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Complementary relationship between female directors and financial literacy in deterring earnings management: The case of high-technology firms

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ABSTRACT

We explore whether the presence of female directors on the boards of high-technology firms has an impact on the boards' monitoring and oversight of earnings management. Using difference-in-difference analyses, we utilize an exogenous change in Israel to examine the changes in, and the effects of, female director representation in constraining earnings management in a changing accounting environment that increased managers' ability to report earnings opportunistically. We find that a high representation of women on the board does not make an incremental contribution to the explanation of earnings management over and above the presence of a female director with financial literacy. However, the presence of one financially literate female director on the board does have a significant effect on restraining earnings management. Moreover, financially literate female directors are more effective than their financially literate male counterparts in deterring earnings management. Our results are robust to controlling for firm characteristics related to the selection of a woman to participate on the BOD as well as to the selection of a financially literate woman in particular. We conclude that financial literacy is complementary to female representation on the board in constraining earnings management. An important economic implication of our findings is that a regulatory move to increase the representation of women on corporate BODs should refer specifically to the inclusion of at least one woman with financial literacy on the board.
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1. Introduction

The literature suggests that female representation on a firm's board of directors (BOD) improves the board's functioning and efficiency (e.g., Adams & Ferreira, 2009; Fondas & Sassalos, 2000; Hillman, Shropshire, & Cannella, 2007). Furthermore, studies present evidence that female directors improve earnings quality by preventing or correcting opportunistic behavior such as earnings management (henceforth, EM; see, Gavious, Segev, & Yosef, 2011; Srinidhi, Gul, & Tsui, 2011). Concomitantly, empirical evidence indicates that directors with financial literacy and expertise are more likely to be able to detect and constrain EM (e.g., Gavious et al., 2011; Xie, Davidson, & DaDalt, 2003). However, to date no study has linked a director's gender and financial literacy in this context. Specifically, are female representation on the BOD and financial literacy mutually exclusive in constraining EM? Or are they complementary such that a financially literate woman makes an incremental contribution to improving board monitoring and oversight of EM above and beyond a woman without financial literacy or a man with financial literacy? This study aims to fill this gap in the literature.

For our analyses, we use the Israeli setting. The proportion of women on the BODs of public companies in Israel is around 15%, similar to that in the US. For comparison, the proportion of women on the boards of public companies in other developed countries is 7.8% in Germany, 10% in Spain, 11.5% in the UK, and 13% in Canada (see, e.g., Adams & Ferreira, 2009; Catalyst, 2009; Bermig & Frick, 2010). Hence, issues of gender diversity on the board are relevant for most countries (see also Srinidhi et al., 2011). Israel is also similar to those countries in economic terms relevant to our study. Specifically, the Israeli economy is based on a free enterprise system, and hence there is a similarity in business practices between Israel and these modern economies.[1] Nevertheless, the Israeli setting is particularly germane to our research question for two main reasons. First, Israel has undergone an exogenous change that allows us to examine the boards' monitoring and oversight of EM under different accounting environments, as well as different levels of conformity between accounting and tax rules, within a single country. In 2007, Israel made a transition towards fair-value accounting

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when Israeli public companies firstly implemented the International Financial Reporting Standards (IFRS).[2] Given that the Israeli Tax Authority (ITA) does not recognize IFRS for tax purposes, publicly traded companies adopted IFRS for accounting purposes, but for tax purposes continued to report according to the Israeli Generally Accepted Accounting Principles.[3] As such, the ITA actually gave formal approval for the use of two sets of accounting rules for reporting, one for book purposes and the other for tax purposes (ITA guidance No. 07/2010).[4] This difference in reporting procedures resulted in an increase in the book-tax gap, and a corresponding decline in book-tax conformity from the moderate level that existed prior to the adoption of IFRS to an extreme nonconformity position (see, e.g., Income Tax Ordinance Amendment No. 188, 2012; Chen, Gavious, & Yosef, 2013).[5] Book-tax *non*conformity allows managers to report opportunistically in one system (book/tax) with little effect on the other, hence reducing the trade-offs firms face in their decisions about financial and tax reporting (e.g., Frank, Lynch, & Rego, 2009). Thus, with a less conservative accounting system and an increased book-tax gap, Israeli managers are in a far better position to manage their book earnings. Using difference-in-difference analyses, we utilize this exogenous change in Israel to examine the changes in and the effects of the presence of female directors and its interaction with financial literacy in constraining EM.

Second, dealing with management intentions and inadequate oversight in reporting biased earnings requires a homogeneous group of firms, because companies are subject to different earnings-management incentives due to regulations or other industry-specific factors (e.g., Burgstahler & Eames, 2003; De Franco, Gavious, Jin, & Richardson, 2011). We chose the Israeli high-tech sector for our analyses after making sure that it consists of a sufficiently large and fairly homogeneous sample. Israel is recognized globally as a leader in high technology and innovation (e.g., Avnimelech, 2008; Gavious & Schwartz, 2011; OECD, 2013). It has been defined as "the world's most vital place for entrepreneurship" (e.g., Haour, 2005). In 2013, *Bloomberg Magazine* examined 200 countries around the world and ranked them by their levels of innovation. Israel ranked first for research and development. At 4.27% of GDP, Israel has the world's highest R&D intensity, which is over twice the OECD average of 2.01% and 1.5% higher than the US 2.77% average.[6] Furthermore, Israel is among the leaders in the number of PCT (Patent Cooperation Treaty) patent applications per billion GDP with a ratio of 13 compared to the EU ratio of 4 and the US ratio of 4.32 (Innovation Union Competitiveness Report, 2011).[7] The OECD, 2013 Science and Innovation Report emphasized the strength of Israel in the ICT (Information and Communication Technologies) and the biotechnology sectors, and pointed out that the percentage of biotechnology patents out of the total PCT patent applications in Israel is the highest in the world.[8] Notably, Israel is ranked among the leading countries in terms of companies that go IPO on NASDAQ (Avnimelech & Schwartz, 2009; Avnimelech & Teubal, 2006; Dashti, Schwartz, & Pines, 2008). Previous studies have found that the emergence of the venture investment industry in Israel is considered to be the most successful instance of diffusion of the Silicon Valley model of venture capital outside of North America (e.g., Avnimelech, 2008; Bresnahan, Gambardella, & Saxenian, 2001; Carmell & de Fontaenet, 2004).

The high-tech sector makes a particularly interesting case for examining women's behavior in general, and on the BODs of companies in particular, given its characteristic challenges, frequent changes and ongoing uncertainty. The gender literature indicates that women in general, and in the high-tech sector in particular, have shattered the "glass ceiling" and worked their way into positions that require skills, behavior and a degree of risk-taking that were previously associated with men (e.g., Morrison, Randall, Van Valsor, & The Center for Creative Leadership, 2004).

Our sample is based on all of the high-tech firms in Israel with sufficient data required for our tests that adopted IFRS in 2007. The sample period extends from 2003 to 2010: the four years prior to the adoption of IFRS (2003–2006) and the four years following the adoption of IFRS (2007–2010), resulting in 520 firm-years. In the first stage of the study we explore the effect of the presence of female directors on EM regardless of their level of financial literacy. The results are inconclusive. Whereas in the pre-IFRS period, the extent of EM is lower when the proportion of female directors on the BOD is higher, in the post-IFRS period it is the opposite. Thus, female directors have an effect on constraining EM only in the pre-IFRS period, in which the ability to manage earnings was reduced. In contrast, under less conservative accounting rules and broader areas of nonconformity, reporting aggressiveness is higher with more women on the board. These conflicting findings indicate that the question of whether female directors improve board monitoring more than their male counterparts is more complex in the context of EM.

In the second stage of the study, we focus on the interaction between the director's gender and his or her financial literacy. A director with financial literacy is one whose education or background includes at least one of the following degrees: Master of Accounting and/or Finance, CPA, and/or current or past position as an executive in a financial institution (see also, e.g., Xie et al., 2003; Schrand & Zechman, 2012). The findings here are unequivocal. The presence of a financially literate woman on the board makes a significant contribution to restraining EM in the pre- as well as the post-IFRS periods. Notably, the proportion of women on the board or the presence of male directors with financial literacy does not incrementally contribute to the explanation of EM over and above the presence of one female director with financial literacy. Our results are robust to controlling for firm characteristics related to the selection of a woman to participate on the BOD as well as to the selection of a financially literate woman in particular. We conclude that being a female director and being financially literate are complementary in improving the BOD's monitoring and oversight of managers' reporting behavior. While gender diversity may be beneficial for the functioning of the BOD in general, by itself it may be insufficient in deterring EM if none of the women is financially literate. Likewise, requiring the presence of financially literate directors seems to be insufficient if none of these directors is a woman. Studies relating gender to ethical values indeed theorize women to be more ethical than men in their judgments and behaviors (e.g., Eccles, 1994; Vermeir & Van Kenhove, 2007), and thus are more likely to report illegal acts and fraudulent financial reporting (e.g., Kaplan, Pany, Samuels, & Zhang, 2009).

Our study should be useful to researchers, regulators, investors, analysts, creditors, as well as other players in the capital markets, because

[2] Though IFRS was formally adopted in Israel in 2008, almost all Israeli public companies voluntarily adopted IFRS in 2007.

[3] Israeli GAAP was mainly influenced by locally developed rules and practices, including regulations of the Israel Securities Authority, and by the accounting principles generally accepted in the US (US GAAP). For a detailed description of the differences between Israeli GAAP and IFRS, see Markelevich, Shaw, and Weihs (2011).

[4] The guidance specifically stated that IFRS was not applicable for tax-reporting purposes and that pre-tax book income was no longer acceptable as the initial starting point for calculating taxable income. While the guidance was formally issued in June 2010, a temporary provision was enacted for the fiscal years 2007–2009 with respect to the lack of acceptance of the use of IFRS for tax purposes.

[5] Historically, Israel has always had a moderate degree of book-tax conformity. While there were differences between book and taxable incomes in Israel before the adoption of IFRS, the two systems were somewhat aligned, because the starting point of the tax return was the income before taxes from the book reporting data. In addition, the Supreme Court in Israel has determined that whenever the tax law is silent, the accounting rules have the upper hand for any issue in disagreement with the IRS. Supreme Court Appeal 494/87 www.takdin.co.il.

[6] OECD Internet Economy Outlook (2013). http://www.oecd-ilibrary.org/sites/factbook-2013-en/08/02/01/index.html.

[7] Innovation Union Competitiveness Report (2011), European Commission, Research and Innovation. http://ec.europa.eu/research/innovation-union/pdf/competitiveness-report/2011/ iuc2011-full-report.pdf#view = fit&pagemode = none.

[8] OECD Science, Technology and Industry Scoreboard (2013) INNOVATION FOR GROWTH, http://www.oecdilibrary.org/docserver/download/9213051e.pdf?expires=14207 12,780 &id = id&accname = guest&checksum = 4EACDF87D69C3DF923DED5961624869C.

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