Do rating agencies impound workforce human capital information into default risk assessments?

Abstract

No accounting policy exists to mandate that employee-level human capital (ELHC) must be included on Annual Reports. Because structured ELHC information is rare, the association between ELHC and credit ratings (risk) is not demonstrated in the extant literature. South Korea is a unique instance where ELHC information is included on Annual Reports as a rule. Using a sample of 9,273 Korean listed firm-year observations from 2011-2020, we demonstrate that employee tenure, a ELHC proxy, has a positive association with credit ratings. The results infer that credit rating agencies interpret that employee tenure improves a firm's potential to survive a business cycle. The study also demonstrates that continuous employment has a more positive effect on credit ratings for NonBig4 and smaller clients/firms, compared to Big4 and larger clients/firms. The study contributes to the literature by demonstrating that firms that retain employees are less likely to default, implying that if firms look after employees, there are economic advantages. From a policymaking perspective, the study demonstrates the information advantage of reporting non-financial ELHC information on Annual Reports, on a structured/numerical basis.

Keywords: continuous employment tenure, credit ratings/risk, human capital; non-financial reporting

1. Introduction

A credit rating is considered an economically meaningful representation of whether a firm is likely to survive a business cycle (Alissa et al., 2013; Boot et al., 2006; Carey and Hrycay, 2001; Kraft, 2014). From a human capital perspective, management ability/quality is shown to reduce a firm's default risk potential (Ashbaugh-Skaife et al., 2006; Bhojraj and Sengupta, 2003; Cornaggia et al., 2017; Crouhy et al., 2001). Moreover, the adoption of progressive employment policies can have a positive effect on credit ratings (Attig et al., 2013; Bauer et al., 2009; Habib and Ranasinghe, 2022; Verwijmeren and Derwall, 2010), suggesting that employee-level human capital (ELHC) can influence credit risk. However, within the accounting framework, there is no statutory policy mandating that ELHC information must be disclosed on financial reports. Due to this policy oversight, inferences about the association between workforce/ELHC quality and a firm's ability to survive a business cycle is limited. As a result of this academic caveat, the main purpose of this study is to answer the following question: '*In a unique situation where numerical ELHC information is made available (South Korea), would credit rating agencies impound the continuous employee tenure of a firm's workforce into credit ratings assessments?'.*

The study has several motivations. First, many argue that a higher propensity to disclose intellectual/human capital information can enhance financial reporting quality (Dumay, 2016; McCracken et al., 2018; Power, 2001). However, firms can be motivated to disclose favourable ELHC information in an attempt to manage their corporate image (Abeysekera and Guthrie, 2004, 2006; Guthrie and Parker, 1989; Michelon, 2015). On the other hand, following the introduction of Article 159 in South Korea, all listed firms must report/disclose numerical ELHC information, including continuous employment, on a comparable firm/year basis (see section 2.2). By providing

empirical evidence that numerical ELHC is used by credit ratings for decision making purposes, the study can offer policymaking suggestions to legislators about the benefits of mandating that all firms report numerical ELHC information on Annual Reports. As an extension, the study can speak to the limitations of the current practice of disclosing ELHC information on an unstructured basis. Second, Stubbs and Higgins (2018) surmise that empirical evidence demonstrating the benefits of non-financial reporting (NFR) information is somewhat lacking. The NFR literature can therefore be extended with evidence that numerical continuous employment (NFR/ELHC) is included in the default risk assessments of important market participants, such as credit rating agencies.

Third, management can make two decisions when it comes to employee investment. First, because human capital is a firm's most valuable asset (Curado et al., 2011; Guthrie et al., 2012), management may perceive that investment in retaining employees can enhance organizational effectiveness. On the other hand, because human capital investment is an expense, management also have an incentive to reduce human capital expenses to enhance net income (Coff, 1999; Flamholtz, 1999; Merino, 1993; Stovall and Neill, 2017). This type of cost reduction is widely demonstrated in 2022-23, with very large reductions to employment at Twitter, Meta, amongst others. To the best of our knowledge, no previous study provides evidence to support the assertion that employee retainment influences default risk. Whilst there may be short-term financial advantages when reducing employment costs, we envision that firms with high levels of employee turnover have a lower probability of surviving a business cycle. Alissa et al., (2013) surmises that there are various economic and reputational benefits associated with credit rating status. The study is therefore motivated to inform management that developing strategies to retain employees can provide firms with economic and reputational advantages, associated with higher credit rating status.

Fourth, Big4 audit firms are shown to have higher (lower) levels of audit quality (risk) compared to NonBig4 audit firms (Basu et al., 2001; DeAngelo, 1981; Fung et al., 2016; Khurana and Raman, 2004; Lisic et al., 2015). Moreover, larger firms are shown to be more likely to survive the business cycle compared to smaller firms (Carey and Hrycay, 2001; Kraft, 2014). Therefore, there is the potential that continuous employment has an incrementally more positive effect on (risker) NonBig4/smaller client/firms' ability to survive, compared to (less risky) Big4/larger client/firms. We are therefore motivated to discover whether the relationship between continuous employment and credit ratings is consistent for Big4/NonBig4 clients and large/small firms. Inferences about the above can extend the literature by demonstrating that credit rating agencies are nuanced in their continuous employment risk assessments, based on client/firm (Big4/NonBig4, large/small) characteristics.

Fifth, the study is motivated to explain how ELHC reporting quality effects society. It is expected that technologies associated with Industry 4.0 will increase efficiency, as well as unemployment (David, 2016). To protect employee welfare, labour unions require human capital information for collective bargaining purposes (Craft, 1981; Maunders and Foley, 1984; Mautz, 1990; Ogden, 1985). However, in countries with low ELHC reporting quality, such as the U.K. (Lim and Mali, 2021; Striukova et al., 2008; Roslender and Stevenson, 2009; Vandemaele et al., 2005) and U.S. (Omens et al., 2021), unless ELHC information is disclosed on a voluntary basis, it is not possible for market participants to determine the propensity of firms to reduce the quality of employment conditions. On the other hand, the numerical ELHC reporting framework implemented by South Korea provides employees, society, investors, amongst others, with transparent information to make inferences about ELHC quality and sustainability. Taken together,

ELHC information opaqueness can be considered an agency problem (Kim and Taylor, 2014).

Using a sample of Korean listed firms over a sample period covering 2011-2020, a positive relationship between credit ratings and continuous employment is demonstrated. The result implies that rating agencies consider continuous employment as an important form of workforce intellectual capital that reduces the potential for default risk. When the sample is divided into Big4/NonBig4 and large/small samples, we find that the effect of continuous employment has an incrementally higher positive effect on credit ratings, hence negative effect of credit risk for (risker) NonBig4 and small clients/firms, compared to (less risky) Big4 and larger clients/firms. We also repeat the analysis after replacing continuous employment with male and female continuous employment, and continue to find consistent results. Moreover, additional analysis including ESG variables, FamaMacBeth (1973) two-step, 3 Stage least square procedures, and analysis after clustering standard errors (at firm level/controlling for firm fixed effect) are conducted. Regardless of the robustness test procedure, consistent results are demonstrated. To avoid unnecessary repetition, contributions associated with the aforementioned empirical results are provided in the conclusion section.

This paper proceeds as follows. In section 2, we review previous literature and develop the hypothesis. In section 3, we discuss the research model and sample selection criteria. Section 4 provides the results of empirical analysis. In section 5, the results of additional analysis are listed. In section 6 we conclude, provide a discussion about empirical findings, list limitations, avenues of future research and policy implications.

2. Literature Review and hypothesis development

2.1. Literature review: credit ratings' association with human capital

Credit ratings are issued by analysts as an indication of a firm's likelihood to survive a business cycle (Carey and Hrycay, 2001). It is well established that financial information taken from Annual Reports (including size, stability, leverage, liquidity and financial performance) are credit ratings determinants (Alissa et al., 2013; Ashbaugh-Skaife et al., 2006; Kraft, 2014; Hovakimian et al., 2009; Kaplan and Urwitz, 1979; Lim and Mali, 2018; Ziebart and Teiter, 1992). Despite infamous high-profile financial defaults, a credit rating is shown to be a robust indicator of a firm's likelihood to survive a business cycle (Bharath, 2008; Dhaliwal et al., 2011; Francis et al., 2005). Firms with higher credit ratings benefit from numerous comparative advantages including lower borrowing costs, better terms from suppliers and reputational advantages, amongst others (Alissa et al., 2013; Blume et al., 1998; Dichev and Piotroski, 2001; Ederington and Goh, 1998). Thus, *ceteris paribus,* firms have an incentive to target the highest credit rating possible.

In additional to evaluating financial indicators, credit rating agencies adjust credit ratings using 'soft' data collected from interviews with management, from media, and financial reports (Bozanic and Kraft, 2015; Kraft, 2014). There is evidence that management's propensity to adopt corporate governance has a positive effect on credit ratings (Ashbaugh-Skaife et al., 2006; Bhojraj and Sengupta, 2003; Crouhy et al., 2001). Kraft (2014) reports that credit rating analysts adjust (increase) a firm's credit rating status based on effective management. Mali and Lim (2019) show that firms with managers that achieve relatively higher operational performance enjoy higher credit rating. Cornaggia et al. (2017) report that management capability decreases potential default risk. Furthermore, the education of management and directors is shown to reduce credit risk (Papadimitri et al., 2020). Taken together, the extant literature shows that over

and above established financial fundamentals, information associated with management human capital quality is impounded into credit rating/risk assessments.

However, due to limitations associated with mainstream financial reports, the relationship between ELHC and credit ratings is not well-established. First, the Annual Report is considered the primary accounting document for information users. Historically, it has been argued that human capital should be included as an asset value on the balance sheet (Flamholtz, 1971; Hekimian and Jones 1967; Hermanson, 1963, 1964). However, because employees cannot be utilised as a resource, as per the definition of an asset, including a numerical value for employees on the balance sheet is considered problematic (Flamholtz, 1974, 1999). Second, whilst some consider the CSR report to be a useful business sustainability benchmark (Leung and Gray, 2016; Rao and Lilit, 2016; Wilburn and Wilburn, 2013), critics argue that (human capital) information included on CSR reports can be symbolic (Cho et al., 2012; Hopwood, 2009; Merkl-Davies and Brennan, 2007). Third, the Integrated Report can be considered a useful breakthrough in intellectual/human capital reporting (Dumay et al., 2016). However, the adoption of Integrated Reporting is slower than expected (De Villiers and Sharma, 2020; Flower, 2015). As a result, ELHC information currently exists outside of the mainstream accounting framework, hence a form of NFR information.

The NFR literature asserts how information that is currently excluded from the mainstream accounting framework may be informative to stakeholders (Baboukardos, 2017; Baboukardos and Rimmel, 2016; Mahadeo et al., 2011; Stolowy and Paugam, 2018). On a longitudinal basis, Duff (2018) and Guthrie et al. (2006) provide evidence that the propensity for firms to voluntary disclose human information is increasing. Firms with a relatively higher propensity to disclose human capital information are shown to benefit from lower borrowing costs (Mangena et al., 2010; Salvi et al., 2020). Likewise, Cao et al.

(2015) shows that a firm's reputation as an employer has a positive effect in reducing borrowing costs. Cormier et al. (2009) infer that information asymmetry associated with low levels of human capital disclosures increases stock price volatility. Furthermore, firms that publish ELHC via Integrated Reports are shown to enjoy lower borrowing costs (García-Sánchez and Noguera-Gámez, 2017). Taken together, the extant literature suggests that firms with a high propensity to disclose human capital information can be perceived as having lower business risk.

However, Omens et al. (2021) provide evidence that human capital disclosures are uncommon for the top 100 S&P (U.S.) firms. They surmise that limited guidance by the SEC is a contributing factor to low human capital reporting quality. Whilst the U.K. government has passed legislation to improve human capital reporting quality (DTI, 2001; CIPD, 2017), human capital reporting quality remains relatively low (Lim and Mali, 2021; Striukova et al., 2008; Roslender and Stevenson, 2009; Vandemaele et al., 2005). Management in the U.K./U.S. can adopt one of two strategies when it comes to ELHC reporting. Firms can choose to disclose ELHC information over and above mandatory requirements, as a legitimacy strategy (Guthrie et al., 2004, 2006). On the other hand, firms can choose to disclose only favourable ELHC information to promote their own self-interest (Abeysekera and Guthrie, 2004, 2006; Guthrie and Parker, 1989; Michelon, 2015; Tinker, 1980; Tinker and Neimark, 1987). Lim and Mali (2021) report that relative to South Korea (see section 2.2), British firms have a tendency to disclose ELHC information using positive narrative, whilst excluding numerical information. Taken together, due to the aforementioned divergence in reporting expectations internationally, the association between ELHC quality and firm performance is opaque in leading economies.

Because numerical ELHC information is lacking within the mainstream accounting framework, the propensity of firms to provide business information using

ELHC narrative/qualitative disclosures is the methodological approach most commonly used to explain the relationship between ELHC and credit ratings. Bauer et al. (2009) reports that the ability of firms to manage human capital has a direct effect on credit ratings, inferring that adequate management of employee relations has a positive effect on credit ratings. Attig et al. (2013) provide evidence that non-financial information associated with workforce diversity and employee relations have a positive effect on credit ratings. Verwijmeren and Derwall (2010) provide empirical evidence that employee wellbeing is associated with a firm's default risk potential. Habib and Ranasinghe (2022) report that because labour is an important factor in a firm's production function, ineffective employee management has a negative effect on credit rating status. Furthermore, Chintrakarn et al. (2020) provide evidence that the adoption of adopt LGBT-supportive policies enhances a firm's credit ratings. Taken together, the disclosure of policy information associated with ELHC is shown to influence a firm's potential to survive a business cycle. However, because ELHC disclosure information is not comparable *per se*, the extent to which ELHC quality can influence credit risk is a cause of academic tension. Thus, the literature can be extended by studies that demonstrate the association between a firm's default risk potential and perceived ELHC quality, using numerical/relative values.

2.2 South Korean human capital reporting quality

Following the implementation of Article 159 in 2010, all South Korean firms must report numerical employee/management data on Annual Reports. Thus, continuous employment is listed on a relative firm-year basis, in a similar format to assets, revenue, leases, etc. Thus, South Korea can be considered an ideal environment to link continuous employment tenure and credit ratings (risk), because the demographics of two firm's

workforces can be compared on a relative basis. The extant literature identifies three reasons South Korean legislators have adopted a strategy to mandate that firms transparently disclose numerical ELHC information. First, South Korea lacks natural resources. Following the Korean War, to enhance the economy, a national productivity strategy adopted by the government has been to invest in human capital (Kim et al., 2010; Lee, 2005). Article 159 can be considered a by-product of South Korea's human capital / national productivity strategy. Second, powerful South Korean labour unions are in a position to demand that workforce/employee level information be made publicly available (Durazzi et al., 2018). Third, weak regulation is shown to be a contributing factor leading to the 1997 Asian (Korean) Financial crisis (La porta et al., 1997; Woods, 2013). Thus, to restore public confidence in the accounting profession, and encourage international investment, South Korea has been an early adopter of regulatory policies to enhance financial reporting transparency (Choi et al., 2017; Mali and Lim, 2018, 2020, 2021i 2021ii).

2.3. Hypothesis development

Meta analysis studies provide evidence of a statistically insignificant association exists between human capital and firm performance (Crook et al., 2011; Rouse and Daellenbach, 1999). The insignificant association between firm performance and human capital is explained by the trade-off that exists between human capital as an investment, as opposed to minimising employee/salary expenses to maximise profit (Merino, 1993; Stovall and Neill, 2017). Salary expense is likely be linked to employee tenure. Thus, increasing employee tenure may be perceived by credit rating agencies as an instance of a firm's inability to turnover staff, signalling ineffective human resource management. If credit rating agencies would interpret employee tenure as above,

continuous employment can be expected to have a negative (insignificant) association with credit ratings.

However, based on two assertions, it is hypothesized that continuous employment tenure will have a positive effect on a firm's ability to survive the business cycle. First, resource-based theory suggests that whist firms are homogenous, heterogenous human capital quality provides firms with a comparative advantage (Barney et al., 2001; Branco and Rodrigues, 2009; Edvinsson and Sullivan, 1996; Hitt et al., 2016; Wernerfelt, 1984). Employee quality determinants such as satisfaction with an employer, commitment, loyalty, motivation, amongst other are associated with employee tenure (Kline and Peters, 1991; Humphrey et al., 2009). Employee tenure is also associated with firm-level innovation (Sun and Ghosal, 2020), knowledge accumulation and productivity (Becker, 2009; Penrose, 1959; Grant, 1996). On the other hand, employee turnover is associated with a loss of business knowledge and negative financial performance (Hancock et al, 2013; Hausknecht and Trevor, 2016; Kacmar et al., 2006; Shaw et al., 2005). Therefore, we envision that credit ratings analysts will interpret continuous employment from a resource-based theory perspective. More specifically, that retaining employee knowledge (amongst other value adding characteristics) can establish a comparative advantage, that reduces a firm's default risk potential.

Second, firms that have developed an environment to retain employees can be perceived as meeting; the compensation (Hausknecht et al., 2009; Hung et al., 2018; Pitts et al.,2011); professional development (Kyndt, 2009; Kroon and Freese, 2013) work-life balance (Clarke, 2001; Kossivi et al., 2016) and social/relationship expectations of employees (Wells and Thelen, 2002). Employee retainment is also shown to be associated with managerial effectiveness in terms of leadership and support (Kaliprasad, 2006; Gberevbie, 2008; Tymon et al., 2011). Whilst there are numerous reasons why an

employee may leave a firm, employee turnover can provide insights about overall managerial (human resource planning) effectiveness (Das and Baruah, 2013). Based on the above, rating agencies are likely to perceive that firms that have retained employees, have been successful in implementing effective human resource planning. Taken together, the following hypothesis is introduced:

H1. Workforce continuous employment tenure has a positive effect on credit ratings.

3. Research design

3.1. Research Model

In equation (1), the main OLS regression model is listed.

$$Credit_{Ratings_{i,t}} = \beta_0 + \beta_1 Continuous_{Emp_{i,t}} + \beta_2 Firm_{Size_{i,t}} + \beta_3 Big4_{i,t} + \beta_4 PBR_{i,t} + \beta_5 WACC_{i,t} + \beta_6 Lev_{i,t} + \beta_7 Borrowing_{portion_{i,t}} + \beta_8 ROA_{i,t} + \beta_9 BigOwn_{i,t} + \beta_{10} Foreign_{i,t} + ID + YD + \varepsilon_{i,t} \quad (1)$$

In Table 1, variable estimation details are listed. Credit ratings, the dependent variable, are the ordinal ranking of credit ratings from NICE, the largest Korean credit rating agency. The ordinal ranking is from 1-10. A full list of notches and credit ratings is included in Panel B. The credit rating score of 10 is the highest ranking implying the lowest potential for financial default. The value of 1 represents the highest potential for default. The main variable of interest, continuous employment is the number of years on average the firm's employees have worked for a firm on a continuous basis. To compute average years of continuous employment, two pieces of information are needed. First, the date an employee was hired. Second, the base date: the date of resignation/retirement for retired employees, or the current financial year for retained employees. Continuous employment is calculated as follows. First, firms calculate continuous employment tenure

by deducting the date of employment from the base date. Second, firms compute the average continuous employment years for every department. Third, they report the average years of continuous employment for the whole company[1]. As expressed in our hypothesis, we expect to find a positive association between continuous employment and credit ratings.

<Insert Table 1 roughly here>

Kraft (2014) shows that firm size influences credit ratings because larger firms are more likely to have the capability to survive business shocks. Thus, we expect a positive association between credit ratings and firm size. As an extension, firms with a higher price to book ratio (*PBR*) can be considered as less likely to default. It is accepted that the audit quality of Big4 audit firms is higher than NonBig4 audit firms (Basu et al., 2001; DeAngelo, 1981; Fung et al., 2016; Lisic et al., 2015). Thus, clients audited by Big4 auditors are relatively larger and less likely to financially default compared to clients audited by NonBig4 auditors. Various studies show that firm borrowing cost, leverage and indebtedness have a negative influence on credit ratings, because they have a direct effect on a firm's ability to survive the business cycle (Kraft, 2014; Hovakimian et al., 2009; Kaplan and Urwitz, 1979). Thus, a negative association between business risk and credit ratings is expected. Alissa et al. (2013) and Ashbaugh-Skaife et al. (2006) provide

[1] For instance, firm A has two employees, where employee1 (department i) starts working on the 1st of January in 20X0, and resigns on the 31st of December, 20X1. Employee2 (department ii) is hired on the 1st of January in 20X0, but still works for the company as of 5th of July in 20X3, and the most recent date of financial statements is the 31st of December in 20X2. Firm A can compute the employee1 (retiree) tenure by calculating the difference between the 1st of January, 20X0 and the 31st of December, 20X1 (2years). Firm A also needs to compute the employee2 (incumbent) tenure by calculating the difference between the 1st of January, 20X0 and the 31st of December, 20X2 (3years). The firm now can compute the average years of continuous employment by averaging these two numbers (2.5years).

evidence that firm ownership influences governance and credit risk. Thus, we expect that as the power of the largest foreign and domestic shareholders increase, they are likely to be in a position to demand governance structures that reduce firm risk. It is accepted that firms with higher credit ratings are better performing (Ziebart and Teiter, 1992; Mali and Lim, 2019). Thus, a positive association between ROA and credit ratings are expected.

Finally, to control for time variation over the 2011-2020 sample period, we include a year dummy variable to control for year fixed effects. A dummy variable is also included for each industry, per SIC code. To ensure that outliers do not influence the predictive validity of regressions, data is winzorized at the top and bottom 1% levels.

3.2. Sample selection

In Table 2, Panel A, the sample selection process is listed. All data is downloaded from established Korean databases, TS-2000, New KISVALUE, and DataGuide 5.0. We initially download 22,701 firm-year observations for Korean firms listed on the Korean stock Exchange (KRX). A single firm-year observation represents a firm's data in a specific year. 6,875 observations are excluded from financial firms and/or firms with insufficient financial data to conduct the analysis. Next, we exclude an additional 6,553 firm year observations for firms without credit rating and continuous employment data, leaving a final sample of 9,273. The sample selection period is 2011-2020. This period has been selected because from 2011, continuous employment information has become more regularly available on Annual Reports. In Panel B, we provide the results of credit rating scores from 2011 to 2020. Overall, credit ratings have remained constant, over the sample period. Panel C shows that continuous employment is decreasing.

<Insert Table 2 roughly here>

4. Empirical results

4.1. Descriptive Statistics and Pearson Correlations

In Table 3, sample data information, descriptive statistics as well as Pearson correlations are provided. As shown in Panel A, the sample can be considered normally distributed due to mean and median levels being almost at parity. Standard deviations are also as expected. The lowest level of continuous employment is 1.4 years. The highest is 19 years. The mean/median of Credit rating scores are 7.01/6.10, and the maximum/minimum values are 10/2 respectively. In Panel B, all correlations between the dependent variable and independent/control variables are significant. As inferred in the main hypothesis, continuous employment has a positive correlation with credit ratings (0.07***). Firm size (011***), Big4 audit selection (0.06***), PBR (0.05***), ROA (0.42***) and ownership structure (Bigown: 0.16***, Foreign: 0.20***) are all shown to have a positive association with credit ratings. Operational risk (-0.11***), indebtedness (-0.63***) and borrowing proportion (-0.46***) have a negative (positive) association with credit ratings (risk).

<Insert Table 3 roughly here>

4.2. Multivariate analysis

In Table 4, the results of the main analysis are included. Based on our hypothesis, we consider that after controlling for known credit risk determinants, there is a significant and positive association between credit ratings and continuous employment. The results demonstrate that as firms are able to retain their employees on a consistent basis, they are likely to be rewarded by rating agencies with higher credit

ratings (Coeff 0.02, t value 4.23). The results allow us to accept our hypothesis. All control variables show the predicted sign. Firm size (Coeff 0.09, t value 6.98), Big4 (Coeff 0.06, t value 2.22), PBR (Coeff 0.06, t value 2.22), financial performance (Coeff 0.03, t value 28.68), large domestic (Coeff 0.66, t value 7.70) and foreign ownership (Coeff 0.97, t value 6.40) all have a positive association with credit ratings. Firm specific risk factors such as WACC (Coeff -0.04, t value -5.13), leverage (Coeff -0.05, t value -59.91) and borrowing (Coeff -1.49, t value -25.50) are all negatively associated with credit ratings.

<Insert Table 4 roughly here>

5. Additional analysis

5.1. Big4 / NonBig4

Big4 clients are shown to be larger than NonBig4 clients in South Korea (Mali and Lim, 2022). Moreover, it is established that the audit quality of Big4 audit firms is higher compared to NonBig4 audit firms (Basu et al., 2001; DeAngelo, 1981; Fung et al., 2016; Khurana and Raman, 2004; Lisic et al., 2015). Therefore, based on the assertions introduced in the hypothesis, the association between continuous employment and credit ratings (risk) can be different for Big4/ NonBig4 clients. More specifically, because NonBig4 clients are likely to be smaller; have lower audit quality; and less capable of retaining/attracting employees, hence perceived to be risker, the following hypothesis is introduced: *retaining business knowledge via employee tenure can have an incrementally more positive effect on a NonBig4 client's ability to survive a business cycle.*

<Insert Table 5 roughly here>

In Table 5, Panel A, mean difference tests are conducted. The results show that Big4 clients have higher credit ratings (t value 6.12***) and are more likely to retain employees (22.57***), implying NonBig4 clients are risker than Big4 clients. In Panel B, regression analysis is provided for Big4 and NonBig4 samples. In column 2 and 3, it is shown that the association between continuous employment and credit ratings is positive for both Big4 (Coeff 0.01, t value 2.07) and NonBig4 clients (Coeff 0.02, t value 4.09). However, the association is more pronounced for NonBig4 clients, consistent with the aforementioned hypothesis. In column 1, we include a dummy variable (Big4) that takes the value of 1 if a client is audited by a Big4 auditor, 0 otherwise (NonBig4). The Conti_Emp* Big4 interaction term is negative (Coeff -0.02, t value -2.62), inferring that the effect of retaining employees has an incrementally more positive effect on a NonBig4 client's credit rating, as expected.

5.2. Larger firms (KOSPI) vs smaller firms (KOSDAQ)

Next, the sample is divided into two other groups known to have different levels of risk, based on firm size. The South Korean stock exchange (KRX) is subdivided into two exchanges. Larger firms are listed on the KOSPI index. Smaller firms are listed on the KOSDAQ index. Because of economies of scale, larger firms are more likely to have the capability to survive business shocks (Carey and Hrycay, 2001; Kraft, 2014), and potentially more likely to retain employees. Thus, we hypothesize: *for smaller (KOSDAQ) firms, with relatively higher levels of employee turnover, retaining employees will have a more positive effect on credit ratings, compared to larger (KOSPI) firms.*

<Insert Table 6 roughly here>

In Table 6, Panel A, as can be expected, larger KOSPI firms are shown to have higher credit ratings (5.04***) and higher levels of continuous employment (55.13***). In Panel B, KOSPI, KOSDAQ and full sample regression analyses are introduced. The results show that for large KOSPI firms, there is no relationship between credit ratings and continuous employment. However, for smaller KOSDAQ firms, the results are statistically significant (Coeff 0.03, t value 5.18). The results imply that smaller firms are more negatively affected by employee turnover compared to larger firms, consistent with the above hypothesis. In column 1, the Market dummy variable takes the value of 1 for KOSPI (large) firms, 0 for (small) KOSDAQ firms. The interaction term Continious_Emp*Market captures the difference in credit rating changes for larger and smaller firms, as a result of employee tenure. The results demonstrate that based on continuous employment tenure increasing, smaller (KOSDAQ) firms have an incrementally higher credit rating status increase, relative to larger (KOSPI) firms (Coeff -0.02, t value -2.51). The results provide further evidence that credit rating agencies perceive the credit risk associated with employee retainment differently for specific groups.

5.3. Male/female continuous employment

Next, we test whether credit rating analysts interpret the continuous employment of male and female employees differently. Increasingly, gender studies demonstrate that having balance in the workforce can have a positive effect on organizational effectiveness (Cho et al., 2020; Mirza et al., 2012; Smith et al., 2006; Vo and Phan, 2013). Thus, given that in South Korea gender equality is lagging behind many Western countries (Choo, 2016), there is the potential that credit rating agencies include female continuous

employment as an additional risk proxy that influences credit rating assignment. On the other hand, the relationship may be equal because rating agencies do not differentiate.

<Insert Table 7 roughly here>

In Table 7, to demonstrate whether there is an equal relationship between continuous employment and credit ratings for male and female employees, we use both male and female continuous employment tenure. This is achieved by using variables that represent the male continuous employment average (*Male Continuous Emp*) and female continuous employment average *(Female Continuous Emp)* respectively. In Panel A, the results show that the average continuous tenure of male employees (7.38) is almost 2 years longer than female employees (5.40). In Model 1, the results show that the association between credit ratings and male continuous employment is positive (Coeff 0.01, t value 3.85). In Model 2, the results show that the association between credit ratings and female continuous employment is positive, but more pronounced (Coeff 0.02, t value 3.90). The results show that regardless of whether we use male or female continuous employment tenure, results are consistent.

5.4. Fama-MacBeth analysis

In this section, we conduct additional tests to demonstrate model robustness. In the main analysis, dummy variables are used to control for industry and year fixed effects. However, to add further robustness, we conduct 3 additional analyses using techniques that are established as providing enhanced predictive validity compared to simply dummy variables. Untabulated results are reported for brevity, for FamaMacBeth (1973) yearly regression (Coeff: 0.015***, t value: 5.73, Adj R2: 0.55), FamaMacBeth two-step procedure (Coeffi: 0.015***, t value: 7.38, Adj R2: 0.55) and 3 Stage least square

procedure (Coeff: 0.016***, t value: 3.85, Adj R2: 0.54). The association between continuous employment and credit ratings are all qualitatively indifferent from the main analysis for all robustness tests, implying that the model, variable selection criteria and results have a high degree of predictive validity.

5.5. Clustered standard errors at firm level and firm fixed effect

In the main analysis, OLS regression analysis is conducted with dummy variables included to control for industry and year fixed effects. However, the same sample firms are observed repeatedly over the 2011-2020 sample period. In order to take this into account and to add further robustness, the analysis is repeated after clustering standard errors at firm level and controlling for firm fixed effects. For brevity, only untabulated results are reported. Robustness tests continue to show that credit ratings increase with continuous employment using clustered standard errors (Coeff: 0.02***, t value: 2.89) and after controlling for firm fixed effect (Coeff: 0.01***, t value: 3.15).

5.6. Controlling for corporate social responsibility

In the main analysis, we examine the association between credit ratings and workforce human capital proxied by continuous employment. However, it is possible that corporate image may affect job satisfaction. We conjecture that firms that are highly socially responsible, environmentally friendly, and have robust corporate governance are likely to retain their employees, because such firms are sustainable. Furthermore, previous studies demonstrate a positive association between corporate social responsibility and credit ratings (Attig et al., 2013; Fabozzi et al., 2021; Jiraporn et al., 2014). Based on the above, we repeat the main analysis using additional control variables,

(Environment, Social, Governance and ESG, total). Specifically, we use 1) ESG (Total score), 2) Social, 3) Governance and 4) Environment scores, provided by the Korea Corporate Governance Service. For brevity, unablated results are reported.

Regardless of the type of ESG variables controlled for, credit ratings have a positive association with continuous employment (ESG model, Continuous Emp Coeff: 0.01***, t value: 2.75; Social model, Continuous Emp Coeff: 0.01***, t value: 2.75; Governance model, Continuous Emp Coeff: 0.01***, t value: 2.66; 4, Environment model, Continuous Emp Coeff: 0.01***, t value: 2.57). However, none of the ESG/CSR scores are found to be significantly associated with credit ratings (ESG Coeff: -0.09, t value: -0.74; Social Coeff: -0.13, t value: -1.15; Governance Coeff: 0.27, t value: 1.63; Environment Coeff: 0.03, t value: 0.28). Taken together, the results imply that continuous employment is considered a more robust indicator of a firm's ability to survive a business cycle, compared to ESG.

6. Conclusion, discussion and avenues for possible future research

South Korea is a rare instance where ELHC information that exists outside of the accounting framework is reported on Annual Reports as a rule (Lim and Mali, 2021). Thus, South Korea is a unique opportunity to demonstrate whether, in a situation where human capital NFR information (continuous employment) is available on a transparent basis, market participants use this information for decision making purposes. To address this academic caveat, this is the first study to provide empirical evidence that after controlling for established credit risk determinants, ELHC, proxied by continuous employment has a positive (negative) incremental effect on credit ratings (risk). The results show that credit rating agencies use ELHC information when making risk

assessment decisions. The study therefore provides important contributions to policymaking, the literature, and practice.

First, in the absence of numerical human capital information, human capital disclosures can be a strategy to enhance informativeness (Caddy, 2000; Gowthorpe, 2009; Power, 2001). There is evidence that a higher propensity to disclose human capital information on a NFR basis is positively associated with firm performance (Lin et al., 2012; Salvi et al., 2020) and lower borrowing costs (Cormier et al., 2009; Mangena et al., 2010). However, disclosures are limited, because information users cannot compare human capital sustainability/policies on a relative firm-level basis, using unstructured disclosures. The NFR literature provides a basis to extend the mainstream accounting framework by identifying limitations (Jackson et al., 2019; La Torre et al., 2018; Stolowy and Paugam, 2018). This study shows that whilst internationally, human capital information is disclosed an unstructured basis, when ELHC information is disclosed on a numerical/structured/comparable basis, it is sought, utilised, and influences the decision making of important information users, such as credit rating agencies, to make default risk assertions. This study therefore extends the NFR literature; by demonstrating that in the absence of numerical firm-year human capital data, information users are at a disadvantage when making firm risk assessments, and; by providing evidence that the human capital information demands of market participants are not currently met, within the mainstream accounting framework.

Second, the sample is divided into groups recognized as having different levels of risk, based on audit risk (Big4/NonBig4 sample selection: Basu et al., 2001; DeAngelo, 1981; Fung et al., 2016; Khurana and Raman, 2004; Lisic et al., 2015) and size (Carey and Hrycay, 2001; Kraft, 2014). Empirical results demonstrate credit rating agencies interpret that decreasing continuous employment has a more significant effect on the

credit rating status of 'risker' NonBig4 clients, compared to less risky Big4 clients. Likewise, based on economies of scale, smaller firms are more likely to default compared to larger firms (Kraft, 2014). This study shows that on a relative basis, employee retainment has a greater positive effect on a small firm's ability to survive the business cycle, compared to a larger firm. Taken together, the results contribute to the literature by providing evidence that credit rating agencies make nuanced decisions about how employee retainment strategies can influence a firm's survival, based on firm size and audit/client risk inferences.

Third, the study provides practical insights to management and stakeholders regarding the economic benefits of employee retainment. The literature infers that investment in human capital can be considered as an expense that negatively affects net income (Merino, 1993; Stovall and Neill, 2017), or an investment in a firm's most valuable asset (Curado et al., 2011; Guthrie et al., 2012; Mali and Lim, 2021). Whilst it is true that reducing expenditure on employee retainment can improve company finances, adopting an ineffective employee retainment strategy is shown to have a negative effect on credit ratings. Given there are various advantages associated with having higher credit ratings, including better terms from suppliers, access to capital and lower restrictions to investment (Alissa, 2013; Blume et al., 1998; Dichev and Piotroski, 2001; Ederington and Goh, 1998), the results imply that there is an economic reason for firms to retain employees. Therefore, we would encourage firms to look after their employees to enjoy benefits associated with higher credit ratings.

Fourth, the study also makes important contributions to policymaking/regulation. Labour unions require employee level human capital information for collective bargaining (Craft, 1981; Maunders and Foley, 1984; Mautz, 1990; Ogden, 1985). Therefore, weak human capital reporting legislation can be

considered a social problem. Moreover, human capital information is increasingly demanded by investors for decision making purposes (Berry and Junkus, 2013; McLachlan and Gardner, 2004). Omens et al. (2021) report that human capital information is underreported in the largest U.S. firms, due to a lack of SEC regulation. In the EU, firms are encouraged to report NFR information on a voluntary basis, but regulation associated with the directive is not established (Torre et al., 2018). In the UK, legislators have introduced policies to enhance the quality of human capital reporting, however, these requests have not been accepted at industry level (DTI, 2001; CIPD, 2017). In the UK, low quality and zero-hour contracts are becoming more prevalent (Farina et al., 2020; Koumenta and Williams, 2019). To address these limitations, we offer a practical solution to policymakers. In South Korea, human capital information that is currently reported on an unstructured basis using NFR, is reported on a structured/numerical basis (Lim and Mali, 2022). As a result, Korean information users can make assessments about a firm's human capital strategy, and business sustainability. Therefore, we encourage international policymakers to consider adopting the South Korean human capital reporting benchmark/framework. We surmise that the adoption of the South Korean human capital reporting framework could have a positive impact on employee welfare and society, as well as benefit investors.

Finally, we list avenues for future research and limitations. We contribute to the literature by showing that continuous employment is seen by credit rating agents as a signal of better future financial performance. The study supports the assertion that if human capital development (over time) is excluded from empirical models, an endogeneity problem exists (Crook et al., 2011; Penrose, 1959; Grant, 1996; Rouse and Daellenbach, 1999). Thus, to extend the literature, we encourage future studies to capture the association between continuous employment and various firm performance proxies,

including indicators of business risk, financial performance and market value. This study is the first to show that ELHC information can be included into credit rating models. However, analysts use optimization algorithms and machine learning techniques, often undecipherable by humans when making credit rating assessments (Galindo et al., 2000; Kwon et al., 1997; Shin et al., 2001). To add granularity to our findings, future studies may collect questionnaire evidence to explain what credit rating agencies are looking for in terms of human capital in the firms they rate.

Credit ratings are taken from the largest Korean agency (NICE), which provides credit ratings for the majority of Korean listed firms. Therefore, the relationship between human capital and credit ratings in our study is based on the opinion of a single credit rating agency. We did not include the details of other credit rating agencies because their coverage is limited compared to NICE. We encourage future international studies to test whether different credit rating agencies consistently associate human capital with default risk potential. South Korea is shown to have more powerful labour unions compared to western countries. However, we are unable to control for the power of labour unions at firm-level because of data unavailability. Thus, we encourage future studies to adopt an international comparative analysis approach to discover whether the association between continuous employment and credit ratings (other firm quality indicators) in western countries is equivalent to South Korean. Such studies would offer insights about how credit rating agencies perceive union power when making default risk assertions.

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