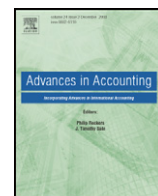




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## The valuation implications of human capital in transactions on and outside the exchange

Ilanit Gavious<sup>a,\*</sup>, Meir Russ<sup>b,1</sup>

<sup>a</sup> Department of Business Administration, Guilford Glazer School of Business and Management, Building 15 Room 122, The Marcus Family Campus, Ben-Gurion University of the Negev, PO Box 653, Beer Sheva, 84105, Israel

<sup>b</sup> Master of Management Frederick E. Baer Professor in Business, Professional Programs in Business, University of Wisconsin–Green Bay, WH460; 2420 Nicolet Drive, Green Bay, WI 54311-7001, USA

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### ABSTRACT

We examine the valuation implications of human capital both for a broad sample of firms and for subsamples of high-technology firms and low-technology firms. Our results suggest that the market appears to value compensation expenses not as expenses but as if they serve as a proxy for a human asset that is omitted from the balance sheets. The findings are consistent with human capital comprising a more sizable portion of the value of high-technology firms than of low-technology firms. The findings also indicate that compensation expenses are valued differently from other expense components of income. Markedly, despite critical differences between investors on the exchange and those buying shares in transactions outside the exchange (controlling interests, information asymmetry, etc.), their assessment of the enhanced value of a firm attributable to human capital is shown to be relatively similar. The results in this study are consistent with compensation expenses creating a valuable intangible asset, hence suggesting that reform in the accounting treatment of these expenses is of critical importance.

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### 1. Introduction

Human capital comprises a sizable portion of the asset base of companies in the 21st century knowledge economy. The changing economy, in which there is a growing number of knowledge-based emerging industries, triggers a need to comprehend the asset base of companies, and how these assets contribute to value creation. A critical aspect of that understanding is the ability to quantify the value of intangibles. A large empirical literature provides ample evidence of the growing importance of intangible assets (e.g., Lev, 2005) and intellectual capital (e.g., Edvinsson & Malone, 1997) in the new, knowledge-based economy, and the inadequacy of the existing accounting methods for managing and measuring the value of those assets (e.g., Stewart, 1997; Lev & Zarowin, 1999; Brown, Kim, & Lys, 1999; Francis & Schipper, 1999; Core, Guay, & Van Buskirk, 2003).

In this study, we focus on the human aspect of the intangibles that drive the value created by a company. Specifically, we investigate the market's assessment of human capital and the affect that this assessment has on firm value. We inquire whether investors view human asset-related expenses ("compensation expenses") differently from other expenses included in the firm's income statement. Generally Accepted Accounting Principles (GAAP) mandate the immediate and

full expensing of compensation costs because of concerns with the reliability and objectivity of capitalization of such costs. While treated by GAAP as a current expense, these amounts in fact provide information about an unrecorded intangible asset (see, e.g., Bell, Landsman, Miller, & Yeh, 2002). Writing-off investments in intangible assets leads to depressed earnings and book values as the exaggerated costs are not matched with their associated revenues. These accounting fundamentals – earnings and book value of equity – thus become less reliable and less value relevant as investments in human capital grow.

Studies that examine the value relevance of accounting information over time support this notion. These studies show a consistent decline in the association of stock returns with earnings and book value of equity over the past two decades (Lev & Zarowin, 1999; Brown et al., 1999; Francis & Schipper, 1999). Core et al. (2003) focus on value relevance of accounting information in the "New Economy Period" (1996–1999) and explore whether it has decreased relative to previous periods. Differentiating between high-technology and low-technology firms, they find that the ability of traditional financial variables to explain firm value of both groups of firms declined during the New Economy Period. Many other value relevance studies focus on a specific high-technology industry.<sup>2</sup> High-technology industries drew the attention of researchers in this context because these

\* Corresponding author. Tel.: +972 8 6477538; fax: +972 8 6477691.  
E-mail addresses: [madaril@bgu.ac.il](mailto:madaril@bgu.ac.il) (I. Gavious), [russm@uwgb.edu](mailto:russm@uwgb.edu) (M. Russ).

<sup>1</sup> Tel.: +1 920 465 2757; fax: +1 920 465 2660.

<sup>2</sup> E.g., Callen et al. (2008), Hand (2004, 2005), Ely et al. (2003), Guo et al. (2005) and Xu et al. (2007) on biotechnology firms; Amir and Lev (1996) on cellular firms; Trueman, Wong, and Zhang (2001), Jorion and Talmor (2001) and Rajgopal, Shevlin, and Venkatachalam (2003) on internet firms.

industries are knowledge intensive and are characterized by large investments in intangible assets (e.g., research and development expenditures, intellectual property and intellectual capital). “The expensing of these investments has raised concerns that financial accounting may be unsuited for a changing economy...” (Callen, Gavious, & Segal, 2008; p. 11).

The studies focusing on high-technology industries yield mixed results. A lack of consensus exists, not only with regards to the value relevance of earnings and book values, but also with regard to that of research and development (R&D) expenditures. Notably, like compensation expenses, R&D is treated by GAAP as a current expense rather than as an investment in an intangible asset. While many studies document an expected positive relation between market values and R&D (e.g., Xu, Magnan, & Andre, *in press*; Ely, Simko, & Thomas, 2003; Callen et al., 2008; Guo, Lev, & Zhou, 2005; Hand, 2005; Core et al., 2003), others show that public equity market valuations do not necessarily increase with the magnitude of R&D expenditures. In particular, reliable inferences regarding the valuation implication of R&D in the case of venture-backed companies cannot be drawn (see, e.g., Armstrong, Davila, & Foster, 2006; Gavious & Schwartz, 2008).

Noticeably, while R&D expenditures received much attention in value relevance studies, investments in human capital have been generally neglected, probably due to the fact that the definitions of human capital are broad and difficult to measure (see, e.g., Swartz, Swartz, & Firer, 2006).<sup>3</sup> In our analyses, we utilize model specifications employed in accounting literature, that implicitly or explicitly follow the Ohlson (1995,1999) and Feltham and Ohlson (1999) valuation models. The model regresses market value of equity on book value of equity, abnormal earnings and ‘other information’. Other information modifies the prediction of future profitability. In their study, Core et al. (2003) document that there is a great variation in values of high-technology as well as low-technology firms during the New Economy Period that remains to be explained. We hypothesize that the increase in unexplained variation in firm values is by and large due to the omission of a prominent value driver – human capital – which prior studies show has an increasing importance to a firm’s overall value and thus should be incorporated in valuation models (see, e.g., Swartz et al., 2006). We therefore add to the valuation model a proxy for compensation expenses to explore the market’s assessment of this value driver and its affect on firm value.

We examine the valuation implications of human capital both for a broad sample of firms and for subsamples of high-technology firms and low-technology firms. We conjecture that human assets comprise a more sizable portion of the intrinsic value of high-technology, knowledge-intensive industries. We find that the market appears to value compensation expenses not as expenses but as if they serve as a proxy for a human asset that is omitted from the balance sheets as well as from most valuation models. Compensation expenses are positively and highly significantly related to firm value in the full sample regression as well as in the subsamples. Specifically, the results imply that \$1 spent on employees by a high (low)-technology firm increases its equity value by more than \$1.9 (\$0.4). What is more, the addition of a proxy for compensation expense to the valuation model significantly increased the regressions’ power of explanation by more than 12%. The findings also indicate that compensation expenses are valued differently from other expense components of income (as are R&D expenses). Based on our findings, we estimate a proxy for the market value derived from human capital and find that the market’s assessment of a high (low)-technology firm’s human capital may account for up to approximately 20% (12%) of its market value. The findings are consistent

with human capital comprising a more sizable portion of the value of high-technology firms relative to low-technology firms.

At the second stage of the study we investigate whether investors outside the exchange assess the human capital differently from investors on the exchange. This comparison is interesting because, in transactions outside the exchange, investors have better access to inside information in the course of the due diligence process and the negotiations that precede the transaction. As a result, these buyers – in particular those that are expected to hold controlling interests after the transaction – due to information asymmetry, should face less information uncertainty relative to the marginal investor on the exchange, which affects their valuation of the firm. The results indicate that \$1 spent by a high (low)-technology firm on employees increases the price paid for the firm’s equity in a merger or an acquisition by more than \$2.3 (\$0.6). Additionally, the buyer’s assessment of a high (low)-technology firm’s unrecorded human capital may account for up to approximately 23% (14%) of the transaction price. Hence, the valuation implications of the human asset for buyers outside the exchange and buyers on the exchange are surprisingly similar. We conclude that despite the important differences between the two types of buyers, which prior literature shows have significant value implications (controlling interests, information uncertainty, etc.), their assessment of the enhanced value of a firm attributable to human capital is relatively alike.

The results in this study are consistent with compensation expenses creating a valuable intangible asset, hence suggesting that reform in the accounting treatment of these expenses is in place. Specifically, accounting standards should allow capitalization of all human asset-related expenses, and determine acceptable approaches or techniques for amortization of the contributed intangible asset.

This study contributes to the literature in a number of ways. First, it systematically investigates the market’s assessment of the human asset on a fairly large sample of firms (3186 observations) and for subsamples of high-technology (1234 firms) and low-technology firms (1952 firms) for the period 1993–2006. This differentiation is important as the value implications of human capital are expected to significantly differ between fast-growing, knowledge-based industries and more traditional industries. The two prior studies investigating this issue are either small sample, and/or use a homogenous sample of firms from one discipline and a certain component of employee expenses. Swartz et al.’s (2006) study is based on 154 firm-year observations (for 1997–2004) of South African firms, not differentiating between high- and low-technology. Bell et al. (2002) use a sample of 85 U.S. computer software companies that reported positive earnings in 1996–1997, and focus on the employee stock option component of executive compensation. We include in our sample, profit as well as loss firms, and capture in our estimations differences in the valuation of profits and losses. Additionally, we include in our analysis all types of compensation expense.

Second, our study is the first to conduct a comparison of the valuation implications of human asset-related expenses for investors buying stocks on the exchange and those buying stocks outside the exchange (in the course of mergers and acquisitions). Third, our measure of compensation expenses is accessible to all types of investors and less noisy than that used in prior studies.

The remainder of the paper is organized as follows: Section 2 outlines the literature on human capital valuation; Section 3 develops the research design; Section 4 describes the sample and data; Section 5 presents the results and Section 6 summarizes the study.

## 2. Human capital valuation

Managing the human asset effectively is pivotal in high-technology as well as in more traditional industries for creating value and achieving market power (e.g., Usoff, 2002).<sup>4</sup> Kallunki, Karjalainen, and

<sup>3</sup> Swartz et al. (2006) assert that intellectual capital is omitted from the specification of the Ohlson (1995) valuation model employed in value relevance studies. They thus include an intellectual capital variable in the Ohlson (1995) valuation model, and find that it significantly contributes to the explanation of share prices.

<sup>4</sup> See GAO (2003) for the public sector.

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