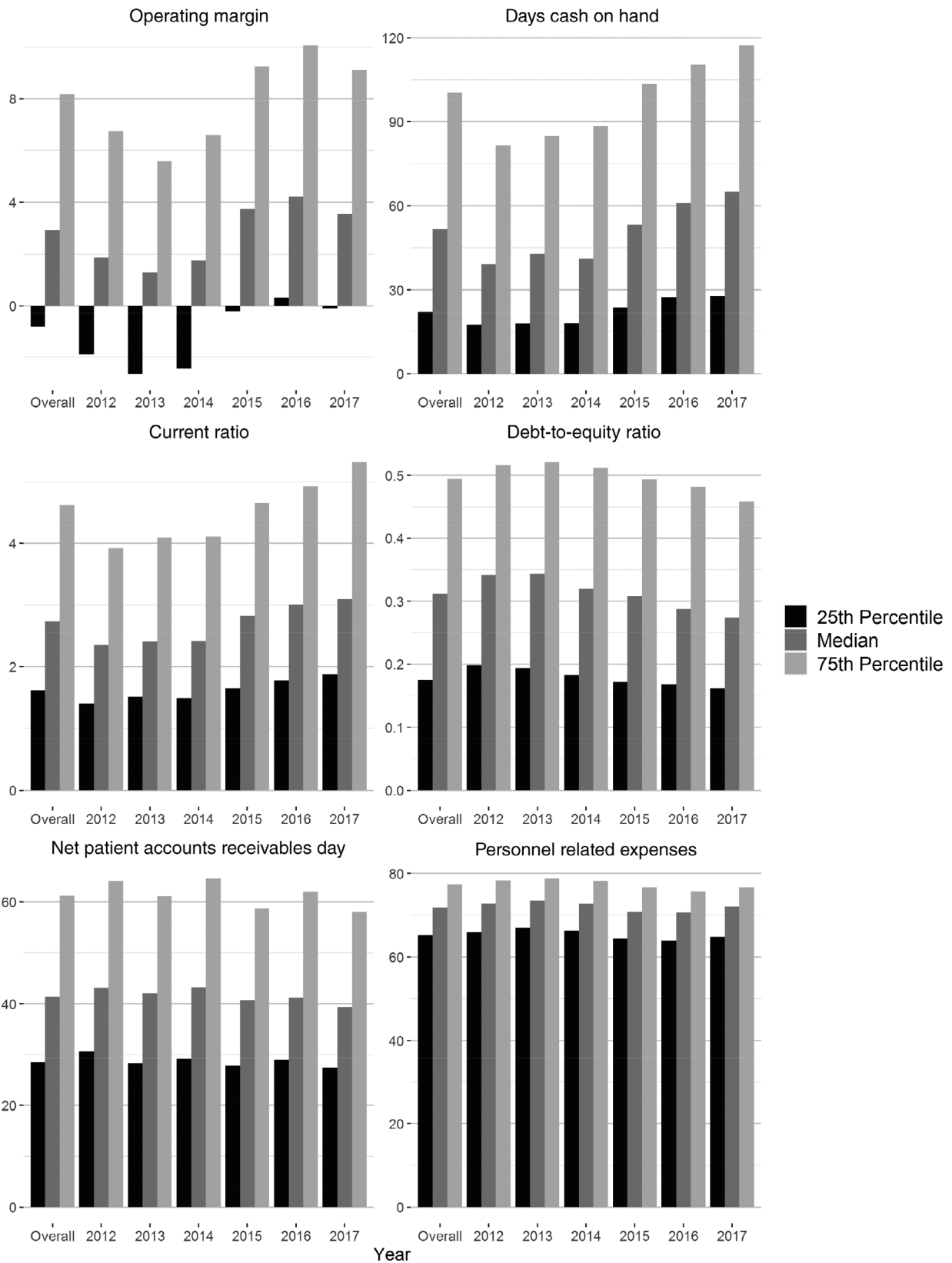
FIGURE 1 Distribution of financial performance measures by years ($n = 5615$)

health center grant (DCOH: 1.12, $p < 0.001$) and community center grant (current ratio: 0.23, $p < 0.01$) were associated with better liquidity, and higher proportions of revenues from the public housing primary care grant were associated with better profitability (operating margin: 0.18, $p < 0.01$). Also, health centers with a higher percentage of funding from non-Bureau of Primary Health Care ("other") grants

had better financial health regarding current ratio (0.20, $p = 0.01$), debt-to-equity-ratio (-0.05, $p = 0.031$), and personnel-related expenses (-0.04, $p = 0.02$). Among neighborhood characteristics, counties with a higher percentage of uninsured adults were associated with more positive financial metrics. We also found that health centers with PCMH recognition were more likely to show better financial liquidity (DCOH: 19.01, $p < 0.001$; current ratio: 4.68, $p = 0.014$) and solvency (debt-to-equity ratio: -2.03, $p < 0.001$).

Results of sensitivity analyses were qualitatively consistent with the main analysis. Our sensitivity analyses based on one-year lagged regression models (Appendix 6) show consistent results with the main results. We also found differences in financial performance measures among census divisions (Appendix 8–9). Furthermore, we found that health centers in more disadvantaged areas were associated with worse profitability, liquidity, and solvency measures (Appendix 10).

4 | DISCUSSION

We found that several factors were independently associated with health centers' financial performance. To our knowledge, this is the most contemporary and comprehensive evaluation of the financial performance of FQHCs in the peer-reviewed literature. Overall, while we found improvement in financial performance measures over time, it is important to note that at least one-fourth of health centers report a near-zero or negative operating margin each year. While health centers could make a strategic decision to face a zero or negative operating margin for any given year in an effort to invest in the organizational mission, continuous negative operating margins are a sign of concern that could lead to the closure of health centers.[25] Further supports to monitor and track health centers with negative operating margins will be needed to prevent service reduction and operation closure.

Consistent with other studies, our results suggest that the ACA and Medicaid expansion played an important role in improving health centers' financial stability.[17,26] First, a higher percentage of Medicaid patients was associated with better financial performance across multiple outcomes. This finding is consistent with our expectations as health centers receive enhanced reimbursement for Medicaid patients, and Medicaid expansion allowed more uninsured patients to enroll in Medicaid.[27–29] We also found improved financial performance in health centers during the years 2015–2017.[17] This temporal effect might have also been related to the ACA's enhanced federal funding for health centers and subsidies to expand access to affordable health insurance for moderate and low-income people, both of which could have enhanced health centers' financial health above and beyond the ACA Medicaid expansions.

Our results also support the notion that leveraging nonphysician providers (i.e., nurse practitioners, physician assistants, certified nurse midwives) may be an important factor in health center financial performance. Higher nonphysician providers' productivity and the percentage of nonphysician providers among total FTEs were both associated with higher profitability and liquidity. Nonphysician providers collaboratively work with primary care physicians and can see patients without the physician present for certain services that vary by state.[30] It is generally known that nonphysician providers are less expensive compared to physicians.[31] Not only are nonphysician providers' salaries lower, but previous studies have also suggested that nonphysician providers provide an equal or better quality of care compared to that of physicians, especially in prevention services, common uncomplicated acute illnesses diagnosis and management, and chronic condition management.[32–35] Moreover, nonphysician providers may help health centers to overcome the challenge of physician recruitment and retention in medically underserved areas.[36] Considering the financial and quality of care benefits that nonphysician providers could bring and the physician shortage problem in many health centers, utilizing and expanding the role of nonphysician providers could be helpful for health centers to not only improve their financial health but also enhance health centers' ability to provide affordable and high quality of care.

We also found that health centers with PCMH recognition had better liquidity and solvency than those without PCMH recognition. PCMH is a care delivery model that aims to deliver coordinated patient-centered care and emphasize quality improvement.[37] Past studies have shown that PCMH adoption is costly from the perspective of primary care practices.[38] The positive association we observe between solvency and liquidity with PCMH may reflect the notion that it was mainly organizations with strong cash and equity positions that were able to make the investments required to achieve PCMH recognition. As health centers with weak liquidity and solvency could have difficulty achieving PCMH recognition, further supports to utilize current HRSA programs to offset the costs of achieving PCMH recognition could be helpful. Another possibility is that PCMH recognition could lead to better financial liquidity and solvency. Some prior studies have found PCMH recognition to be associated with lower health care cost, higher quality of care, and greater patient and staff satisfaction,[39–43] which are factors known to be associated with better financial performance in some settings.[44,45] While providing patient-centered, coordinated care through models such as the PCMH may require upfront financial investment, such efforts may have long-term benefits for financial performance, as well as improve quality of care and patient and staff satisfaction.

Our study findings also illustrate the complex relationship between the racial composition of patients served, area-level deprivation, and health center financial status. Over 60% of health center patients identify as members of the minority race or ethnicity groups and the Health Center Program has historically made disparities reduction a core, explicit focus of the program.[46,47] In our main analysis, we found that a higher percentage of African American and/or Hispanic/Latino patients was associated with worse financial performance for the health center. Race and ethnicity are multifaceted and complex, known to be strongly intertwined with factors such as the availability of neighborhood resources to support health and socioeconomic status. Further, the variables available to measure

dimensions of socioeconomic status in this analysis were relatively limited in terms of granularity (with ZIP code-based averages missing notable within ZIP code variation) and representativeness (e.g., percent unemployed does not fully represent employment-related challenges). Without more defined and comprehensive measures, it is difficult to fully determine what is driving the observed racial differences.

As a sensitivity analysis to further explore these relationships, we included the neighborhood SDI as an additional factor. First of all, we found that the SDI was correlated with the percentage of African American and Latino patients (0.30). Also, disadvantaged neighborhoods were associated with worse financial outcomes based on models that included SDI but excluded health center percentage of race/ethnicity. However, when including both race/ethnicity and SDI, race/ethnicity composition continued to be associated with worse financial performance. These results raise a point that individual patient factors are related to health centers' financial status beyond area-level deprivation. Also, a recent study has shown that, while patient-level social risks such as housing insecurity and financial resource strain are associated with community-level risk (SDI), community-level and patient-level risk do not fully overlap, suggesting that patient-level risk may further explain the remaining association with race/ethnicity, which might reflect deep, long-term structural racism.[48] The FQHC program is designed to meet the needs of underserved populations that happen to include a large proportion of African Americans and/or Hispanic/Latinos. One interpretation of our study findings is that more resources will be necessary to support health centers that serve a larger proportion of structurally disadvantaged populations. However, given the limitations of our data, additional research is needed to better examine these complex associations.

It is important to note that even given the potential for the negative financial impact of serving population segments, health centers continue to welcome and serve anyone that walks through their doors, regardless of ability to pay. Additionally, our findings highlight the importance of HRSA's financial support of health centers. Notably, Section 330 grant funding of the Public Health Service Act is purposely designed to enable health centers to care for underrepresented and structurally disadvantaged populations, which include racial and ethnic minorities. Additionally, considering recent studies that highlight exacerbated racial health disparities due to the COVID-19 pandemic,[49,50] our findings related to race/ethnicity and financial status of health centers suggest that strengthening programs such as Section 330 can prove effective to ensure the needs of structurally disadvantaged populations are met and attenuate racial and ethnic disparities in care, and ultimately outcomes. Also, while the share of health centers' total revenue from non-HRSA funding decreased across years,[1] we find that non-HRSA funding is an important determinant of a health center's financial status. Non-HRSA funding includes other federal grants, state and local indigent care programs, and private grants, which are used to provide specific services or to serve specific populations.[2] Finding opportunities to support health centers to be financially independent operating organizations is important. Yet, we should not overlook the potential benefits of non-HRSA funding, such as expanding access to care to communities in need, as well as supporting health centers' financial health.

This study has the following limitations. First, as we focused on health centers with financial data, there could be a selection bias issue. While more than 70% of health centers had financial data, our study findings may not generalize to all health centers, especially to small and rural health centers. Second, our regression analyses are not able to determine the causal relationship between examined factors and financial performance measures. While we did find consistent results in our lagged regression models (i.e., how factors in 1 year are associated with financial outcomes the following year), further studies should assess causal relationships using additional study designs. Third, this study has some challenges in interpreting all the complex relationships among independent variables. For example, we have limitations in clearly interpreting the positive association between more uninsured patients and health centers' positive financial status. More studies with nuanced and detailed analyses, potentially with mixed methods, will be needed to better illustrate these relationships. Lastly, when interpreting financial metrics as outcome variables for health centers, the unique community health orientation of health centers should be considered as well. As mission-based organizations, health centers seek to improve access to high-quality and comprehensive care for medically underserved populations and may choose to invest in advancing those missions, rather than maximizing financial health metrics. Additional research could be directed at gaining a better understanding of the optimal relationship between meeting mission imperatives while maintaining financial sustainability.

This study presents information on the association between health center-related factors and multifaceted financial performance measures that include profitability, liquidity, and solvency. The study findings highlight potential opportunities to improve health centers' financial performance that could be achieved through the health center and policy level efforts such as supporting Medicaid eligibility expansion and leveraging nonphysician providers. It is important to further support health centers to enhance their financial health to continuously provide affordable and high-quality care in medically underserved areas. As the current COVID-19 pandemic places particular stress on the financial health of the primary care safety net in the United States, continued attention to the sustainability of FQHCs is essential. This study provides a key baseline and context for policies and programs to support health centers' short- and long-term financial sustainability.

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