

## **Cash Reserves and System Membership: Does System Membership Improve Not-For-Profit Hospitals' Access to Internal Capital by Reducing Optimal Cash Balances?**

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This Special Issue of the *Journal of Health Care Finance* honors Dr. Louis C. Gapenski for his contributions to the fields of health care finance, public health finance and health administration. In his writing, teaching and mentoring, he served as a role model for all of us.

## **Cash Reserves and System Membership: Does System Membership Improve Not-For-Profit Hospitals' Access to Internal Capital by Reducing Optimal Cash Balances?**

### **Abstract**

Many not-for-profit hospitals hold far more cash than is required to meet working capital needs. One reason not-for-profit hospitals hold these reserves is that they face capital market imperfections that create barriers to raising external financing. These barriers are likely to be smaller for system hospitals than for independent hospitals. As a result, independent hospitals that join systems may have an opportunity to “free up” cash reserves that can then be used to fund investment in real assets. We test this theory using a sample of independent not-for-profit hospitals that joined systems between 1998 and 2007. We find that most acquired hospitals do not hold large cash balances before acquisition and that even acquired hospitals that do hold large amounts of cash before being acquired do not experience large reductions in cash balances after acquisition.

## Introduction

Hospitals are currently facing regulatory and market forces that make capital expenditures critical. These include new investments in information technology systems needed to improve clinical quality, to take advantage of payer incentives to use this technology and increasingly to avoid financial penalties for failing to use this technology (American Hospital Association, 2013). Capital investment has also been linked to the quality of clinical care hospitals provide (Levitt, 1994) and a hospital's ability to compete with other hospitals in its market (Byrd & McCue, 2003). However, as capital needs have increased many independent hospitals have found raising capital difficult (American Hospital Association, 2013; Carlson and Galloro, 2009). In particular, many independent not-for-profit (NFP) hospitals claim they have difficulty finding funding for capital investment. Some of these hospitals maintain large stocks of financial assets that could easily be liquidated to fund capital investment needs (Gentry, 2002; Song and Reiter, 2010), but this course of action is seldom if ever recommended to hospital executives. Instead, hospitals seeking access to capital are frequently advised by consultants and industry experts to join multihospital systems as a way to improve access to capital (Ault, Childs, Wainright, and Young, 2011; Janiga and Muller, 2013). However, little is known about how system membership affects a hospital's ability to access capital markets and which characteristics of system membership are responsible for improving an acquired hospital's access to capital. This paper will examine the possibility that system membership improves access to capital by allowing independent hospitals to hold fewer financial assets in reserve and to use a portion of their existing reserves for capital investment.

Finance theory suggests that independent NFP hospitals have a unique set of organizational and financial market characteristics that lead them to hold large investments in financial assets rather than using these funds as a source of capital (Gapenski and Pink 2013). These financial assets include cash holdings as well as short-term investments in financial securities. (Throughout the rest of the paper both of these categories of financial securities will collectively be referred to as "cash" because of their liquid nature.<sup>1</sup>) It is possible that system membership alters these characteristics in ways that allow hospitals to reduce their cash balances. As a result, acquisition by a system may allow some hospitals with large cash holdings to use some of their cash to fund investment in real assets. "Freeing up" cash and other financial assets is one way that system membership could improve access to capital for acquired hospitals. The amount of capital available from "freed up" internal cash reserves is potentially large because NFP hospitals hold large stores of financial assets. From 1997-2006 NFP hospitals held an average of 21% of their assets in cash or financial investments while investor-owned hospitals held only 4% of their assets as cash or financial investments (Song and Reiter, 2010). Even NFP hospitals with negative profits held 15% of their assets as cash or securities. Moreover, analysis of Medicare Cost Report data suggests NFP hospitals affiliated with multihospital systems hold smaller stores of cash and financial investments than independent NFP hospitals. Not-for-profit hospitals have sizeable investments in financial assets. If system membership reduces the optimal level of financial assets NFP hospitals should hold, acquired hospitals' financial investments should be a ready source of internal capital to fund real investment opportunities.

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<sup>1</sup> Rivenson et al (2000) examine different ways to conceptualize NFP hospitals' liquid asset holdings and finds that hospitals holding large cash balances also tend to hold large stores of other liquid financial assets.

Understanding the financing benefits of system membership and how these benefits are achieved is important. If system membership allows a hospital to shift its asset structure and reduce its holdings of cash (an asset that produces a relatively low return) to make investments in real assets (that produce a higher return), this would greatly increase the efficiency of the hospital's financial management. However, the costs of system membership can be large for independent hospitals. These costs include a loss of autonomy and community control, transactions costs associated with the system acquisition (Herman, 2014; Mitrakos, 2012) and possible increases in the prices of hospital services to the community (Melnick and Keeler, 2007). Moreover, there is reason to believe system membership may not affect acquired hospitals' access to capital at all. Systems are likely motivated to acquire hospitals for reasons other than their desire improve the acquired hospital's access to capital. Acquiring systems may be motivated by the idea that an acquisition is "a good deal" because the cost of acquiring a hospital is lower than the value of future revenues the hospital will produce, or by the desire to realize economies of scale (though there is little evidence these benefits are realized (Burns et al., 2015; Burns and Pauly 2002; Dranove, Durkac, and Shanley 1996; Dranove and Lindrooth 2003; Sloan, Ostermann, and Conover 2003). Many of these objectives can be achieved even without a change in optimal cash holdings that frees up cash reserves for investment in real assets. Moreover, system acquisition is not likely to reduce cash holdings for all acquired hospitals. Despite the relatively large cash holdings most independent NFP hospitals maintain, some acquired hospitals join systems precisely because they are facing financial distress and have minimal cash holdings. Hospitals acquired because they face financial distress may actually experience increases in their cash holdings after acquisition by a system.

This paper adds to our understanding of how system membership affects an acquired hospital's ability to access capital by examining whether system membership frees up financial assets that can be used to fund real investment. In the sections that follow, this paper will review financial theory that explains how firms determine their optimal level of cash and financial asset holdings. This framework suggests several reasons NFP hospitals maintain large cash balances and several characteristics of multihospital systems that may cause optimal cash balances of NFP system hospitals to be smaller than their independent counterparts. Finally, the hypothesis that acquired hospitals with high cash holdings may experience reductions in their cash balances after joining systems is examined empirically using a panel of independent NFP hospitals acquired by NFP hospital systems.

### ***How firms set optimal cash balances***

If capital markets were perfect, financing would be available for all investment opportunities that promised returns great enough to compensate for a project's risk. Firms could easily raise this financing at rates that appropriately reflected a project's risk. Cash balances would be small because cash would only be used to meet working capital needs. Gapenski provides an excellent summary of firms' cash management objectives, writing "...the goal of cash management is to minimize the amount of cash the business must hold to conduct its normal activities while having sufficient cash on hand to support operations" (Gapenski and Reiter 2016). However, for some firms informational and agency concerns create differences in the cost of internal and external financing (Fazzari et al., 1988). Not-for-profit firms have a limited ability to raise external capital since they are unable to sell shares of equity and must rely solely on donated capital and debt

issues. As a result of these market imperfections, firms must hold cash balances not only for transactional purposes but as a precaution in case external financing is unavailable or excessively costly (only available at rates significantly above a project's risk-adjusted expected return). But how much cash should a firm hold? An article by Opler et al. (1999) provides the theoretical and empirical basis for much of the existing research on optimal cash balances. Opler et al. suggest that firms face costs associated with holding cash as well as costs of experiencing a cash shortfall. Costs of holding cash include profits from forgone investments and agency costs resulting from large cash balances that insulate managers from the oversight. Firms also face costs of holding too little cash. These costs include being forced either to pass up investment opportunities or to issue costly debt to take advantage of investment opportunities. If the cash shortfall is sufficiently severe, a firm may be forced to sell off assets at a discount to raise the funds necessary to prevent bankruptcy. A firm's optimal cash balance equates the expected marginal costs of holding too much and too little cash. Opler et al. refer to this theory of cash management as the "tradeoff theory" of cash management. Using a sample of investor-owned firms, Opler et al. find that firms maintain target cash balances over time and tend to increase cash balances when actual cash balances fall below target balances. These results are consistent with the idea that firms have an optimal cash balance. The costs that create these optimal balances---costs of holding cash and the cost of a cash shortfall---are discussed in more detail below.

### *Costs of holding cash*

The primary cost of holding cash is the difference between the return it generates when held as a liquid assets and the return that it would generate if put to its most profitable use. This is known as the liquidity premium, because in most cases the return on cash holdings is below the returns associated with other possible uses for cash (Miller and Orr, 1966; Opler, et al., 1999). To see this, consider how an investor-owned firm operating to maximize shareholder value can use cash. There are three possible uses of cash. First, the firm may hold cash for transactional purposes in the form of safe, liquid, low-return securities. If excess cash is available, the firm will invest it in real assets expected to produce a return greater than the firm's cost of capital. If none of the available projects is expected to produce returns at or above the cost of capital, the firm should return cash to shareholders. Holding cash is costly because the return on cash holdings is below the return investors expect on their equity and, equivalently, below the required returns on real investments.

In addition to costs created by the liquidity premium, cash balances can also lead to agency costs. Agency costs arise because managers have incentives to pursue their own objectives to the detriment of firm owners (Jensen and Meckling, 1976). These objectives can include shirking work duties, increasing executive compensation, consuming perquisites, or investing in projects with a low expected return simply to expand the size of the organization, "empire building" (Bertrand and Mullainathan 2003; Blanchard 1994; Jensen 1986; Harford 1999), Large cash holdings can make it easier for managers to pursue these objectives. Investment in low-return projects is simpler because managers are not subject to monitoring by external capital markets (Opler et al., 1999). Inefficient operation, perquisite consumption and unwarranted increases in executive compensation are more likely because excess cash protects firms that engage in these activities from the financial distress that they might face without cash reserves. The existence of these agency costs reduces a firm's optimal cash balance. However, unless a firm has good governance mechanisms in place to monitor and control managers' actions, equity holders will not realize the

extent of the agency costs imposed by large cash balances, nor will equity holders take actions to reduce these costs. As a result the firm will tend to accumulate cash reserves in excess of its optimal balance (Opler et al., 1999).

### ***Expected costs of cash shortfalls***

If capital markets were perfect, there would be no cost to a cash shortfall. When investment opportunities arose firms could borrow from banks or bondholders willing to provide financing at an appropriate risk-adjusted rate and without incurring transactions costs of issuance. However, agency costs and asymmetric information problems make internal financing cheaper than external financing for some firms (Fazzari et al., 1988), while for other firms these problems create credit rationing that makes external financing completely unavailable (Stiglitz and Weiss, 1981). Firms with low cash holdings and prevalent investment opportunities face particularly high costs of cash shortfalls. These costs are largest when the firm has no access to debt markets and must forgo projects that cannot be funded with cash holdings. In this case the cost of a cash shortfall is the profit forgone when a hospital must pass up a profitable investment opportunity. A similar, though less severe, cost of maintaining a small cash balance is realized by firms for which external debt financing is more costly than internal financing. In this case the cost of a cash shortfall is the premium a firm must pay to issue the debt required to fund the firm's investment opportunity. When cash shortfalls are sufficiently large, a firm may face bankruptcy and associated costs of financial distress. These include asset sales to raise cash needed to satisfy obligations and other costs driven by the uncertainty surrounding a firm's future including strained relationships with suppliers and customers. These indirect costs of financial distress are large. Estimates of these costs range from 11% (Altman, 1984) to 23% (Andrade and Kaplan, 1998) of the firm's pre-distress value.

### ***Independent NFP hospital cash balances***

Not-for-profit hospitals have optimal cash balances and maintain target cash balances in the same way as investor-owned firms (Rivenson, et al., 2011). However, the unique features of independent, NFP hospitals affect the size of these optimal cash balances by affecting both the cost of a cash shortfall and the cost of holding cash. Specifically, independent NFP hospitals have financial and operating characteristics that make their expected cost of cash shortfalls high relative to investor-owned and system-affiliated NFP hospitals, resulting in a higher optimal level of cash holdings for independent NFP hospitals. Independent NFP hospitals may also have lower costs of holding cash, which would lead these hospitals to hold more cash. This would be the case if independent NFP hospitals were better able to engage in arbitrage by issuing tax-exempt debt even when internal financing was available, or if poor governance reduces these hospitals' perceived cost of holding a large cash balance. Either of these factors would make independent NFP hospitals' costs of holding cash relatively low, though whether or not independent and system-affiliated hospitals actually differ in the quality of their governance or their ability to engage in tax arbitrage is less clear.

### *High costs of a cash shortfall*

Financial market imperfections lead to differences in the cost of internal and external financing. As a result a cash shortfall creates costs that include the inability to finance profitable investment opportunities or the premium required to raise external financing. Not-for-profit hospitals are especially likely to face costly external financing. The most important factor increasing NFP hospitals' cost of external financing is these hospitals' limited access to equity capital. Since NFP hospitals cannot issue new shares of equity, funding investment opportunities often requires new debt financing and a shift in capital structure that is difficult to reverse. This shift is costly if a hospital enjoyed an optimal capital structure before taking on additional debt, and even more costly if the hospital was over-levered. The use of cash can also increase the premium on external financing if it results in a downgrade to the hospital's bond rating. Many hospitals report that they target cash holdings at a level that will allow them to maintain a specific bond rating (Rivenson et al., 2000).

There is evidence that independent, NFP hospitals experience both costs of forgone investment and costs of raising "expensive" external financing. Not-for-profit hospitals rely on liquid assets to fund investment and are forced to limit investment when cash flows are not sufficient to fund all desired projects (Calem and Rizzo, 1995; Reiter, Smith and Wheeler, 2008). However, system-affiliated NFP hospitals are less likely to rely on internal cash to finance investment than independent NFP hospitals (Calem and Rizzo, 1995), which suggests that system hospitals may face smaller costs of forgone investment and external financing than independent NFP hospitals. Moreover, the premium system-affiliated hospitals must pay for external financing is probably smaller than the premium required of independent NFP hospitals, because bond rating agencies seem to favor hospital systems over independent hospitals (Dunn, 2013; Moody's Investor Service, 2012; Standard and Poor's, 2012; Standard and Poor's, 2013). As a result the costs of raising external financing and the cost of foregone investment are likely to be greater for independent NFP hospitals than for system-affiliated NFP hospitals.

Not only are the costs of a cash shortfall high for independent NFP hospitals, these hospitals are also more likely to experience a shortfall because their cash flows vary more than the cash flows of hospital systems. Miller and Orr (1966) show that a firm's optimal cash balance is decreasing with the size and volume of its cash transactions because these factors reduce random variation in a firm's cash flows. Hospital systems, by definition, are larger than individual hospitals and can take advantage of economies of scale in cash management. In addition to reducing cash flow variation by exploiting economies of scale, systems have more diverse sources of cash flow than individual hospitals. Systems may contract with a larger number of payers spread over a larger geographic area than independent hospitals. To the extent that cash flows from these payers are not perfectly correlated overall variation in cash flow is reduced. Less volatile cash flows reduce the likelihood of a cash shortfall and hence the size of precautionary cash balances. Overall, the likelihood of a cash shortfall is higher for independent hospitals than for system affiliated hospitals. Should such a shortfall occur, it will also be more costly for an independent NFP hospital relative to similar system-affiliated hospitals. This high expected cost of a cash shortfall is one incentive for NFP hospitals to maintain large cash holdings.

### *Low costs of holding cash*

Relative to system-affiliated and investor-owned hospitals, independent NFP hospitals have high costs of a cash shortfall and incentives to hold large stores of cash. Independent NFP hospitals may also hold more cash than hospitals with other organizational forms for two reasons. First, governance among independent NFP hospitals may be worse than governance of investor-owned or system-affiliated NFP hospitals. As a result independent NFP hospital boards may underestimate the agency costs of high cash balances and allow managers to accumulate excess cash. Second, NFP hospitals' ability to engage in indirect arbitrage using tax-exempt debt makes the cost of holding cash much lower for NFP hospitals than for investor-owned hospitals. Unfortunately, the factors that determine how much arbitrage is available to a hospital are complex and it is unclear whether system-affiliated or independent NFP hospitals are better able to engage in this arbitrage. The remainder of this section describes how agency costs and the liquidity premium differ for investor-owned and both system-affiliated and independent NFP hospitals.

Agency costs, including perquisite consumption and inefficient investment, are one of the costs firms face when holding cash. Good governance can reduce these costs and help to limit the amount of excess cash a firm holds. Unfortunately, many of the mechanisms associated with good governance in investor-owned firms are unavailable to NFP hospitals. These include management compensation arrangements that tie executive pay to firm value (usually measured by stock price), the presence of large blocks of shareholders to monitor firm actions, or the threat that poor-performing managers can be removed through a hostile takeover (Shleifer and Vishny, 1997). Governance of NFP hospitals comes primarily in the form of a governing board composed of community representatives acting as volunteers. These representatives may lack the experience to closely monitor managers. Moreover, board service is voluntary and members are not compensated for their service and so many board members may lack the time required to closely monitor managers. As a result, NFP hospital managers may be able to maintain excessive cash balances and enjoy perquisite consumption or "empire building" investment. Independent NFP hospital board members may underestimate these costs.

Prior research on the relationship between cash holdings and agency costs suggests that large levels of cash holdings can create agency costs not only in investor-owned firms, but in NFP organizations and municipal government organizations as well. (Municipal government organizations also lack many of the governance mechanisms used by investor-owned firms.) In a sample of municipal governments, Gore (2009) finds high cash holdings are associated with larger administrative expenses, higher city manager salaries and greater managerial entrenchment. Among NFP organizations (over 40% of which were hospitals) higher cash balances are associated with greater executive compensation and lower expenditures on program goals, even after controlling for important covariates like organizational size (Core, Guay and Verdi, 2006).

Not-for-profit hospitals with large cash balances certainly seem likely to incur agency costs. However, it is possible that system membership improves hospital governance, helping board members to recognize the high agency costs of holding cash and resulting in reductions in cash balances. System level managers have the experience and resources necessary to monitor the managers of affiliated hospitals. Community board members may lack this experience and these resources. Depending on the system's organization, system-level managers may also have the



authority to replace under-performing hospital managers in the same way activist shareholders can replace managers in an investor-owned firm. Even though there are reasons to suspect that system membership improves governance of independent NFP hospitals in ways that would reduce these hospitals' cash balances, research that actually compares the effectiveness of governance structures in independent and system-affiliated NFP hospitals is scarce. It is possible that agency problems at the system-level are no less severe than problems at the hospital level. The differences in governance for system and independent hospitals, and whether these differences do in fact have an effect on hospitals' cash holdings are opportunities for future research.

Another reason NFP hospitals have high cash holdings (relative to investor-owned hospitals) is that NFP hospitals have the opportunity to engage in an indirect arbitrage by holding cash rather than using it to fund investment. Not-for-profit hospitals are able to engage in this arbitrage by issuing tax-exempt debt at below-market rates while investing cash holdings in financial assets with returns greater than the interest rate on the tax-exempt debt. This arbitrage opportunity gives both system-affiliated and independent NFP hospitals a low liquidity premium and hence a low cost of holding cash. The availability of indirect arbitrage opportunities is an important reason NFP hospital hold larger cash balances than their investor-owned counterparts (Wheeler, et al., 2000).

It is clear that indirect arbitrage opportunities are available to NFP hospitals, but it is less clear whether system membership increases or decreases these opportunities. Wedig et al. (1996) develop a theoretical model describing the conditions necessary for indirect arbitrage to take place. The extent to which this arbitrage is available depends on several factors including: a) the availability of projects qualifying for tax-exempt debt; b) the availability of profitable investment opportunities that do not qualify for tax-exempt debt; c) the degree of the hospital's leverage; d) the size of the hospital's cash holdings. System membership could create new investment opportunities that qualify for tax-exempt financing. This would increase the independent hospital's opportunities for indirect arbitrage, decrease the cost of holding cash and increase the hospital's cash holdings.<sup>2</sup> Alternatively, system membership could create new investment opportunities that did not qualify for tax-exempt financing. In this case, cash reserves would be used to fund these projects and the hospital's cash holdings would fall. Clearly the determinants of a NFP hospital's liquidity premium are complex and the effects of system membership on this premium, and hence a hospital's cash balances, is an opportunity for future theoretical and empirical research.

### ***Does acquisition by a system reduce hospitals' cash balances?***

The previous sections have described a number of theoretical reasons that system-affiliated NFP hospitals should have lower optimal cash balances than independent NFP hospitals. However, the discussion in the previous sections has neglected an important, practical point. Even if independent NFP hospitals have relatively high optimal cash balances, they may have trouble actually accumulating these balances. This is especially true in a sample of hospitals acquired by systems because some of these acquired hospitals may be joining systems precisely because they were unable to generate adequate cash to support their operations, much less fund investment and

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<sup>2</sup> This is true for hospitals with relatively low leverage. Higher leverage decreases the opportunity for arbitrage by increasing the interest rate for all debt types, even tax-exempt debt, and reducing the spread between the cost of debt and the expected return on financial assets.

precautionary reserves. The remainder of this paper is devoted to answering two questions. First, in the sample of acquired NFP hospitals, how many have excess cash holdings that system membership could “free up” to be used in investment. Second, for the sample of acquired NFP hospitals with excess cash holdings, does system membership actually result in reductions in these cash holdings as theory suggests.

## Data and Sample

Study data come from two sources, the American Hospital Association (AHA) hospital database records from 1996-2009 and Medicare Cost Report (MCR) records from 1996-2009. The AHA data come from files maintained and updated yearly by the AHA. Medicare Cost Report (MCR) data are collected by the Centers for Medicare and Medicaid Services (CMS) and contain information on costs and other characteristics for all US hospitals that accept Medicare patients. Data used in this study come from Schedule G of the cost report. Medicare Cost Report data are widely used in academic research (for example (Bazzoli et al. 2000; Dranove and Lindrooth 2003; Kim and McCue 2008)). However, these data have also been criticized as inaccurately describing hospitals’ financial conditions and the costs hospitals incur in providing care. (Kane and Magnus, 2001; Magnus and Smith, 2000) Unfortunately, most sources of hospital financial data have limitations, and a nationally representative dataset containing audited financial information at the hospital level is not available (Medicare Payment Advisory Commission, 2004).

The sample is also restricted to NFP hospitals, since this study focuses on how system membership changes NFP hospitals’ ability to use internal cash reserves for capital investment. We have excluded from the sample hospitals with unusual organizational characteristics including hospitals owned by the state, local and federal governments, hospitals located in US territories outside the 50 US states, hospitals not classified by the AHA as providing general acute care services and hospitals that did not appear in both the AHA and MCR data. These hospitals have characteristics that may cause their cash management procedures to differ from those in other hospitals. Hospitals with multiple system status changes and hospitals with system status changes that could not be confirmed are also excluded. The derivation of the sample is described further in Table 1. Several hospitals were excluded because they had missing data or data values that were unrealistically large or small. The general rule used define unrealistic data was greater than the 75<sup>th</sup> percentile plus four times the interquartile range. In addition, total assets were considered to be unrealistic if the reported value was less than zero. Numbers of unrealistic values are reported in Table 2.

**Table 1:** Sample Selection

	<b>Acquired Hospitals</b>	<b>Permanent Independent Hospitals</b>
US General Acute Care Hospitals	576	1,865
Couldn't be Matched to MCR	519	1,684
Dropping Unconfirmed Acquisitions	219	1,684
Keeping only NFP Owned Facilities	156	981
After Deleting Missing/Unrealistic Data	95	956

**Table 2: Unrealistic Values by Variable**

Variable	Acquired		Permanent Independent	
	Hospitals	Years	Hospitals	Years
Days cash on hand*	0	0	29	79
Return on assets	0	0	102	155
Operating expenses per bed	0	0	0	0
Net patient revenue per bed	0	0	21	59
Total assets	0	0	1	1
Long term debt to total assets	0	0	8	13
None from above list**	61	145	897	919

Note: All variables except for days cash on hand are lagged

\* Days cash on hand includes cash, temporary investments, notes receivable and financial investments

\*\*These include some observations missing because lagged values are not available in the first year of the data set

Hospitals are required to file partial-year cost reports in cases where the hospital’s ownership changes or the hospital adopts a new beginning date for its fiscal year. As a result, the Medicare Cost Report data occasionally contain multiple reports for the same hospital in the same year. When this was the case for acquired hospitals we kept the earlier observation if the duplicate occurred in the pre-acquisition period and the later observation if the duplicate occurred in the post-acquisition period. When independent hospitals without a change in system status had duplicate observations, we retained the later of the duplicate observations.

## Measures

### *Cash holdings*

Cash holdings are measured using the “days cash on hand” metric common in practice and in previous research on hospital cash holdings. Days cash on hand is computed as a hospital’s total cash holdings divided by the hospital’s average daily operating expenses. This measure is comparable for hospitals of different sizes and offers an intuitive interpretation (the number of days a hospital could continue operating without taking in any additional cash). Both the cash holdings and operating expense amounts used to compute the ‘days cash on hand’ measure are taken from the Medicare Cost Report’s Schedule G. Cash holdings here include actual cash balances as well as notes receivable, temporary investments and other financial investments. All financial investments, rather than just short-term investments, are included in the cash measure because long-term investments could potentially be liquidated to fund capital investment.

### *Excess cash*

This study examines whether acquired hospitals have excess cash holdings and whether system membership reduces these cash holdings. However, determining what constitutes “excess cash holdings” for a particular hospital is challenging. This study uses three measures of excess cash holdings since there is not a universally agreed upon measure of excess cash. The first two measures define excess cash based on the distribution of cash holdings for independent, NFP hospitals. These measures define hospitals with excess cash holdings as hospitals that have cash holdings greater than the 75<sup>th</sup> or the 50<sup>th</sup> percentile of all permanent independent hospitals. This measure assumes that hospitals with cash holdings above the 75<sup>th</sup> or 50<sup>th</sup> percentile are the hospitals most likely to reduce their cash balances after joining systems. Year to year changes in financial markets and hospital industry conditions could affect all hospitals’ cash holdings and so the 50<sup>th</sup> and 75<sup>th</sup> percentile definitions of excess cash are for each year of the sample rather than from the pooled data.

Using percentile cutoffs to define excess cash holdings is straightforward but imperfect because percentile measures do not take into consideration characteristics that affect a hospital’s optimal level of cash holdings. The third measure of excess cash addresses this problem. For this measure, predicted cash holdings are modeled as a function of variables that should affect a hospital’s optimal cash holdings. These variables include proxies for hospital size (total assets), since larger hospitals can be expected to hold more cash. A leverage variable is included as well (long-term debt to total assets) since hospitals with better debt market access are expected to hold less precautionary cash. Proxies for profitable investment opportunities (return on assets and local market characteristics) are also included since hospitals with a better set of investment opportunities can be expected to hold larger cash reserves because the cost of a cash shortfall is greater for these hospitals. Similar measures have been used as proxies for investment opportunities in other research (Reiter et al., 2008) since the typical measure of investment opportunities, Tobin’s Q, cannot be computed for firms without publicly traded equity. Finally, proxies for cash flow are included (net patient revenues) since hospitals that typically generate more cash can hold smaller cash balances. Net patient revenues are an admittedly imperfect measure of cash flow. Unfortunately, actual cash flow data are not available for a national sample of hospitals and using net income as a proxy is also imperfect since NFP hospitals have been shown to manage earnings figures towards zero. (Leone and Van Horn, 2005) Cash holdings are predicted using lagged values of these financial variables. Ideally, the model predicting cash holdings would also include a measure of cash flow volatility. However, this variable is unavailable both because of limited cash flow data and because requiring a lagged measure of volatility would have limited an already small sample even further.

Parameters for the model used to predict cash holdings are estimated using data on system hospitals. These parameters are then used to predict cash holdings for permanent independent and acquired hospitals. These predictions can be interpreted as the amount of cash an independent hospital with a given set of characteristics would be expected to hold if it were part of a hospital system. Permanent independent and acquired hospitals with cash holdings above the predicted amount are deemed to have excess cash holdings. Parameters for the model of cash holdings are calculated for each year of data rather than from pooled data since these parameters may change

from year to year as hospital industry characteristics change. A similar method for identifying excess cash holdings was used by Opler et al (1999) and Core (2006).

### ***System membership***

Data on system status is taken from the AHA hospital database. In keeping with previous research in this area, the *sysid* variable generated from AHA internal files is used rather than the *mhsmemb* variable determined by a hospital's response to the AHA annual survey (Dranove and Lindrooth, 2003). Two categories of system membership are included in the sample—hospitals that are independent throughout the study period and hospitals that are independent and then join a hospital system. In addition, data for permanent system hospitals are used to estimate one of the measures of excess cash holdings. The AHA definition of a hospital system includes single hospital systems. A freestanding hospital can be considered a member of a system if the hospital is closely affiliated with three or more other healthcare organization (AHA Guide, 2005). Many of the potential benefits of system membership may not be realized for these single hospital systems. Therefore, the system membership variable is adjusted to exclude hospitals in systems containing only one or two hospitals. These hospitals are excluded from the analysis since they are not classified as system hospitals but cannot be classified as independent hospitals either. This definition is similar to the one used by the bond rating agency Standard and Poor's (Standard and Poor's, 2013). Whether the effects of system membership differ for one to two hospital systems versus larger systems is an opportunity for future research.

This study uses a two-step procedure to identify independent hospitals that joined systems. First, data from the AHA annual survey for the years 1996-2009 are analyzed to identify changes in a hospital's system status. Cases are identified where a hospital was not classified as a member of a hospital system, then, in the next year, the hospital was classified as a system member. However, in researching some of these transactions it became apparent that a system membership change did not occur as indicated by the AHA data. To resolve these discrepancies, two sources were consulted--the annual lists of hospital mergers and acquisitions published by Modern Healthcare and the Hospital Acquisition Reports published by Irving Levin and Associates. If neither the Modern Healthcare lists nor the Hospital Acquisition reports contained a record of an independent hospital's acquisition, the hospital's webpage and online news coverage were used to find evidence of the transaction. If none of these attempts yielded confirmation that the transaction occurred, the hospital was eliminated from the sample. Hospitals with unconfirmed transactions were eliminated from the data for several reasons. First, some hospitals with unconfirmed transactions clearly listed a system affiliation on their webpages but did not offer information about the date on which they joined a system. In these cases it was impossible to assign a system status to each hospital year since only the current system status was known. In other cases, the hospital websites did not contain information about a system affiliation. However, some hospitals with confirmed system affiliations do not prominently display their affiliation on their websites so the lack of information about system-affiliation is not adequate justification for classifying these hospitals as independent. The final sample contains information on 95 acquired NFP hospitals.

In addition to dropping hospitals that are members of one or two hospital systems, hospitals that the AHA data suggest have undergone multiple changes in system status and hospitals that become independent after having been affiliated with a system are also omitted from this study. This is

done for two reasons. First, the system status data on these hospitals may not be accurate, especially in the case of hospitals with multiple system status changes. Second, the study questions relate to the common claim that multihospital system membership can improve an independent hospitals' access to capital. There are no similar claims to guide our expectations about how internal capital reserves could change for hospitals leaving systems or hospitals with multiple system changes. This paper's results can speak to the effect of independent hospitals joining systems, though dropping cases of multiple changes in system membership will certainly limit the generalizability of these results.

## Methods

This study addresses two questions---do independent hospitals purchased by multihospital systems maintain especially large cash holdings that could be a source of investment capital, and does system membership lead to reductions in these excess cash balances. The first question (do acquired hospitals have excess cash balances) is answered simply by looking at the percent of acquired hospitals that fall into each of the three definitions of an excess cash balance. This distribution is compared to the percent of permanent independent hospitals with an excess cash balance.<sup>3</sup>

The second study question (whether system membership results in reductions in cash balances for hospitals with excess cash holdings) is examined using a difference in differences study design. This method compares changes in cash holdings for acquired hospitals to changes in cash holdings for a control group of hospitals. In this case, the control group is made up of independent hospitals that do not join multihospital systems and also have excess cash holdings.

For each acquired hospital, changes in cash holdings are measured as the difference in days cash on hand in the year before acquisition and days cash on hand in the first and second years after acquisition. These differences are compared to changes in cash holdings for the control group over the same period. For instance, for a hospital with excess cash holdings that was acquired in the year 2000, changes in cash holdings from 1999 to 2001 and 1999 to 2002 are calculated. These changes in cash holdings are compared to the average change in cash holdings from both 1999 to 2001 and 1999 to 2002, for all independent hospitals with excess cash holdings. Regression to the mean is not a concern for this study since acquired hospitals with high levels of cash holdings are being compared to independent controls with similarly high cash holdings.

## Results

Table 3 shows descriptive statistics for the study sample. Acquired hospitals held less cash on average than permanent independent hospitals. This is preliminary evidence that the desire to “free

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<sup>3</sup> This measure is most interesting for the measure of excess cash holdings based on predicted cash holdings since, by definition, 25% of independent hospitals will have “excess cash balances” above the 75<sup>th</sup> percentile of cash holdings and 50% of independent hospitals will have “excess cash balances” where excess cash is measured as having cash holdings larger than the 50<sup>th</sup> percentile.

up” internal cash reserves for capital investment may not be a benefit most hospitals are anticipating when they join multihospital systems. Acquired hospitals’ relatively smaller cash holdings do not appear to be explained by better access to debt markets than other independent hospitals (long-term debt to total asset ratios are similar) nor by better ability to generate positive cash flow (at least to the extent this can be captured by revenue and profitability measures---both of which are lower for acquired hospitals than independent hospitals). It is possible, however, that acquired hospitals are holding less cash because they lack the profitable investment opportunities permanent independent hospitals have, and as a result the acquired hospitals face smaller opportunity costs associated with passing up profitable investment opportunities. The sample of acquired hospitals does have a lower return on assets than the group of permanent independent hospitals.

**Table 3:** Descriptive statistics

Variable	Pre- Acquisition		Post- Acquisition		Independent Hospitals		System Hospitals	
	mean	sd	mean	sd	mean	sd	mean	sd
Days cash on hand	95	83	84	96	113	105	87	107
Return on assets (%)	1.7	7.8	2.0	9.6	2.7	7.1	3.9	9.3
Operating expenses per bed (‘000)	448	206	665	330	490	316	549	303
Net patient revenue per bed (‘000)	435	192	667	355	479	310	550	308
Total assets (‘000,000)	123	258	136	164	108	172	153	248
Long term debt to total assets	0.32	0.19	0.37	0.28	0.29	0.2	0.31	0.28
N		95		95		956		1,044

Note: All variables except for days cash on hand are lagged.

N reported is number of hospitals in each group rather than the number of hospital-year observations. Some hospitals are not observed in all years

Despite the fact that acquired hospitals have lower cash holdings than permanent independent hospitals during the pre-acquisition period, cash holdings nonetheless fall for acquired facilities from the pre- to the post-acquisition period (95 days cash on hand vs. 84 days cash on hand). Moreover, the post-acquisition average cash holdings are similar to the average cash holdings for all system hospitals.

### *Hospitals with excess cash holdings*

Table 4 shows the number of hospitals from the acquired and permanent independent hospital samples with excess cash holdings. There is no evidence that a greater proportion of acquired hospitals held excess cash than permanent independent hospitals. By any of the three measures of excess cash holdings, the percent of acquired hospitals with excess cash is relatively similar to the percent of permanent independent hospitals with excess cash.

**Table 4:** NFP hospital observations by sample year and measure of excess cash holdings

<b>Measure of Excess</b>	<b>Year</b>										<b>Total</b>	<b>%</b>
	<b>98</b>	<b>99</b>	<b>00</b>	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>05</b>	<b>06</b>	<b>07</b>		
All acquired	14	18	8	19	5	4	8	4	3	9	95	---
>75th percentile	4	3	1	5	0	0	2	0	1	1	17	18%
> 50th percentile	7	10	7	10	5	3	6	2	5	6	61	64%
Greater than predicted	8	5	0	1	0	0	2	2	1	6	25	26%
<b><i>Independent</i></b>												
All independent	596	848	831	824	809	806	790	789	796	789	7,878	---
>75th percentile	149	212	208	206	202	202	197	197	199	197	1,969	25%
> 50th percentile	298	424	416	412	405	403	395	395	398	395	3,941	50%
Greater than predicted	169	189	37	79	219	100	261	211	217	666	2,148	27%

The top panel of Table 4 shows the total number sample hospitals acquired in each year of the study. This panel also shows, by year, the number of acquired hospitals that held excess cash as determined using three different measures of excess cash holdings. The measures of excess cash holdings are 1) Cash holdings in excess of the 75th percentile of all independent hospitals 2) cash holdings in excess of the 50th percentile of all independent hospitals and 3) Cash holdings in excess of the cash holdings predicted by a multivariate model of hospital cash holdings. The 7,878 observations for independent hospitals are hospital-years, not individual hospital observations. This is because an independent hospital can serve as a control observation for multiple acquired hospitals.

### ***Changing cash holdings***

Table 5 shows difference in difference estimates of the changes in cash holdings associated with hospital system membership. Results from analyses using each of the three measures of excess cash are reported. The evidence to support the hypothesis that system membership allows acquired hospitals to reduce their cash holdings is weak. Both of the percentile-based measures of excess cash suggest that acquired hospitals with excess cash in the pre-acquisition year reduced their cash holdings by a greater amount than independent hospitals with similarly high cash holdings. Unfortunately, these differences were not statistically significant, with one exception. The two-year difference in difference estimate derived using the definition of excess cash as cash holdings above the 50<sup>th</sup> percentile for all independent hospitals suggests system acquisition resulted in 11.7 day reduction in days cash on hand. This reduction has a p-value of 0.07, but there is no theoretical reason that this particular measure of the change in cash holdings should be significant while the others are not.



**Table 5:** Difference in Difference Estimates of Changes in Cash Holdings

Measure of Excess	Pre-acquisition to 1 year after			Pre-acquisition to 2 years after		
	Acquired	Independent	DiD	Acquired	Independent	DiD
<b>Cash holdings &gt; 75th</b>						
Change in cash holdings	-62.0 (27.8)	-46.1 (4.2)	-15.8 (25.9)	-78.0 (24.7)	-58.0 (4.3)	-20.0 (23.4)
Acquired hospitals	17		---	17		---
<b>Cash holdings &gt; 50th</b>						
Change in cash holdings	10.0 (6.1)	13.8 (0.3)	-3.8 (6.2)	6.4 (6.1)	18.1 (0.3)	-11.7* (6.2)
Acquired hospitals	61		---	61		---
<b>Excess cash holdings</b>						
Change in cash holdings	-17.1 (20.7)	-25.4 (2.7)	8.3 (21.2)	-24.0 (17.4)	-30.8 (3.8)	6.7 (17.9)
Acquired hospitals	25		---	25		---

Notes: \* p-value <0.1

Standard errors are shown in parentheses. The first panel shows results estimated when excess cash holdings are defined as cash holdings above the 75th percentile for permanent independent hospitals. The second panel uses a definition of excess cash as cash holdings above the 50th percentile of cash holdings. The final panel are results estimated when excess cash is defined as cash holdings above what is predicted using a multivariate model.

The results estimated using the definition of excess cash holdings based on predicted cash holdings actually suggest system membership is associated with an increase in cash holdings for acquired hospitals. This result is also statistically insignificant but it is surprising that the direction of the effect is the opposite of what was hypothesized. This may be a result of the small sample size or may be because the model used to predict cash holdings omitted variables that determine hospitals' optimal cash holdings.

## Discussion

Using any of the three measures of excess cash holdings it does not appear that acquired hospitals are more likely to hold excess cash than independent hospitals that were not acquired. This suggests that few independent hospital acquisitions are motivated by a desire to “free up” internally held cash reserves for capital investment. This could be because independent hospitals place greater value on their independence than the benefits system membership offers. In fact, the desire to maintain independence may be one reason some hospitals keep large stores of cash and investments. From a purchasing system's perspective, independent hospitals holding large cash balances may be difficult to acquire. For some independent hospitals a large cash balance may be the result of past and present financial success. These hospitals may not have much to gain by

joining systems and may avoid acquisition all together, or they may demand a high acquisition price or other costly concessions from potential purchasers. Even for independent hospitals with much to gain from system membership, high cash balances create problems for acquiring systems. High cash balances allow a hospital to continue operating without a system partner. Without an immediate threat to the independent hospital's ability to continue operations, high-cash independent hospitals may be unable to convince community members, employees and physicians that the benefits of system membership are worth the loss of independence. This lack of consensus would make it much harder for an acquiring system to purchase an independent hospitals.

For the small number of hospitals with high cash holdings that are acquired, these results do not support the hypothesis that system membership leads to large declines in cash holdings that could be used to fund real investment. In fact, the results do not suggest that acquired hospitals experience large enough reductions in days cash on hand to bring them in line with the mean cash holdings for all system hospitals. System hospitals held a mean of 87 days cash on hand, averaged over all years of the sample. Study results suggest that acquired hospitals with high-cash holdings experienced declines of -15.8 days in the first year after acquisition and -20 days in the second year. (These results were estimated using the 75<sup>th</sup> percentile of independent cash holdings as the cutoff for "high cash". The other two measures of "high cash" hospitals lead to smaller estimated reductions in days cash on hand.) The minimum level of cash holdings required to be classified as "high-cash" varied between 145 days (in 2002) and 185 days (in 1998). An acquired hospital with 145 days cash on hand (the lowest required to be classified as "high cash" in any year) that experiences a 20 day decline in cash holdings would still be maintaining 125 days cash on hand, notably more than the system-average of 84 days cash. Moreover, the change required to bring high-cash hospitals in line with system averages would have to be much bigger than the estimated changes. The standard error of the estimated change in days cash is 23.4. If the true effect of system membership is large enough to bring high-cash, acquired hospitals into line with system averages then this effect must be greater than the estimated effect by 1.5 standard errors.<sup>4</sup> The changes in cash holdings associated with the other two measures of cash holdings were both smaller in magnitude than the changes estimated using the 75<sup>th</sup> percentile as a cutoff to define "high cash" hospitals.

Study results suggest that the reductions in cash holdings high-cash hospitals experience are unlikely to be large enough to bring these hospitals' cash holdings in-line with system hospital averages. This begs the question—why is the mean level of cash holdings for system-affiliated hospitals (87 days cash on hand) lower than the average level of cash holdings for independent hospitals (113 days cash on hand)? If hospital systems are not reducing acquired hospitals' cash holdings then why is the mean cash level among system-affiliated hospitals different than among independent hospitals? One explanation is that systems are more likely to acquire hospitals with low cash holdings. There is some evidence to support this idea in the descriptive statistics in Table 2.3. In the pre-acquisition period cash holdings averaged 95 days cash, lower than the 113 days cash the average independent hospital held. A second explanation is that systems are successful in reducing the cash holdings of the hospitals they acquire but the reductions take longer than two years to accomplish and so the results presented in this study do not capture all of the reduction.

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<sup>4</sup> To elaborate, the lowest level of cash holdings a hospital could maintain to be "high cash" is 144 days cash on hand. The estimated reduction in cash holdings associated with system membership is 20, with a standard error of 23.4. So  $144 - (20 + (23.4 \times 1.5))$  is 88.9, only slightly above the system average for cash holdings (87 days).

## ***Limitations***

This study has a number of limitations. First, there are limitations related to the quality and availability of data from the MCR. These data have been criticized as inaccurate (Kane and Magnus, 2001; Magnus and Smith, 2000) but are also frequently used in academic research. Unfortunately, these data do not include variables measuring some of the important determinants of hospital cash holdings, like cash flow information or cash flow volatility. Omitting these variables from the models used to predict hospital cash holdings likely resulted in an imperfect prediction of hospital cash holdings and hence an imperfect measure of excess cash holdings. For these reasons the study includes two other measures of high cash holdings based on percentile cutoffs. Unfortunately, these measures do not take into account characteristics of hospitals that may cause them to optimally hold a large cash balance.

The relatively short post-acquisition follow-up period (two years) is another limitation of the study. Rivenson et al (2000) found anecdotal evidence that in the late 1990s some acquired hospitals had difficulty centralizing cash management. This suggests that perhaps hospital systems require more than two years to make meaningful changes in the cash balances of acquired hospitals. Using a longer follow-up period could provide more information about how acquired hospital cash balances change over time. However, a longer follow-up period would also have reduced the already minimal sample size.

The assumption imposed by the difference-in-differences study design creates limitations on the study as well. This method assumes that acquired hospitals would have had similar changes in cash management as all independent hospitals, had the acquired hospitals remained independent. This may not be true. As a means of testing this, characteristics affecting cash holdings were compared between pre-acquisition hospital periods and independent hospitals. These results are provided in Table 3. There were differences among the two groups but none suggested the group of acquired hospitals were holding greater cash reserves than would be expected or that the acquired hospitals should be expected to reduce expenses more than the group of permanent independent hospitals. Moreover, the assumption that independent hospitals that were not acquired is a useful control group is probably more realistic than the assumptions required for a cross-sectional comparison of independent and system-affiliated hospitals.

## **Conclusion**

This study contributes to the literature on system membership and hospitals' access to capital by using finance theory to identify a new mechanism through which system membership could improve acquired hospitals' access to capital. Since hospital systems have lower costs of cash shortfalls and hence lower optimal cash balances than independent hospitals, system acquisition should enable independent hospitals to use some of their cash reserves for capital investment. However, empirical tests suggest that relatively few acquired hospitals hold excess cash balances before acquisition. This is an interesting difference between investor-owned firms and NFP hospitals. Investor-owned firms holding large cash balances often become targets for acquisition but this study suggests hospitals with excess cash are no more likely to be acquired than those without. Study results fail to support the hypothesis that acquired hospitals holding excess cash

reduce their cash balances. This may be because system membership has no effect on acquired hospitals' cash balances, or because changes in cash balances take longer to occur than the two year follow-up period used in this study. Future research could incorporate additional years of data and a larger sample of acquired hospitals to generate more precise estimates of the changes in acquired hospitals' cash balances. Another interesting question worthy of further research is whether systems prefer to acquire hospitals with low cash holdings and if so, why these hospitals are preferred.

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