# Financial Leverage and Unemployment Rate to Human Capital Cost

## Kalaleh Shayanfar

M.A in Accounting, Islamic Azad University, Nour branch, Iran.

**Abstract:** *The current study is to examine the relationship between financial leverage and unemployment rate both with human capital costs of companies' listed Tehran stock exchange. The study is a kind of applied, descriptive - correlative research. All listed companies in Tehran stock exchange were selected as statistical population during 2008 to 2012. So, there are 95 listed companies in this research. Financial leverage and Unemployment rate variables and Wage per employee variable are regarded as independent and dependant variables, respectively. So hypothesis are provided and related data are collected. The results show that there is a significant relationship between both financial leverage and unemployment rate with human capital costs in the companies' listed Tehran stock exchange.*
**Keywords:** *Capital structure; Unemployment risk; Human capital cost.*

## INTRODUCTION

In a world that employees value job security, Employees prefer working for a low leverage firm over working for a high leverage firm. As a result, highly levered firms need to pay their employees higher wages, or they will not to be able to hire an employee in a competitive labor market (Maksimovic & Titman, 1991). Although researchers have been long aware of the interaction between labor and capital markets, no consensus has been reached on the causal relation and how debt policy may affect employee wages (Broners & Deere, 1991). the purpose of the current study is to examine the relationship between financial leverage and unemployment rate with human capital costs of companies' listed Tehran stock exchange. The study on the relationship between employee and capital structure is important for the following reasons. First, recent evidence suggests that a firm's non-financial stakeholders can have a significant influence on its capital decisions (Titman, 1984). However, the role of employee, one of the most important stakeholders, in capital structure decision only receives minimum attention (Batjaggia & Thakor, 1994). Second, CEO and other top managers are not the only employee group that will suffer when firms enter financial distress or bankruptcy. Gilson et al (1989) find that replaced employees bear large personal costs. Hence, the workforce in a firm is expected to relate to its capital structure decision. Third, psychology research has already documented that job security is one of the most important determinants of human happiness. In a company, employee is one of the key stakeholders. Surprisingly, human capital is one of the most important factors of firm success in competition and human resource is the most important resource of organizational process (Pfeffer, 1996). However, financial leverage is one of the discussable topics in accounting and has a special place in capital structure management.

Unemployment is a serious problem for developed and developing economies. Beside the costs for social protection of unemployed individuals that an economy has to bear, the depreciation of human capital will led to a decline in productivity and to the macroeconomic imbalances. So, the current study aims to show the effectiveness of financial leverage and unemployment rate on human capital costs of companies' listed stock exchange. The findings of the research help organizations to exploit their human capital and manage them in a better way. By the way, according all mentioned above, the study is to examine the relationship between financial leverage and unemployment rate both with human capital costs of companies' listed in Tehran stock exchange during the period of 2008-2012.

## 1. Literature and Study background

Namazi & Ghadirian (2013) in their study show that there is a negative significant relationship between intellectual capital and bankruptcy risk. Chemmannur et al (2013) suggest that, financial leverage has a significant and positive effect on wage per employee. Akyol & Veroijmeren (2013) evidence there is a positive significant relationship between financial leverage and employee wages in Netherland and U.S. Agrawal and Matsa (2013) in their study show that unemployment wage increase financial leverage, specially for firms which have financial constraints. Bae et al (2011) there is a significant negative relationship between human capital cost and financial leverage. Hovakimian & Li (2011) find that there is a negative relationship between financial leverage and wages. This negative relationship increases in more levered firms. Setayesh & Kazemnejad (2011) find that there is a positive significant relationship between intellectual capital and capital structure. Berk (2010) find that optimal capital structure affected by human capital costs. Derwal (2010) also find that skilled workforce reduces debt ratio. Safavimoghdam (2007) show that natural unemployment rate reduces employee productivity.

## 3- Research Hypotheses

- **Hypothesis 1)** there is a significant relationship between financial leverage and unemployment rate with human capital cost.
- **Hypothesis 2)** there is a significant relationship between financial leverage and human capital cost.
- **Hypothesis 3)** there is a significant relationship between unemployment rate and human capital cost.

## 4- Research Methodology

The current paper is a kind of applied and descriptive – correlation study. Population used of companies listed in Tehran Stock Exchange during 2008 to 2012 has been used as statistical population and data has been selected considering following restrictions and systematic elimination method:

1.      The end of financial year is the end of Isfand Month.

2.      In order to ensure comparability of their activity do not invest and finance in companies such insurance and banks.

3.      To be profitable during the financial period.

4.      The financial year has not been changed during financial period.

5.      The firms which have available information necessarily.

According to noticed conditions, 95 companies are selected as research sample during 5 years. The data was calculated by Excel Software and Eviews7 Software is applied for testing hypothesis. the theoretical part of the data collected through books, articles and academic theses so data sample was collected through TSE, RDIS, CODAL, fipiran sites and also Rahavard Novin Software.

## 5-  Research Variables

In this study, the relationship between financial leverage, unemployment rate and human capital cost for companies' listed Tehran Stock Exchange is examined simultaneously. According to research there are two Independent Variables. In this study considered three hypotheses that will be reviewed. In This research we have used three models as follows:

Research variables according to hypothesis (1) considered in model (1) based on Williams & Fox (2009) as follows:

$\text{Ln (Wage per employee)}_{it} = \alpha_0 + \alpha_1 \text{ Financial leverage}_{it} + \alpha_2 \text{ Unemployment rate}_{it} + \alpha_3 \text{ Firm leverage}_{it} \times \text{Unemployment rate}_{it} + \alpha_4 \text{ Firm size}_{it} + \alpha_5 \text{employee productivity}_{it} + \alpha_6 \text{ Market to book ratio}_{it} + \alpha_7 \text{Profitibility}_{it} + \alpha_8 \text{ Tangibility}_{it} + \alpha_9 \text{ Earnings volatility}_{it} + \varepsilon_{it}$

**Dependent Variable =** Wage per employee

**Independent Variable** = Financial leverage and Unemployment rate

**Control Variables** = Firm Size, Employee Productivity, Market to Book ratio, Profitability, Tangibility, Earnings Volatility.

Research variables according to hypothesis (2) considered in model (2) based on Williams & Fox (2009) as follows:

$\text{Ln(Wage per employee)}_{it} = \alpha_0 + \alpha_1 \text{ Financial leverage}_{it} + \alpha_2 \text{ Firm size}_{it} + \alpha_3 \text{ employee productivity}_{it} + \alpha_4 \text{ Market to book ratio}_{it} + \alpha_5 \text{ Profitibility}_{it} + \alpha_6 \text{Tangibility}_{it} + \alpha_7 \text{ Earnings volatility}_{it} + \alpha_8 \text{ Herfindal index}_{it} + \varepsilon_{it}$

**Dependent Variable =** Wage per employee

**Independent Variable** = Financial leverage

**Control Variables** = Firm Size, Employee Productivity, Market to Book ratio, Profitability, Tangibility, Earnings Volatility, Herfinadal index.

Research variables according to hypothesis (3) considered in model (3) based on Williams & Fox (2009) as follows:

$Ln(Wage\ per\ employee)_{it} = \alpha_0 + \alpha_1\ Unemployment\ rate_{it} + \alpha_2\ Firm\ size_{it} + \alpha_3\ employee\ productivity_{it} + \alpha_4$
$Market\ to\ book\ ratio_{it} + \alpha_5\ Profitibility_{it} + \alpha_6\ Tangibility_{it} + \alpha_7\ Earnings\ volatility_{it} + \alpha_8\ Herfindal\ index_{it} + \varepsilon_{it}$

**Dependent Variable =** Wage per employee

**Independent Variable** = Unemployment rate

**Control Variables** = Firm Size, Employee Productivity, Market to Book ratio, Profitability, Tangibility, Earnings Volatility, Herfinadahl index.

## 6- Definition of Variables

Our main explanatory variables are a firm's financial leverage, which we define as total debt over the total assets. And the other one is unemployment rate which is calculated by statistics per country. In order to measure human capital cost we calculate the log of wage per employee. We use various control variables. Firm size is included as we expect larger firms to pay higher wages than smaller firms, for example because employees in large firms are generally more skilled (Brown & Medoff, 1989). We measure firm size as the logarithm of total assets. We also control the employee productivity, which we measure as total sales divided by the number of employees. We expect higher wages for more productive employees. The market to book ratio is a common proxy for a firm's growth opportunities. All else equal, we expect employees in growth firms to accept lower wages, which increases cash flows for the firm's investments and expected pay increases in the future. Profitability is included to control for the possibility that rent sharing occurs: when firms share rents with their workers, we expect a positive relation between profitability and wages. On the other hand, profitability reduces the chance of bankruptcy, which could lead to employees receiving lower wages in profitable firms. The variable tangibility is gross property, plant, and equipment scaled by total assets. According to Berk et al (2010), a capital intensive firm is less likely to default and can thus pay lower wages. We also control for earnings volatility. A firm with more volatile earnings is more likely to default, so we expect a positive relation between earnings volatility and wages. We measure earnings volatility as the standard deviation of earnings before interest and tax (scaled by total assets) over the past 5 years. We include the Herfindahl-Hirschman index (HHI), a commonly accepted measure for, market concentration, to control for wage differences based on different competitive environment across industries. Michaelides (2010) finds that in highly competitive industries (low HHI-scores), employees are less likely to be exploited by employers. We therefore expect higher wages in less concentrated industries.

## 7- Findings

In order to analysis hypothesis, descriptive statistics have been used and then Eviews7 Software has been applied. First, static test through Lyn – Levine method has been considered and then in order to examine variance anisotropy and significant fixed effects method through F statistics test and Hausman test and finally regression model was analyzed through Fixed Effect Method. Then according to analysis Regression

Model from research process and examine significant Regression Model and coefficients variables have been performed for testing the hypothesis.

Table (1) central dispersion parameters of each variable

| Variable | Min | Max | Mean | Std Dev |
|---|---|---|---|---|
| Human capital cost | 2.2168 | 23.7452 | 12.7684 | 3.6295 |
| Financial Leverage | 0.1362 | 0.4947 | 0.2632 | 0.1691 |
| Unemployment rate | 0.0912 | 0.1296 | 0.1025 | 0.0325 |
| Firm size | 5.0241 | 41.4527 | 19.6507 | 4.2541 |
| Employee productivity | 2362.965 | 52143.265 | 21415.965 | 125.2653 |
| Market to book ratio | 0.4152 | 3.5147 | 1.4752 | 0.6258 |
| Profitability | 0.0153 | 0.1925 | 7.1502 | 0.1253 |
| Tangibility | 0.1547 | 0.4965 | 0.2162 | 0.0956 |
| Earnings volatility | 0.0546 | 0.2756 | 0.1632 | 0.0452 |
| Herfindahl index | 0.0442 | 0.7215 | 0.3754 | 0.1265 |

Research findings of each hypothesis as follows:

### 7-1. finding of hypothesis (1):

$H_0$:  There isn't a significant relationship Between Financial Leverage and Unemployment rate with Human capital cost.

$H_1$:    There is a significant relationship Between Financial Leverage and Unemployment rate with Human capital cost.

Table (2) Regression test for the first hypothesis

| Variable | R | STD | T Statistics | SIGN |
|---|---|---|---|---|
| Fixed | 0.187 | 0.645 | 2.956 | *0.026 |
| Financial Leverage | -1.625 | 0.274 | -3.487 | *0.001 |
| Unemployment rate | -0.418 | 0.669 | -4.297 | *0.000 |
| Financial Leverage*Unemployment rate | -0.351 | 0.285 | -4.134 | *0.000 |
| Firm size | 3.011 | 0.487 | 1.629 | 0.075 |
| Employee productivity | 0.312 | 0.316 | 3.165 | *0.016 |
| Market to book ratio | 1.159 | 0.284 | 3.222 | *0.007 |
| Profitability | 1.753 | 0.555 | 4.007 | *0.000 |
| Tangibility | 0.258 | 0.705 | 0.285 | 0.085 |
| Earnings volatility | -0.654 | 0.264 | -1.548 | 0.052 |

*Error level of 5%

Table (3) capability of explanation and overall significant of model

| R | | DW | ANOVA | |
|---|---|---|---|---|
| Determination Coefficient | Adjusted Determination Coefficient | | F | SIGN |
| 0.525 | 0.518 | 1.698 | 12.336 | **0.000 |

**Error level of 1%

According to table (3) as the amount statistic Dourbin - Watson test is between 1.5 - 2.5, So the assumption of the lack of correlation between errors is accepted and the Regression model can be used. consider to the significant amount of F(12.336) test error of less than 0.01% can be concluded that research Regression model consistent with dependent, control and independent variables is a adequate model and set of independent and control variables able to explain changes in human capital cost. The amount of adjusted determination coefficient is 51.8% which indicate that 51.8% of changes in total research dependent variable depend on independent and control variables in this model. Also impact coefficient of Financial leverage variable on Human capital cost is equal to -1.625 that implies the existence of negative and inverse relationship between Financial leverage and Human capital cost, this explain that if Financial leverage increases, Human capital cost of the company will decrease. The impact coefficient of Unemployment rate variable on Human capital cost is equal to -0.418 that implies the existence of negative and inverse relationship between Unemployment rate and Human capital cost, this explain that if Unemployment rate increases, Human capital cost of the company will decrease. On the other hand, the effect of synergetic ratio for financial leverage and Unemployment rate on Human capital cost is equal to -0.351 that implies the existence of negative and inverse effects of synergic ratio for financial leverage and Unemployment rate on Human capital cost.

## 7-2. Finding of Hypothesis (2):

$H_0$: There isn't a significant relationship Between Financial Leverage and Human capital cost.

$H_1$: There is a significant relationship Between Financial Leverage and Human capital cost.

Table (4) Regression test for the first hypothesis

| Variable | R | STD | T Statistics | SIGN |
|----------|-----|-----|--------------|------|
| Fixed | 0.214 | 0.526 | 1.914 | *0.015 |
| Financial Leverage | -0.257 | 0.188 | -2.036 | *0.009 |
| Firm size | 0.411 | 0.602 | 2.065 | *0.009 |
| Employee productivity | 0.014 | 0.478 | 1.521 | 0.053 |
| Market to book ratio | 0.102 | 0.227 | 1.032 | 0.096 |
| Profitability | 0.004 | 0.474 | 1.154 | 0.084 |
| Tangibility | 0.099 | 0.622 | 1.936 | *0.011 |
| Earnings volatility | -0.112 | 0.269 | -2.125 | *0.007 |
| Herfindahl Index | 0.028 | 0.196 | 0.574 | 0.254 |

*Error level of 5%

Table (5) capability of explanation and overall significant of model

| R | | DW | ANOVA | |
|---|---|----|-------|---|
| Determination Coefficient | Adjusted Determination Coefficient | | F | SIGN |
| 0.441 | 0.432 | 1.622 | 7.025 | **0.000 |

**Error level of 1%

According to table (5) as the amount statistic Dourbin - Watson test is between 1.5 - 2.5, so the assumption of the lack of correlation between errors is accepted and the Regression model can be used. consider to the significant amount of F(7.025) test error of less than 0.01% can be concluded that research Regression model consistent with dependent, control and independent variables is a adequate model and set of independent and control variables able to explain changes in human capital cost. The amount of adjusted determination coefficient is 43.2% which indicate that 43.2% of changes in total research dependent variable depend on independent and control variables in this model. Also impact coefficient of Financial leverage variable on Human capital cost is equal to -0.257 that implies the existence of negative and inverse relationship between Financial leverage and Human capital cost, this explain that if Financial leverage increases, Human capital cost of the company will decrease.

### 7-3. Finding of Hypothesis (3):

$H_0$: There isn't a significant relationship Between Unemployment rate and Human capital cost.

$H_1$:   There is a significant relationship Between Unemployment rate and Human capital cost.

Table (6) Regression test for the first hypothesis

| Variable | R | STD | T Statistics | SIGN |
|---|---|---|---|---|
| Fixed | 0.227 | 0.369 | 1.932 | *0.011 |
| Unemployment rate | -0.329 | 0.148 | 2.385 | *0.003 |
| Firm size | 0.106 | 0.524 | 1.245 | 0.095 |
| Employee productivity | 0.047 | 0.306 | 1.439 | 0.074 |
| Market to book ratio | 0.269 | 0.412 | 0.962 | 0.124 |
| Profitability | 0.227 | 0.103 | 2.069 | *0.009 |
| Tangibility | 0.003 | 0.478 | 1.662 | 0.055 |
| Earnings volatility | -0.199 | 0.202 | -2.022 | *0.009 |
| Herfindahl Index | 0.021 | 0.388 | 1.952 | *0.015 |

*Error level of 5%

Table (7) capability of explanation and overall significant of model

| R | | DW | ANOVA | |
|---|---|---|---|---|
| Determination Coefficient | Adjusted Determination Coefficient | | F | SIGN |
| 0.574 | 0.566 | 1.748 | 7.265 | **0.000 |

**Error level of 1%

According to table (7) as the amount statistic Dourbin - Watson test is between 1.5 - 2.5, So the assumption of the lack of correlation between errors is accepted and the Regression model can be used. consider to the significant amount of F(7.265) test error of less than 0.01% can be concluded that research Regression model consistent with dependent, control and independent variables is a adequate model and set of independent and control variables able to explain changes in human capital cost. The amount of adjusted determination coefficient is 56.6% which indicate that 56.6% of changes in total research dependent variable depend on

independent and control variables in this model. The impact coefficient of Unemployment rate variable on Human capital cost is equal to -0.329 that implies the existence of negative and inverse relationship between Unemployment rate and Human capital cost, this explain that if Unemployment rate increases, Human capital cost of the company will decrease.

Table (8) summary of results research hypothesis test

| Hypothesis | Description of hypothesis | Test results |
|---|---|---|
| First | There is a significant relationship between Financial leverage and Unemployment rate with Human capital cost | Accepted |
| Second | There is a significant relationship between Financial leverage and Human capital cost | Accepted |
| Third | There is a significant relationship between Unemployment rate and Human capital cost | Accepted |

## 8- Conclusion

The current study investigate the relationship between financial leverage and unemployment rate with human capital cost for 95 companies listed Tehran stock exchange during 2008-2012. The regression analyses show that there is a negative significant relationship between financial leverage and unemployment rate with human capital cost. The results of the study are in line with Hovakimian & Li (2011), Blenchard (1991) and differ from Akyol & Veroijmeren (2013). The results of the current study may improve management decisions and is usefull for investors, stockholders and researchers. So it can help to planning about debt ratios and human resource costs. In order to compensation of unemployment risk and satisfy employees, the employer must control financial leverage and spend more costs for workforce with the perspective of unemployment and job option shortage.

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