THE VALUATION OF ORGANIZATION CAPITAL

ACROSS PROFIT AND LOSS FIRMS

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The Valuation of Organization Capital Across Profit and Loss Firms

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ABSTRACT

Investments in intangible capital and the frequency of reported losses have increased among firms over the last decades, in turn leading to a deteriorating link between book value of equity, earnings, and equity market values. Existing literature on the valuation of loss firms suggests that the value relevance of book value of equity and earnings is moderated by the extent of knowledge capital among these firms. Using an augmented version of the Ohlson (1995) model for a sample of 80,522 U.S. firm-year observations, we show that organization capital has incremental, yet modest, explanatory power to that of knowledge capital for explaining the equity market values of loss firms. We also find consistent evidence of a positive and differential valuation of organization capital across profit and loss firms. However, when we look in more detail at qualitatively different loss firms in our sample, we find no support for a differential valuation of organization capital. This is inconsistent with our expectation and overall suggests that investors are able to assess differences in organization capital between profit firms and loss firms, but fail to do so between qualitatively different loss firms. These findings contribute to our understanding of the stock market valuation of organization capital and provide new insights into the value determinants of loss firms.

Keywords: intangible capital, organization capital, equity valuation, accounting conservatism, value relevance

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1. Introduction

Investing in intangible capital is an increasingly important activity for competitive advantage and growth among firms. Over the course of the last three decades, the aggregate level of intangible investments has surpassed that of tangible investments and marks a fundamental shift in how firms generate value (Corrado and Hulten, 2014; Enache and Srivastava, 2018). Meanwhile, a trend of an increasing number of losses has emerged over the years. According to U.S. Compustat data, 45% of all reported earnings between 2010 and 2019 were negative, whereas the corresponding number for the 1980s was only 29%.[1] This increase in reported losses among firms in the face of growing intangible capital investments has gained the attention of critics and researchers alike. The critics suggest that the accounting fails to capture the importance of intangible capital, in turn hampering investors' assessments of firm performance (Lev, 2001, 2018; Lev and Gu, 2016). In a similar vein, researchers suggest that many firms with reported losses are not financially distressed but report a loss because of the accounting treatment for their research and development activities, i.e., their *knowledge capital* (Darrough and Ye, 2007). Specifically, most investments in intangible capital are expensed as incurred under prevailing accounting standards. On this note, research suggests that knowledge capital plays an important role in explaining equity market values of loss firms (Joos and Plesko, 2005; Darrough and Ye, 2007; Franzen and Radhakrishnan, 2009; Ciftci and Darrough, 2015). *Organization capital*, on the other hand, is a relatively unexplored source of intangible capital in this setting. This is surprising since research suggests that organization capital (e.g., human capital, brand capital, and economic competencies) provides long-term benefits, allows for sustained competitive advantage and may even play a more prominent role than knowledge capital in value creation (Broekaert et al., 2016; Lev et al., 2009). Some work exists on the association between organization capital and equity market values (e.g., Eisfeldt and Papanikolaou, 2013; Banker et al., 2019), but the literature is silent as to its role in explaining the equity market values of loss firms.

In this paper, we ask whether organization capital has explanatory power for equity market values of loss firms and if the market valuation of organization capital varies across profit firms and loss firms. We answer these questions by examining the association between investments in organization capital and equity market values across profit firms and loss firms for a sample of 80,522 U.S. firm-years between 1977 and 2021. Our focus on the valuation of organization capital across profit firms and loss

1. Excluding financial firms.

firms provides a meaningful comparison of investor perceptions, because the literature suggests that the valuation of accounting information does not fully extend from one group to the other (Franzen and Radhakrishnan, 2009). Specifically, we augment the valuation model of Ohlson (1995) by including variables for expensed investments in knowledge capital and organization capital, measured using an approach made popular by Peters and Taylor (2017).

Considering the literature that unequivocally reports its many benefits, we hypothesize that organization capital has incremental explanatory power for equity market values of loss firms. Consistent with our prediction, the valuation model improves in explanatory power when organization capital is included. To our surprise, however, this improvement is only modest. Moreover, we find that the unrecorded stock of organization capital is valued more positively for profit firms than for loss firms and argue that this is because profit firms, by virtue of reporting a profit, are perceived as making more productive use of their stock of organization capital among investors. On the other hand, our findings suggest the period investment in organization capital net of amortization is more value relevant for loss firms. Drawing on signaling theory, we argue that this is because the net investment in organization capital of a loss firm sends a relatively more positive signal to outside investors conveying management's commitment to, and belief in, a more profitable future. This differential valuation of organization capital across profit and loss firms is in contrast to what would follow from the notions of investors 'fixating' on reported earnings (Sloan, 1996) or investors being misled by accounting (Penman and Zhang, 2002; Lev et al., 2005), indeed suggesting that investors can assess the information conveyed in earnings components and value the organization capital accordingly.

However, when we look in more detail at the qualitative differences of our sample of loss firms following the approach of Gu et al. (2021), we find no support for a differential valuation of organization capital. This implies that investors make no different valuation of organization capital across loss firms that are qualitatively more similar to profit firms *vis-à-vis* loss firms that are more likely to be poor performers. This is in stark contrast to our other results, suggesting that investors fail at assessing the qualitative aspects of the firm when reported earnings are negative. Taken together, after controlling for other explanatory variables and scale differences, our findings suggest that organization capital has incremental, yet modest, explanatory power for equity market values of loss firms and that organization capital is valued differently across profit and loss firms, but similarly across qualitatively different loss firms.

Overall, this study contributes to our understanding of investor perceptions of intangible capital and has some particular implications for researchers, practitioners and the discourse on the accounting treatment for intangible capital. First, our work adds to the literature on the role of intangible capital in explaining the seemingly deteriorating link between book value of equity, earnings and equity market values. Most of this literature focuses on period investments in knowledge capital to explain differences between profit and loss firms (e.g., Joos and Plesko, 2005; Ciftci and Darrough, 2015). On this note, we examine the investor valuation of past and period net investments in both knowledge capital and organization capital, across profit and loss firms. This is an important feature of this study because it allows for an equal comparison across several dimensions. The extant literature on knowledge capital and organization capital that does take into account past investments (e.g., Sougiannis, 1994; Lev and Sougiannis, 1996; Banker et al., 2019) has not, to the best of our knowledge, yet distinguished between profit and loss firms. While we corroborate some of the findings in this literature, our study also suggests there are important valuation differences between profit and loss firms. More than that, we also show that there is an important lack of difference in the stock market valuation of organization capital across qualitatively different loss firms. By the same token, our study also contributes to the literature on equity valuation of loss firms in general, and the literature on the interface between loss firm valuation and intangible capital in particular. The literature on valuation of loss firms and intangible capital has exclusively focused on knowledge capital and, in turn, only on the period investment in knowledge capital. To this literature we provide not only insights on the valuation of both past and period net investments in knowledge capital, but also the net investments relating to organization capital. Gu et al. (2021) make an exception to this rule which makes their study similar to ours in spirit. However, they study returns and shed no light on the contemporaneous valuation of past and period net investments, neither in knowledge capital nor in organization capital.

Secondly, having found that investors can distinguish between profit and loss firms in their valuation of organization capital, but not between losses induced by the accounting treatment for intangible capital and losses that are not, our findings underscore some practical implications. For instance, having highlighted this differential valuation of organization capital, our findings suggest that users of financial statements could benefit from additional information when the information conveyed in earnings is deemed insufficient for assessing future firm performance. While we have no intention of arguing for any direction we believe the discourse on the accounting treatment

for intangible capital should take, our findings add nuance to the discussion on the extent to which investors are able to use accounting information for assessing firm performance. In turn, if additional disclosure on intangible investments is the route ahead, these findings should foster a more targeted discussion on what information on intangible capital should be covered by these disclosures and for whom.

Finally, a major reason for the lack of empirical research on organization capital in relation to loss firm valuation is likely the inherent difficulty in measuring organization capital. We overcome this hurdle by introducing a measure for organization capital from adjacent literature (Peters and Taylor, 2017). Although this measure of organization capital is based on a fraction of *Sales, General and Administrative* spending, our findings show that even a crude measure like this provides valuable insights and can help explain equity market values of loss firms. Our introduction of this simple measure to the equity valuation of loss firms opens up several avenues for future usage by practitioners and researchers alike.

The remainder of this paper is organized as follows. In Section 2, we systematically review the extant literature on knowledge capital and organization capital and their associations with the stock market and abnormal returns, respectively. We also provide an overview of the literature on the valuation of loss firms as well as highlight some differences between knowledge capital and organization capital suggested in the literature. Based on our review, we end the section by developing our hypotheses. In Section 3, we establish an equity valuation framework based on Ohlson (1995) which we use for our empirical analysis. Section 4 provides an overview of our data as well as summary statistics for our sample of profit and loss firms. In Section 5, we present and discuss our findings and in Section 6 we perform additional testing procedures to gauge the robostness of our results. Finally, Section 7 summarizes this paper and offers a concluding discussion.

2. Literature Review

2.1. Intangible Capital – Knowledge Capital and Organization Capital

We refer to the immediately expensed internally generated intangible assets of a firm as the intangible capital of that firm. Much of the value creation among firms today comes from intangible capital, and the level of investment in intangible capital is on a steady rise (Corrado et al., 2005; Corrado et al., 2009; Corrado and Hulten, 2014). Some authors even suggest that because firms have equal access to labor and tangible capital in the market, the competitive advantage of a firm stems from its intangible capital which allows the utilization of tangible capital and labor in unique ways (Gu and Lev, 2011). Because the literature offers no definite specification of its constituents (Kaufmann and Schneider, 2004), we classify intangible capital into two groups: knowledge capital and organization capital.

Knowledge capital is developed through scientific and non-scientific research activities, such as product development and discovery, that create a form of knowledge that can be described as the innovative property of the firm (Hall et al., 2005; Corrado et al., 2005). This way, research and development (R&D) spending can be interpreted as investments in knowledge capital (Peters and Taylor, 2017) which over time contributes to a stock of knowledge capital (Griliches, 1979).

Evenson and Westphal (1995) define organization capital as the *"knowhow used to combine human skills and physical capital into systems for producing and delivering want-satisfying products"* (p. 2237) and Lev et al. (2009) similarly define organization capital as enabling *"superior operating, investment and innovation performance, represented by the agglomeration of technologies – business practices, processes and designs"* (p. 277). Thus, organization capital is the intangible capital related to customer relationships, brand reputation, human resources, and economic competencies (Lev, 2001; Corrado et al., 2005; Wyatt, 2008). Viewed this way, organization capital emanates from spending on areas such as product promotion, distribution channel management, customer support, employee training, and software, all of which are included in the sales, general, and administrative (SG&A) expense account (Lev and Radhakrishnan, 2005; Banker et al., 2011; Banker et al., 2019). Therefore, certain spending included in SG&A can be interpreted as investments in organization capital (Eisfeldt and Papanikolaou, 2013; Peters and Taylor, 2017; Enache and Srivastava, 2018).

Numerous studies suggest that both knowledge capital and organization capital have asset characteristics by means of contributing positively to firm performance for several years subsequent to the investment. For instance, Sougiannis (1994) studies if knowledge capital investments, as measured via R&D expenditures, improve earnings and finds that, for a sample of 573 U.S. firms between 1975 and 1985, the contribution from R&D persist on average for seven years subsequent to the investment. Oswald and Zarowin (2007) make similar findings in a U.K. setting. Lev et al. (2009) investigate the effect of organization capital on firm performance for a sample of U.S. firms between 1971 and 2006 and show that organization capital, as measured via SG&A expenditures, is positively associated with asset productivity and contributes positively to earnings for five years subsequent to the investment. Studying a sample of acquiring U.S. firms over the period 1984-2014, Li et al. (2018) document how acquiring firms with high organization capital exhibit significantly better post-acquisition performance in terms of return on assets, gross margins and asset turnover. Research also documents how various constituents of organization capital such as human resource practices (Black and Lynch, 2004; Caroli and Van Reenen, 2001), selling expenditures (Gourio and Rudanko, 2014), administrative expenses (De and Dutta, 2007), and advertising (Ravenscraft and Scherer 1982; Graham and Frankenberger, 2000) are positively associated with different measures of future firm performance.

2.1.1 The Controversy in the Accounting Treatment for Intangible Capital Investments

Unlike tangible and financial assets which are standardized at large, intangible capital is heterogeneous and uncertain as to the appropriability of its future benefits (Webster, 1999; Lev, 2001). These characteristics underpin the prevailing U.S. accounting standard for investments in intangible capital, under which most of these investments are expensed as incurred.[2] However, to the extent investments in knowledge capital and organization capital do create assets, the immediate expense of these investments under conservative accounting practices understates reported earnings

2. Starting in 1975, U.S. GAAP requires the immediate expense of all R&D expenditures (FASB, SFAS No. 2, 1974) with the argument that empirical research "generally failed to find a significant correlation between R&D expenditures and increased future benefits as measured by subsequent sales, earnings or share of industry sales" (p. 12). Today, accounting principles for R&D is covered in FASB ASC Topic 730. Intangible capital expenditures in general are capitalized as assets on the balance sheet only to the extent these expenditures relate to an asset that can be separately identifiable, has an economic life that can be determined, and it is not inherent in a continuing business or nonprofit activity nor related to an entity as a whole (FASB ASC 340-20, 350 and 985-20).

and equity book values.[3] While these effects from conservative accounting practices revert over time (Penman and Zhang, 2002), Lev and Gu (2016) raise some concern as to the usefulness of accounting in terms of reflecting firm performance and argue that investors are inhibited by the prevailing accounting standard in making qualified estimates of the economic properties of intangible capital investments. On the contrary, Penman (2009) argues that the immediate expense of investments in intangible capital is irrelevant because users of financial statements can capitalize these expenditures based on information in the income statement. Nonetheless, some studies suggest that investors and analysts may have difficulty in assessing information on intangible capital investments as reflected in forecast inaccuracy (Chambers et al., 2002; Gu and Wang, 2005; Banker et al., 2019). This, however, may be due to the sparse disclosure on intangible capital investments and not the immediate expense per se. For instance, while some firms voluntarily disclose amounts spent on areas such as advertising or specific R&D, both the number of firms doing so and the content of these disclosures tend to be limited (Sougiannis, 1994; Enache and Srivastava, 2018). Moreover, the difficulty for investors, caused by lacking financial disclosures, is potentially exacerbated by the idiosyncratic nature of intangible capital insofar that investors cannot base their assessment on the economic outcome of other firms' corresponding investments (Aboody and Lev, 1998). On this note, Lev (2018) suggests that the usefulness of accounting information has deteriorated and that *"reported earnings no longer reflect enterprise performance"* (p. 465). This notion of low information value of earnings is supported by several papers reporting that disaggregated earnings components convey information beyond the information conveyed in the earnings measure itself (Lipe, 1986; Ohlson and Penman, 1992). Herrman et al. (2000) for instance, shows that investors assign a higher (lower) coefficient on earnings components that are more (less) persistent.

2.2. The Value Relevance of Knowledge Capital

Prompted by the accounting treatment for intangible capital and the related debate on the informativeness of earnings, numerous studies have disaggregated earnings with respect to knowledge capital investments and examined its association with equity market values. This stream of literature consistently reports evidence for a positive association between knowledge capital investments and contemporaneous stock prices,

3. We follow Penman and Zhang (2002) and view conservatism as an accounting practice that *"keep[s] the book values of net assets relatively low"* (p. 238). This includes the expense of R&D outlays as incurred rather than capitalizing and amortizing these outlays (Penman and Zhang, 2002).

in turn suggesting that knowledge capital investments are perceived of as assets by investors (e.g., Hirschey and Weygandt, 1985; Hall, 1993; Cockburn and Griliches, 1988; Shevlin, 1991; Sougiannis, 1994; Lev and Sougiannis, 1996).

For instance, Lev and Sougiannis (1996) calculate *pro forma* stocks of knowledge capital by capitalizing past R&D expenditures "as if" the investments had been capitalized at the time of investment and make corresponding amortization adjustments to earnings. Lev and Sougiannis (1996) find, consistent with their conjectures, that this *pro forma* information set for knowledge capital yields a stronger association with stock prices for their sample of U.S. firms between 1975-1981. This suggests that investors are indeed able to decipher accounting information and, more, that investors capitalize information on knowledge capital investments. Sougiannis (1994) also analyzes the association between past knowledge capital investments and equity market values for a similar sample of 573 U.S. firms between 1975 and 1985. Using an early version of Ohlson's (1995) valuation framework (Ohlson, 1989), Sougiannis (1994) separates current knowledge capital investments from earnings and adds an additional variable for past knowledge capital investments. This exercise yields evidence for a positive relationship between investments in knowledge capital and both market values of equity and subsequent earnings. Sougiannis (1994) distinguishes between a direct and an indirect valuation effect of knowledge capital. The direct valuation effect is the effect of past and current knowledge capital investments reflected directly in the market value of equity. The indirect effect, on the other hand, is the valuation effect of realized benefits from past knowledge capital investments reflected in earnings. Sougiannis (1994) argues that it is unlikely that a firm can initiate, complete, and benefit from a knowledge capital investment all in the same period. Therefore, the indirect valuation effect includes only benefits from past knowledge capital investments. Sougiannis (1994) finds that there are temporal differences in terms of direct effect but on average, and for the majority of the sample years, the coefficient on the stock of past knowledge capital investments is insignificant whereas the coefficient on the current investment in knowledge capital is significant. Sougiannis (1994) proposes three explanations for this result. The first explanation is that earnings, via the direct effect, provide sufficient information on expected benefits from past knowledge capital investments. The second explanation is that the current investment provides sufficient information on the expected benefits from past knowledge capital investment. The third explanation is that information from past investments is value irrelevant, in other words alluding to market efficiency. Another interpretation of the results in Sougiannis (1994) comes from Wyatt (2008). Her interpretation of the insignificant

coefficient on the stock of past knowledge capital investments is that investors do not expect any future benefits from past knowledge capital investments. However, Wyatt (2008) also proposes another explanation, namely that investors may perceive past investments in knowledge capital with uncertainty as to the probability of realizing their future benefits.

Another stream of literature on the association between knowledge capital and market values is interested in subsequent stock returns, i.e., asking to what extent knowledge capital is incorporated in stock prices. This literature consistently finds that firms with high knowledge capital intensity or changes in investment pattern earn abnormal stock returns for several years subsequent to the investment (e.g., Lev and Sougiannis, 1996; Chan et al., 2001; Chambers et al., 2002; Eberhart et al., 2004). However, there is some controversy among the proposed explanations for these abnormal returns. Chambers et al. (2002) posit that these abnormal returns likely are compensation for additional risk since knowledge capital intensive firms exhibit greater variability in stock returns, earnings and analysts' forecast. Eberhart et al. (2004) find evidence for abnormal returns for five years subsequent to an increase in knowledge capital investment and, in contrast to Chambers et al. (2002), attribute these abnormal returns to market mispricing. Chambers et al. (2002) suggest that investors systematically underreact to the benefits associated with knowledge capital investments. Along the same line of reasoning, but adding nuance to the story, Chan et al. (2001) find that only when knowledge capital investments are examined relative to the market value of equity do stocks of high knowledge capital firms earn abnormal returns. Chan et al. (2001) suggest that these firms have a history of poor stock performance and that the three years of abnormal returns indicate that investors do not fully apprehend the future earnings signals from these knowledge capital investments. When the management of these firms, despite pressures from investors to cut costs and improve earnings, invests in knowledge capital, it reflects an optimism about future prospects (Chan et al., 2001). However, investors discount this information and are slow in revising their expectations that may be dominated by past negative experiences.

Another argument related to the market mispricing explanation suggests that abnormal returns result from distorted financial information induced by the immediate expense of investments in intangible capital (Amir and Lev, 1996; Lev and Zarowin, 1999; Penman and Zhang, 2002; Lev et al., 2005). According to this argument, earnings are depressed under growing investment patterns and conservative accounting

practices. This in turn creates *"unrecorded reserves"*, which later are realized when the investment pattern slows down (Penman and Zhang, 2002). This way, under conservative accounting practices, conservatively reported earnings become aggressively reported earnings and *vice versa*, at certain points of change in investment pattern (Lev et al., 2005). Consistent with this idea, Lev et al. (2005) find evidence for an undervaluation of firms with conservative earnings and an overvaluation of firms with aggressive earnings, but that this mispricing is corrected when the investment pattern reverses. Taken together, this particular mispricing explanation is in line with the *"functional fixation"* hypothesis which postulates that market participants naïvely fixate on reported earnings rather than the value relevant information conveyed in earnings (Sloan, 1996), suggesting that market participants are misled by the accounting information.

2.3. The Value Relevance of Organization Capital

The literature on organization capital is scarce compared to that on knowledge capital. One plausible reason for this is that organization capital is inherently difficult to measure. Since organization capital investments are included under the SG&A expense line item, commingled with expenditures that provide benefits only in the period incurred (Banker et al., 2011; Lev and Radhakrishnan, 2005; Enache and Srivastava, 2018), disaggregating earnings with respect to organization capital investments is not a straight-forward exercise.

Yet, while considerably more slim than that on knowledge capital, the literature on organization capital also offers some evidence for a positive association between organization capital and market values, thus indicating that investors consider the asset value of organization capital. Peters and Taylor (2017) find that organization capital (and other intangible assets including knowledge capital) contribute incrementally to the neoclassical measure of *Tobin's q*, i.e., the ratio between a firm's enterprise value and its physical capital at replacement cost. Corroborating the greater prevalence of organization capital in the overall economy, Peters and Taylor (2017) find that the stock of organization capital in their sample, on average, is three times the size of the knowledge capital stock. Similarly, Banker et al. (2019) investigate whether investors value organization capital created from SG&A spending. They regress stock prices of U.S. firms between 1970 and 2011 on operating income, SG&A expenditures, capitalized past SG&A expenditures, as well as current R&D and advertising expenditures. They find that the coefficient on current SG&A expenditures is significant

and negative, whereas the coefficient on capitalized past SG&A expenditures is significant and positive. Banker et al. (2019) explain these results by suggesting that the stock market values the SG&A expenditure as an operating expense, whereas the capitalized amount of past SG&A expenditures (i.e., the organization capital stock), is priced positively as an asset.

While limited, there is also a series of papers examining the association between organization capital and stock returns. This literature, too, consistently shows that organization capital is positively associated with abnormal stock returns and offers some controversy in explaining these. Eisfeldt and Papanikolaou (2013), for instance, find that firms with more organization capital exhibit higher subsequent stock returns than firms with less organization capital and conclude that this is because shareholders and key employees have a mutual claim on firm cash flows. The outside option for employees poses a risk for shareholders, should key talent abandon the firm. This way, key talent must be adequately compensated and Eisfeldt and Papanikolau (2013) argue that this is why investors demand additional risk compensation for organization capital intensive firms. Other research finds a positive relationship between abnormal returns and investments in information technology (Dewan and Ren, 2007) and customer satisfaction (Fornell et al., 2006) and similarly attributes the abnormal returns to being compensation for the additional risk.[4] Moreover, Banker et al. (2019) show that an investment strategy of long positions in high organization capital firms and short positions in low organization capital firms earns abnormal returns. Addressing the question of whether these abnormal returns are due to market mispricing or compensation for additional risk, Banker et al. (2019) argue that these results are more likely explained by mispricing since the reversal of the abnormal returns over time among the sample firms is not consistent with the risk compensation hypothesis. In the adjacent literature on the cross-section of stock returns, several authors suggest that adjusting the well-known Fama-French (1992) HML-risk factor for unrecorded intangible assets can restore the ability of the factor to explain stock returns in the 21st century (Arnott et al., 2021; Eisfeldt et al., 2021).[5]

4. We note that when information technology investment is part of a knowledge capital project, it is accounted for as such. Otherwise it is accounted for analogously to other organization capital investments (Banker et al., 2019).
5. The HML-risk factor as originally specified by Fama-French (1992) is a portfolio consisting of long positions in high book-to-market stocks and short positions in low book-to-market stocks.

2.4. Valuation of Loss Firms

2.4.1 The Relevance of Book Value of Equity and Earnings for Loss Firm Valuation

Turning to the valuation of loss firms, one stream of literature suggests that reported losses must be perceived by investors as (i) only transitory because they would otherwise exercise their put option on the firm's net assets and liquidate their investment at a price commensurate with the abandonment option value (Hayn, 1995), or (ii) an indication of an unviable business that needs to adapt and that the value of the firm is determined by its adaptation option value (Burgstahler and Dichev, 1997). Along this line of reasoning, the literature that seeks to explain the value of loss firms based on the book value of equity and reported earnings suggests that the book value of equity is relatively more important for the valuation of loss firms. Barth et al. (1998), for instance, posit that the book value of equity increases inversely with the financial health of the firm. The reasons put forward for this argument include the importance of book value of equity as a proxy for the abandonment option value (Hayn, 1995), the resources available to adapt the operations (Burgstahler and Dichev, 1997), or as a proxy for the normal earnings power of the firm when reported earnings are not informative of future earnings (Ohlson, 1995; Penman, 1998; Collins et al., 1999).

2.4.2 The Relevance of Knowledge Capital for Loss Firm Valuation

The conservative accounting treatment for investments in knowledge capital has been the fulcrum in a later series of literature on the valuation of loss firms. Particularly, several papers argue that many reported losses among firms, as well as their equity market values, in part can be explained by the immediate expense of knowledge capital investments that depress equity book values and earnings. For instance, Darrough and Ye (2007) show that their sample of firms investing in knowledge capital sustain for long periods albeit reporting losses and argue that these losses are induced by conservative accounting practices and not indicative of financial distress. Because these firms are unlikely to liquidate or experience deteriorating losses, Darrough and Ye (2007) argue that theories which predict that loss firms are valued based on their abandonment option or adaptation option (Hayn, 1995; Burgstahler and Dichev, 1997) are not adequate for explaining their value. Rather, the authors suggest that these firms have *"hidden assets"* related to expensed knowledge capital investments which are priced positively by the market, thus providing value relevant information.

In a similar vein but focusing on disaggregated earnings, Joos and Plesko (2005) find that investors do not value losses *per se* but rather value the components of earnings such as knowledge capital investments. When losses contain a component related to knowledge capital investments, this component is valued separately and positively as a proxy for growth opportunities whereas the remainder of the negative earnings is valued as a transitory loss (Joos and Plesko, 2005). Relatedly, Ciftci and Darrough (2015) suggest that the explanatory power of book values and earnings vary across levels of knowledge capital intensity. In contrast to the assumed prominence of the book value of equity in explaining the value of loss firms (e.g., Burgstahler and Dichev, 1997; Collins et al., 1999), Ciftci and Darrough (2015) find that the explanatory power of book value increases inversely with knowledge capital intensity for loss firms. Further corroborating the notion of conservative accounting distortion in book values of equity and earnings, Ciftci and Darrough (2015) also find that the explanatory power of both book value of equity and earnings as well as the differences between profit and loss firms decreases with higher levels of knowledge capital intensity. The above findings all imply that there are variables beyond book values of equity and earnings for loss firms that provide value relevant information to investors.

While the market values of loss firms have been examined with regards to the knowledge capital of these firms, the literature sheds no light on the market valuation of past and current net investments in knowledge capital for loss firms particularly. Franzen and Radhakrishnan (2009) makes an attempt at this using the notion of a linear dynamic in earnings and assumes that future earnings can be described as a linear function of current earnings. Regressing stock prices on an augmented version of the Ohlsson (1995) model in which the expensed knowledge capital investment is separated from earnings for a large sample of U.S. firms between 1982 and 2002, Franzen and Radhakrishnan (2009) find a positive coefficient on earnings and a negative coefficient on the expensed knowledge capital investment for profit firms, and a positive coefficient on the knowledge capital investment for loss firms.

Explaining these findings, similar to two of the explanations in Sougiannis (1994), Franzen and Radhakrishnan (2009) suggest that positive earnings (profits) convey information about the expected future benefits from past knowledge capital investments. For loss firms, this information is conveyed directly in the current investment in knowledge capital. Assuming that knowledge capital investments activities are positive net present value projects, Franzen and Radhakrishnan (2009) conjecture

that because the investment in knowledge capital for profit firms correlates with an omitted economic amortization charge in their model, it should take a negative sign because information about expected future benefits from the investment is conveyed in earnings. Yet, Franzen and Radhakrishnan (2009) also consider the case of new knowledge capital investments which may have a different pattern in expected future benefits, thus offsetting the negative coefficient. On the contrary, they suggest, the coefficient on the current investment in knowledge capital for loss firms is positive because it conveys the expected future benefit from the knowledge capital investments which have not yet been realized in earnings.

In a recent paper, Gu et al. (2021) examine the information content in earnings for loss firms by distinguishing between firms whose losses are induced by accounting conservatism and firms whose losses are not. The former group of firms would report a profit had they not made investments in intangible capital and the latter group of firms would report a loss even after taking into account their intangible capital investments. Examining separate components of earnings and intangible investments, Gu et al. (2021) show that the weak earnings-return relationship documented previously in the literature (e.g., Hayn, 1995) disappears for the group of firms whose losses are induced by conservative accounting, while it remains for the other group. Interestingly, Gu et al. (2021) find that firms whose losses are induced by accounting conservatism outperform the other group of loss firms in terms of patent citation, lead time, and portfolio value as well as in terms of employee attraction, retention, and productivity. The group of firms whose losses are induced by accounting conservatism also exhibit greater stock returns than the other group of loss firms. Taken together, these findings suggest in line with the functional fixation hypothesis (Sloan, 1996) that the market is slow in appreciating value relevant information.

2.5. The Value Relevance of Intangible Capital and Loss Firm Valuation in Summary

In summary, our review of the literature suggests that intangible capital, comprising knowledge capital and organization capital, is an important asset class among firms, yet not treated as such under prevailing accounting standards. While the accounting treatment for intangible capital in light of its importance for firm performance has raised some concern in the literature, it seems that both knowledge capital and organization capital are associated with equity market values, suggesting that investors to some extent are able to decipher the accounting information. Interestingly to note, however, is that these studies find different results in terms of whether past invest-

ments, period investments, or both past and period investments are value relevant to investors and tend to provide different explanations. These differences in results may be due to differences in research design, variable measurement or sample period and size. Nonetheless, investors appear to only partially account for the value of intangible capital, because both knowledge capital and organization capital are associated with abnormal stock returns. The literature offers two competing explanations for these abnormal returns related to intangible capital. One explanation is that the risk framework in which intangible capital is evaluated fails to capture the additional risk associated with intangible capital (Fama, 1998; Mitchell and Stafford, 2000). The other explanation is that investors fail to adequately account for the expected future benefits from intangible capital, i.e., that there is mispricing in the stock market. The mispricing explanation can in turn either be attributed to the sluggishness among investors in revising their expectations or that investors are misled by noisy earnings measures exacerbated by accounting conservatism.

The literature examining the valuation of loss firms suggests that the book value of equity is more important than earnings for the valuation of loss firms, and vice versa for profit firms. A later series of papers suggests that all loss firms are not financially distressed and that value relevant information relating to investments in knowledge capital is not properly captured in a valuation model based on only the book value of equity and reported earnings (e.g., Collins, 1999). Moreover, it also suggests that valuation implications of knowledge capital for loss firms do not fully extend to profit firms. Specifically, Franzen and Radhakrishnan (2009) provide theoretical support for one of Sougiannis (1994) proposed explanations, suggesting that earnings are indirectly informative of expected future benefits from past knowledge capital for profit firms but that the knowledge capital investment itself conveys the corresponding information for loss firms. Their explanation is based on the notion of a relationship between earnings components and omitted knowledge capital variables in an augmented Ohlson (1995) model. Gu et al. (2021) examines different loss firms and shows that the previously documented weak earnings-return relationship is restored for some of these firms when intangible capital is taken into account.

2.6. Important Differences Between Knowledge Capital and Organization Capital

While knowledge capital and organization capital and their associations with the stock market have been accounted for in the literature, only knowledge capital has been considered in explaining the valuation of loss firms. Maines et al. (2003) address

the question of whether findings from research on knowledge capital generalizes to other forms of intangible capital and notes that it depends on whether knowledge capital is *"...economically similar to other intangibles and on how familiar investors are with information about other types of intangibles."* (p. 176). While our literature review suggests that there indeed are similarities between knowledge capital and organization capital, there are also documented aspects of organization capital that may not translate directly to the findings on knowledge capital in equity valuation of loss firms. First, because of its breadth, organization capital is likely more prevalent than knowledge capital among firms today (Chan et al., 2001; Prescott, 2005; Lev et al., 2009; Corrado and Hulten, 2014; Banker et al., 2019). All firms do not engage in research and development, but it is reasonable to believe that all firms to some extent invest in areas such as marketing, employee training or distribution systems.

Second, both knowledge capital and organization capital is associated with risk as is evident from their associations with variability in stock price and earnings, analyst prediction error, and analyst forecast dispersion (Gu and Wang, 2005; Chambers et al., 2002; Chan et al., 2001; Che, 2009; Banker et al., 2019). Evidence suggests, however, that the risk associated with organization capital is less than that associated with knowledge capital (Enache and Srivastava, 2018). In fact, the literature suggests that various sources of organization capital can reduce risk (Singh et al., 2005; Huang and Wei, 2012; Agarwal et al., 2011; Tuli and Bharadwaj, 2009). Particularly, customer satisfaction increases future cash flows and reduces their variability (Gruca and Rego, 2005) and favorable brand associations reduce volatility in product sales during recessions (Larkin, 2013).

Third, evidence suggests that organization capital is a catalyst for the outcome of knowledge capital (Broekaert et al., 2016; Kurt and Hulland, 2013; Feng, 2022). Consistent with these notions, several studies document that investments in organization capital increase the likelihood of commercial success for knowledge capital investments (e.g., Chauvin and Hirschey, 1997; Hulten and Hao, 2008; Pindado et al., 2010).

Fourth, and following a similar line of reasoning, organization capital improves resilience and flexibility of the firm (Teece et al., 1997; Amram and Kulatilaka, 1999). According to contingency theory, this flexibility and resilience from organization capital likely also increases the firm's capacity in coping with contingencies, in turn playing an important role for the success of the firm (Donaldsson, 2001; Baker and Nelson, 2005). Thus, organization capital may to a greater extent than knowledge

capital be a source of advantage for long term sustained competitiveness (Barney, 1991; Lev, 2001). On this note, Hasan and Chueng (2018) even posit that *"organization capital serves as one of the precursors that allow firms to move from one stage to another progressively"* (p. 557).

In fact, drawing on the resource based view of firms (Barney, 1991), several papers suggest that organization capital has characteristics of being rare, valuable and inimitable (Osinga et al., 2011; Srivastava et al., 1998). In a similar vein, whereas knowledge capital investments are disclosed separately in the R&D expense line item, the investments in organization capital are shielded from competitors' eyes because they are commingled with other expenditures in the SG&A expense line item.

Thus, considering the above and potentially many more differences between knowledge capital and organization capital, the lack of research on the interface between organization capital and the valuation of loss firms is a surprising gap in the literature. To the extent that organization capital is a valuable resource that is difficult to imitate as well as is a facilitator of knowledge capital performance, investments in organization capital are likely also important in explaining market equity values of loss firms. By examining the interface between organization capital and stock market valuations of loss firms, the purpose of this paper is to fill this gap in the literature.

2.7. Hypothesis Development

We examine the valuation of organization capital across profit and loss firms, because prior research suggests that the valuation implications of book value of equity, earnings and knowledge capital do not fully extend from one group to another (Franzen and Radhakrishnan, 2009). The literature suggests that losses are perceived as transitory by investors and that persistent earnings components are priced more positively than transitory ones (Hayn, 1995; Joos and Plesko, 2005; Herrman et al., 2000). It also suggests that knowledge capital can explain differences in the value relevance of accounting information across profit and loss firms (Ciftci and Darrough, 2015). Thus, to the extent that expensed investments in organization capital are perceived as assets and are informative of expected future earnings for profit firms (Banker et al., 2019), we expect that these investments can also incrementally explain equity market values of loss firms. Hence, we state the following hypothesis:

HYPOTHESIS 1: Organization capital has incremental explanatory power for equity market values of loss firms.

Next, we examine whether the investment in organization capital net of amortization as well as the stock of organization capital is valued differently across profit and loss firms. The literature on organization capital suggests that the stock of organization capital is valued positively by investors (Banker et al., 2019). We hypothesize that, because profit firms generate positive earnings, the stock of organization capital of a profit firm is likely more productive than that of a loss firm on average and perceived as such by investors. In other words, by virtue of generating positive earnings, a profit firm is likely to be perceived by investors as creating more value from its organization capital investments than a loss firm on average. Conversely, albeit having made investments in organization capital, these have not materialized as investors might have expected for a loss firm. Accordingly, we expect the stock of organization capital of the average profit firm to be valued more positively than that of the average loss firm. Yet, to the extent organization capital is a facilitator of knowledge capital performance as well as perceived by investors as a valuable resource relatively less risky than knowledge capital, we expect the coefficient on the stock of organization capital to be positive for both groups of firms. Considering the above, we state the following hypothesis:

HYPOTHESIS 2: The coefficient on the stock of past organization capital investments is positive for both profit firms and loss firms but more positive for profit firms.

Moreover, the documented positive valuation of the net investment in knowledge capital in the related literature can be explained by signaling theory (Spence, 1973; Bhattacharya and Ritter, 1985). Particularly, these investments provide a signal of "growth opportunities" that are yet to be realized in future periods (Doukas and Switzer, 1992; Srivastava et al., 1998; Chan et al., 2001) and convey private information valuable to outsiders (Barney et al., 2001). We hypothesize that this theory applies also to investments in organization capital since organization capital is found positively associated with various firm performance metrics (Lev et al., 2009). Particularly, we hypothesize that loss firms are likely under pressure from investors to cut spending and restore profitability. When management, despite these pressures, makes investments in organization capital it signals credible and valuable insider information to outsiders in the capital market conveying a belief in a more profitable future (Chan et al., 2001). Particularly, because organization capital is a source of competitive advantage, flexibility, and overall is a facilitator of knowledge capital, the signaling value of investing in organization capital is a reassurance to investors that

other investment activity is relatively protected from competitors' imitation (Feng, 2022). On the other hand, inasmuch profit firms generate a more satisfactory return, profit firms unlikely face the same pressures to cut costs and reduce spending. Therefore, while investments in organization capital among profitable firms may also be viewed positively as signals from management conveying similar information, these signals are likely perceived as less important by investors. Since the literature documents a positive relationship between organization capital and abnormal returns, the value of the net investment in organization capital may not fully be reflected in contemporaneous market values. However, to the extent investors are not misled by the accounting, the expected benefits from these investments should be at least partially reflected in the stock prices across profit and loss firms in line with the above expectations. Consequently, we expect the coefficient on the net investment in organization capital to be positive for both profit and loss firms but larger for loss firms because these investments have higher signaling value for loss firms. We state the following hypothesis:

HYPOTHESIS 3: The coefficient on the net investment in organization capital is positive for both profit firms and loss firms but more positive for loss firms.

3. Research Design

3.1. Establishing an Equity Valuation Framework

To examine the valuation of organization capital across profit and loss firms, we use an augmented version of the Ohlson (1995) model. The Ohlson (1995) model expresses the firm equity value as a function of book value of equity, current residual earnings and other value relevant information. However, it is popular in the value relevance literature to use a version of the Ohlson (1995) model in which the equity value of the firm is expressed as a function of (opening) book value of equity and reported earnings for the period (e.g., Collins et al., 1999; Darrough and Ye, 2007; Ciftci and Darrough, 2015). While the parsimony of this simplified specification has its advantages, a discussion on its assumptions, restrictions and derivation is warranted.

We start by expressing the dividend discount model in equation (1a) and how it relates to the residual income valuation model in equation (1b) which the Ohlson (1995) model relies on. This derivation rests on the assumptions that (A1) the value of equity equals the present value of future dividends, and (A2) there is a clean surplus relationship so that $y_{t-1} = y_t - x_t + d_t$ where y_{t-1} (y_t) is the opening (closing) balance of book value of equity, d_t is net dividends for period t, and x_t is the earnings for period t. With these assumptions, the value of equity P at time t can be expressed as

$$P_t = \sum_{\tau=1}^{\infty} R^{-\tau} E_t[\tilde{d}_{t+\tau}] = \tag{1a}$$

$$= y_t + \sum_{\tau=1}^{\infty} R^{-\tau} E_t[\tilde{x}^a_{t+\tau}] \tag{1b}$$

where $\tilde{x}^a_{t+\tau}$ is the expected residual earnings for the future period $t+\tau$, and $R = (1+r)$ where r is the cost of equity capital. Residual earnings for period t can be expressed as $x^a_t = x_t - r \times y_{t-1}$. The intuition of equation (1b) is that it expresses the equity value as a function of the book value of equity and the present value of future residual earnings, where the equity book value proxies for the present value of normal earnings.[6]

Examining value relevance of accounting data, our main interest lies in reported information rather than projections about the future. Therefore, we impose some

6. Ohlson (1995) denotes residual earnings as reported earnings less normal earnings (cost of capital multiplied by the opening book value of equity). It follows from this that the opening book value of equity is capitalized normal earnings.

restrictions on equation (1b) that relaxes its dependency on explicit forecasts of future earnings. To this end, Ohlson (1995) introduces an appealing notion of a linear information dynamics which addresses the time-series behavior of residual earnings. In addition to the assumptions (A1) and (A2), Ohlson (1995) adds the assumption that (A3) residual earnings $\{\tilde{x}^a_\tau\}_{\tau\geq 1}$ follow a stochastic process in which they are unconditionally mean-reverting towards zero. This is economically intuitive as competition eventually drives residual earnings towards zero so that earnings equals the cost of capital. However, there may be value relevant information other than period earnings that impact future residual earnings. This existence of other value relevant information poses an issue to the assumed linear relationship in the model. Therefore, Ohlson (1995) add the term ν_t to account for value relevant information that is yet to be reflected in either book value of equity or earnings. If $\tau = 1$, residual earnings for the next period $\tilde{x}^a_{t+1}$ can be expressed as

$$\tilde{x}^a_{t+1} = \omega x^a_t + \nu_t + \tilde{\epsilon}_{1,t+1} \tag{2a}$$

$$\tilde{\nu}_{t+1} = \qquad \gamma\nu_t + \tilde{\epsilon}_{2,t+1} \tag{2b}$$

where $0 \leq \omega < 1$ and $0 \leq \gamma < 1$ are fixed and known exogenous parameters implicitly defined as dependent on the firm-specific environment and governing accounting principles, and $\tilde{\epsilon}_{1,2}$ are unpredictable zero-mean stochastic error terms. The inherent value range restrictions of the parameters ω and γ satisfy the mean-reversion process. Equation (2a) implies that future residual earnings are dependent on mean-reverting current residual earnings, plus future value-relevant information. Equation (2b) implies that the estimation of future value relevant information is dependent on mean-reverting current information about the future. Hence, $E_t[\tilde{x}^a_{t+\tau}] \to 0$ and $E_t[\tilde{\nu}_{t+\tau}] \to 0$. Considering equation (2a), (2b), and assumptions (A1)-(A3), the Ohlson (1995) model is expressed as:

$$P_t = y_t + \alpha_1 x^a_t + \alpha_2 \nu_t \tag{3}$$

where $\alpha_1 = \frac{\omega}{R-\omega} \geq 0$ and $\alpha_2 = \frac{R}{(R-\omega)(R-\gamma)} > 0$. The interpretation of coefficients $\alpha_1(\omega)$ and $\alpha_2(\omega, \gamma)$ is that larger values of the exogenous and firm-specific parameters ω and γ increases the sensitivity of P_t for residual earnings and other value relevant information (Ohlson, 1995). Equation (3) expresses the value of equity as a function of equity book value, residual earnings for the period, and other value relevant information that impacts the expectations of future residual earnings.

Collecting and substituting x_t^a with the complete term for residual earnings $x_t^a = x_t - r \times y_{t-1}$, and y_t with the clean surplus relation $y_{t-1} = y_t - x_t + d_t$ yields the following derivation:

$$P_t = y_{t-1} - d_t + x_t + \alpha_1(x_t - r)y_{t-1} + \alpha_2\nu_t \tag{4a}$$

or, rewritten as

$$P_{t,cum} = (1 - \alpha_1 r)y_{t-1} + (1 + \alpha_1)x_t + \alpha_2\nu_t \tag{4b}$$

where $P_{t,cum} = P_t + d_t$. If residual earnings are assumed to be restricted and follow an autoregressive process as well as assumed to accurately predict all future residual earnings, then residual earnings alone can reflect all business goodwill and render other value relevant information irrelevant, so that $\nu_t = 0$ (Ohlson, 1995). However, such assumptions seem far too strict, especially in the case of losses. Collins et al. (1999) reason that since ν_t is assumed to be independent of x_t and y_{t-1}, any omission of the term will not affect the coefficient estimates. Rather, empirical studies commonly substitute the term with a constant and an error term arguing that these will absorb the otherwise unobservable parameter ν_t (e.g., Collins et al., 1999; Lev and Zarowin, 1999; Darrough and Ye, 2007). We follow this common approach and add a constant and an error term. We also change the notation (variables $P_{t,cum}$, y_{t-1}, and x_t for MVE_t, BVE_{t-1}, and X_t) and arrive at the parsimonious specification:

$$MVE_t = \beta_0 + \beta_1 BVE_{t-1} + \beta_2 X_t + \epsilon_t \tag{5}$$

where $\beta_0 = 0$, $\beta_1 = 1 - \frac{r\omega}{R-\omega}$, and $\beta_2 = 1 + \frac{\omega}{R-\omega}$. Equation (5) expresses cum-dividend market value as a function of the sum of opening balance of book value of equity and earnings.[7]

While equation (5) relies upon the assumption of a clean surplus relation, we note that most value relevance literature violates this assumption by substituting earnings with core earnings, measured as income before extraordinary items and discontinued operations (Hayn, 1995; Barth et al., 1996; Collins et al., 1999; Darrough and Ye, 2007). This use of dirty surplus accounting is oftentimes argued as more reliable for forecasting purposes due to the transitory nature of extraordinary items. While

7. We note, however, that some of the value relevance literature use the closing balance of the book value of equity (e.g., Darrough and Ye, 2007; Darrough and Ciftci, 2015). If we were to use the closing balance, the model would include the period earnings twice and the book value and earnings would be increasingly correlated with each other, thus the impact from period earnings on the market value of equity would be captured in two coefficients (Collins et al., 1999).

limiting the functionality of the Ohlson (1995) model, we follow practice in the value relevance literature and use income before extraordinary items and discontinued operations on the basis of this earnings measure better satisfying a linear information dynamic. In Section 6, we re-estimate the model ensuring a clean surplus relation with virtually unaffected results.

Despite the frequent use of equation (5) in the value relevance literature, it is, as opposed to the residual income valuation model in equation (1b), limited in the eyes of accounting conservatism (Darrough and Ye, 2007). For instance, the conservative accounting treatment for intangible capital investments leaves (in most cases) no trace of these investments on the balance sheet. However, to the extent these investments do provide benefits in future periods, the accounting rate of return on the book value of equity will on average be low in early years and high in later years (Feltham and Ohlson, 1995). This situation likely induces a temporal bias in the residual earnings to the extent reported earnings are different than economic earnings. Feltham and Ohlson (1995) define the present value of future expected residual earnings as the *"unrecorded goodwill"*, i.e., the difference between the unbiased value of a firm's equity compared to its book value. The specification of the residual income valuation model resolves this issue because it is insensitive to accounting conservatism if residual earnings eventually revert to a zero net present value equilibrium (Skogsvik and Jeuttner-Nauroth, 2013). However, because our aim of this paper is to isolate and examine the market valuation of the unrecorded goodwill related to organization capital, we proceed with our specification of equation (5) to explicitly consider the unrecorded goodwill related to knowledge capital and organization capital. This is because in a model where accounting conservatism has an algebraic solution, our specific variables of interest become unobservable.

3.2. Measuring Value Relevance of Accounting Data

Value relevance research examines the empirical relation between stock market values and firm attributes (Holthausen and Watts, 2001). While the firm attributes of interest can be derived from either financial or non-financial information, common for all these studies is that the attribute is said to be value relevant if it is associated with, or increases the explanatory power for, equity market values (Beisland, 2009).

Market values, in turn, are thought of as reflecting investor valuations (Wyatt, 2008).[8] The research design for these studies is usually an equity valuation test in which stock prices (price models) or changes in stock prices (return models) are regressed on the variable of interest or the change in this variable (Kothari and Zimmerman, 1995; Holthausen and Watts, 2001). Equation (5) is the most common example of a price model.

Kothati and Zimmerman (1995) argue that a concerted use of both price and return models strengthens the reliability of accounting studies. By virtue of their functional form, however, these models test different things. As Barth et al. (2001) note:

> *"The key distinction between value relevance studies examining price levels and those examining price changes, is that the former are interested in determining what is reflected in firm value and the latter are interested in determining what is reflected in changes in value over a specific period of time."* (p. 95)

In other words, whereas a price model is a test of value relevance, a return model is a test of information responsiveness. Equation (5) is a price model in that it explains contemporaneous stock prices in terms of levels of equity book value and earnings.

3.3. Measuring Investments in Intangible Capital

To measure the specific value relevance of organization capital, we augment equation (5) to explicitly take into account variables for investments in knowledge capital and organization capital. We do this by estimating firm-specific *pro forma* capital stocks of knowledge capital and organization capital and corresponding *pro forma* earnings components representing the net (amortized) investment in knowledge capital and organization capital. The process for taking these variables into account will be described below.

A topic of discussion in the value relevance literature is that the value relevance test of a variable is a joint test of the reliability of the variable (Barth et al., 2001). In this context, reliability refers to whether the variable of interest is a reliable measure of the economic construct of interest, whereas relevance refers to whether the measure is a

8. Inferences from these tests rest upon a certain degree of market efficiency. Specifically, it is required that (i) prices pre-disclosure of information are unbiased estimates of prices post-disclosure, (ii) individuals have homogenous information and beliefs about the realization, and (iii) that the risk-sharing is efficient in the sense that no one is worse off while some are better of when information is revealed (Lev and Ohlson, 1982). C.f. Debreu (1951), Arrow (1951), and Arrow and Debreu (1954) for an elaborate discussion on the type of risk-sharing assumed in the value relevance literature.

relevant measure of the underlying value construct (Wyatt, 2008). Generally speaking, it is difficult to determine if the value relevance (or lack thereof) is due to the measured variable's relevance, reliability or both (Barth et al., 2001). For instance, in testing value relevance by the economic significance of the variable coefficient, the relatively larger (or smaller) coefficient may be due to low reliability in the measure of the underlying economic value construct. Wyatt (2008) suggests that a reliable measure requires (i) a well defined value creation construct, and (ii) a measure capable of reflecting the economic substance of the value construct. She also points out that some measures may be relevant for the underlying value creation construct but not reliable in measuring it.

On this note, Hall et al. (2005) argue that theory does not give much guidance on how intangible capital should be specified for measuring the underlying processes through which the investment activity creates value. Neither does theory give guidance on how investment activity in intangible capital translates into market values (Hall et al., 2005). Assuming that a firm invests in knowledge capital and organization capital to maximize the expected discounted value of future pay-offs from its activities to its shareholders, and further assuming that these investments, at least on average, have expected positive net present values, the underlying value creation process from investments should be captured via R&D and SG&A expenditures (Doukas and Switzer, 1992; Banker et al., 2019), at least from an input-perspective. Another option is of course to construct measures of output, for instance the number of patent citations for knowledge capital (Hall et al., 2005) or survey scores on customer satisfaction for organization capital (Ittner and Larcker, 1998). However, not only do the latter methods share some of the problems associated with input-measures in terms of adequately capturing the underlying value creation process, but they also do not lend themselves well for research interested in the informativeness of accounting information. One could possibly argue that using expensed amounts for measuring intangible capital, and especially those included in the SG&A line item comprising a greater mixture of expenses compared to the R&D expense account (Enache and Srivastava, 2018), leads to rough and imprecise estimates. However, the expensed amounts pertaining to investments in intangible capital are indeed included in these expense accounts and there are no alternative public sources of information for those interested in firms' invested amounts in intangible capital. Following a similar line of reasoning, one could also make the opposite argument. Namely, because the future benefits of intangible capital are *"inherently connected to the benefits attributable to the entity as a whole"* (Skinner, 2008, p. 203), it is difficult to establish the relation-

ship between a specific expenditure (e.g., marketing, employee training or a research project) to particular subsequent benefits such as increased revenue or margins. From this view, collectively measured estimates of knowledge capital and organization capital based on expensed amounts are plausibly more accurate.[9] This way, measuring knowledge capital and organization capital capital using financial accounting information, we make the assumption that other financial information on these firm resources is not available elsewhere. To the extent such information is in fact available outside of the financial statements at low search cost to investors, our results are biased against finding statistically significant results.

Moreover, our previous review of the literature on the value relevance of intangible capital investments suggests a positive relationship between contemporaneous stock prices and both knowledge capital and organization capital measured via R&D and SG&A expenditures, respectively. This provides some assurance as to the validity of the method. Accordingly, we follow the literature and interpret spending on research and development (R&D) as investments in knowledge capital and spending on sales, general, and administrative (SG&A) as investments in organization capital (Peters and Taylor, 2017). We estimate firm and year specific stocks of organization and knowledge capital by capitalizing historical R&D and SG&A spending. For each firm and year, we calculate the fraction of R&D and SG&A to be capitalized and the corresponding amortization charge. Stated in U.S. dollars, the investment amount in knowledge capital to be capitalized, KC_{it}^{INV}, for firm i year t is given by

$$KC_{it}^{INV} = RD_{it} \times \gamma_{RD} \tag{6a}$$

and the corresponding investment in organization capital, OC_{it}^{INV}, to be capitalized for firm i year t is given by

$$OC_{it}^{INV} = SGA_{it} \times \gamma_{SGA} \tag{6b}$$

where RD_{it} and SGA_{it} are firm-specific R&D and SG&A expenditures and γ_{RD} and γ_{SGA} are the capitalization rates for knowledge capital and organization capital, respectively. We follow Peters and Taylor (2017) and interpret the full amount of R&D spending as investments in knowledge capital and capitalize R&D so that $KC_{it}^{INV} = RD_{it}$ or $\gamma_{RD} = 100\%$.

9. For instance, Eisfeldt and Papanikolaou (2013) and Li et al. (2018) validate the use of SG&A expenditures in measuring organization capital by finding a strong association between their measures of organization capital and workplace rankings, productivity, managerial ability, and managerial quality scores.

Based on our previous discussion, however, it is unlikely that all of the spending included in the SG&A expense account provides benefits in future periods. Hence, we follow previous literature and capitalize only a fraction of SG&A expenses for approximating the share of organization capital investments (see e.g., Lev and Radhakrishnan, 2005; Hulten and Hao, 2008; Eisfeldt and Papanikolaou, 2013; Eisfeldt and Papanikolau, 2021; Peters and Taylor, 2017). Whereas some researchers estimate firm- or industry-specific capitalization rates for SG&A, a simplified and more frequently used approach is to use a fixed capitalization rate. Following a shadow pricing methodology on composite SG&A spending among pharmaceutical firms, Hulten and Hao (2008) deemed that 30% of total SG&A spending approximates the proportion of SG&A spending that contributes to future value, i.e., the organization capital of the firm. In addition to capitalizing 30% of SG&A to proxy for organization capital investments, Peters and Taylor (2017) test a broad range of capitalization rates and obtain qualitatively similar results. Ewens et al. (2021) investigate capitalization rates of SG&A across a broad set of industries. Having performed a battery of validation tests, Ewens et al. (2021) conclude that their estimates of SG&A capitalization rates for measuring organization capital, ranging between 19-49% for the studied industries, improve the model as compared to fixed capitalization rates in terms of explaining market values and various measures of organization output such as employee skill level, employee satisfaction rankings, brand rankings, and trademark registrations. On average, they find that the capitalization rate of SG&A is 27%. This estimate is strikingly close to the 30% suggested by Hulten and Hao (2008). Nonetheless, the approach of Peters and Taylor (2017) and the capitalization rate of Hulten and Hao (2008) have been influential and used frequently across different strands of literature in measuring organization capital (e.g., Andrei et al., 2019; Cooper et al., 2020; Bongaerts et al., 2021; Gulen et al., 2021). Accordingly, we follow this literature and set $\gamma_{SGA} = 30\%$.[10]

Similar to Peters and Taylor (2017), we use the perpetual inventory method to calculate the capital stock of knowledge capital and organization capital, assuming that all investments are made at the end of the year.[11] The closing balance of the stock of

10. We test a series of different capitalization rates for SG&A suggested in earlier papers and obtain qualitatively similar (untabulated) results capitalizing 30%, 50% and Ewens et al. (2021) industry-specific rates.

11. This computation uses a geometric amortization pattern where the investment value decreases over time but never reaches zero, implying that investments in intangible capital have a perpetual useful life. Furthermore, constructing a capital stock based on R&D and SG&A expenditures assumes it is fully equity financed. This is likely a reasonable assumption since intangible investments rarely qualify as collateral for raising debt (Falato et al., 2020).

knowledge capital and the stock of organization capital is given by

$$KC_{it} = KC_{i,t-1}(1 - \delta_{it}^{RD}) + KC_{it}^{INV} \tag{7a}$$

and

$$OC_{it} = OC_{i,t-1}(1 - \delta_{it}^{SGA}) + OC_{it}^{INV} \tag{7b}$$

where KC_{it} and OC_{it} are the stocks of knowledge capital and organization capital, respectively, at time t for firm i and δ_{it}^{RD} and δ_{it}^{SGA} are the amortization rates of organization and knowledge capital, respectively. While perhaps a simplification, we set $KC_{i0} = 0$ and $OC_{i0} = 0$ the first year a firm appears in the Compustat record as suggested by Peters and Taylor (2017).

The literature offers a mix of amortization rates for knowledge capital, δ^{RD}. Some use fixed rates between 15-25% (Pakes and Schankerman, 1984; Chan et al., 2001; Bernstein and Mamuneas, 2006; Corrado et al., 2009; Falato et al., 2020), and others use rates based on specific industry estimates (Lev and Sougiannis, 1996; Peters and Taylor, 2017; Li and Hall, 2020; Ewens et al., 2021). Given the plethora of suggested rates, and for the sake of consistency and comparability, we stick to the method proposed in Peters and Taylor (2017). Specifically, Peters and Taylor (2017) use the industry-specific rates in Li and Hall (2020) which are estimated based on the industries listed in the BEA R&D Satellite Account (R&DSA), ranging between 11.2% for pharmaceuticals and 73.3% for motor vehicles. The industry-specific rates cover only 28% of Compustat firms, and 31% of our sample.[12,13] Following Peters and Taylor (2017), we set $\delta^{RD} = 15\%$ for the remainder of our sample. While the literature suggests a wide range of depreciation rates for organization capital, we follow Peters and Taylor (2017) and set $\delta^{SGA} = 20\%$ which perhaps is the most frequently proposed rate. Appendix C provides an overview of the capitalization and amortization rates used across industries.

Having estimated the intangible capital stocks, KC_{it} and OC_{it}, the amortization rates, δ_{it}^{RD} and δ_{it}^{SGA}, and the periodic intangible investments, KC_{it}^{INV} and OC_{it}^{INV}, we calculate an estimate of the 'misstatement in reported earnings' (Lev and Sougiannis, 1996). We refer to this estimate as the net investment in knowledge capital and organization capital, respectively, and corresponds to the difference in reported earnings between an accounting regime under which knowledge capital and organization

12. BEA is the acronym for Bureau of Economic Analysis.
13. Peters and Taylor (2017) use the estimates from an earlier unpublished version of Li and Hall (2020). The estimates, however, are unchanged (Ewens et al., 2021).

capital investments are capitalized and an accounting regime under which these investments are immediately expensed. Specifically, the net investment is the period investment minus the amortization of the stock of past investments. The net investment in knowledge capital is calculated as

$$X_{it}^{KC} = KC_{it}^{INV} - \delta_{it}^{RD} \times KC_{i,t-1} \tag{8a}$$

and the net investment in organization capital as

$$X_{it}^{OC} = OC_{it}^{INV} - \delta_{it}^{SGA} \times OC_{i,t-1} \tag{8b}$$

3.4. Specification of Regression Models

We perform our empirical analysis and hypothesis testing estimating two regression models. We augment equation (5) by including the above specified variables related to knowledge capital in equation (9). Estimating this model allows us to compare our results to the extant literature, and specifically that on the valuation of loss firms. We then extend the analysis and include also the above discussed organization capital variables in equation (10). Accordingly, we estimate the following models for our hypothesis testing:

$$MVE_t = \beta_0 + \beta_1 BVE_{t-1} + \beta_2 X_t + \beta_3 KC_{t-1} + \beta_4 X_t^{KC} + \epsilon_t \tag{9}$$

$$\begin{aligned} MVE_t = {} & \beta_0 + \beta_1 BVE_{t-1} + \beta_2 X_t + \beta_3 KC_{t-1} + \beta_4 X_t^{KC} + \\ & + \beta_5 OC_{t-1} + \beta_6 X_t^{OC} + \epsilon_t \end{aligned} \tag{10}$$

where:

MVE_t = cum-dividend market value of equity three months after the fiscal year-end. We add back any dividend to common shareholders pertaining to the period if this dividend is paid out before our security price measure date.

BVE_{t-1} = opening balance of book value of equity.

X_t = income before extraordinary items for the period.

KC_{t-1} = opening balance of the knowledge capital stock as if R&D expenditures were capitalized (equation 7a).

X_t^{KC} = net investment in knowledge capital for the period (equation 8a).

OC_{t-1} = opening balance of organization capital stock as if 30% of SG&A expenditures were capitalized (equation 7b).

X_t^{OC} = net investment in organization capital for the period (equation 8b).

We drop the subscript i for each variable for ease of exposition in the above specifications. While evidence suggests that investors consider the value effects from deferred taxes (Daley, 1995; Sougiannis, 1994), we do not include these effects to simplify the analysis (Lev and Sougiannis, 1996). We control for both spatial (industry) and temporal (year) fixed effects in all regressions and correct for heteroskedasticity using White's (1980) robust standard errors.

3.5. The Issue and Mitigation of Scale Effects

The issue of *scale* is frequently highlighted in the value relevance literature (Lev and Sougiannis, 1994; Banker et al., 2019; Darrough and Ye, 2007). While no distinct description of the cause-effect relationship nor any definite remedy to the issue is offered in the literature, the scale effect in value relevance studies can be summarized as follows. A scale effect is the result from accounting data varying significantly with firm size across sample firms, where a small number of large firms drive a significant portion of the coefficient estimates in the regression analysis (Easton and Sommers, 2003). When market prices are regressed on accounting information, these size differences in the panel data can overstate the economic significance of the coefficient estimates, in turn leading to incorrect statistical inferences (Barth and Clinch, 2009). Viewed this way, scale has the character of a correlated omitted variable. Scale has also been discussed in relation to heteroscedasticity since the variance in model residuals for the subset of larger firms typically is higher than that of smaller firms (Barth and Clinch, 2009). Barth and Kallapur (1996) suggest that this is particularly a problem when the size differences are unrelated to the research question.

The literature suggests several ways in which the issues related to scaling can be mitigated, but most suggestions raise additional concerns. Particularly, many propose deflating the variables with the number of shares outstanding or equity book value (Barth and Clinch, 2009). However, Barth and Kallapur (1996) argue that scale impacts the analysis regardless of whether accounting data is deflated. Instead, they suggest that including a size proxy as an independent variable while using White's (1980) robust standard errors is a superior approach for mitigating scale issues. On this note, Barth and Kallapur (1996) suggest that the book value of equity can sufficiently serve as a proxy for firm size. Collins et al. (1999) examine whether book value of equity is an omitted scale proxy in simple price-earnings regressions (e.g., Jan and Ou, 1995) and find that the role of equity book value likely is two-fold in the

model. That is, book value of equity is both a value relevant variable and a proxy for scale.

To alleviate scale-related issues, we correct for heteroskedasticity using White's (1980) robust standard errors in our regressions and include the book value of equity as a proxy for size (scale), the normal earnings power of a business, and the abandonment and adaptation option value (Hayn, 1995; Burgstahler and Dichev, 1997; Collins et al., 1999). To further account for size differences in our sample we winsorize all variables at the 1% level and, as an additional testing procedure, estimate our models for a sub-sample of firms with less variance in size in Section 6.2.

4. Data

4.1. Sample Selection

Our sample comprises all U.S. firms in the Compustat-CRSP merged file with necessary accounting and security data for the period 1977 to 2021. Following Peters and Taylor (2017), we collect accounting data dating back to 1950 for our measures of intangible capital stocks in equation (7a) and (7b). Starting in 1975, the Financial Accounting Standards Board (FASB) required the immediate expense of all R&D expenditures (FASB, SFAS No. 2, 1974), hence we give all firms two years to comply with the standard before estimating our regression models. Also following the literature, we exclude utility firms (Standard Industrial Classification codes 4900-4999), financial firms (6000-6999), and public administration and non-classifiable firms (9000-9999) because firms in these industries typically follow a different set of accounting rules (Peters and Taylor, 2017). To mitigate potential survivorship bias, we include both active and inactive firms in our sample. For each firm and year, we collect 21 financial statement items and three security-related items from the Compustat-CRSP merged file and two EPS measures from I/B/E/S, out of which only ten financial statement items and security-related items are related to our main variables of interest.[14,15,16] The remaining data items are used to either filter our sample, compute control variables for robustness tests, or present in summary statistics. We obtain monthly security price data for each firm as per market closing three months after fiscal year-end and assume that the annual or year-end report and the information included is publicly available no sooner nor later than at this point in time. We measure the market value of equity cum-dividend. That is, we add back any dividend to common shareholders pertaining to the fiscal year if the dividend is paid out (dividend ex-date) before our security price date. All variables are measured in U.S. dollar amounts. As discussed in the previous section, to mitigate the effect of size and outliers, we winsorize all regression variables by year at the 1st and 99th percentiles. Following the literature, we also exclude all firm-year observations with missing or negative sales (Compustat

14. The financial statement items collected are Income Before Extraordinary Items (Compustat item *ib*), R&D Expense (*xrd*), SG&A Expense (*xsga*), In-Process R&D (*rdip*), Cost of Goods Sold (*cogs*), Total Revenue (*revt*), Net Income/Loss (*ni*), EBIT (*ebit*), Gross Profit (*gp*), Book Value of Equity (*ceq*), Total Assets (*at*), Other Intangible Assets (*intano*), Current Assets (*act*), Cash and Short-Term Investments (*che*), Debt in Current Liabilities (*dlc*), D&A (*dp*), Operating Cash Flow (*oancf*), Gross Property, Plant, and Equipment (*ppegt*), Net Property, Plant, and Equipment (*ppent*), Receivables (*rect*), and Advertising Expense (*xad*).
15. The security-related items collected are Common Shares Outstanding (*cshoq*), Monthly Closing Price (*prccm*), and Dividend per Share (*dvpsxm*).
16. The EPS items collected are the Mean EPS Estimate (*meanest*) and Actual EPS Value (*actual*).

item *revt*) or total assets (*at*), and observations with property, plant, and equipment (*ppent*) below $5 million (Peters and Taylor, 2017). To classify an observation as a profit (loss), we require a minimum of two consecutive years of profits (losses), measured by income before extraordinary items. Hence, we exclude all firm-years not part of a series of consecutive years with reported profits or losses.

Peters and Taylor (2017) note that the SG&A item *xsga* in almost all cases include R&D expenses (*xrd*) and in-process R&D write-offs (*rdip*). Hence, we follow their approach in measuring SG&A as *xsga* minus *xrd* minus *rdip* whenever *xsga* exceeds *xrd* or *xrd* exceeds cost of goods sold (*cogs*).[17] In all other cases, we use *xsga* as stored in Compustat, or set *xsga* to zero if missing. Following Lev and Radhakrishnan (2005) and Peters and Taylor (2017), we also set *xrd* to zero when missing.

4.2. Summary Statistics

Table 1 provides summary statistics and variable definitions. Our final sample comprises 80,522 firm-year observations with 9,579 unique firms between 1977 and 2021, of which 64,499 (80%) are profit firms and 16,073 (20%) are loss firms. The data show that profit firms in general are larger (MVE_t, BVE_{t-1}), older (AGE_t), but less knowledge capital intensive (KC_t/BVE_t) than loss firms. However, both samples have similar organization capital intensity (OC_t/BVE_t). We consider our requirement of at least two consecutive profit or loss years sufficient for distinguishing between sticky profits and losses. Three years ahead in time, profit firms continue to generate positive return on assets, while loss firms continue to generate negative returns (ROA_{t+3}). So far, the characteristics of our sample resemble those documented in the extant literature. That is, loss firms are on average younger and more knowledge capital intensive (Joos and Plesko, 2005; Darrough and Ye, 2007; Franzen and Radhakrishnan, 2009). In Table A1, we provide Pearson and Spearman correlation coefficients and a brief discussion on the relation between our independent variables.

17. The Compustat item *rdip* is coded negative per default.

Table 1
Summary Statistics of Profit Firms and Loss Firms

This table presents summary statistics of the variables specified in equations (9) and (10), as well as key financial metrics for our samples of profit firms (Panel A) and loss firms (Panel B). We present the mean, median, standard deviation, and the 1st, 25th, 75th and 99th percentiles. MVE_t is the cum-dividend market value of equity, BVE_{t-1} is the opening balance of book value of equity, X_t is the reported earnings, KC_{t-1} is the opening balance of the knowledge capital stock, X_t^{KC} is the net (amortized) investment in knowledge capital, OC_{t-1} is the opening balance of the organization capital stock, X_t^{OC} is the net (amortized) investment in organization capital, KC_t/BVE_t and OC_t/BVE_t is the knowledge capital stock and organization capital stock scaled by book value of equity, respectively, INT_t/TA_t is capitalized other intangible assets scaled by total assets, $GROWTH_t$ is the sales growth, GM_t is the gross margin, ROA_t and ROA_{t+3} is the return on assets year t and *t+3* (until 2018), ROE_t is the return on equity, CFO_t/TA_{t-1} is the operating cash flow scaled by beginning-of-year total assets, and AGE_t is the firm age.

	Mean	Median	SD	p1	p25	p75	p99
Panel A: Profit firms (n=64,449)							
MVE_t	4073.29	467.87	14718.98	8.34	109.81	1980.58	68501.90
BVE_{t-1}	1039.98	175.70	3338.29	−62.85	52.27	652.34	16384.00
X_t	201.17	25.58	710.39	0.25	6.94	104.00	3659.00
KC_{t-1}	194.82	0.06	1095.95	0.00	0.00	33.33	4441.46
X_t^{KC}	16.26	0.00	90.96	−13.89	0.00	3.46	322.64
OC_{t-1}	436.16	60.90	1366.63	0.00	15.30	256.44	7214.58
X_t^{OC}	33.06	6.62	93.39	−33.01	1.39	24.47	514.66
KC_t/BVE_t	0.14	0.00	0.35	0.00	0.00	0.18	1.26
OC_t/BVE_t	0.55	0.37	0.88	−0.41	0.17	0.70	3.97
INT_t/TA_t	0.04	0.01	0.08	0.00	0.00	0.05	0.37
$GROWTH_t$	0.16	0.10	1.00	−0.32	0.02	0.21	1.18
GM_t	0.37	0.34	0.19	0.06	0.23	0.48	0.88
ROA_t	0.14	0.12	0.10	0.00	0.08	0.18	0.47
ROA_{t+3}	0.11	0.10	0.11	−0.17	0.05	0.16	0.41
ROE_t	0.20	0.15	3.27	−0.40	0.09	0.22	1.21
CFO_t/TA_{t-1}	0.13	0.12	3.00	−0.99	0.04	0.20	1.09
AGE_t	18.17	15.00	14.05	1.00	7.00	26.00	61.00
Panel B: Loss firms (n=16,073)							
MVE_t	913.90	118.86	3947.97	2.96	29.47	447.74	16236.94
BVE_{t-1}	294.56	61.87	1275.14	−198.53	17.60	184.02	4363.00
X_t	−68.46	−19.86	168.23	−761.50	−59.78	−5.82	−0.19
KC_{t-1}	92.45	3.97	354.10	0.00	0.00	58.25	1319.75
X_t^{KC}	13.44	0.00	51.50	−19.74	0.00	7.07	225.64
OC_{t-1}	134.76	23.80	557.65	0.00	5.51	78.87	2084.13
X_t^{OC}	10.65	1.65	44.20	−34.48	0.00	8.26	191.40
KC_t/BVE_t	0.50	0.02	1.26	−2.17	0.00	0.66	5.24
OC_t/BVE_t	0.67	0.33	1.75	−3.61	0.06	0.91	7.62
INT_t/TA_t	0.05	0.00	0.10	0.00	0.00	0.05	0.48
$GROWTH_t$	0.77	0.02	30.58	−0.84	−0.13	0.24	6.71
GM_t	−7.14	0.28	282.41	−33.74	0.12	0.49	0.91
ROA_t	−0.13	−0.06	0.28	−0.99	−0.19	0.00	0.10
ROA_{t+3}	−0.07	0.00	0.30	−0.97	−0.13	0.07	0.36
ROE_t	−1.96	−0.24	174.88	−8.99	−0.56	−0.07	5.70
CFO_t/TA_{t-1}	−0.06	0.00	0.28	−0.82	−0.11	0.05	0.25
AGE_t	11.78	8.00	11.14	1.00	4.00	16.00	51.00

5. Empirical Analysis

5.1. A Comparison Between Our Results and the Extant Literature

We begin our analysis by comparing our findings to the extant literature on the value relevance of knowledge capital and establish that we obtain qualitatively similar results. Table 2, columns (1) to (3), presents results from estimation of equation (9).

In terms of the estimated coefficients on book value of equity and earnings, our findings are consistent with the findings documented in the extant literature. The results suggest that investors value profit firms primarily on the basis of their earnings as a proxy for the present value of the stream of future earnings (Burgstahler and Dichev, 1997). The coefficient on earnings for profit firms is positive and statistically significant ($p<0.01$) and the corresponding coefficient for loss firms is insignificant. Put differently, earnings are relevant for the equity market value of profit firms but not for loss firms. Again corroborating the findings in previous research, our findings show that book value of equity is more important for explaining the equity market value of loss firms than for profit firms. The coefficient on book value of equity is positive for both profit and loss firms, but significantly larger for loss firms ($p<0.01$). While most of the previous literature has suggested this relationship only on the basis of the relative importance of book value of equity in earnings, our result suggests that this relationship holds also when knowledge capital is taken into account.

We next address the value relevance of knowledge capital investments. We find that the net investment in knowledge capital is valued positively by investors as is reflected in the estimated coefficients across both profit and loss firms. Both coefficients are positive and statistically significant ($p<0.01$). Yet, we do not find statistical evidence of any difference in means for the two samples. The knowledge capital stock, however, does not seem to be valued positively by investors across both profit and loss firms. The estimated coefficient on the knowledge capital stock is value relevant only for loss firms, and significantly different from the coefficient estimate for profit firms ($p<0.01$), suggesting that past investments contain more value relevant information for loss firms than for profit firms.

Our literature review offers a range of explanations for these results. One line of reasoning in the literature as to the insignificant coefficient on the stock of past knowledge capital investments for profit firms, i.e., its value irrelevance, is that information about expected benefits from past investments is conveyed indirectly in earnings. That is, positive earnings (profits) are informative of the benefits realized

from past investments in the sense that common cash-flow patterns from knowledge capital investments are known to investors (Sougiannis, 1994; Franzen and Radhakrishnan, 2009). Following Franzen and Radhakrishan (2009), the interpretation of the significant coefficient on the stock of knowledge capital for the average loss firms is, conversely, that losses do not convey information about the productivity of past investments. Instead, the value relevant information about expected future benefits is conveyed directly in the stock of past investments. Our results are consistent with these explanations. The literature suggests it is unlikely that investments in knowledge capital and its subsequent benefits occur in the same period and that current earnings therefore do not convey information about future benefits from these investments (Sougiannis, 1994). Since we find the net investment in knowledge capital value relevant for both profit and loss firms, we infer that the net investment conveys information about its future expected benefits directly. Alternatively, as an explanation of the lack of significance of the knowledge capital stock, Sougiannis (1994) suggests that a positive coefficient on the investment component possibly means that information about expected future benefits from the stock of knowledge capital investments is conveyed in the net investment indirectly. However, we do not find support for this explanation for loss firms since investors evidently find past knowledge capital investments value relevant, i.e., informative of expected future benefits.

Our findings could also be interpreted such that past knowledge capital investments for the average loss firm are perceived as less risky than those of the average profit firm (Wyatt, 2008). Or, alternatively, investors have higher hopes for the average loss firm to realize the benefits from past knowledge capital investments than they have for the average profit firms. Moreover, according to the explanation of Wyatt (2008), our results also suggest that expected future benefits from period investments in knowledge capital are perceived as less uncertain, hence its positive and significant coefficient. The positive and significant coefficient on the net investment in knowledge capital for both profit and loss firms could also be explained by the signaling value of such investments. Chan et al. (2001) and Doukas and Switzer (1992) suggest that by investing in knowledge capital, management sends a signal to outsiders in the capital market conveying insider information on expectations for the future. Another explanation put forward by Sougiannis (1994) is that the insignificant coefficient on past knowledge capital investments may be due to market efficiency, i.e., past investments are not informative about future expected benefits. According to this explanation, our results would suggest that historical information on knowledge capital investments cannot (can) be used to predict stock prices for profit (loss) firms.

Table 2
Value Relevance of Knowledge Capital and Organization Capital Across Profit Firms and Loss Firms

This table presents the regression results from estimating equations (9) and (10) for profit and loss firms. It shows the association between equity market values, book value of equity, earnings and past and net investments in knowledge capital and organization capital for both samples. The dependent variable is cum-dividend market value of equity (MVE_t). The independent variables are as follows. BVE_{t-1} is the opening balance of book value of equity, X_t is the reported earnings, KC_{t-1} is the opening balance of the knowledge capital stock, X_t^{KC} is the net (amortized) investment in knowledge capital, OC_{t-1} is the opening balance of the organization capital stock, and X_t^{OC} is the net (amortized) investment in organization capital. See further variable definition in Section 3.4. Columns (1) to (3) present the regression results from including components related only to knowledge capital. Columns (4) to (6) present the regression results from including components related to both knowledge capital and organization capital. *, **, and *** denote statistical significance at the 1%, 5% and 10% levels, respectively. *t*-statistics are presented in parentheses and are estimated with robust standard errors (White, 1980). All regressions include industry and year fixed effects. A constant is included in all regressions.

	Equation (9)			Equation (10)		
	Profit firms	Loss firms	Difference (Profit-Loss)	Profit firms	Loss firms	Difference (Profit-Loss)
BVE_{t-1}	0.75***	1.00***	−0.25	0.49***	0.93***	−0.44**
	(8.55)	(5.05)	(−1.15)	(5.60)	(4.51)	(−1.97)
X_t	13.71***	−1.49	15.20***	12.29***	−0.45	12.74***
	(26.25)	(−1.13)	(10.67)	(24.03)	(−0.35)	(9.21)
KC_{t-1}	−0.30	2.65***	−2.95***	−0.49	2.41**	−2.90***
	(−0.75)	(2.60)	(−2.70)	(−1.23)	(2.44)	(−2.73)
X_t^{KC}	24.68***	24.09***	0.59	26.06***	20.46***	5.61
	(6.38)	(5.61)	(0.10)	(6.68)	(4.78)	(0.97)
OC_{t-1}				1.50***	0.49***	1.00***
				(7.62)	(3.61)	(4.20)
X_t^{OC}				5.66***	17.63***	−11.97***
				(2.84)	(6.33)	(−3.50)
N	64449	16073		64449	16073	
$Adj.R^2$	0.84	0.49		0.85	0.52	

In contrast to our results, Lev and Sougiannis (1996) find a statistically significant coefficient on the stock of past knowledge capital investments in their joint sample of profit and loss firms, and Peters and Taylor (2017) document a positive relationship between the stock of knowledge capital and market values. These contrasting results are likely because the capital stock of knowledge capital in both these papers is measured as per closing balance year *t*, whereas our measure of the knowledge capital stock is as per opening balance year *t*. In other words, the stock of knowledge capital in these studies corresponds to the sum of our measures of the knowledge capital stock and the net investment in knowledge capital. In untabulated results, we re-estimate equation (9) with the stock of knowledge capital as per closing balance year t and find a positive and significant ($p<0.01$) mean coefficient on this variable.

5.2. The Value Relevance of Organization Capital Across Profit and Loss Firms

5.2.1 Incremental Explanatory Power of Organization Capital

Having established that we obtain similar results to those in the extant literature with regards to knowledge capital, we turn to our findings of the value relevance of organization capital. Our first hypothesis predicts that the inclusion of organization capital in the equity valuation model for loss firms has explanatory power incremental to that of a model based on book value of equity, earnings, and investments in knowledge capital. We base this prediction on the literature which consistently underscores the benefits from organization capital such as its role in facilitating the outcome of other investment activities and contributing to reduced risk and sustained competitive advantage. That is, we predict an improved explanatory power (adjusted R^2) in equations (10) compared to that of equation (9) for loss firms. The results from our estimation of equations (9) and (10) are presented in Table 2.

For loss firms, the average adjusted R^2 is 53% from estimating equation (10) when both knowledge capital and organization capital are considered in the model. In comparison, the average adjusted R^2 from estimating equation (9) for loss firms is 49%, i.e., when only knowledge capital is accounted for. This corresponds to an improvement of 6% (=(0.52-0.49)/0.49) and shows that organization capital on average has incremental explanatory power for equity market values in addition to that from book value of equity, earnings, and knowledge capital. With this result, we find support for our first hypothesis.

Nonetheless, while the magnitude of the explanatory power is not part of our first hypothesis, it is difficult to call this increase anything but modest. Based on the rich body of literature arguing for the many great qualities of organization capital, we would expect the incremental explanatory to be greater. In comparison, and stressing this point, the incremental difference in explanatory power between equation (9) and equation (10) for equity market values of profit firms is only 1%. Taken together, however, this difference indicates that the incremental explanatory power of organization capital for explaining market values is higher for loss firms than for profit firms.

5.2.2 The Value Relevance of Past Investments in Organization Capital

Our second hypothesis states that investors value the stock of past organization capital investments positively for both profit firms and loss firms but on average more

positively for profit firms. Because profit firms generate positive earnings, we hypothesize that the average profit firm has a relatively more productive stock of organization capital than the average loss firm has and that investors value these differences accordingly. Thus, to the extent that investors consider the asset nature of organization capital investments, the perceived importance of the average loss firm's organization capital stock should be lower than that of the average profit firm.

Table 2, columns (4) to (6), shows that the stock of organization capital is perceived as value relevant for both profit and loss firms but that investors on average find the stock of organization capital more value relevant for profit firms. Consistent with our prediction, these results suggest that investors value the stock of organization capital positively for both profit and loss firms but more positively for profit firms. The estimated coefficients for both profit and loss firms are positive and statistically significant ($p<0.01$), as is the difference in means between the two ($p<0.01$). This result is qualitatively similar to that of Banker et al. (2019) who find that past capitalized SG&A is positively associated with market values. However, we should note that Banker et al. (2019) examine a joint sample of profit and loss firms. We use a split sample of profit and loss firms and to show that the value relevance of the organization capital stock is higher for profit firms than loss firms, in turn confirming that investors decipher accounting information and price the stock of past organization capital investments differently across profit and loss firms.

5.2.3 The Value Relevance of Net Investments in Organization Capital

We next consider our third hypothesis that investors value the net investment in organization capital positively for both profit and loss firms, but more positively for loss firms. Empirical studies suggest that organization capital is positively associated with firm performance (e.g., Li et al., 2018) and, drawing on signaling theory, our expectation is that the signaling value of an investment in organization capital is higher for a loss firm than for a profit firm on average.

Table 2, columns (4) to (6), presents the coefficient estimates for the net investment in organization capital. The results indicate that the net investment is positively associated with equity market values for both profit and loss firms. The estimated mean coefficients are positive and statistically significant ($p<0.01$) for profit and loss firms. Consistent with our prediction, the difference in means between the coefficient estimates is also negative and significant ($p<0.01$), suggesting that investors price the net investment in organization capital more positively for the average loss firm than for

the average profit firm. In other words, these results suggest that the net investments convey relevant information about future expected benefits, but that investors find this information relatively more important in determining the worth of loss firms. In contrast to our results, Banker et al. (2019) find a negative coefficient on the full amount of SG&A expenditures and suggest that investors value this component as an expense. However, to the extent our measure captures the investment share of the SG&A expenditure, this different result is not surprising since the rest of the SG&A expenditure is likely benefited from in the period incurred.

Taken together, these results show that both the net investment in organization capital and the stock of past organization capital investments are priced positively both for profit and loss firms, on average, but that investors value these investments differently depending on whether it is a profit or loss firm. Specifically, our findings suggest that investors perceive the stock of organization capital as more value relevant for profit firms, whereas the net investment is perceived as more value relevant for loss firms. In conclusion, we find support also for our second and third hypotheses.

5.3. A Comparison Between Knowledge Capital and Organization Capital

Instead focusing on the differences between the coefficient estimates of equations (9) and (10), we find that the difference between the coefficient on book value of equity for profit and loss firms becomes more pronounced, yet keeping its sign. The coefficients on book value of equity decrease slightly for both samples but the difference in means becomes statistically significant ($p<0.05$). Our interpretation of these results remains, suggesting that book value of equity is more value relevant for loss firms. While the coefficients on earnings, net investment in knowledge capital, and the stock of knowledge capital change slightly, our interpretation from our previous analysis remains.

Comparing the coefficients on the knowledge capital variables with the organization capital variables from estimating equation (10), it is interesting to note the considerable difference in size between the coefficients on the net investment variables. For profit firms, the size of the coefficient on the net investment in knowledge capital is almost five times the size of that related to organization capital. For loss firms, this difference is less pronounced, yet similar in direction. In terms of the coefficients on the knowledge capital and organization capital stocks, the differences between the two are similar in magnitude for both profit and loss firms. Nonetheless, the coefficient on the knowledge capital stock is insignificant for profit firms but positive and sta-

tistically significant for loss firms ($p<0.05$). Taken together, these differences suggest that knowledge capital explains more of the equity market values across both profit and loss firms than does organization capital. Particularly, the net investment in knowledge capital has the greatest impact on market values of equity for profit firms out of all the included intangible capital variables. The impact from the net investment in knowledge capital and organization capital, respectively, is greater than the impact from the capital stocks for loss firms. Overall, since organization capital has only a modest impact on the equity market values, these differences stress the point made in relation to the test of our first hypothesis.

Nonetheless, guided by theory and consistent with our predictions, the positive coefficient estimates on the net investment in organization capital suggest that these investments have signaling value for both profit and loss firms. To the extent that investors perceive organization capital as a facilitator of other investment activity as well as a resource that is rare, valuable, and difficult for competitors to imitate, making an investment in organization capital has greater importance for a business that is performing relatively worse financially. Put differently, when the management of a loss firm invests in organization capital, it sends a credible signal to outsiders in the capital market that it is taking action to restore profitability. Investors likely perceive this information more positively than they would perceive a corresponding signal from a profit firm conveying "only" the facilitating and strategic benefits that follow from investing in organization capital.

Moreover, the interpretation of the positive and significant coefficient estimates on the organization capital stocks for both profit and loss firms is that the organization capital captures the underlying workings of firms as well as is a source of competitive advantage and that investors are well aware of these qualities. That is, firms rely on skilled employees, satisfied customers, and other economic competencies for a sustained operation. While both profit and loss firms have organization capital, investors likely assign a greater valuation multiplier to the organization capital of profit firms because these firms, by virtue of being profitable, make relatively greater use of their organization capital stocks.

In the previous section, we offered some different explanations for our results concerning the valuation of knowledge capital. The literature offers no equivalent explanations for the valuation of organization capital. However, our results for organization capital are consistent with most of these explanations. For instance, to the extent a bundled investment in organization capital is unlikely to be initiated, completed and

benefited from in the same period, the benefit from the investment is not reflected in earnings for the period (Sougiannis, 1994). Therefore, the information about the expected future benefits from this investment is instead reflected directly in the net investment component. This is likely to be the case for both profit and loss firms. Analogously, because organization capital is a source of sustained competitive advantage, comprices a broad array of competencies and is an overall facilitator of other investment activity, investors cannot satisfactorily perceive information about the full scale of expected future benefits from organization capital in either earnings or the net investment (Sougiannis, 1994), thus turning to the stock of past organization capital directly for information. This applies equally across profit and loss firms.

Our results also fit the risk (Wyatt, 2008) and the market efficiency explanation (Sougiannis, 1994). Starting with the risk explanation, our results from this perspective suggest that both the period investment in organization capital as well as the stock of past organization capital investments is perceived as less than all risky – an explanation that would agree with the qualitative differences between knowledge capital and organization capital. According to the market efficiency explanation, investors do not consider information conveyed in the stock of past investments value relevant, suggesting that lagged financial information cannot be used to predict stock prices. From this perspective, our results for organization capital investments suggest that investors indeed consider past organization capital investments in pricing contemporaneous market values, further suggesting that lagged information on past organization capital investments can be used to predict stock prices. Without making any further investigations as for the latter, however, this is just to say both the stock of organization capital and net investment in organization capital conveys value relevant information about expected future benefits from organization capital directly for both profit firms and loss firms.

In summary, our results suggest that organization capital has incremental, yet only modest, explanatory power to that of a model of book value of equity, earnings and knowledge capital for equity market values of loss firms. Knowledge capital has greater impact on equity market values for profit and loss firms than does organization capital. Our results also show that capitalized past investments as well as the net investment in organization capital are valued positively and differently across profit and loss firms, because the information about future expected benefits conveyed in these variables is perceived differently by investors.

5.4. Accounting Conservatism and Reported Losses

Considering that Compustat data suggest that 45% of the reported earnings among non-financial U.S. firms between 2010 and 2019 were negative, it is useful to see if the above results hold in a refined sense by looking in more detail at differences in our sample of loss firms. This is motivated because research suggests that the conservative accounting treatment for investments in intangible capital may cause firms to report losses albeit having sound underlying business fundamentals (Darrough and Ye, 2007). On this note, Gu et al. (2021) suggest that *"all losses are not alike"* and report how firms whose losses are induced by the immediate expense of intangible capital investments outperform, along several operating performance metrics and in terms of subsequent stock returns, firms whose losses are not induced by this accounting treatment but rather result from performing poorly.

Because our results suggest that investors value organization capital positively but differently across profit and loss firms, investors indeed assess profit firms and loss firms differently. Thus, to the extent firms with reported losses induced by conservative accounting practices are qualitatively more similar to profit firms, there may be differences in investor perceptions of the organization capital among the firms in our sample of loss firms that impact our results. In other words, because investors indeed seem to assess qualitative differences between profit and loss firms, it is useful to see if investors also understand differences between qualitatively different loss firms.

Accordingly, we compare the estimated coefficients on organization capital between samples of firms whose losses are induced by the immediate expense of intangible capital investments and firms whose losses are not induced by this accounting treatment for intangible capital but rather is the result from performing poorly. We refer to the first sub-sample of loss firms as Accounting losers and the latter sub-sample of firms as Economic losers. To the extent there are differences similar to those documented by Gu et al. (2021) between our samples of Accounting losers and Economic losers, our expectation is that investors value the organization capital of Accounting losers analogously to how our results suggest investors value the organization capital of profit firms. For Economic losers, we expect that investors value the organization capital analogously to how our results suggest investors value the organization capital for loss firms overall. That is, we expect that investors take these qualitative differences into account.

We follow Gu et al. (2021) and define Accounting losers as the group of firms whose

reported loss would turn into a profit had their investments in intangible capital instead been capitalized, whereas Economic losers would report a loss in either case.[18] An Accounting loser has earnings $X_t < 0$ and

$$X_t + X_t^{KC} + X_t^{OC} > 0, \qquad \text{(Accounting loser)}$$

whereas an Economic loser similarly has $X_t < 0$, but

$$X_t + X_t^{KC} + X_t^{OC} < 0, \qquad \text{(Economic loser)}$$

and X_t, X_t^{KC}, and X_t^{OC} are defined as in Section 3.4. For the sake of consistency, we depart from the classification in Gu et al. (2021) by means of also including the amortization charge of organization capital in determining whether the loss is induced by accounting conservatism or not. To capture only more sticky losses, analogous to our classification of loss firms in our main sample, we require Accounting and Economic losers to report at least two years of consecutive losses. Hence, the sum of observations of Accounting losers and Economic losers equals that of loss firms. Table 3 presents summary statistics of our samples of Accounting and Economic losers. While perhaps a crude bifurcation of our sample of loss firms, our summary statistics in Panel A (Panel B) report that Accounting losers (Economic losers) on average are larger (smaller), exhibit a higher (lower) sales growth, have a positive (negative) gross margin, and positive (negative) operating cash flow scaled by the opening balance of total assets. Accounting losers are also younger than Economic losers with an average firm age of 8.8 (12.5) years. Three years ahead, the average Accounting loser continues to generate an average negative return on assets (ROA_{t+3}), yet higher than today and higher than that of the average Economic losers. These summary statistics indicate the qualitative differences between the two groups of loss firms and thus far corroborate the findings of Gu et al. (2021). That is, it appears our sample of Accounting losers are on average good performing businesses who report a net loss due to accounting conservatism whereas our sample of Economic losers have relatively worse fundamentals and report a net loss due to poor performance. In this light, our sub-samples are similar to those in Gu et al. (2021).

18. Illustrative example: a computer system design business (δ^{RD}=0.489) reporting income before extraordinary items of -\$10m, R&D expenditure of \$50m, and SG&A expenditures of \$150m for the period and have an estimated knowledge (organization) capital stock of \$100m (\$150m), would have adjusted earnings of \$6.1m (=-10+50-100×0.489+150×0.3-150×0.2).

Table 3
Summary Statistics of Accounting and Economic Losers

This table presents summary statistics of the variables specified in equations (9) and (10), as well as key financial metrics for our samples of Accounting losers (Panel A) and Economic losers (Panel B). We provide the mean, median, standard deviation, and the 1st, 25th, 75th and 99th percentiles. MVE_t is the cum-dividend market value of equity, BVE_{t-1} is the opening balance of book value of equity, X_t is the reported earnings, KC_{t-1} is the opening balance of the knowledge capital stock, X_t^{KC} is the net (amortized) investment in knowledge capital, OC_{t-1} is the opening balance of the organization capital stock, X_t^{OC} is the net (amortized) investment in organization capital, KC_t/BVE_t and OC_t/BVE_t is the knowledge capital stock and organization capital stock scaled by book value of equity, respectively, INT_t/TA_t is capitalized other intangible assets scaled by total assets, $GROWTH_t$ is the sales growth, GM_t is the gross margin, ROA_t and ROA_{t+3} is the return on assets year t and $t+3$ (until 2018), ROE_t is the return on equity, CFO_t/TA_{t-1} is the operating cash flow scaled by beginning-of-year total assets, and AGE_t is the firm age.

	Mean	Median	Std. Dev.	p1	p25	p75	p99
Panel A: Accounting losers (n = 3,067)							
MVE_t	1686.20	271.99	5192.31	4.46	68.41	1034.22	26840.60
BVE_{t-1}	275.98	87.00	811.50	−90.80	30.92	229.20	3227.18
X_t	−29.24	−8.68	62.63	−294.04	−27.50	−2.23	−0.07
KC_{t-1}	125.98	22.62	343.71	0.00	0.00	94.43	1785.46
X_t^{KC}	33.81	5.71	86.53	−1.19	0.00	29.70	439.94
OC_{t-1}	128.58	34.83	364.24	0.00	10.23	102.59	1722.66
X_t^{OC}	26.47	8.41	58.60	−1.15	2.12	25.04	269.32
KC_t/BVE_t	0.62	0.30	1.11	−0.75	0.00	0.81	5.24
OC_t/BVE_t	0.73	0.43	1.48	−3.25	0.15	0.96	7.18
INT_t/TA_t	0.06	0.02	0.09	0.00	0.00	0.08	0.44
$GROWTH_t$	0.47	0.14	2.77	−0.32	0.01	0.35	6.18
GM_t	0.36	0.45	0.60	−1.96	0.26	0.68	0.93
ROA_t	−0.05	−0.02	0.13	−0.48	−0.10	0.02	0.13
ROA_{t+3}	−0.03	0.01	0.21	−0.67	−0.10	0.07	0.39
ROE_t	−0.17	−0.09	0.93	−2.50	−0.21	−0.03	1.43
CFO_t/TA_{t-1}	0.02	0.03	0.41	−0.46	−0.03	0.08	0.32
AGE_t	8.81	5.00	8.84	1.00	3.00	12.00	41.00
Panel B: Economic losers (n=13,006)							
MVE_t	731.78	95.74	3568.26	2.71	25.30	355.83	12816.61
BVE_{t-1}	298.94	55.31	1361.64	−206.99	15.50	171.80	4668.90
X_t	−77.70	−23.58	183.31	−907.00	−69.85	−7.46	−0.33
KC_{t-1}	84.54	1.60	356.05	0.00	0.00	48.78	1229.64
X_t^{KC}	8.63	0.00	37.30	−22.86	0.00	3.52	157.25
OC_{t-1}	136.22	21.75	594.16	0.00	4.80	72.77	2201.29
X_t^{OC}	6.92	0.97	39.13	−45.93	0.00	5.62	139.80
KC_t/BVE_t	0.47	0.00	1.28	−2.55	0.00	0.59	5.24
OC_t/BVE_t	0.66	0.30	1.81	−3.78	0.04	0.90	7.64
INT_t/TA_t	0.05	0.00	0.10	0.00	0.00	0.05	0.49
$GROWTH_t$	0.24	−0.01	1.47	−0.84	−0.16	0.19	5.58
GM_t	−0.17	0.25	2.21	−8.45	0.10	0.44	0.88
ROA_t	−0.15	−0.07	0.23	−0.96	−0.22	−0.01	0.09
ROA_{t+3}	−0.07	0.00	0.24	−0.97	−0.14	0.06	0.33
ROE_t	−0.52	−0.30	2.36	−8.49	−0.64	−0.11	5.14
CFO_t/TA_{t-1}	−0.08	−0.02	0.23	−0.86	−0.14	0.04	0.22
AGE_t	12.48	9.00	11.50	1.00	4.00	17.00	52.00

Table 4 presents the results from our estimation of equation (10) on the two subsamples of loss firms, i.e., Accounting losers and Economic losers. While the estimated coefficients on the net investment in organization capital are statistically significant for Accounting losers and Economic losers ($p<0.01$) and the stock of organization capital is significant ($p<0.01$) for Economic losers, these results provide no evidence for any differences in means between the two. Thus, we cannot sufficiently distinguish whether the organization capital is valued differently across these qualitatively different loss firms. The only apparent difference between these loss firms is that between the estimated coefficients on net investment in knowledge capital, which is positive for Accounting losers ($p<0.01$), but value irrelevant for Economic losers. The difference in means is positive and statistically significant ($p<0.05$).

In this light, unlike our interpretation of the comparison between profit and loss firms in the previous section, the interpretation of these results is that investors do not seem to adequately distinguish between the qualitative differences in organization capital across Accounting losers and Economic losers. Gu et al. (2021) find that Accounting losers outperform Economic losers in terms of stock returns.[19] Whereas this evidence suggests that investors seem to correct their perception of the qualitative differences among loss firms over time, our findings show that investors do not perceive these qualitative differences at the outset, i.e., before correcting their valuation.

In other words, inasmuch as our results from estimating equation (10) for profit and loss firms suggest that investors dissect accounting information and assess the organization capital of firms accordingly, investors do not seem to do the same for these qualitatively different loss firms. That is, to paraphrase Gu et al. (2021), investors appear to consider all losses alike in terms of their organization capital. Taken together, our findings suggest that investors make different assessments of the financial information of organization capital depending on whether the earnings number is positive or negative but make no further investigation when the earnings number is negative. In other words, our results suggest that investors do not fixate on the reported earnings per se, but fail to "look under the hood" when firms report losses.

19. Gu et al. (2021) study the value relevance of earnings across samples of loss firms and argue that the relevance of earnings is restored for their equivalent sample of Accounting losers when expensed investments in knowledge capital and organization capital is taken into account. However, this difference compared to our result is primarily due to Gu et al. (2021) measuring earnings as a composite of the variables that we regress separately. In untabulated results, we similarly find a positive and statistically significant coefficient on "adjusted" earnings when measured collectively with our measures of the net investment in knowledge capital and organization capital, respectively.

A plausible explanation for this is that, *prima facie*, the presentation of accounting information of both Accounting losers and Economic losers appear similar to investors. That is, to the extent investors are misled by reported negative earnings, the investor perception of the signaling value from making an investment in organization capital is no different for an Accounting loser compared to that for an Economic loser. In general, to the extent these loss firms are indeed qualitatively different in terms of performance, our findings are largely consistent with the notion of firms with conservative earnings being undervalued compared to firms with aggressive earnings (Lev et al., 2005).

Table 4
Value Relevance Across Accounting Losers and Economic Losers

This table presents the regression results from estimating equations (9) and (10) for Accounting and Economic losers. It shows the association between equity market values, book value of equity, earnings and past and net investments in organization and knowledge capital for both samples. The dependent variable is cum-dividend market value of equity (MVE_t). The independent variables are as follows. BVE_{t-1} is the opening balance of book value of equity, X_t is the reported earnings, KC_{t-1} is the opening balance of the knowledge capital stock, X_t^{KC} is the net (amortized) investment in knowledge capital, OC_{t-1} is the opening balance of the organization capital stock, and X_t^{OC} is the net (amortized) investment in organization capital. See further variable definition in Section 3.4. Columns (1) to (3) present the regression results from including components related only to knowledge capital. Columns (4) to (6) present the regression results from including components related to both knowledge capital and organization capital. *, **, and *** denote statistical significance at the 1%, 5% and 10% levels, respectively. *t*-statistics are presented in parentheses and are estimated with robust standard errors (White, 1980). All regressions include industry and year fixed effects. A constant is included in all regressions.

	Accounting losers	Economic losers	Difference (Accounting-Economic)
BVE_{t-1}	0.69^{**}	0.92^{***}	-0.23
	(2.23)	(4.20)	(-0.61)
X_t	8.76	-1.25	10.01
	(1.15)	(-0.91)	(1.30)
KC_{t-1}	1.93^{**}	2.51^{**}	-0.57
	(2.16)	(2.31)	(-0.41)
X_t^{KC}	31.62^{***}	10.52	21.10^{**}
	(5.55)	(1.49)	(2.33)
OC_{t-1}	0.26	0.43^{***}	-0.18
	(0.43)	(3.08)	(-0.29)
X_t^{KC}	24.04^{***}	16.32^{***}	7.72
	(3.82)	(4.48)	(1.07)
N	3067	13006	
$Adj.R^2$	0.63	0.49	

6. Additional Testing Procedures

6.1. Controlling for Alternative Explanatory Variables

It is useful to see if our results hold considering other variables that are related to the valuation of, and investment activity in, intangible capital. For instance, because investments in knowledge capital are associated with revenue growth (Morbey and Reithner, 1990), and revenue growth is both associated with expected earnings growth (Core et al., 2003) and considered an important investment criterion among many investors (Block et al., 2019), our results may be influenced by the revenue growth among our sample firms.

Moreover, while we follow the previous literature by means of substituting net earnings with income before extraordinary items and income from discontinued operations in equations (9) and (10), this specification of our valuation model violates clean surplus accounting and may impact our results. Namely, Jones and Smith (2011) find that both special items and other comprehensive income, albeit reverting over time, have predictive power incremental to net earnings for future firm performance. Darrough and Ye (2007) also find that special items explain some of the valuation differences in their sample of loss firms.

Firm age may also impact our results because young firms are likely more prone to report losses and invest in knowledge capital (Franzen and Radhakrishnan, 2009). Empirical studies also find that organization capital varies with life cycle differences among firms (Hasan and Cheung, 2018; Atkeson and Kehoe, 2005).

Additionally, prior research suggests that the value relevance of earnings information changes around information releases due to accrual manipulation (e.g., Collins and DeAngelo, 1990). For instance, firms with low earnings quality that just slightly beat consensus analyst earnings per share estimates earn short-term abnormal stock returns (Bhojraj et al., 2009). In the long term, however, this type of real earnings management leads to value destruction and, thus, potentially reporting a loss (Jensen, 2005). Because this is a common behavior among firms (Graham et al., 2005), driven by managers' incentive to delay discretionary spending on R&D, advertising, and maintenance to meet earnings expectations in the market (Skinner and Sloan, 2002; Graham et al., 2005), the occurrence of earnings management in our panel data may impact our results. The literature also suggests that accruals as a proxy for earnings quality both have implications for equity valuation (Sloan, 1996; Dechow and Dichev, 2002) and are related to earnings management (Healy, 1985). Consequently, the

accruals among our sample of firms may influence our results.

Accordingly, we examine the potential impact from the above variables on our estimated results from equation (9) and (10) by re-estimating these equations with an additional set of control variables as follows:

$$\begin{aligned} MVE_t = {} & \beta_0 + \beta_1 BVE_{t-1} + \beta_2 X_t + \beta_3 KC_{t-1} + \beta_4 X_t^{KC} + \\ & + \gamma_1 GROWTH_t + \gamma_2 ACCRUALS_t + \gamma_3 XI_t + \gamma_4 OCI_t + \\ & + \gamma_5 AGE_t + \gamma_6 EM + \epsilon_t \end{aligned} \tag{11}$$

$$\begin{aligned} MVE_t = {} & \beta_0 + \beta_1 BVE_{t-1} + \beta_2 X_t + \beta_3 KC_{t-1} + \beta_4 X_t^{KC} + \\ & + \beta_5 OC_{i,t-1} + \beta_6 X_{it}^{OC} + \gamma_1 GROWTH_t + \gamma_2 ACCRUALS_t + \\ & + \gamma_3 XI_t + \gamma_4 OCI_t + \gamma_5 AGE_t + \gamma_6 EM + \epsilon_t \end{aligned} \tag{12}$$

where MVE_t, BVE_{t-1}, X_t, KC_{t-1}, X_t^{KC}, OC_{t-1}, and X_t^{OC} are defined as in Section 3.4 and:

$GROWTH_t$ = total revenue (Compustat item *revt*) for the period, scaled by the revenue for the prior period, minus 1.

$ACCRUALS_t$ = total accruals (*taccruals*) for the period.

XI_t = extraordinary items, income from discontinued operations, and provisions for common and/or preferred dividends that reconcile income before extraordinary items (*ib*) into net income (*ni*), calculated as *ib* less *ni*.

OCI_t = other comprehensive income, computed as total comprehensive income attributable to common shareholders (*citotal*) less net income (*ni*).

AGE_t = number of years since the firm first appeared in the Compustat-CRSP merged file. We use data back until 1950 to compute this measure.

EM = a dummy variable indicating 1 if the firm is prone to earnings management through a temporary reduction in discretionary spending on R&D, advertising, or increasing accruals, and zero otherwise. See Appendix B for the complete calculation.

Table 5 presents the results from estimating equations (11) and (12) for profit and loss firms as well as for Accounting losers and Economic losers. The results show that

the interpretations of our previous estimations remain virtually unchanged when we control for additional explanatory variables. Turning to the estimated coefficients on our control variables, we note that only our proxies for sales growth ($GROWTH_t$), accruals ($ACCRUALS_t$), other comprehensive income (OCI_t), firm age (AGE_t), and earnings management (EM) have statistically significant relevance for explaining firm value. Sales growth has a positive impact on firm value for profit firms, loss firms, and Economic losers, the extent of accruals has a negative impact on firm value for profit firms and Accounting losers, earnings management has a positive effect on equity market values for Accounting losers, other comprehensive income has a negative impact on profit firms and, finally, age has a negative effect on equity market values for profit firms. Nonetheless, also considering these impacts, our results are robust.

Table 5
Robustness Check: Value Relevance Across Profit Firms and Loss Firms

This table presents the regression results from our robustness test with control variables as specified in Section 6.1, equations (11) and (12). We report the results for profit firms, loss firms, Accounting losers and Economic losers. It shows the association between equity market values, book value of equity, earnings, and past and net investments in organization and knowledge capital for both samples. The dependent variable is cum-dividend market value of equity (MVE_t). The independent variables are as follows. BVE_{t-1} is the opening balance of book value of equity, X_t is the reported earnings, KC_{t-1} is the opening balance of the knowledge capital stock, X_t^{KC} is the net (amortized) investment in knowledge capital, OC_{t-1} is the opening balance of the organization capital stock, and X_t^{OC} is the net (amortized) investment in organization capital. The construction of these measures is described in Section 3.4. We control for the following variables. $GROWTH_t$ is the sales growth for the period, $ACCRUALS_t$ is the total amount of accruals, XI_t is the extraordinary items and income from discontinued operations that reconcile Compustat item *ib* into *ni*, OCI_t is the other comprehensive income, AGE_t is the firm age and EM is a dummy-variable taking the value of 1 if the firm is prone to earnings management as described in Appendix B, or zero otherwise. Columns (1) to (3) present the regression results from including components related only to knowledge capital. Columns (4) to (6) present the regression results from including components related to both knowledge capital and organization capital. *, **, and *** denote statistical significance at the 1%, 5% and 10% levels, respectively. *t*-statistics are presented in parentheses and are estimated with robust standard errors (White, 1980). All regressions include industry and year fixed effects. A constant is included in all regressions.

	Equation (11)			Equation (12)			Equation (12)		
	Profit firms	Loss firms	Difference (Profit-Loss)	Profit firms	Loss firms	Difference (Profit-Loss)	Accounting loser	Economic loser	Difference (Acc.-Econ.)
BVE_{t-1}	0.31***	0.77***	−0.47**	0.17*	0.82***	−0.66***	0.02	0.94***	−0.92**
	(3.50)	(4.27)	(−2.32)	(1.90)	(4.34)	(−3.16)	(0.06)	(4.74)	(−2.29)
X_t	13.14***	0.16	12.97***	12.00***	0.16	11.84***	11.37	−1.55	12.91*
	(25.85)	(0.06)	(4.82)	(24.04)	(0.06)	(4.59)	(1.57)	(−0.57)	(1.68)
KC_{t-1}	−0.36	2.81***	−3.17***	−0.54	2.48***	−3.03***	2.24***	2.48**	−0.25
	(−0.91)	(2.78)	(−2.92)	(−1.33)	(2.59)	(−2.91)	(2.69)	(2.40)	(−0.19)
X_t^{KC}	23.45***	23.96***	−0.52	24.93***	20.41***	4.52	28.61***	10.24	18.37**
	(6.14)	(5.31)	(−0.09)	(6.48)	(4.54)	(0.76)	(5.48)	(1.32)	(1.97)

(Continued)

Table 5 – *Continued*

	Equation (11)			Equation (12)			Equation (12)		
	Profit firms	Loss firms	Difference (Profit-Loss)	Profit firms	Loss firms	Difference (Profit-Loss)	Accounting loser	Economic loser	Difference (Acc.-Econ.)
OC_{t-1}				1.40***	0.43***	0.97***	−0.25	0.42***	−0.67
				(6.95)	(3.00)	(3.94)	(−0.45)	(2.86)	(−1.16)
X_t^{OC}				3.66*	17.35***	−13.69***	21.72***	16.83***	4.88
				(1.76)	(5.65)	(−3.70)	(3.67)	(4.19)	(0.69)
$GROWTH_t$	665.43***	244.14***	421.29***	717.83***	208.32***	509.52***	167.09	209.55***	−42.47
	(6.62)	(4.85)	(3.75)	(7.26)	(4.30)	(4.63)	(1.46)	(4.17)	(−0.34)
$ACCRUALS_t$	−4.47***	−1.45	−3.02***	−3.77***	−0.69	−3.08***	−5.08***	0.16	−5.24***
	(−10.08)	(−1.55)	(−2.92)	(−8.45)	(−0.73)	(−2.96)	(−3.36)	(0.15)	(−2.88)
XI_t	−1.88	0.38	−2.26	−2.02	−1.23	−0.79	1.13	−1.54	2.67
	(−1.18)	(0.12)	(−0.64)	(−1.27)	(−0.39)	(−0.23)	(0.17)	(−0.49)	(0.36)
OCI_t	−1.24***	−0.23	−1.02	−0.79*	−0.59	−0.20	1.87	−0.47	2.34
	(−2.78)	(−0.11)	(−0.47)	(−1.83)	(−0.28)	(−0.09)	(0.28)	(−0.22)	(0.34)
AGE_t	−0.72	−1.73	1.02	−18.85***	3.29	−22.14***	−10.22	5.00	−15.22**
	(−0.17)	(−0.51)	(0.19)	(−4.55)	(1.06)	(−4.29)	(−1.62)	(1.50)	(−2.15)
EM	125.91	−247.42	373.33	115.89	−161.85	277.73	450.85**	−340.69	791.54
	(1.19)	(−0.80)	(1.14)	(1.10)	(−0.61)	(0.97)	(1.97)	(−0.75)	(1.55)
N	64025	15678		64017	15671		3044	12626	
$Adj.R^2$	0.85	0.50		0.85	0.53		0.64	0.49	

6.2. Examining the Impact from Differences in Firm Size

As an additional procedure, we examine the potential impact of scale effects as discussed in Section 3.5 estimating equations (11) and (12) for a limited sample of firms for which the difference in size has smaller variation. Specifically, we restrict the sample to the 2nd and 3rd yearly quartiles of equity book values.

Table 6 presents the results from estimating equations (11) and (12) for this sample of firms of more equal size. In this limited size setting, the incremental explanatory power of a model which includes organization capital investments (equation 12) compared to that which does not include organization capital investments (equation 11) is larger for loss firms than what our main results for the full sample reports, with a change in adjusted R^2 of 8% (compared to 6%). Nonetheless, this result is consistent with our prediction and supports our first hypothesis.

While the coefficient on the stock of past organization capital investments loses its statistical significance for loss firms in the analysis of this limited sample, our interpretation that information conveyed in the stock of organization capital investments is more important for profit firms than loss firms remains unchanged from our full sample results in Section 5. As for the net investment in organization capital, our results are largely unchanged and our third hypothesis is supported also for this sample of firms. That is, net investments are more value relevant for loss firms than profit firms. For Accounting losers and Economic losers in this limited sample, the results from our estimation of equation (10) without additional explanatory variables remain. That is, we do not find support for a positive and differential valuation of organization capital investments across Accounting and Economic losers.

Considering the control variables, the estimated coefficients remain unchanged from our estimation of the full sample with an addition of a negative coefficient on accruals for loss firms and a negative coefficient on the control variable for extraordinary items (XI_t) for Economic losers.

Taken together, the results from this testing procedure suggest our results from previous procedures are robust in terms of the potential influences from variation in firm size and other explanatory variables.

Table 6
Controlling for Size: Value Relevance Across Profit and Loss Firms

This table presents the regression results from equations (11) and (12) in a limited sample where we only include the 2nd and 3rd yearly quartiles of book value of equity, as described in Section 6.2. We report the results for profit firms, loss firms, Accounting losers and Economic losers. It shows the association between equity market values, book value of equity, earnings, and past and net investments in organization and knowledge capital for both samples. The dependent variable is cum-dividend market value of equity (MVE_t). The independent variables are as follows. BVE_{t-1} is the opening balance of book value of equity, X_t is the reported earnings, KC_{t-1} is the opening balance of the knowledge capital stock, X_t^{KC} is the net (amortized) investment in knowledge capital, OC_{t-1} is the opening balance of the organization capital stock, and X_t^{OC} is the net (amortized) investment in organization capital. The construction of these measures is described in Section 3.4. We control for the following variables. $GROWTH_t$ is the sales growth for the period, $ACCRUALS_t$ is the total amount of accruals, XI_t is the extraordinary items and income from discontinued operations that reconcile Compustat item *ib* into *ni*, OCI_t is the other comprehensive income, AGE_t is the firm age and EM is a dummy-variable taking the value of 1 if the firm is prone to earnings management as described in Appendix B, or zero otherwise. The control variables are defined in 6.1. Columns (1) to (3) present the regression results from including components related only to knowledge capital. Columns (4) to (6) present the regression results from including components related to both knowledge capital and organization capital. *, **, and *** denote statistical significance at the 1%, 5% and 10% levels, respectively. *t*-statistics are presented in parentheses and are estimated with robust standard errors (White, 1980). All regressions include industry and year fixed effects. A constant is included in all regressions.

	Equation (11)			Equation (12)			Equation (12)		
	Profit firms	Loss firms	Difference (Profit-Loss)	Profit firms	Loss firms	Difference (Profit-Loss)	Accounting loser	Economic loser	Difference (Acc.-Econ.)
BVE_{t-1}	0.44***	1.10***	−0.66***	0.27***	1.12***	−0.85***	0.13	1.23***	−1.10**
	(4.58)	(7.21)	(−3.68)	(2.84)	(7.01)	(−4.60)	(0.31)	(7.65)	(−2.46)
X_t	12.44***	2.91**	9.52***	11.35***	2.69**	8.66***	7.65	1.77	5.87
	(22.22)	(2.33)	(6.97)	(21.00)	(2.27)	(6.68)	(0.65)	(1.58)	(0.50)
KC_{t-1}	−0.28	0.87**	−1.15*	−0.48	0.66*	−1.14*	1.74**	0.46	1.28
	(−0.67)	(2.10)	(−1.96)	(−1.13)	(1.65)	(−1.96)	(2.02)	(1.08)	(1.35)
X_t^{KC}	23.11***	31.13***	−8.02	24.73***	27.54***	−2.81	28.88***	24.31***	4.57
	(5.73)	(7.39)	(−1.38)	(6.14)	(6.98)	(−0.50)	(4.15)	(3.54)	(0.47)

(Continued)

Table 6 – *Continued*

	Equation (11)			Equation (12)			Equation (12)		
	Profit firms	Loss firms	Difference (Profit-Loss)	Profit firms	Loss firms	Difference (Profit-Loss)	Accounting loser	Economic loser	Difference (Acc.-Econ.)
OC_{t-1}				1.50***	0.18	1.32***	0.76	0.10	0.66
				(6.93)	(1.01)	(4.68)	(1.01)	(0.56)	(0.86)
X_t^{OC}				3.59*	13.45***	−9.86**	11.89*	14.05***	−2.16
				(1.66)	(3.99)	(−2.47)	(1.74)	(3.19)	(−0.27)
$GROWTH_t$	1016.06***	246.79***	769.26***	1126.83***	198.63**	928.20***	22.58	273.05***	−250.47
	(6.17)	(2.63)	(4.06)	(7.09)	(2.16)	(5.06)	(0.12)	(2.58)	(−1.15)
$ACCRUALS_t$	−4.14***	−1.67**	−2.47***	−3.44***	−1.22*	−2.22***	−4.77**	−0.70	−4.07*
	(−8.87)	(−2.44)	(−2.98)	(−7.31)	(−1.87)	(−2.77)	(−2.31)	(−1.05)	(−1.91)
XI_t	−1.59	0.81	−2.40	−1.57	−0.59	−0.98	3.45	−1.07	4.52
	(−0.94)	(0.27)	(−0.70)	(−0.93)	(−0.20)	(−0.29)	(0.46)	(−0.33)	(0.56)
OCI_t	−1.46***	−1.29	−0.18	−1.08**	−1.65	0.57	−0.28	−1.89*	1.60
	(−3.19)	(−1.19)	(−0.15)	(−2.44)	(−1.56)	(0.50)	(−0.04)	(−1.77)	(0.22)
AGE_t	2.00	0.41	1.59	−23.51***	7.44	−30.94***	−11.22	8.89	−20.11
	(0.33)	(0.06)	(0.17)	(−4.00)	(1.15)	(−3.55)	(−0.92)	(1.26)	(−1.45)
EM	21.24	136.20	−114.95	19.95	158.66	−138.72	551.36*	−20.52	571.88
	(0.13)	(0.62)	(−0.42)	(0.12)	(0.82)	(−0.54)	(1.91)	(−0.04)	(1.03)
N	35643	5823		35635	5817		1278	4538	
$Adj.R^2$	0.85	0.57		0.86	0.59		0.61	0.59	

7. Concluding Discussion

7.1. Conclusion

In this paper, we examine the explanatory power of organization capital for equity market values of loss firms, as well as the valuation of organization capital across profit and loss firms. This research is motivated by the parallel increase in intangible capital investment and corporate loss reporting. Although it is widely recognized that both knowledge capital and organization capital are important resources for the growth and commercial success of firms, only knowledge capital has been examined in terms of explaining the equity market values of loss firms. Using an equity valuation model based on Ohlson (1995) with measures for intangible capital made popular in adjacent literature (Peters and Taylor, 2017), our study of 80,522 U.S. firm-years between 1977 and 2021 reveals that organization capital indeed has incremental explanatory power for equity market values for loss firms. However, this effect is only modest, a finding that is quite surprising given the many benefits from organization capital underscored in the literature.

Next, examining the information content conveyed in accounting information, we show that the valuation of organization capital differs between profit firms and loss firms. We also note that knowledge capital has a greater impact on market values of equity for both profit firms and loss firms. Again, a surprising finding considering the abundant literature on the many benefits from organization capital. While past organization capital investments are more value relevant for profit firms, the period net investment is more value relevant for loss firms. Drawing on signaling theory, this suggests that the net investment in organization capital is perceived by investors as having a greater impact on future performance for loss firms than for profit firms. Similarly, positive earnings indirectly signal the relatively greater productivity of the organization capital stock for profit firms.

These results, however, are different from our results from analyzing differences in our sample of loss firms. When we in more detail examine loss firms whose losses are induced by the immediate expense of intangible capital investments and loss firms whose losses are due to poor performance, we find, contrary to our expectation, no evidence of a differential valuation of organization capital. To the extent these two types of loss firms are qualitatively different as per suggestions in previous literature, investors do not seem to value their organization capital accordingly.

Our findings for profit and loss firms suggest that investors dissect the financial accounting and make adjustments similar to those suggested in Penman (2009) to assess value relevant information not conveyed in reported earnings or equity book values for profit firms and loss firms, but fail to do the same across loss firms with different characteristics. That is, whereas our findings suggest that the financial accounting information appears sufficient for investors in assessing the organization capital across profit and loss firms, our analysis of differences between loss firms suggests that either (i) investors are not able to use financial accounting information for assessing the organization capital across different loss firms, (ii) investors are irrational and do not value the organization capital of these loss firms differently, or (iii) that this analysis is incomplete because of its limited sample size or failure to control for some effect unbeknownst to us.

We make several attempts at ensuring the reliability of our results. First, we include several alternative explanatory variables documented in the literature and find that our results are robust. Moreover, to mitigate biases in our firm-specific measures of organization capital, we re-estimate our equations with industry-specific measures of organization capital investments suggested by Ewens et al. (2021) with unaffected (untabulated) results. We also acknowledge the issue of scale highlighted in the literature and attempt at mitigating potential influences from scale differences in our sample by winsorizing our data, including a scale proxy in our models, using robust standard errors in our model estimations as well as by re-estimating our models on a smaller sample with less variance in size. These procedures do not change the interpretation of our results.

7.2. Contribution

One reason for the lack of literature on the interface between organization capital and loss firm valuation is perhaps that researchers have presumed organization capital to have the same role in explaining the equity market values of loss firms as the literature suggests it has for profit firms. Our analysis provides a window into the valuation of organization capital in the stock market and we show that the information contained in organization capital is different for past and period net investments in organization capital as well as that the valuation of organization capital is significantly different across profit and loss firms. More than that, our comparison across several dimensions shows that there is an important lack of difference in the stock market valuation of organization capital across qualitatively different loss firms. By the same token, our

study also underscores for future researchers interested in the valuation of loss firms or certain of their attributes the importance of distinguishing between different losses.

Because one of the main conceptual purposes of financial statements is to provide its users with information that will help them in their capital allocation decisions (FASB Conceptual Statement no. 8, Chapter 1, 2021), our findings also have implications for practitioners and the accounting community. By no means do we argue for any particular treatment because there are several users of financial accounting information other than equity investors (Holthausen and Watts, 2001). However, to the extent our findings indicate that investors do not understand the differences between losses that are induced by conservative accounting and losses that are the result of poor performance, our findings may have implications for the ongoing debate on the accounting treatment for intangible capital investments. Particularly, our findings underscore an important difference in investors' relative ability in understanding accounting information and should spur the discussion on which sort of disclosures should be made in relation to organization capital investments and for whom. By the same token, as for managerial implications, a positive relationship between organization capital and equity market value, coupled with investors' lacking ability to fully understand the nuances between firms and their organization capital, indicates that greater voluntary disclosure on investment activity in organization capital could be beneficial. Considering the strategic nature of organization capital, however, increased disclosure may also come at a cost. Thus, we do not offer any particular proposals but merely provide this insight and leave it up to the professional community to decide on the proper course of action.

Another possible reason for the lack of literature on organization capital in this setting is that organization capital is inherently difficult to measure. We overcome this hurdle by introducing a measure for organization capital used frequently in adjacent literature. Our introduction of this measure of organization capital investment, which is based on a fraction of SG&A spending, shows that even a relatively crude measure can provide valuable insights into the valuation of organization capital across profit and loss firms. Our introduction of this simple measure to the equity valuation of loss firms opens up several avenues for future usage by practitioners and researchers alike.

7.3. Limitations and Suggestions for Future Research

This paper has several limitations that may provide fruitful avenues for future research. First, to the extent the true level of investment in organization capital is rather constant over time in the cross-section, measuring organization capital using a fixed fraction of SG&A offers a good trade-off between relevance, sophistication, and usefulness. However, assuming a fraction of SG&A to proxy for the level of investment is essentially another way of saying that firms with a larger operating cost base have more organization capital. The reality may very well be that the firm is simply wasteful with its resources. Conversely, but along the same argument, this measure may not do good work at capturing strengths of organization capital that implies lower SG&A expenditures, such as having good supplier relationships. Thus, because there are aspects of organization capital that this measures cannot capture properly, future research is encouraged to continue developing measures of organization capital that balance relevance, sophistication, and usefulness yet have a broad scope.

Another potential limitation of this study is that it is confined to U.S. data. We study U.S data to allow for an equal comparison of our results to those in the extant literature. Nonetheless, because research reports several interesting differences with regard to intangible capital and equity valuation both internationally and under different accounting regimes (Green et al., 1996; Wyatt, 2005; Corrado et al., 2016), it would be interesting to see if our findings translate to an international setting. Thus, another fruitful avenue of research is examining differences in the valuation of intangible capital across profit and loss firms internationally or between different accounting regimes.

Moreover, in this paper, we attempt at isolating the stock market valuation of knowledge capital and organization capital. However, because the literature documents a potential complementarity between knowledge capital and organization capital, there are potentially nuances to the interplay between knowledge capital and organization capital well worth investigating further in relation to equity valuation of loss firms. In conclusion, there are thus many promising future research avenues ahead and we hope the findings of this paper encourage their pursuit.

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Appendices

A. Data Discussion

Table A1, panels (A) and (B) presents Pearson and Spearman correlation coefficients of the independent variables in equation (9) and (10) for profit and loss firms. We show that the earnings measure is correlated with the opening book value of equity, likely consistent with the linear information dynamic proposed by Ohlson (1995) which postulates that period (future) residual earnings can be described as a linear function of past (period) residual earnings. We also show that the stocks of knowledge capital and organization capital are correlated with both the opening balance of book value of equity and earnings. Aside from the eventual impact from past investments on future earnings, this correlation is partly induced by the construction of the variables. When investments in knowledge capital and organization capital were expensed, they were deducted from book value of equity. In effect, the sum of book value of equity and the intangible capital stocks equal the *pro forma* measure of book value of equity under an accounting regime allowing capitalization of investments in knowledge and organization capital. Because prior research documents a strong correlation between market values and both book values of equity and intangible capital stocks (Peters and Taylor, 2017), the similar correlations in our sample come as no surprise.

Table A1
Correlation Matrix

This table presents Pearson (bottom left triangle) and Spearman (top right triangle) correlation coefficients for our independent variables across profit firms (Panel A) and loss firms (Panel B). All tabulated coefficients are statistically significant at the 1% level. None of our untabulated control variables specified in equations (11) and (12) in Section 6.1 are correlated with either the main independent variables or each other.

Variables	BVE_{t-1}	X_t	KC_{t-1}	X_t^{KC}	OC_{t-1}	X_t^{OC}
Panel A: Profit firms						
BVE_{t-1}		0.8489	0.3032	0.2061	0.7125	0.5267
X_t	0.8104		0.2926	0.2017	0.7052	0.5501
KC_{t-1}	0.5625	0.5963		0.6210	0.3519	0.1888
X_t^{KC}	0.4338	0.5100	0.7066		0.1794	0.2583
OC_{t-1}	0.6209	0.5826	0.4500	0.2843		0.6610
X_t^{OC}	0.4480	0.4237	0.3504	0.5833	0.6043	
Panel B: Loss firms						
BVE_{t-1}		-0.5058	0.2753	0.2219	0.4238	0.2699
X_t	-0.6442		-0.3295	-0.2759	-0.3441	-0.2591
KC_{t-1}	0.3092	-0.2198		0.5186	0.0982	0.0516
X_t^{KC}	0.1012	-0.0788	0.2219		-0.1194	0.2411
OC_{t-1}	0.3477	-0.2525	0.5115	0.0447		0.3256
X_t^{OC}	0.3425	-0.2830	0.1478	0.2796	0.0586	

Nonetheless, it seems our panel data exhibit signs of endogeneity and simultaneity. For instance, Lev and Sougiannis (1996) reason that exogenous shocks increasing the demand for a firm's product will affect both period earnings and the marginal turn to capital, resulting in increased R&D investments. We posit that, aside from R&D, this is also the case with organization capital investments. A common approach to alleviate these issues is by using an instrumental variable insensitive to firm-specific exogenous shocks, thus uncorrelated with the error term. However, the use of an instrumental variable as in Lev and Sougiannis (1996) limits the particular firm-specific metrics we set out to examine in this paper.

B. The Earnings Management Measure

We follow the procedure proposed in Bhojraj et al. (2009) for classifying firms that beat analyst consensus forecasts with low earnings quality. Bhojraj et al. (2009) show that these firms are more prone to earnings management and generate short-term abnormal returns, however underperform in the longer term in comparison to firms with high earnings quality but that miss analyst consensus forecasts. Using their computations, we construct a dummy variable that takes the value of 1 if the earnings quality is low and the actual EPS reported is within 1 cent ($0.01) above the analyst consensus forecasted EPS, and 0 otherwise. Bhojraj et al. (2009) measure earnings quality as a score variable ranging from 0 to 3, where 0 and 1 indicate low quality earnings and 2 and 3 high quality earnings. The score is the sum of three dichotomous variables that each takes the value of 1 if true:

1. The change in R&D expenditures scaled by the prior year's total assets is above the median for all firms that year.
2. The change in advertising expenditures scaled by the prior year's total assets is above than the median for all firms that year.
3. The discretionary accruals scaled by the prior year's total assets is below the median for all firms that year.

We only use firms that report either R&D expenditures or advertising expenditures, which prevents us from classifying firms into the low earnings group only because of high discretionary accruals (e.g., a firm with below median R&D, below median advertising, and below median discretionary accruals gets a score of 1, thus classified as having low earnings quality). The discretionary accruals for each firm are measured as the difference between total accruals and estimated non-discretionary accruals. In

the first stage, for every year and two-digit SIC code, we cross-sectionally regress the following model:

$$ACC = \alpha + \beta_1(\Delta Rev) + \beta_2 PPE + \epsilon \tag{13}$$

where ACC is total accruals calculated as income before extraordinary items (Compustat item *ib*) minus operating cash flow (*oancf*), ΔRev is total revenue (*revt*) year t minus total revenue year *t-1*, scaled by total assets (*at*) year *t-1*, and PPE is gross property, plant, and equipment (*ppegt*) year t scaled by total assets year *t-1*. Operating cash flow is not available in the Compustat file before 1988. We use the definition in Dou et al. (2016) for operating cash flow before that: $ib - \Delta act + \Delta che + \Delta lct - \Delta dlc + dp$ (stated as Compustat items). In the second stage, we use the fitted values obtained from equation (13) to estimate firm-specific non-discretionary accruals, $NDACC$,

$$NDACC = \alpha + \hat{\beta}_1(\Delta Rev - \Delta AR) + \hat{\beta}_2 PPE + \epsilon \tag{14}$$

where ΔRev and PPE are defined as above and ΔAR is accounts receivable (*rect*) year t less accounts receivable year *t-1*, scaled by total assets year *t-1*.

C. Amortization and Capitalization Rates for Knowledge Capital and Organization Capital

We estimate industry-specific amortization rates for knowledge capital (R&D) following Li and Hall (2020), and the respective NAICS industry classification codes following the BEA's R&D Satellite Account (R&DSA). these are presented in Table A2 below along with fixed amortization and capitalization rates for SG&A (δ^{SGA} and γ_{SGA}, respectively).

Table A2
Amortization and Capitalization Rates for Knowledge Capital and Organization Capital

This table presents industry-specific amortization rates for R&D (δ^{RD}) as estimated by Li and Hall (2020), and the respective NAICS industry classification codes following the BEA's R&D Satellite Account (R&DSA). It also presents the fixed amortization and capitalization rates for SG&A (δ^{SGA} and γ_{SGA}, respectively). We use these amortization and capitalization rates for calculating the stocks of knowledge capital and organization capital, respectively, KC_t and OC_t, as well as the net investments, X_t^{KC} and X_t^{OC}, for both intangible capital classes. The estimates of amortization rates for R&D, δ^{RD}, covers 35.6% of our sample firm-years, compared to 28% of the total firm-years in the Compustat file (Ewens et al., 2020). Following Peters and Taylor (2017), the remaining 64.4% are assigned a fixed R&D amortization rate of 15%.

Industry	n	NAICS	δ^{RD}	δ^{SGA}	γ_{SGA}
Computer and peripheral equipment manufacturing	1,357	3341	0.363	0.200	0.300
Software publishers	2,898	5112	0.308	0.200	0.300
Pharmaceutical and medicine manufacturing	5,151	3254	0.112	0.200	0.300
Semiconductor and other electronic component manufacturing	4,404	3344	0.226	0.200	0.300
Aerospace product and parts manufacturing	1,080	3364	0.339	0.200	0.300
Communications equipment manufacturing	2,201	3342	0.192	0.200	0.300
Computer systems design and related services	2,006	5415	0.489	0.200	0.300
Motor vehicles, bodies and trailers, and parts manufacturing	2,294	3361-3363	0.733	0.200	0.300
Navigational, measuring, electro-medical, and control instruments manufacturing	3,909	3345	0.329	0.200	0.300
Scientific R&D services	335	5417	0.295	0.200	0.300
All other	54,887	-	0.150	0.200	0.300
Total	80,522	-	-	-	-