Strategic Management Journal
Strat. Mgmt. J., **37**: 2346–2361 (2016)
Published online EarlyView in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/smj.2566
Received 1 October 2014; *Final revision received 14 December 2015*

THE HR EXECUTIVE EFFECT ON FIRM PERFORMANCE AND SURVIVAL

CLINT CHADWICK,[1]* JAMES P. GUTHRIE,[1] and XUEJING XING[2]
[1] *School of Business, University of Kansas, Lawrence, Kansas, U.S.A.*
[2] *College of Business Administration, University of Alabama, Huntsville, Alabama, U.S.A.*

Research summary: *This article replicates and extends Welbourne and Cyr's (1999) pioneering study of the relationship between the presence of human resource executives (HREs) and firm performance in initial public offering (IPO) firms. We employ a larger, more generalizable sample, a model better fitted to the IPO context, and alternative performance measures to execute a more robust examination of this relationship. Using Welbourne and Cyr's model specifications, our results parallel theirs: there is no significant relationship between HREs and firms' post-IPO financial performance. Moreover, extending Welbourne and Cyr's study, we find that the presence of HREs at the time of firms' IPOs is positively related to the ultimate success measure: post-IPO firm survival. Additionally, for firms that had executives at the time of IPO, the negative effect of firm size on firm mortality is greater and the positive effect of leverage on firm mortality is smaller.*

Managerial summary: *Does paying attention to HRM help firms to succeed? This study examines that question in a sample of generally small, young firms that went public from 1996 to 2008. Only about 10 percent of these firms had human resource executives (HREs) at the time of their IPOs, allowing us to examine the effects of the presence of HREs on firm performance. While we find that the presence of an HRE at IPO is not related to firms' post-IPO financial performance, firms that had HREs at IPO are significantly more likely to survive in the long run. Since approximately 20 percent of the sample firms do not survive, this is a very meaningful outcome. Indeed, survival may be the ultimate measure of firm performance.*

INTRODUCTION

The implications of people management for firm performance is a topic that has received considerable attention in recent years in two related streams of research, strategic human capital (SHC) and strategic human resource management (SHRM). Both streams of research raise the question of whether firms' formally designated HRM practitioners contribute to firm performance. This issue received some attention in early SHRM research (e.g., Huselid, Jackson, and Schuler, 1997; Welbourne and Andrews, 1996; Welbourne and Cyr, 1999), which produced a compelling but incomplete set of results. Since then, however, the question has largely been set aside by SHRM researchers. Indeed, some observers, both academics and practitioners, have explicitly objected to the assumption that formal HRM practitioners are the best custodians of strategic HRM within firms (e.g., Chadwick and Dabu, 2009; Hammonds, 2005). In a similar spirit, strategy researchers have tended to describe firms' actions with respect to human capital in generic terms, leaving the strategic role of formal HRM practitioners unclear. Yet, the influence and contribution of formally designated HRM practitioners are made more intriguing by repeated

Keywords: human resource executive; firm survival; firm performance; strategic HRM; replication
*Correspondence to: Clint Chadwick, 3183 Capital Federal Hall, 1654 Naismith Drive, Lawrence, KS 66045, U.S.A. E-mail: clint.chadwick@ku.edu

empirical demonstrations that HRM and human capital can meaningfully affect firm performance (e.g., Crook *et al.*, 2011; Subramony, 2009).

Our article revisits this unsettled question, specifically focusing on firms' top HR executives (HREs): Do HREs contribute to firm performance? To do so, we replicate Welbourne and Cyr's (1999) pioneering study on the firm performance implications of having an HRE in a firm's top management team (TMT). By avoiding the need for survey-based data, this approach also makes possible the use of large samples to test the performance effects associated with the HR function. However, Welbourne and Cyr's (1999) study has certain shortcomings in terms of sample size, performance measures, and generalizability.[1] These shortcomings, along with the importance of this study's research question and its innovative empirical approach, make a compelling case for replication.

Welbourne and Cyr (1999) assessed the HRE effect using a sample of 360 U.S. initial public offerings drawn from a single year, 1993. In our replication, we provide a more robust assessment by utilizing a sample of over 2,500 U.S. IPOs occurring from 1996 through 2008. Utilizing this larger and more generalizable sample, our replication is consistent with Welbourne and Cyr (1999) in that our results do not support a direct relationship between the presence of an HRE on firms' TMTs and post-IPO firm financial performance. Additionally, in contrast with Welbourne and Cyr (1999), our replication does not provide empirical support for interaction effects comprised of the presence of an HRE, two contingency variables (firm size and firm growth), and post-IPO firm financial performance. However, the presence of an HRE does seem to "matter" when we extend Welbourne and Cyr's (1999) study by examining the HRE effect on the ultimate measure of long term firm performance: firm survival. In addition, we find that firm size and leverage interact with the presence of an HR executive effect to predict firm survival. Because the present study utilizes a much larger, more representative, longitudinal sample, alternative measures of firm performance, and models that are better fitted to the IPO context, we believe that it offers an improved test of Welbourne and Cyr's (1999) original, compelling research question. We begin by summarizing the approach and findings reported by Welbourne and Cyr (1999).

THE WELBOURNE AND CYR (1999) STUDY

Relatively little empirical research has directly examined the relationship between either formal HRM functions or practitioners and firm performance. One previously employed approach is to measure the relative quality of firms' HRM functions and use that variance to predict differences in firm performance (e.g., Huselid *et al.*, 1997). An analogous approach could be employed to examine the HRE effect on firm performance. However, the effectiveness of this approach is contingent on the validity of the measure of HREs' quality which is potentially confounded with firm performance and, in cross sectional data, is also vulnerable to reverse causality. For instance, it is not implausible that respondents at better performing firms have more positive perceptions of their HREs' effectiveness.

A cleaner approach to this question is to examine the impact of the *presence* of an HRE on firm performance—i.e., to compare firms with an HRE to firms with no HRE. Yet in most samples, this approach is also problematic. For regulatory and managerial reasons, most firms of even modest size have HREs. Thus, with little cross-firm variance to work with, it is difficult to determine an HRE effect. The innovative approach pioneered by Welbourne and colleagues (Cyr, Johnson, and Welbourne, 2000; Welbourne and Andrews, 1996; Welbourne and Cyr, 1999) was to use samples of firms undertaking IPOs. IPO firms tend to be young and small and, as has been widely documented, HRM systems in young and small firms tend to be informal (Chadwick *et al.*, 2013; Kotey and Slade, 2005). Given that IPO firms' formal HRM functions tend to be small or nonexistent, an HRE presence on the TMT will be significant and rare in such firms, a characteristic that can be exploited to assess the impact of HREs on firm performance. Consistent with this point, Welbourne and Cyr (1999) found

[1] In terms of generalizability, Welbourne and Cyr (1999) use data from a single year, which makes it challenging to disentangle confounding causal factors and limits statistical power. Welbourne and Cyr's (1999) performance measures (i.e., stock prices and earnings per share) also have some inherent constraints. For example, stock prices are subject to the influences of non-economic events such as stock splits and do not account for dividends, which contribute to financial performance. Earnings per share (EPS) is also somewhat problematic in cross-firm analyses because its estimation can vary from firm to firm.

DOI: 10.1002/smj

that only seven percent of their sample of 360 IPO firms had an HRE.

Welbourne and Cyr (1999) hypothesized that the presence of an HRE on the TMT would be a reflection of the strategic importance of HRM in an IPO firm—in the authors' words, a measure of whether HRM is "taken seriously" in the firm. Additionally, the presence of an HRE on the TMT could help attract resources to HRM issues, enhance the internal fit of the firm's HRM system, and lead to better firm decision making, both generally and specifically with respect to HRM issues.[2] Thus, Welbourne and Cyr (1999) hypothesized that the presence of an HRE on the TMT would be associated with higher post-IPO firm performance. Welbourne and Cyr (1999) also argued that firm growth would enhance the positive effects of having an HRE in the TMT of IPO firms and that smaller IPO firms would see a more pronounced HRE effect on firm performance.

Welbourne and Cyr's analysis and findings

Welbourne and Cyr (1999) used a sample of 360 IPO firms that went public in the U.S. in 1993 to run OLS regression estimates of post-IPO firm performance. The authors' dependent variables were 1996 year-end stock price and 1996 year-end earnings per share (EPS). Welbourne and Cyr (1999) centered their analysis on a dummy variable that indicated whether or not firms had an HRE in the TMT. Firm size and change in sales were utilized in interactions with the HRE dummy in the authors' analysis. In addition to 1993 stock price and 1993 EPS, firm size, change in sales, firm age, firm-specific risk, net profit per share at the time of IPO, unionization, and firm beta at year-end 1996 were employed as control variables.[3] The primary data source for firm characteristics was each firm's IPO prospectus. Financial data such as change in sales, beta, and the dependent variables were obtained from the COMPUSTAT database.

In Welbourne and Cyr's (1999) analysis, the direct relationships between the HRE dummy and the study's two dependent variables, stock price and EPS, were not significant. On the other hand, the authors found that an interaction between the HRE dummy and change in sales was positively associated with stock price, while an interaction between the HRE dummy and firm size was negatively associated with EPS. However, neither of these two interaction terms were significantly related to both stock price and EPS. Additionally, as reported in Table 1, Welbourne and Cyr (1999) estimated a three-way interaction between the HRE dummy, change in sales, and firm size that was not significantly related to either dependent variable. For the reader's reference, the models from Welbourne and Cyr's (1999) article that used change in sales data from 1992 to 1995 are reported in the left-hand side models for stock price and EPS in Table 1.

It is tempting to conclude that Welbourne and Cyr's (1999) study demonstrated that formal HRM "doesn't matter". However, this simple summary would be a mischaracterization of Welbourne and Cyr's (1999) analysis, which, more precisely speaking, largely failed to find statistically significant relationships between the presence of an HRE and sample firms' post-IPO financial performance. The current study subjects this conclusion to a broader, more robust analysis.

Despite the ambiguous findings, Welbourne and Cyr's (1999) study suggests some issues to emphasize in a replication. First, as discussed earlier, this study suggests that IPOs are a potentially fruitful setting for examining the impact of HREs on firm performance. Moreover, contingencies such as firm size may influence the strength and direction of the HRE/firm performance relationship and should be accounted for in any analyses. Stepping back a bit from the Welbourne and Cyr (1999) study's details, it also remains uncertain how the sampling of the population of IPO firms may influence results. A larger sample, drawn across multiple years, should allow us to make more generalizable inferences about the nature of this relationship with greater statistical power. In addition, the different interaction results imply that the choice of performance measures can have important implications for drawing inferences about the effect of HREs on IPO firms. As we will demonstrate, since the ultimate measures of IPO performance are survival and value creation,

[2] Further, Welbourne and Cyr (1999) suggested that the presence of HREs in firms is a reasonable proxy for the existence of formal HRM functions in IPO firms. Indeed, it is hard to imagine that an IPO firm with a formal HRM function does not have an HRE. However, the opposite relationship is not so clear. Messersmith and Guthrie (2010) noted that it is not unprecedented for some HREs to be the sole employee dedicated to HRM within an IPO firm.

[3] Welbourne and Cyr (1999) estimated two OLS regressions for each dependent variable. The first regression used change in sales data from 1992 to 1993, while the second regression used change in sales data from 1992 to 1995. The substantive results of the analyses were unchanged across the two different specifications for each dependent variable.

DOI: 10.1002/smj

Table 1. OLS regression results for replication of Welbourne and Cyr (1999)

	Stock price model: Welbourne and: Cyr (1999)	Stock price model:: The current study		EPS model: Welbourne: and Cyr (1999)	EPS model:: The current study	
	Coefficient	Coefficient	Std. error	Coefficient	Coefficient	Std. error
Intercept		−0.26	4.63		−0.47	0.37
HR executive	−0.13	−1.67	1.81	0.05	−0.25	0.24
Change in sales	0.02	1.24	0.50	−0.04	−0.03	0.08
Firm size	0.42***	1.29	0.72	0.46***	0.02	0.06
Risk factors (leverage)	−0.27***	−8.53	2.11	−0.20***	−1.50	0.41
Stock price at IPO	−0.42***	0.60	0.37	−0.54***	0.02†	0.01
Net profit per share at IPO	−0.09	0.68	0.43	−0.17***	0.18	0.09
Firm age	0.05	0.20	0.56	0.10*	0.19	0.09
Union presence	0.10*	−0.42	1.45	0.16**	0.00	0.25
Beta	0.11*	2.10	1.22	0.14***	−0.31	0.13
Industry dummies?	Yes	Yes		Yes	Yes	
Year dummies?	n/a	Yes		n/a	Yes	
Change in sales × HR executive	0.23**	−0.03	1.46	0.01	0.18	0.19
Firm size × HR executive	−0.03	1.82	1.52	−0.16*	0.05	0.18
Change in sales × firm size		0.45	0.31		0.04	0.03
Change in sales × firm size × HR executive	−0.10	−2.09	1.69	0.02	−0.23	0.22
n	360	1,233		360	1233	
R^2	0.46	0.24		0.49	0.13	
F-statistic	15.87***	7.51		12.40***	4.77	

Unit of analysis in all models is individual firms' IPOs. Dependent variables are stock price and earnings per share (EPS), as indicated. Industry dummies are included in each model, though results for these variables are not reported. Year dummies are included in both models for the current study, though results for these variables are not reported. (As Welbourne and Cyr (1999) used IPO firms from a single year (1993), year dummies were unnecessary in their analysis.) Welbourne and Cyr (1999) model results only reported asterisks denoting p values less than certain levels as indicated in the table according to the following notation: $^{\dagger}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

research focusing on IPO firms can – and perhaps should – also employ these outcomes.

DATA AND METHOD

IPO firms have been studied extensively in the finance literature and thus there is a fair degree of consensus on a standard set of variables that should be included as controls in models of post-IPO firm performance. This helps us to effectively isolate the effects of the presence of HREs from other, potentially correlated factors that also influence post-IPO firm performance and survival. The original data set comes from Ritter (2014) and consists of 3,558 IPO firms with founding dates between 1996 and 2008. The year 1996 is the first year in which the U.S. Securities and Exchange Commission (SEC) required IPO firms to file their registration statements on EDGAR (the Electronic Data Gathering, Analysis, and Retrieval system). We collected information from the registration statement (Form S-1) on whether the IPO firm has a named executive for human resources.

Ritter's datasets are widely considered as the best available for studying IPOs and are frequently employed for that purpose. This sample does not include best efforts offers (typically very small offerings), ADRs (American Depository Receipts), financial firms, or IPOs with an offer price below $5 per share. Included are almost all IPOs of U.S. firms that are large enough to be of interest to primary

DOI: 10.1002/smj

market participants (e.g., institutional investors). For more details on the sample's characteristics, see Loughran and Ritter (2004).

To match firms in the Ritter data set with their firm performance data, we required our sample firms to be available on both the Compustat and CRSP databases. Consistent with previous IPO research, we omit utility firms (SIC codes 4900–4999) and firms with total sales less than $20 million. To reduce the impact of outliers, we winsorized key variables such as book leverage at the 1st and 99th percentiles. We also required the main variables that explain firm survival to be available for every firm-year observation. Our final sample consists of 2,508 IPOs and 11,278 firm-year observations from 1996 to 2008.

Dependent variables

We use five different dependent variables to evaluate IPO firm performance and survival: stock price, EPS, firm mortality, firm survival time, and Tobin's Q. Stock price and EPS are the dependent variables for the replication portion of the analysis; we employ firm mortality, firm survival time, and Tobin's Q in our analytical extension of Welbourne and Cyr's (1999) research question.

Stock price

Following Welbourne and Cyr (1999), stock price is the value of the IPO firm's stock at the end of the fourth fiscal year following its IPO. As Welbourne and Cyr (1999) employed firms that issued IPOs in a single year, 1993, the stock price that they used was from the end of 1996. In contrast, our stock price measure could come from a number of specific years within the observation period, depending on the year of IPO. To account for unobserved year-specific effects, we thus included a set of dummy variables for the year of IPO in the analysis. Since, following Welbourne and Cyr (1999), the stock price models are conditional on stock price at the time of IPO, this variable's estimated effects reflect a degree of change from the firm's initial stock price (though this variable is not an actual change in stock price measure).

Earnings per share (EPS)

Following Welbourne and Cyr (1999), we compute EPS as net income divided by the number of shares outstanding at the end of the fourth fiscal year following its IPO. As with stock price, EPS at the time of IPO is a control variable.

Firm mortality

Following Welbourne and Andrews (1996) and Bhattacharya, Borisov, and Yu (2015), we employ a dummy measure of the "involuntary death" of a public firm to operationalize firm mortality. We identify involuntary death based on the CRSP delisting code. The CRSP delisting code consists of the following six categories: active (100–171), mergers (200–290), exchanges (300–390), liquidations (400–490), dropped (500–591), and expirations (600–610). Based on these codes, we define a dummy variable, firm mortality, that takes on the value of one if a firm is delisted before 2009 as indicated by a code of 400–490, 500–591, or 600–610. In our sample of 2,508 IPOs, involuntary death occurred for 502 IPO firms (20% of the sample).

Firm survival time

In a second approach to firm mortality, we examine firm survival time. For every firm year, survival time is the number of years from that particular year to the time of its involuntary death as defined above.

Tobin's Q

Tobin's Q is the ratio between an IPO firm's market value and the replacement value of its physical assets. Tobin's Q is widely viewed as a measure of value added by such intangible assets as managerial competence, human capital, knowledge, and social capital, and has been employed previously in strategic HRM research (e.g., Huselid, 1995; Welbourne and Andrews, 1996). It is thus a useful complement and contrast to Welbourne and Cyr's (1999) original financial performance dependent variables.[4]

[4] Compared to other possible financial performance measures such as accounting profitability and stock returns, Tobin's Q provides important advantages. First, Tobin's Q as a measure of firm value at a point in time allows us to avoid possible biases stemming from abnormal returns over a period of time. For example, Lang and Stulz (1994) argued that without an asset-pricing model that completely explains the cross section of expected returns, one "can document as performance abnormal returns resulting from the lack of proper risk adjustment" (p. 1252). Second, Tobin's Q is a better measure of firm performance than accounting profitability (e.g., ROA) because it reflects not only a firm's performance history, but also the present value of future estimated cash

DOI: 10.1002/smj

HR executive variable

Following Welbourne and Cyr (1999), we define an HRE as an executive who specializes in human resource management (e.g., vice president for human resources). We manually collected data on the presence of an HRE amongst the firm's management team for each of the 2,508 IPO firms in our sample by searching the S-1 form of every IPO in our sample at the SEC's EDGAR website (http://www.sec.gov). Form S-1 is the official registration statement that an IPO firm files with the SEC at the time of the actual offering, providing a comprehensive and reliable description of the firm with detailed discussions on a broad range of topics, from the management team to the operating environment of the firm. Based on whether a firm reported a human resource executive on its S-1 form, we constructed a dummy variable, *HR executive*, which takes the value of one if a firm indicates the presence of a human resource executive and zero otherwise. On Form S-1, it's typical to list the firm's entire management team, not just the firm's top five executives, as in other types of firm reporting. While there is a small possibility that a firm may have an HRE but decide not to list an HRE on Form S-1, in all or very nearly all cases, if a firm has an HRE, she will be listed on Form S-1 and thus captured by the HRE dummy variable. Out of 2,508 IPO firms, 244 (9.7%) report the presence of an HRE, a number comparable to that (7%) reported by Welbourne and Cyr (1999).

Moderator variables

Change in sales

Following Welbourne and Cyr (1999), change in sales is the percentage change in annual sales from the firm's IPO year to the fourth fiscal year following its IPO.

Firm size

Following Welbourne and Cyr (1999), in our replication, we measure firm size as the natural log of the IPO firm's number of employees at the time of its IPO. Given a focus on "people", it is common in SHRM research to use number of employees as a measure of firm size, while the log of annual sales is the conventional measure of firm size in IPO research. However, in this data set, both size measures are positively correlated (0.48, $p = 0.05$), and the substantive results of the analysis are unchanged regardless of which firm size measure is used.

Leverage

Book leverage is total debt divided by the book value of assets, and thus captures the degree to which the firm is required to service debt, scaled to its asset base. We use this variable, which has been employed in IPO research, as part of our additional analysis.

Control variables for the replication analysis

Consistent with previous IPO research (e.g., Arikan and Capron, 2010; Bhattacharya *et al.,* 2015) and with research from Welbourne and colleagues (Welbourne and Andrews, 1996; Welbourne and Cyr, 1999), we control for a number of factors that could plausibly be related both to firm financial performance or survival and to the presence of an HRE. Unless noted otherwise, these variables are measured at the time of a sample firm's IPO. The control variables that are required to replicate Welbourne and Cyr's (1999) analysis include the following measures.

Risk factors

Welbourne and Cyr (1999) employed a measure that aggregated dummy indicators of 13 "risk factors" that were listed by firms in their IPO prospectuses. Unfortunately, collecting this information from IPO prospectuses for all 2,508 firms in the sample was impractical. Thus, we substituted two measures of IPO firm risk that are commonly employed by IPO researchers: leverage and research and development intensity (Coles, Daniel, and Naveen, 2006). Research and development intensity is R&D expenditures divided by total assets at the end of the fourth fiscal year following an IPO. The substantive

flows stemming from an event or an organizational policy, practice or design (e.g., the presence of an HRE). Third, specific to the influence of HRM on firm performance, authors have argued that the "invisible assets" of HR systems and human capital are more likely to be reflected in market valuation, as opposed to accounting measures of performance. For example, Becker *et al.* (1997) note " … human capital based competencies are in part the source of the 'intangible capital' represented by the difference between the book value of a firm's assets (i.e., shareholder's initial investment) and the current market value of those assets" (p. 47). Fourth, in contrast to stock price and EPS, Tobin's Q does not vary with the number of shares outstanding, the amount of dividends management chooses to pay to shareholders, and so forth.

DOI: 10.1002/smj

results of our analysis do not change with the use of one or the other of these two variables. Since we have a theoretic interest in the HRE × leverage interaction in the additional analysis, we employ leverage in the results below.

Stock price at IPO

Following Welbourne and Cyr (1999), this variable is the stock price at the end of the IPO fiscal year.

Net profit per share at IPO

Following Welbourne and Cyr (1999), net profit per share at IPO is net income divided by shares outstanding (EPS) at the end of the IPO fiscal year.

Firm age

Following Welbourne and Cyr (1999), this variable is the natural log of the difference between the current year and the founding year of the firm.

Union presence

Following Welbourne and Cyr (1999), this dummy variable takes on a value of one if a firm listed union representation for any of its workers in its IPO prospectus; otherwise, this variable has a value of zero.

Beta

Following Welbourne and Cyr (1999), beta is a measure of systematic risk associated with an IPO firm as given by the CRSP database, measured at the end of the fourth fiscal year following its IPO.

Industry dummies and year dummies

Following Welbourne and Cyr (1999), we include a set of dummies capturing the broad industries within which the sample firms compete. The industry dummies account for fixed effects of industry competition on post-IPO firm performance and survival. Similarly, a set of year dummies account for year specific effects on the estimated relationships in the models. For parsimony, neither set of variables' coefficients are reported.

Control variables unique to the additional analysis

The current study also utilizes a number of additional control variables in an analysis that extends our study beyond the original models employed by Welbourne and Cyr (1999). These control variables are consistent with those commonly employed by researchers who are estimating firms' post-IPO performance, particularly with respect to firm survival and Tobin's Q, and thus appear in these additional models rather than in the replication models, as the latter follow Welbourne and Cyr (1999). Note that some controls from the Welbourne and Cyr (1999) replication, such as industry dummies, carry over to the additional analysis. The control variables that we use for this additional analysis also include the following measures.

VC–backed

VC-backed is a dichotomous variable that takes on the value of one if the firm is backed by a venture capitalist and zero otherwise. Venture capitalists provide funding and expertise to IPO firms, potentially increasing their likelihood of survival and success, and may also be linked with the presence of an HRE. These data are from Thomson Reuters' VentureXpert.

VC reputation

VC reputation is a dichotomous variable that takes on the value of one if the firm is backed by a top VC as ranked by Nahata (2008), and zero otherwise. VC reputation can increase the likelihood of IPO firms' survival and success. These data are from Thomson Reuters' VentureXpert.

Underwriter reputation

Underwriter reputation is a continuous variable that measures the reputation of a firm's underwriter. IPO underwriters with good reputations can help secure greater value in an IPO and thus increase the probability of IPO survival. A lead underwriter's reputation is a rank measure developed by Carter and Manaster (1990). For IPOs with multiple lead underwriters, this variable is the average of their reputation ranks. This was obtained from the Ritter website (2014).

DOI: 10.1002/smj

Incubation time

Incubation time is the number of years between the founding year of the firm and the year in which the firm went public (IPO). Incubation time has been demonstrated to be positively related to post-IPO firm survival (Bhattacharya *et al.*, 2015). This was also obtained from the Ritter website (2014).

Public age of the firm

Public age is the number of years between the current fiscal year and the year in which the firm went public. (Firm age is commonly included as a control variable in SHRM research, but in this case the total age of the firm is equivalent to the sum of incubation time and public age.) All things equal, public age is negatively correlated with firm mortality, since a greater proportion of IPO firms fail in the early years after going public than in later years.

Market to book ratio and probability of bankruptcy

Market to book ratio is the market value of assets relative to the book value of assets. This variable accounts for the market's valuation of the firm relative to what it paid for its assets. We define an IPO firm's probability of bankruptcy per Altman (1968) as $3.3 \times \text{Pre-tax income} + \text{Sales} + 1.4 \times \text{Retained earnings} + 1.2 \times (\text{Current assets} - \text{Current liabilities})/\text{Book assets}$.

RESULTS

We will first discuss the results for our replication of Welbourne and Cyr's (1999) analysis followed by the results of our extension of their work. Table 1 (shown earlier) reports results for the OLS regressions that replicate Welbourne and Cyr's (1999) models (where change in sales ends the fourth fiscal year following a firm's IPO). To aid the reader in interpretation, we have placed those results side-by-side with the results that Welbourne and Cyr (1999) reported for the same models in their article. Note that missing data reduce the replication sample from 2,508 IPO firms to 1,233 cases in this analysis.[5]

A few estimation differences between Welbourne and Cyr's (1999) models and the replication models exist, most notably in sample size (n = 360 versus n = 1,233, respectively) and in the number of years in the observation period (1 year, 1993, versus 13 years, 1996–2008, respectively). Moreover, because the latter observation period spans multiple years, we included a set of year dummies as well as industry dummies in the current study's models. Additionally, as we noted above, we substituted a more conventional measure of IPO risk factors (debt leverage) for the risk factors measure that Welbourne and Cyr (1999) employed. Nevertheless, the results for leverage are similar in sign and significance to those that were generated by Welbourne and Cyr's risk factors measure. Finally, we added a term for the change in sales × firm size two-way interaction to Welbourne and Cyr's (1999) model in order to render a more conventional estimate of the three-way interaction that those authors used in their model.

As Table 1 reports, the results for the replication models are not as strong as those reported in Welbourne and Cyr (1999), both in results for specific variables and in model fit. Nevertheless, there are a few significant differences between the two pairs of models that favor the more generalized models in the current study. For example, change in sales is positively related to stock price ($\beta = 1.24, p = 0.01$), a relationship that has intuitive appeal. Additionally, in the original article, net profit per share at

[5] This decline in sample size is primarily caused by using independent variables from the time of the firm's IPO to predict outcomes at the end of the fourth fiscal year following the IPO, as required to follow Welbourne and Cyr's (1999) approach. This requirement omits all IPOs issued in the last three years (23%) of our sample period and all IPOs issued in other years that do not survive to the end of the fourth fiscal year after the IPO (approximately 18%). Together, these two requirements omit roughly 41 percent of the IPO firms in our sample. Imputing missing data to "fill in" empty cells in our data set does not make sense in this latter case, since those data are missing because the firm did not survive rather than due to a more innocuous mechanism (e.g., survey non-response). As in Welbourne and Cyr (1999), we lose a relatively small number of additional cases due to missing data for non-survival reasons, mainly due to missingness in the firm size (in employees) and beta variables. With respect to missingness due to these variables, we performed a t-test of the difference in the main study variables between the replication sample IPO firms and the dropped IPO firms, finding little difference between the two groups (results available upon request). It is possible that missing data affects the inferences that we can draw from the results in Table 1. Yet since our models in the Table 1 replication have trivially significant coefficients, the bias, if any, would seem to be *against* rather than *in favor of* reporting spurious results. Moreover, our additional analysis that models firm survival is not vulnerable to the firm survival missingness issue and thus has a larger usable sample.

DOI: 10.1002/smj

IPO was negatively related to EPS, suggesting that sample firms with higher profitability at IPO had lower EPS in the post-IPO period. In the current study, this relationship has a positive sign and is significant ($\beta = 0.18$, $p = 0.05$). The relationship of beta to EPS is also reversed: Whereas it was positive in the original analysis, beta is negatively related to EPS in our replication ($\beta = -0.31$, $p = 0.02$), which again is more consistent with common findings of IPO research. In short, while the Welbourne and Cyr (1999) models have more significant variables than our replication models, upon closer inspection, a number of those significant original results run counter to the usual findings for such variables in the IPO literature. We suspect that the difference in findings for control variables is rooted in the broader and more representative sample of the population of IPO firms that we employ in the replication.

More importantly (and consistent with Welbourne and Cyr, 1999) the HRE dummy variable is not significantly related to either stock price ($\beta = -1.67$, $p = 0.35$) or EPS ($\beta = -0.25$, $p = 0.31$) in the replication models in Table 1. Moreover, the significant results that Welbourne and Cyr (1999) reported for two of their two-way interactions are not significant in the current study's models ($\beta = -0.03$, $p = 0.98$; $\beta = 0.05$, $p = 0.77$, respectively). As these are results for two-way interactions, it is possible that the loss of significance for these interaction terms stems from our use of the additional two-way interaction term between change in sales and firm size. However, when we remove this interaction from the current study's models, the results for the other two-way interaction terms are still non-significant. Thus, this difference seems instead to be driven by the longer observation period and broader sample employed in the current study. As with Welbourne and Cyr (1999), the three-way interaction did not produce significant results ($\beta = -2.09$, $p = 0.22$; $\beta = -0.23$, $p = 0.30$, respectively).

To investigate if the original results are a consequence of Welbourne and Cyr's (1999) focus on 1993 (only), we split our sample and ran separate models for sub-samples from each of the years, 1996 through 2008, in the observation period. Acknowledging the loss of statistical power that this creates, we note that these results largely mirror those reported for the longer observation period. However, the model for 1996 (the first year of our observation period) estimates some marginally significant two-way interaction terms (results available upon request). This implies that the significant interactions reported by Welbourne and Cyr (1999) may reflect characteristics of the 1993–1996 IPO market rather than more general relationships in the broader IPO population.

Additional survival analysis

As other commentators have noted, the ultimate long-run firm performance measure is survival (Klepper, 2002; Welbourne and Andrews, 1996). Unlike more narrowly defined accounting or financial measures of performance, firm survival captures the aggregate effects of all positive and negative factors influencing firm viability. Given the high mortality rates of firms shortly after IPO, survival is a particularly salient measure of performance for this population. We propose that, consistent with Welbourne and Cyr's (1999) theoretic intent, the presence of an HRE on the TMT at the time of the IPO will increase the probability of post-IPO survival due to a managerial dominant logic inclined toward HRM and the utilization of more effective people management practices.

It has been demonstrated that firms increase the complexity and formality of their HRM as they increase in size (e.g., Kotey and Slade, 2005) and, more recently, that formal HRM may be more important to firm performance in larger versus smaller firms (Chadwick *et al.*, 2013). Thus, analogously, we expect that the general positive effect of HREs on survival will be magnified as the number of employees to be managed increases. Furthermore, debt has been shown to raise the probability that post-IPO firms will fail as they attempt to service the debt that they carry (e.g., Berk, Stanton, and Zechner, 2010). This demand places a higher premium on effectively managing the firm's human capital along with other critical resources. Hence, we posit that HREs are more valuable in firms with high debt levels.

Table 2 provides Pearson correlations and descriptive statistics for key variables in the additional analysis. In these correlations, the HRE variable is negatively related to firm mortality, VC backing, and public age, and positively related to VC reputation, underwriter reputation, incubation time, the probability of bankruptcy, and firm size (in employees).

DOI: 10.1002/smj

Table 2. Means, standard deviations, and bivariate correlations for key variables in the additional analysis

Variable	Mean	Std. Dev	1	2	3	4	5	6	7	8	9	10	11	12
1. Firm mortality	0.17	0.37	1.00											
2. Tobin's Q	2.62	4.59	−0.05	1.00										
3. HR executive	0.10	0.30	−0.05	−0.01	1.00									
4. VC backed	0.39	0.49	−0.02	0.11	−0.03	1.00								
5. VC reputation	0.02	0.13	−0.02	0.07	0.03	0.15	1.00							
6. Underwriter reputation	1.75	3.34	−0.04	0.02	0.05	0.04	0.15	1.00						
7. Incubation time	2.36	0.97	−0.05	−0.08	0.10	−0.30	−0.04	0.07	1.00					
8. Public age	3.77	3.27	−0.04	−0.12	−0.04	0.03	0.00	0.00	−0.04	1.00				
9. Market to book ratio	2.17	3.57	−0.06	0.61	−0.02	0.09	0.08	0.01	−0.09	−0.11	1.00			
10. Leverage	0.19	0.24	0.21	−0.13	0.00	−0.17	−0.03	0.06	0.11	0.01	−0.13	1.00		
11. Probability of bankruptcy	0.21	3.61	−0.17	0.00	0.05	−0.25	−0.02	0.05	0.25	0.11	0.00	−0.06	1.00	
12. Employees (00s)	4.14	20.00	−0.03	0.03	0.08	−0.08	−0.02	−0.02	0.13	0.06	−0.03	0.06	0.08	1.00

n = 11,278 firm-years.

Results of probit regressions for firm mortality

Hazard models are commonly employed when investigating how a variable affects the probability of the occurrence of an event such as firm mortality. Such models can be classified into two major groups: discrete-time hazard models and duration (or survival) models. The most popular of the former include probit and logit models, and the most representative example of the latter is the Cox proportional hazard model. Because both classes of models have pros and cons, we employ both in our additional analysis.

Our discrete-time hazard model is a pooled probit regression in which the dependent variable takes the value of one if a firm experiences an involuntary death and zero otherwise. This methodology divides each firm's event history into one or more time units, each of which is treated as an observation (a small amount of missing data reduces the sample from 11,278 to 10,843 cases). Thus, the additional analysis sample size is considerably larger than it is for the OLS replication regressions. For the additional analysis, each observation is a firm-year where the dependent variable indicates whether a firm suffered an eventual involuntary death. Although this data structure generates multiple observations from a single firm, autocorrelation across those firm-years is corrected within the analysis. This type of hazard analysis is especially appropriate in data sets that have a number of variables that update over time within the observation period.

Per Bhattacharya *et al.* (2015), we control for the usual determinants of IPO firm mortality: firm size, age, growth opportunities, probability of financial distress, industry dummies, and so forth. Table 3 reports the results for these probit regressions. Here, we find that, conditional on these controls, the presence of an HRE on the top management team is significantly associated with a reduced probability of IPO firm mortality during the observation period ($\beta = -0.31$, $p < 0.001$). Additionally, the results for the control variables are largely significant and run in reasonable directions, confirming that the key determinants of IPO firm mortality in our sample data are consistent with previous research.

To evaluate the marginal effects of explanatory variables in a probit regression, we first compute the marginal effect of every variable at each observation. We then calculate the sample average of these individual effects to obtain the overall marginal effect for every explanatory variable. Per this interpretation, the results indicate that the probability of firm mortality in our sample is, on average, 6.3 percent lower for firms with an HRE than for firms without an HRE.

The other two models in Table 3 add interactions with the two moderators, size (in employees) and leverage (firm debt) noted earlier. In untabulated results, we find that the average marginal effect of employees on firm mortality when the firm does not have an HR executive is -0.0005 ($p-$value < 0.048), and -0.0125 ($p-$value < 0.000) when the firm does have an HR executive. These statistics suggest that a one-standard deviation increase in firm size (employees) decreases the probability of firm mortality for firms without an HR executive by 0.15 percent, but decreases the probability of firm mortality for firms with an HR executive by

DOI: 10.1002/smj

Table 3. Probit regression results for firm mortality

	Model 1		Model 2		Model 3	
	Coefficient	Std. error	Coefficient	Std. error	Coefficient	Std. error
Intercept	−1.10	0.06	−1.11	0.06	−1.12	0.06
HR executive	−0.31	0.06	−0.09	0.07	−0.11	0.07
VC backed	−0.05	0.04	−0.05	0.04	−0.05	0.04
VC reputation	−0.03	0.14	−0.04	0.14	−0.04	0.14
Underwriter reputation	−0.02	0.00	−0.02	0.00	−0.02	0.00
Employees	−0.003	0.001	−0.003	0.001	−0.003	0.001
Incubation time	−0.01	0.02	−0.01	0.02	−0.01	0.02
Public age	−0.05	0.01	−0.05	0.01	−0.05	0.01
Market to book ratio	−0.02	0.01	−0.02	0.01	−0.02	0.01
Leverage	1.09	0.07	1.11	0.07	1.17	0.07
Probability of bankruptcy	−0.05	0.00	−0.05	0.00	−0.05	0.00
HR executive × employees			−0.07	0.02		
HR executive × leverage					−0.84	0.21
Industry dummies?	Yes		Yes		Yes	
−2log likelihood	9025.35		9025.35		9025.35	
AIC	9027.35		9027.35		9027.35	
SC	9034.64		9034.64		9034.64	
Likelihood ratio	896.40		922.11		913.27	
Score	946.48		946.69		974.12	
Wald Chi-square	806.20		807.80		827.33	
Pseudo R^2	0.08		0.08		0.08	

n = 10,843 firm-years. Dependent variable is firm mortality (=1).

3.75 percent. The difference in marginal effects between the two cases indicates a meaningfully large interaction effect. We also find that the average marginal effect of debt on firm mortality when the firm does not have an HR executive is 0.248 ($p-$value < 0.000), and 0.052 ($p-$value < 0.099) when the firm does have an HR executive. The average marginal effects suggest that a one-standard deviation increase in debt increases the probability of firm mortality for firms without an HR executive by 5.95 percent, but increases the probability of firm mortality for firms with an HR executive by only 1.25 percent. Again, the difference in marginal effects between the two cases illustrates the interaction effect of HR executives and debt on firm mortality. Overall, the results indicate that when firms have an HR executive, the negative effect of firm size on firm mortality is greater and the positive effect of leverage on firm mortality is smaller.

Robustness check for endogeneity

Having an HRE is a choice made voluntarily by firms. If this choice is based on factors that also affect firm mortality, then our analysis could suffer from simultaneity or reverse causality. However, this is unlikely because firm mortality takes place in our data after we observe the presence of an HRE. On the other hand, it is possible that an omitted variable, such as the quality of an IPO firm's entrepreneurial founder, could drive both firm mortality and the presence of an HRE such that the estimated relationship between the HRE dummy and firm mortality is spurious. To evaluate the empirical relevance of endogeneity in our analysis, we ran a bivariate probit model that simultaneously estimated the presence of an HRE with a model predicting firm mortality, as in Table 3. A desirable feature of the bivariate probit model is that it is always identified through its functional form (Wilde, 2000).[6] Although this model does not require instrumental variables to be identified, we included a dummy indicator of right-to-work states in the selection equation, with the expectation that firms in such states are less likely to have an HRE.

In our bivariate probit estimation, the Wald test fails to reject the hypothesis that the selection

[6] One common remedy for endogeneity is to estimate instrumental variable models using two-stage least squares (2SLS). Unfortunately, we cannot find a sufficient set of instrumental variables that are highly correlated with the presence of an HR executive but uncorrelated with firm survival.

DOI: 10.1002/smj

and outcome equations (HR executive dummy = explanatory variables + a dummy variable for right-to-work states; Firm mortality = HRE dummy + other explanatory variables) are independent. Moreover, the HRE variable's coefficient ($\beta = -0.32$, $p < 0.001$) is virtually is unchanged from that estimated in Table 3. Hence, endogeneity does not seem to be a concern for inference regarding the relationship of the HRE variable with firm mortality.

Results for the Cox proportional hazard model for firm survival time

The second way to evaluate the hazard of firm mortality is to model the time from an IPO to firm mortality. The biggest advantage of using a Cox regression to do so lies in its ability to account for right censoring (i.e., the fact that the observation period ends before the event that is being modeled has occurred). However, the Cox model is based on a stringent proportionality assumption that the event and non-event subjects belong to the same population, with the non-event subjects being right-censored cases for which the event has not yet occurred. Thus, it is useful to employ more than one type of hazard analysis for comparison, as we do here. Cox models also provide hazard ratios, which are more easily interpreted than coefficient estimates.

In Table 4, we estimate the impact of the presence of an HRE on time to firm mortality using the Cox proportional hazard model. In this model, we maintain the same specification as the probit model reported in Table 3 with the exception of the two age-related variables, which are omitted from the model. (Time-related variables are inappropriate in Cox models because the dependent variable, time to an event, would be highly correlated with such variables.) Note that in the Cox model, the interpretation of coefficients runs counter to intuition: Although the model estimates the length of time to an event's occurrence (in this case, firm mortality), a negative sign here indicates a *lower* probability of firm mortality (that is, a higher probability of firm survival). In this model, we find that, consistent with the probit model, the coefficient estimate for the HRE dummy variable is significant and negative ($\beta = -0.55$, $p < 0.001$). This result suggests, again, that the presence of a HRE significantly lowers the risk of premature firm mortality. The hazard ratio (not reported in the table for brevity) for the HRE dummy is 0.58, suggesting that the risk of mortality for firms with an HRE is only 0.58 times that of sample firms without an HRE. More precisely, this result suggests that time to a sample firm's involuntary death is significantly longer if that firm has an HRE in its top management team.

The other two models in Table 4 estimate the two interactions of interest in this analysis. As we found with the probit models in Table 3, the HRE × size (in employees) interaction is negative and significant ($\beta = -0.15$, $p < 0.001$), suggesting that HREs are more strongly associated with lower firm mortality as firm size increases. The HRE × debt interaction is also negative and significant ($\beta = -1.35$, $p < 0.001$), suggesting that HREs are more strongly associated with lower firm mortality as firm debt increases, as anticipated. Thus, the effects of HREs in reducing firm mortality again appear to be positively moderated by firm size and by firm debt.

Results for the OLS regressions for Tobin's Q

Lastly, Table 5 presents results for our OLS analysis of Tobin's Q.[7] In this analysis, the HRE dummy did not have a significant direct relationship with Tobin's Q. Although it is hazardous to read too much into a non-significant result, we note that this is similar to the result for Tobin's Q in Welbourne and Andrews (1996), notwithstanding our sample size is much higher (n = 6,008 vs. n = 136). The other two models in Table 5 estimate the two interactions with firm size and debt. The HRE × size (in employees) interaction is positive and significant ($\beta = 0.01$, $p < 0.001$), suggesting that HREs are associated with higher Tobin's Q as firm size increases. On the other hand, the HRE × debt interaction is not significant. As we anticipated, this lack of significant results is interesting in the context of the stock price and EPS results. Again, applying appropriate caveats about drawing inferences from non-significant results, the Tobin's Q analysis implies that the lack of significant relationships with financial performance is not merely a function of the inadequacies of stock price and EPS as measures of firm financial performance.

[7] In this table we use firm-year observations only for the first three post-IPO years. According to Bhattacharya *et al.* (2015), the first three post-IPO years are the most critical to the survival of an IPO firm. Thus, if a factor (e.g., the presence of an HRE) is beneficial, its effect should be more pronounced in the first three post-IPO years. We note that in the full sample with all available firm years,

DOI: 10.1002/smj

Table 4. Cox proportional hazard model for firm survival time

	Model 1		Model 2		Model 3	
	Coefficient	Std. error	Coefficient	Std. error	Coefficient	Std. error
HR executive	−0.55	0.10	−0.14	0.13	−0.16	0.13
VC backed	−0.12	0.06	−0.13	0.06	−0.12	0.06
VC reputation	0.09	0.23	0.09	0.23	0.07	0.24
Underwriter reputation	−0.03	0.01	−0.04	0.01	−0.04	0.01
Employees	−0.01	0.00	−0.01	0.00	−0.01	0.00
Incubation time	−0.04	0.03	−0.03	0.03	−0.04	0.03
Market to book ratio	−0.12	0.02	−0.12	0.02	−0.12	0.02
Leverage	1.60	0.10	1.62	0.09	1.74	0.10
Probability of bankruptcy	−0.08	0.01	−0.08	0.01	−0.09	0.01
HR executive × employees			−0.15	0.04		
HR executive × leverage					−1.35	0.34
Industry dummies?	Yes		Yes		Yes	
−2log likelihood	14719.54		14719.54		14719.54	
AIC	14719.54		14719.54		14719.54	
Likelihood ratio	790.76		816.57		808.70	
Wald Chi-Square	814.18		819.01		847.92	

n = 10,843 firm-years. Dependent variable is time to firm mortality.

Table 5. OLS regression results for Tobin's Q

	Model 1		Model 2		Model 3	
	Coefficient	Std. error	Coefficient	Std. error	Coefficient	Std. error
Intercept	2.10	0.10	2.11	0.10	2.11	0.11
HR executive	0.09	0.20	0.04	0.20	0.01	0.29
VC backed	0.88	0.20	0.88	0.20	0.89	0.20
VC reputation	2.12	1.16	2.12	1.16	2.13	1.16
Underwriter reputation	0.03	0.04	0.03	0.04	0.03	0.04
Employees	0.00	0.00	0.00	0.00	0.00	0.00
Profitability	0.00	0.04	0.00	0.04	0.00	0.04
Public age	−0.01	0.00	−0.01	0.00	−0.01	0.00
Leverage	−2.43	0.26	−2.42	0.26	−2.48	0.29
Dividends to equity ratio	0.03	0.03	0.03	0.03	0.03	0.03
Net capital expenditures to sales ratio	−0.01	0.01	−0.01	0.01	−0.01	0.01
HR executive × employees			0.01	0.00		
HR executive × leverage					0.41	0.63
Industry dummies?	Yes		Yes		Yes	
R^2	0.09		0.09		0.09	
F	23.29		22.89		22.61	

n = 6,008. Dependent variable is Tobin's Q.

DISCUSSION

We set out to replicate and extend the results of Welbourne and Cyr (1999) on the relationship between HREs and firm performance. One limitation of that earlier article was that it was based on a small sample of IPOs issued in a single year. The current study's replication of these authors' analysis in a larger, more generalizable sample gives us a more robust test of Welbourne and Cyr's original research question. Yet our results for stock price, EPS, and Tobin's Q are largely non-significant, either as direct effects or in interaction with key contingencies. Nevertheless, a lack of findings for these dependent variables is not a definitive test of post-IPO firm financial performance, as there are a number of alternative (and, perhaps, better suited) financial outcomes that could be modeled in the post-IPO context.

the effects of HREs as well as their interactions with employees and debt are nonsignificant with respect to Tobin's Q.

DOI: 10.1002/smj

Indeed, while Welbourne and Cyr's (1999) article has often been colloquially described as having shown that formal HRM "doesn't matter", such a conclusion is unwarranted for two reasons. First, as we noted earlier, that simple summary is a mischaracterization of both Welbourne and Cyr's (1999) results and the replication results of the current study, which, more precisely speaking, fail to find a significant relationship between the presence of an HRE and a set of post-IPO firm financial performance outcomes. Second (and perhaps more importantly), our hazard models suggest that the presence of an HRE reduces the likelihood that post-IPO firms will fail. This finding is robust across two different types of hazard analysis and persists in the face of an endogeneity correction and a strong set of control variables derived from the IPO literature. These latter results thus represent a significant extension of Welbourne and Cyr (1999) and an important alternative test of their central research question.

Our interaction results in the hazard analysis further extend those reported in Welbourne and Cyr (1999). We show that when HREs are present at the time of a firm's IPO, the negative effect of firm size on subsequent firm mortality is greater and the positive effect of leverage on subsequent firm mortality is smaller. These results call for deeper investigation into causal mechanisms. For example, it would be helpful to see evidence that distinguishes the effects of a firm's dominant logic that emphasizes strategic human capital from firms' technical competence in managing human capital and estimates which mechanism is a stronger determinant of the HRE/firm survival relationship. If it were demonstrated in future research that HREs have a greater influence on firm survival than they do on financial firm performance, such investigations into causal mechanisms would again become even more important. Huselid *et al.* (1997) posited a distinction between "technical" HRM and strategic HRM. Perhaps HREs' most significant effect (at least, in small firms) is on technical factors that drive firm survival rather than on factors that influence firms' competitive advantages. The SHRM and strategic human capital streams of research might profit from exploring this distinction between technical and strategic HRM explicitly.

As with the original Welbourne and Cyr (1999) article, a key limitation of our approach is that the precise interpretation of the HRE variable is unclear. Although our general interpretation of the HRE dummy is as an indicator of how seriously firms take HRM issues, this variable has multiple specific interpretations, including: the presence of a formal HRM function, top management's orientation towards HRM, the professionalization of the IPO firm's management, the firm's ability to be operationally effective in managing human capital, and the firm's ability and interest in managing human capital strategically.

Thus, while the comparison between firms that have HREs and those that don't is a "clean" approach to a difficult issue (i.e., addressing the influence of HRM on firm performance), it is also a fairly coarse measure of firms' emphasis on HRM issues. This is important to keep in mind when evaluating this study's results. The contrast between the non-significant financial outcomes findings and the significant hazard model findings invites conclusions about when HREs "matter" (and when they don't) for firms, but these must be tempered by the usual caveats about drawing inferences from non-significant results. For example, the HRE dummy does not capture cross-firm differences in the quality of HREs within the category of firms that have HREs. It is possible that an unbiased measure of cross-firm differences in the quality of HREs would find significant relationships with post-IPO firm financial performance, whereas the dichotomous measure of HREs utilized here can only distinguish firms on more dramatic but less nuanced performance outcomes, such as post-IPO survival.[8]

[8] It is also interesting to speculate on analytic reasons why the survival analyses were more significant than the replication of Welbourne and Cyr's (1999) models. Although differences in the sizes of the samples employed seems at first glance to be a likely explanation for the difference, in additional analyses (available upon request), we explore how different combinations of independent variables and dependent variables from the replication models in Table 1 and the survival models in Tables 3 and 4 are related to post-IPO financial performance and survival. These results demonstrate that our significant findings in the survival analysis are a consequence of changing *both* the independent and dependent variables in our analysis. We thank our editors for suggesting this examination.

As we mentioned in our footnote on missing data, the data sets for the replication and the survival analysis are notably different in that the latter include IPO firms that do not survive the entire post-IPO observation period, while the former do not. It is, of course, probable that the sample firms that do not survive the observation period are different from those that survive. Thus, their omission from the replication sample not only reduces statistical power, but may introduce a bias to the replication model. For instance, the omission of the firms that "die" in the observation period from the post-IPO financial performance models most likely eliminates the firms with the worst financial performance. If those firms had somehow been included in that

DOI: 10.1002/smj

Moreover, concerning interpretation of results, the HRE dummy has an imprecise correlation with firms' formal HRM functions. The presence of an HRE on a firm's TMT does not necessarily indicate that a formal, effective HRM function exists in a firm, nor do HRM competencies only exist in HRM departments. However, while this point affects our interpretation of the HRE dummy's effects, it does not invalidate the statistical relationships reported here. What we have specifically modeled here is whether young, small firms benefit from the presence of an HRE. Thus, further research into the meaning of the HRE dummy variable could represent a significant line of future inquiry.

Another potential limitation of our findings is that the relationships that we estimate generally across the sample's years may have changed over time. It is possible that HREs in firms later in our observation period are more effective than HREs in firms earlier in the period. We investigated this possibility but found no supporting evidence for time-varying effects on our relationships of interest. Additionally, we observe that IPO firms are a subset of the general population of firms, potentially limiting the generalizability of our findings. However, as we noted above, Welbourne and Cyr's (1999) original insight remains valuable: The advantages of using IPO firms to isolate the effects of HREs in firms make this a desirable setting for the current study. Of course, larger firms nearly all have HREs, such that determining the effect of HREs in larger firms requires capturing different levels of HRE quality.

Conclusion

Overall, our results are an intriguing replication and extension of earlier work that addresses a key question that is larger than this single study: Do formally designated HRM practitioners help firms to succeed? We hope that our findings here encourage more work that operationalizes this increasingly important but heretofore under-explored research question.

REFERENCES

Altman E. 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance* **23**(4): 589–609.

Arikan AM, Capron L. 2010. Do newly public acquirers benefit or suffer from their pre-IPO affiliations with underwriters and VCs? *Strategic Management Journal* **31**(12): 1257–1289.

Becker BE, Huselid MA, Pickus PS, Spratt MF. 1997. HR as a source of shareholder value: research and recommendations. *Human Resource Management* **36**(1): 39–47.

Berk JB, Stanton R, Zechner J. 2010. Human capital, bankruptcy, and capital structure. *Journal of Finance* **65**(3): 891–926.

Bhattacharya U, Borisov A, Yu X. 2015. Firm mortality and natal financial care. *Journal of Financial and Quantitative Analysis* **50**(1–2): 61–88.

Carter R, Manaster S. 1990. Initial public offerings and underwriter reputation. *Journal of Finance* **45**(4): 1045–1067.

Chadwick C, Dabu A. 2009. Human resources, human resource management, and the competitive advantage of firms: toward a more comprehensive model of causal linkages. *Organization Science* **20**(1): 253–272.

Chadwick C, Way SA, Kerr G, Thacker JW. 2013. Boundary conditions of the high-investment human resource systems—small firm labor productivity relationship. *Personnel Psychology* **66**(2): 311–343.

Coles JL, Daniel ND, Naveen L. 2006. Managerial incentives and risk-taking. *Journal of Financial Economics* **79**: 431–468.

Crook TR, Todd SY, Combs JG, Woehr DJ, Ketchen DJ. 2011. Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology* **96**(3): 443–456.

Cyr LA, Johnson DE, Welbourne TM. 2000. Human resources in initial public offering firms: do venture capitalists make a difference? *Entrepreneurship: Theory and Practice* **25**(1): 77–91.

Hammonds K. 2005. Why we hate HR. *Fast Company*: 40–47.

Huselid MA. 1995. The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal* **38**(3): 635–672.

Huselid MA, Jackson SE, Schuler RS. 1997. Technical and strategic human resources management effectiveness as determinants of firm performance. *Academy of Management Journal* **40**(1): 171–188.

Klepper S. 2002. Firm survival and the evolution of oligopoly. *RAND Journal of Economics* **33**(1): 37–61.

Kotey B, Slade P. 2005. Formal human resource management practices in small growing firms. *Journal of Small Business Management* **43**(1): 16–40.

Lang L, Stulz R. 1994. Tobin's Q, corporate diversification, and firm performance. *Journal of Political Economy* **102**(6): 1248–1280.

Loughran T, Ritter JR. 2004. Why has IPO underpricing changed over time? *Financial Management* **33**(3): 5–37.

Messersmith JG, Guthrie JP. 2010. High performance work systems in emergent organizations: implications for firm performance. *Human Resource Management* **49**(2): 241–264.

analysis, perhaps significant relationships between the presence of HREs and financial performance may have appeared.

Nahata R. 2008. Venture capital reputation and investment performance. *Journal of Financial Economics* **90**(2): 127–151.

Ritter J. 2014. U.S. IPOs with founding dates from 1996-2008. Available at: https://site.warrington.ufl.edu/ritter/ipo-data/ (accessed March, 2014).

Subramony M. 2009. A meta-analytic investigation of the relationship between HRM bundles and firm performance. *Human Resource Management* **48**(5): 745–768.

Welbourne TM, Andrews AO. 1996. Predicting the performance of initial public offerings: should human resource management be in the equation? *Academy of Management Journal* **39**(4): 891–919.

Welbourne TM, Cyr LA. 1999. The human resource executive effect in initial public offering firms. *Academy of Management Journal* **42**(6): 616–629.

Wilde J. 2000. Identification of multiple equation probit models with endogenous dummy regressors. *Economics Letters* **69**(3): 309–312.