

Utilization of Contingent Workers and Firm Performance

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Abstract

The nature of the employment relationship between employers and employees is undergoing transformation in the new economy. Approximately 30 percent of the civilian workforce works in “non-standard” work arrangements, including agency temporary workers, direct-hire temporary workers, on-call workers, leased employees, contract company workers, independent contractors, self-employed workers, and regular part-time workers.¹ Workers employed in these non-standard work arrangements are referred to as contingent workers. Employers have various reasons for utilizing contingent workers, ranging from cost control and flexibility in staffing to screening for qualified direct hires or finding specialized talent.² This phenomenon is the focus of a number of studies, and conditions under which externalization of employment occurs have been identified.³ The question arises whether the utilization of contingent workers affects firm performance.

Research Methodology

The American Management Association (AMA) conducted a survey of its member organizations in June 1999 regarding the utilization of contingent workers. The questionnaire included information on firm size, whether the firm was engaged in manufacturing, extent of unionization, and percent of the workforce that is contingent, as well as questions relating to the reasons for using contingent workers, the departments in which the contingent workers are used, and the type of contingent worker employed. Over 1,200 human resource managers of the AMA member organizations responded to the survey. This analysis was conducted among the publicly traded firms that responded to the Contingent Worker Survey.⁴

Firm performance was measured in terms of traditional financial analysis: earnings per share (EPS), dividends per share (DPS), and price-earnings

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ratio (P/E ratio). The null hypothesis, that there are no differences among firms that use more contingent workers compared to firms that use fewer contingent workers, was tested using two-tailed statistical tests, since this author felt that there was no compelling theory to predict the direction of observed differences in financial performance.

Results

Utilization of contingent workers IS related to firm performance. Firms with a higher utilization of contingent workers (equal to or more than 10 percent of their workforce) had significantly higher price-earnings ratios in 1999 than firms with a lower utilization of contingent workers (less than 10 percent of their workforce). Firms with a lower utilization of contingent workers (less than 10 percent of their workforce) had significantly lower price-earnings ratios in 1999 than firms with a higher utilization of contingent workers (10 percent or more of their workforce). There are no differences in either EPS or DPS between firms with a higher utilization of contingent workers compared to firms with a lower utilization of contingent workers. See Table 1.

Cost as a reason for using contingent workers. Companies for which cost reduction was a more important motivation for using contingent workers had significantly lower P/E ratios in 1999 and distribute significantly higher DPS compared to firms for which cost reduction is less important. See Table 2.

Firms that cited payroll cost reduction as a very important or somewhat

TABLE 1
Utilization of Contingent Workers and Firm Performance

| | t-Test for Equality of Means | | | | |
|------------------------|------------------------------|--------|-----|--------------------|--------------------|
| | Mean | t | df | Sig. (2-tailed) | Mean Difference |
| <i>P/E Ratio</i> | | | | | |
| 10% contingent workers | 19.0297 | -2.271 | 151 | .027 ^a | -7.3765 |
| 10% contingent workers | 26.4062 | | | | |
| <i>EPS</i> | | | | | |
| 10% contingent workers | .7667 | -104 | 159 | .918 | -5.4133E-02 |
| 10% contingent workers | .8208 | | | | |
| <i>DPS</i> | | | | | |
| 10% contingent workers | .4495 | 1.271 | 159 | .205 | .1121 |
| 10% contingent workers | .3374 | | | | |

^aequal variances not assumed

TABLE 2
Cost Control as a Reason for Using Contingent Workers

| | t-Test for Equality of Means | | | | |
|--|------------------------------|-----------|-----------------------|-------------------------------|--------------------|
| | Mean | t | df | Sig. (2-tailed) | Mean Difference |
| <i>P/E Ratio</i> | | | | | |
| Cost Control important | 19.1428 | -1.855 | 125 | .069 ^a | -5.3614 |
| Cost Control not important | 24.5042 | | | | |
| <i>EPS</i> | | | | | |
| Cost Control important | 1.0572 | -104 | 134 | .292 | .5889 |
| Cost Control not important | .4683 | | | | |
| <i>DPS</i> | | | | | |
| Cost Control important | .4919 | 1.271 | 134 | .023 | .1975 |
| Cost Control not important | .2944 | | | | |
| Regression | | | | | |
| Dependent Variable: Price-Earnings Ratio | | | | | |
| Model | Sum of Squares | df | Mean Square | F | Sig. |
| 1 Regression | 1827.026 | 1 | 148.911 | 5.680 | .020 |
| Residual | 19943.172 | 62 | 269.325 | | |
| Total | 21770.198 | 63 | | | |
| Model Summary | | | | | |
| Model | R | R Squared | Adjusted R Squared | Std. Error of the Estimate | |
| 1 | .290 ^b | .084 | .069 | 17.9350 | |

^aequal variances not assumed

^bpredictors: (Constant), Q3A7

important reason for using contingent workers had significantly lower P/E ratios than firms that state that payroll cost reduction is not at all important. This result is particularly significant for non-manufacturing firms. See Table 3.

Companies that cited healthcare cost reduction as a very important or somewhat important factor had significantly lower P/E ratios in 1999 compared to firms that stated that healthcare cost reduction is not at all important. This difference is greater among non-manufacturing firms and among companies whose contingent workforce is composed of more than 10 percent of its total workforce. See Table 4. Furthermore, companies that stated that healthcare cost reduction is very important or somewhat important had significantly higher DPS in 1999 compared to firms that stated that healthcare cost reduction is not at all important.

Firms that stated that pension cost reduction is very important or somewhat important had higher DPS than companies that stated that pension cost reduction is not at all important, but there were no significant differences in P/E ratios or earnings per share among firms that stated that pension cost reduction was an important motivation for using contingent workers. See Table 5.

The question arises whether firms that invoke cost reduction as a reason for using contingent workers are in worse “financial health” than firms for which cost reduction is not an important reason for using contingent workers. To test this hypothesis, firms were compared on measures of firm financial health, independent of the outcomes measures for firm financial performance, for the periods 1997, 1999, 2001, and 2002, that is, periods before and after, as well as during, the time reference period for the utilization of contingent workers. The measures of firm financial health included cash flow from operations relative to common shares outstanding; total debt relative to common shares outstanding; extraordinary items; extraordinary items and discontinued operations; Earnings Before Interest, Taxes, and Depreciation Annual (EBITDA),⁵ beta calculated on a calendar year basis; and Z scores, a

TABLE 3

Payroll Reduction as a Reason for Using Contingent Workers and Price-Earnings Ratio

| Source | ANOVA | | | | |
|------------------------------|---------------------------|-----|----------------|---------|------|
| | Type III Sum of Square | df | Mean Square | F | Sig. |
| Corrected Model | 3229.572 | 3 | 1076.524 | 4.227 | .007 |
| Intercept | 58130.189 | 1 | 58130.189 | 228.272 | .000 |
| Manufacturing | 2495.457 | 1 | 2495.457 | 9.799 | .002 |
| Reason: Payroll Cost | 1068.365 | 1 | 1068.365 | 4.195 | .043 |
| Manufacturing * Payroll Cost | 1197.301 | 1 | 1197.301 | 4.702 | .032 |
| Error | 30813.041 | 121 | 254.653 | | |
| Total | 92329.785 | 125 | | | |
| Corrected Total | 34042.613 | 124 | | | |

*R Squared = .095 (Adjusted R Squared = .072)

Estimated Marginal Means Manufacturing *
Reason: Payroll Cost Reduction Dependent
Variable: Price-Earnings Ratio

| Manufacturing | Reason: Payroll Cost Reduction | Mean | Std. Error |
|-------------------|--------------------------------|--------|------------|
| Non-Manufacturing | Not Important | 35.372 | 4.265 |
| | Important | 22.088 | 2.778 |
| Manufacturing | Not Important | 18.679 | 2.913 |
| | Important | 19.057 | 2.303 |

TABLE 4
Healthcare Cost Reduction as a Reason for Using Contingent Workers
and Price-Earnings Ratio

| ANOVA | | | | | |
|--|----------------------------|-----|----------------|---------|------|
| Dependent Variable: Price-Earnings Ratio | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 3422.425 | 3 | 1140.808 | 4.454 | .005 |
| Intercept | 59884.805 | 1 | 59884.805 | 233.789 | .000 |
| Manufacturing | 1805.612 | 1 | 1805.612 | 7.049 | .009 |
| Reason: Healthcare Cost Manufacturing * | 1424.827 | 1 | 1424.827 | 5.562 | .020 |
| Healthcare Cost | 1076.273 | 1 | 1076.273 | 4.202 | .043 |
| Error | 30225.629 | 118 | 256.149 | | |
| Total | 90915.788 | 122 | | | |
| Corrected Total | 33648.044 | 121 | | | |

*R Squared = .102 (Adjusted R Squared = .079)

Estimated Marginal Means Manufacturing * Reason:
Healthcare Cost Reduction Dependent Variable:
Price-Earnings Ratio

| Manufacturing | Reason: Healthcare Cost Reduction | Mean | Std. Error |
|-------------------|-----------------------------------|--------|------------|
| Non-Manufacturing | Not Important | 33.538 | 3.579 |
| | Important | 20.310 | 3.080 |
| Manufacturing | Not Important | 19.420 | 2.531 |
| | Important | 18.494 | 2.705 |

Estimated Marginal Means
Utilization * Reason: Healthcare Cost Reduction
Dependent Variable: Price-Earnings Ratio

| Utilization of Contingent Workers | Reason: Healthcare Cost Reduction | Mean | Std. Error |
|--------------------------------------|-----------------------------------|--------|------------|
| ≤ 10% Workforce | Not Important | 20.433 | 2.194 |
| | Important | 17.704 | 2.434 |
| ≥ 10% Workforce | Not Important | 44.417 | 4.807 |
| | Important | 21.777 | 2.981 |

TABLE 5
Pension Cost Reduction as a Reason for Using Contingent Workers

| | | ANOVA | | | | |
|-----------|----------------|---|-----|-------------|-------|------|
| | | Dependent Variables: Price-Earnings Ratio, EPS, DPS | | | | |
| | | Sum of Squares | df | Mean Square | F | Sig. |
| P/E Ratio | Between Groups | 297.822 | 2 | 148.911 | .553 | .557 |
| | Within Groups | 33934.920 | 126 | 269.325 | | |
| | Total | 34232.742 | 128 | | | |
| EPS | Between Groups | 27.036 | 2 | 13.518 | 1.298 | .277 |
| | Within Groups | 1406.271 | 135 | 10.417 | | |
| | Total | 1433.307 | 137 | | | |
| DPS | Between Groups | 3.687 | 2 | 1.844 | 7.695 | .001 |
| | Within Groups | 32.344 | 135 | .240 | | |
| | Total | 36.032 | 137 | | | |

| Mean, Pension Cost Reduction, and Price-Earnings Ratio, EPS, DPS | | |
|--|------------------------|---------|
| | Pension Cost Reduction | Mean |
| P/E Ratio | Very important | 21.6694 |
| | Somewhat important | 19.0388 |
| | Not at all important | 22.6419 |
| EPS | Very important | 1.7150 |
| | Somewhat important | 1.1761 |
| | Not at all important | .4801 |
| DPS | Very important | .781 |
| | Somewhat important | .5022 |
| | Not at all important | .2911 |

predictor of bankruptcy.⁶ Comparisons were made between companies for which cost control, including payroll cost reduction, healthcare cost reduction, and pension cost reduction, was an important reason for using contingent workers and firms for which cost control was not an important reason for using contingent workers. For the years 1997, 1999, or 2001, there were no significant differences in cash flow from operations relative to common shares outstanding between companies for whom cost control was important compared to companies for which cost control was not important; but in 2002 the companies for which cost control was important had higher cash flow from operations relative to shares outstanding (ANOVA $p \leq .035$). For the years 1997, 1999, 2001, or 2002, there were no significant differences in total debt relative to common shares outstanding between companies for whom cost con-

trol was important compared to companies for which cost control was not important, using analysis of variance; but in 1997 the companies for which payroll cost reduction was important had higher total debt relative to shares outstanding (t test $p \leq .007$), and the companies for which healthcare cost reduction was important had higher total debt relative to shares outstanding in 1997 (t test $p \leq .026$). There were no significant differences for extraordinary items or extraordinary items including discontinued operations between companies for which cost reduction was an important reason for using contingent workers compared to companies for which cost reduction was unimportant in any period. There were no significant differences in any year in EBITDAM, Earnings Before Interest, Taxes, and Depreciation on an Annual Basis, between companies for which cost reduction was an important reason for using contingent workers compared to companies for which reduction was not important. For the years 1997 and 1999 there were no significant differences in beta between companies for which cost reduction was important compared to companies for which cost reduction was not an important reason for using contingent workers. But in the years 2001 and 2002, companies for which cost reduction was an important reason for using contingent workers had lower betas ($p \leq .05$ and $p \leq .02$, respectively). A Z score analysis showed that companies for which cost reduction was not an important reason for using contingent workers had significantly higher Z scores than companies for which cost reduction was important for all years.⁷ Moreover, companies for which cost reduction was not an important reason for using contingent workers had Z scores that were significantly higher than 3.0 for all years 1997, 1999, 2001, 2002, 2003. In addition, companies for which cost reduction was an important reason for using contingent workers had Z scores in 2002 and 2003 that are not significantly different from a Z score of 1.81 and that are significantly lower than a Z score of 3.0. It is not likely that cost control reasons are directly related to company poor financial health several years later, but rather that the managerial decision-making processes themselves are causally related to a poorer long-term consequence. Overall there are no significant differences between firms in "financial health" that would be predictive of differences in firm performance.

Finding specialized talent as a reason for using contingent workers. Firms that stated that finding specialized talent is very important had higher P/E ratios than companies that stated that finding specialized talent is somewhat important or not at all important. Furthermore, firms that stated that finding specialized talent is very important or somewhat important give higher DPS than companies that stated that finding specialized talent is not at all impor-

tant. These results suggest that firms that use contingent workers for strategic reasons relating to the acquisition of human capital gain a competitive advantage. See Table 6.

The temp to perm track: screening for qualified direct hires as a reason for using contingent workers. Companies that stated that screening for qualified direct hires is very important or somewhat important had significantly lower P/E ratios in 1999 compared to firms that stated that screening for qualified direct hires is not at all important. In addition, companies that stated that screening for qualified direct hires is very important or somewhat important distributed significantly more DPS in 1999 compared to firms that stated that screening for qualified direct hires is not at all important. These results suggest that more effective firms have other mechanisms for hiring qualified employees than converting temps to permanent employees. See Table 7.

TABLE 6
Finding Specialized Talent as a Reason for Using Contingent Workers

| | | ANOVA | | | | |
|-----------|----------------------|---|-----|-------------|-------|---------|
| | | Dependent Variables: Price-Earnings Ratio and DPS | | | | |
| | | Sum of Squares | df | Mean Square | F | Sig. |
| P/E Ratio | Between Groups | 22902.616 | 2 | 1101.308 | 4.431 | .014 |
| | Within Groups | 33307.441 | 134 | 248.563 | | |
| | Total | 35510.057 | 136 | | | |
| DPS | Between Groups | 1.06 | 2 | .753 | 3,189 | .044 |
| | Within Groups | 33.533 | 142 | .236 | | |
| | Total | 35.039 | 144 | | | |
| | | Mean, Finding Specialized Talent and Price-Earnings Ratio and DPS | | | | |
| | | Finding Specialized Talent | | | Mean | |
| P/E Ratio | Very important | | | | | 25.9416 |
| | Somewhat important | | | | | 16.8364 |
| | Not at all important | | | | | 20.8487 |
| DPS | Very important | | | | | .4315 |
| | Somewhat important | | | | | .4745 |
| | Not at all important | | | | | .2424 |

TABLE 7
Screening for Direct Hires as a Reason for Using Contingent Workers

| | | ANOVA | | | | |
|---------------------------|-------------------------|---|-------------|-------------|-------|------|
| | | Dependent Variables: DPS and Price-Earnings Ratio | | | | |
| | | Sum of Squares | df | Mean Square | F | Sig. |
| DPS | Between Groups | 1.506 | 2 | .753 | 3.189 | .044 |
| | Within Groups | 33.533 | 142 | .236 | | |
| | Total | 35.039 | 144 | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | |
| Corrected Model | 3706.096 | 3 | 1235.365 | 4.915 | .003 | |
| Intercept | 51313.289 | 1 | 51313.289 | 204.166 | .000 | |
| Use of Contingent Workers | 2007.389 | 1 | 2007.689 | 7.988 | .005 | |
| Reason: Screening | 2061.623 | 1 | 2061.623 | 8.203 | .005 | |
| Contingent * Screening | 367.499 | 1 | 367.499 | 1.462 | .229 | |
| Error | 31667.705 | 126 | 251.331 | | | |
| Total | 97569.020 | 130 | | | | |
| Corrected Total | 35373.801 | 129 | | | | |

*R Squared = .105 (Adjusted R Squared = .083)

| Mean, Screening for Direct Hires and Price-Earnings Ratio and DPS | | |
|---|--------------------------------------|---------|
| | Screening for Direct Hires | Mean |
| P/E Ratio | Very important or somewhat important | 19.7108 |
| | Not at all important | 26.5045 |
| DPS | Very important | .3766 |
| | Somewhat important | .4592 |
| | Not at all important | .1984 |

Earnings per share. Earnings per share, an outcomes variable, was not significantly related to the independent variables measured in the questionnaire.

Dividends per share. Distribution of quarterly dividends (dividends per share) is generally higher among firms with lower P/E ratios. This suggests that distribution of dividends is used as a means of holding investors. If a firm has a lower P/E ratio, it tends to offer higher dividends instead. This finding may indicate the strategic use of dividends distributions by firms with lower P/E ratios; namely, in order to serve as an attractive opportunity for investors, those firms with lower P/E ratios distribute more dividends than firms that are more attractive investments in terms of their price-earnings ratios.

Unionization. Unionized firms have lower price-earnings ratios and pay higher dividends per share than nonunionized firms. See Table 8.

Manufacturing. Manufacturing firms had significantly lower price-earnings ratios in 1999 than nonmanufacturing firms and paid higher dividends than nonmanufacturing firms. See Table 9.

Discussion and Conclusions

This analysis relates the utilization of contingent workers to firm financial performance among publicly traded companies that participated in the AMA 1999 Survey on Contingent Workers, concluding that greater utilization of contingent workers is related to better firm performance, particularly P/E ratios. Relatively few investigations relate firm performance to the utilization of contingent workers. However, Nayar and Willinger (2001) recently examined the relationship between firm performance and increasing use of contingent workers. Their study shows that firms that increased their use of contingent workers have higher stock return measures than firms that do not use more than 10 percent contingent workers.⁸ Their study used a different time period (1978–1991), a different group of companies or databases, and different measures of firm performance. Their conclusion, that increased reliance on contingent labor increases firm profitability, however, is consistent with the findings of this study.

Shulamit Kahn, at Boston University, and her colleagues have also investigated the relationship between the utilization of contingent workers and firm financial performance. Although they interpret their findings as “mixed,”⁹ firms that used more contingent workers had higher EPS and higher stock prices than

TABLE 8
Firm Performance of Unionized and Nonunionized Firms

| | | t-test for Equality of Means | | | | |
|-----------|-------------|------------------------------|--------|-----|------|-------------|
| | | Mean | t | df | Sig. | Mean Square |
| P/E Ratio | Nonunion | 23.0224 | 2.246 | 158 | .026 | 5.3521 |
| | Union Firms | 17.6703 | | | | |
| EPS | Nonunion | .6651 | -.895 | 164 | .372 | -.4245 |
| | Union Firms | 1.0896 | | | | |
| DPS | Nonunion | .2802 | -3.552 | 164 | .001 | -.2840 |
| | Union Firms | .5642 | | | | |

TABLE 9
Firm Performance of Manufacturing and Nonmanufacturing Firms

| | | ANOVA | | | | | |
|-----------|------------------|--|----------------|-----|-------------|-------|------|
| | | Dependent Variables: Price-Earnings Ratios, EPS, DPS | | | | | |
| | | Mean | Sum of Squares | df | Mean Square | F | Sig. |
| P/E Ratio | Nonmanufacturing | 25.3652 | Between Groups | 1 | 1909.625 | 7.711 | .006 |
| | Manufacturing | 18.0686 | Within Groups | 150 | 247.647 | | |
| | | | Total | 151 | | | |
| EPS | Nonmanufacturing | 1.3096 | Between Groups | 1 | 15.939 | 1.742 | .189 |
| | Manufacturing | .6333 | Within Groups | 159 | 9.151 | | |
| | | | Total | 160 | | | |
| DPS | Nonmanufacturing | .3366 | Between Groups | 1 | 187 | 0.722 | .397 |
| | Manufacturing | .4104 | Within Groups | 158 | 259 | | |
| | | | Total | 159 | | | |

firms that used a lower percentage of contingent workers (Kahn et al. 2001). In a follow-up study, Kahn (2000) found that greater utilization of contingent workers was related to higher firm productivity.¹⁰ The work of Professors Nayar, Willinger, Kahn, and Kahn's colleagues concurs with the results reported herein.¹¹ The convergence of these four different studies provides confidence in the conclusion that companies that use more contingent workers have better financial performance than firms that use fewer contingent workers.

Factors relating to use of temporary workers have been identified by Davis-Blake and Uzzi (1993). Davis-Blake and Uzzi found that independent contractors¹² were used in jobs requiring "firm-specific or complex technical skills," whereas (other) temporary workers were used in situations where there were "variations in employment needs," requiring flexibility in employment on the part of the firm. Kahn (2000, 242) also found that the human resource managers interviewed in her study appreciate the flexibility that the utilization of temp workers provides to a company. The use of contingent workers, both as independent contractors and other temporary workers, provides a firm with the ability to meet variations in employment needs, without incurring higher fixed costs associated with regular employees, thereby adjusting to variations in the firm's market and creating a competitive advantage to such firms. Matusik and Hill (1998) theorize about the reasons that a competitive advantage might be created by firms' use of contingent workers. Their rationale, that contingent workers bring more up-to-date market-based knowledge to the firms employing them, comport with our finding that it is particularly the strategic use of contingent workers that is related to more effective firm performance.

Cost cutting as a reason for the use of contingent workers was not related to better firm performance in this study.¹³ Indeed the human resource managers interviewed by Kahn (2000) acknowledge that the costs of using contingent workers may be the same as, or greater than, the costs of regular employees. Although firms may not pay their contingent workers medical or pension benefits, temp agencies supplying the contingent workers charge a fee that may be equal to, or greater than, the costs of the benefits. This study found that firms that state the reasons for their use of contingent workers is to lower costs, payroll and healthcare costs in particular, have lower P/E ratios. On the other hand, firms that use contingent workers for the purpose of finding specialized talent, a strategic approach to the use of contingent workers, have higher P/E ratios. The utilization of contingent workers likely creates a competitive advantage between firms; hence industry-wide measures might mask differences in competitive advantage between firms within the same industry.

Given the positive effects of the utilization of contingent workers on firm performance, it is unlikely that this trend will be reversed. Therefore, the negative effects of contingent work should be managed.¹⁴ Specifically, poli-

cies and programs for contingent workers whereby benefits and pensions adhere to the individual worker and are portable across employers or even agencies that place temporary workers should be developed, with a particular emphasis toward “low end” contingent workers.¹⁵

In conclusion, the strategic use of contingent workers is associated with better firm performance, whereas cost cutting approaches to the use of contingent workers is not associated with firm competitive advantage. Since many contingent workers are relatively disadvantaged in terms of access to health-care and pension benefits, policies and programs should be developed to address these relative disadvantages, rather than attempt to reverse the trend toward the increased utilization of contingent workers.

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Notes

1. The number of jobs in the temporary-help supply industry rose 577 percent, while the total number of jobs rose 44 percent between 1982 and 1998 (U.S. General Accounting Office 2000).

2. See for example American Management Association 1999.

3. See, for example, U.S. Department of Labor, Bureau of Labor Statistics 1995; Washington Senate Democratic Caucus 1999; U.S. Department of Labor, Bureau of Labor Statistics 2001; and Carre et al. 2000.

4. Of the 1,248 employers responding to the AMA survey, 220 were publicly traded companies.

5. The COMPUSTAT definition of EBITDA is:

| | Mnemonic | Concept Calculation | Units |
|-----------------|-----------|---|------------|
| Annual | EBITDAM | EBITDA/SALE*100 | Percentage |
| Quarterly | EBITDAMQ | @VALUE(OIBDPQ/SALEQ, (OIBDPQ/SALEQ)[-1])*100 | Percentage |
| 12 Month Moving | EBITDAM12 | @VALUE(OIBD12/SALE12, (OIBD12/SALE12)[-1])*100 | Percentage |

The annual concept is Earnings Before Interest, Taxes, and Depreciation Annual, Quarterly, or twelve-month moving, divided by Sales ↔ Net. This total is then multiplied by 100.

The quarterly concept is Operating Income Before Depreciation divided by Sales ↔ Quarterly. This total is then multiplied by 100. If no value is available for the current quarter, the value for the previous quarter will be calculated.

The 12 Month Moving concept is Operating Income Before Depreciation 12MM divided by Sales ↔ Net ↔ 12MM. This total is then multiplied by 100. If no value is available for the current quarter, the value for the previous quarter will be calculated.

6. Z score is a bankruptcy prediction model developed by Edward Altman at New York University. Data were obtained from Standard and Poor's COMPUSTAT database, which defines Z score as:

| Mnemonic | ZSCORE | Concept Calculation |
|----------|--------|--|
| | | $1.2*(WCAP/AT) + 1.4*(RE/AT) + 3.3*(EBIT/AT) + .6*(@VALUE(PRCCF*CSHO,CEQ) + PSTK)/(AT - CEQ - PSTK) + .999*(SALE/AT).$ |

If a value less than 1.81 is returned, then there is a high probability of bankruptcy. If a value greater than 3.0 is returned, then there is a low probability of bankruptcy. This item is designed to forecast failure in the short-term (up to two years).

7. A higher Z score indicates a lower likelihood of bankruptcy.

8. Nayar and Willinger define the use of contingent workers by a notation in the COMPUSTAT database at note 25 that "a firm has 10 percent or more seasonal or part-time workers in that particular fiscal year" (2001, 666). They measured profitability in terms of stock returns comparing "buy-and-hold excess returns in a 250-day period subsequent to the fiscal year in which the reliance on contingent labor is revealed . . . [with] a prior 250-day period" (2001, 678). Buy-and-hold excess returns are defined on pp. 673-74.

9. Kahn, in a more intensive case study of two companies in the South, found that in the textile industry the companies that had made "sudden, radical shifts" to the use of temp workers had declining financial performance, or financial performance that was no different, in comparison with control companies that had not made such shifts to temp workers (2000, 235-36). She interprets the case studies to indicate that her findings reveal a mixed relationship between the use of contingent workers and firm financial performance. However, extraneous variables at work in the single company that made the "sudden, radical" shift to the use of contingent workers and that subsequently experienced a significant decline in financial performance may also have accounted for the decline in its financial performance; for instance, the shift in employment policy may have been triggered by a need for sudden cost reductions, which factor also accounted for the reduction in financial performance. As discussed *infra*, cost as a motivator in the utilization of contingent workers was not related to better financial performance in the present study.

10. In the same study, Kahn (2000, 256-57) found that the use of independent contractors, but not other categories of temporary workers, was negatively related to firm profitability; however, change in the use of independent contractors between 1995 and 1997 and change in profits between 1995 and 1997 were unrelated. Moreover, her study was based on industry-wide measures. Thus, differences between companies that are more or less competitive based on firm management practices may be masked by the level of measurement.

11. The author feels that the findings reported herein are particularly robust since two-tailed tests of statistical significance were used. See *supra*, the section on research methodology.

12. Independent contractors were included in the definition of contingent workers in the AMA Survey used in this study.

13. Similarly, control of labor costs by downsizing is negatively related to stock price. See Worrel, Davidson, and Sharma (1991), who found that downsizing by itself was related to declines, rather than increases, in stock price. Casio, Young, and Morris (1997) examined the effect of employment downsizing on stock price for the period 1980-1994; they con-

cluded that employment downsizing alone, in the absence of asset re-structuring, was related to lower average return on stock price compared to stable employers in the short run, but related to better returns in the years following the downsizing.

14. The U. S. General Accounting Office (2000) study of contingent workers notes that medical benefits and pensions are significantly lower for temporary workers other than independent contractors.

15. Many temp agencies offer benefits packages to the temporary workers, which the agencies contract out. However temporary workers sometimes rotate between and among temp agencies, often at the suggestion of the temp agency client organizations where the temps work so that portability of benefits is still important for agency temp workers.

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