Determinants of intellectual capital disclosure in the IPOs and its impact on underpricing: evidence from Indonesia

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Abstract: We investigate the determinants of intellectual capital (IC) disclosure in the prospectus of initial public offering (IPO). Going deeper, we also examine the impact of IC disclosure on underpricing. By studying 86 IPOs of Indonesian firms over the period of 2000–2014, we do find that ownership retention and underwriting portion have a positive effect on the extent to which IC is disclosed. Moreover, our results reveal that IC disclosure is negatively correlated with the level of underpricing. In addition, evidence is also found that IC disclosure mediates the link between underwriting portion and underpricing.

Keywords: Initial public offerings; intellectual capital disclosure; managing underwriter; ownership retention; underpricing.

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1 Introduction

Intellectual capital (IC) is an important resource for value creation and competitive advantage of firms in the contemporary business. Some researches show that IC can improve financial performance and company’s share performance (Sihotang and Winata, 2008; Ousama and Fatima, 2015; Saeed et al., 2016). However, the accounting standards do not provide a proper guideline. Therefore, IC has not been included in the financial reports (Bukh et al., 2005; Rashid et al., 2012; Widarjo and Bandi, 2013). Inconsistent findings are found in the previous studies on the role of disclosure as an alternative to minimise information asymmetry and cost of capital (Diamond and Verrechia, 1991; Leuz and Verrechia, 2000; Loughran and Ritter, 2004; Ljungqvist, 2006; Singh and Van der Zahn, 2007; Too et al., 2015).

Some previous studies have investigated the determinants and impacts of disclosure on cost of capital and firm value. However, few studies are found in the setting of initial public offering (IPO) particularly in emerging countries including Indonesia. Bukh et al. (2005), Singh and Van der Zahn (2008) and Rimmel et al. (2009) have studied the determinants of IC disclosure in the IPO. On the other side, Singh and Van der Zahn (2007) and Too et al. (2015) have examined the link between IC and cost of capital which is proxied by IPO underpricing. However, inconsistent findings are found. Singh and Van der Zahn (2007) find that IC disclosure has positive impact on underpricing, while no significant effect is found in the study of Too et al. (2015), which is not in line with the signalling theory that has been proved in the literature of disclosure (e.g. Jog and McConomy, 2003; Schrand and Verrecchia, 2004).

This paper re-examines the determinants of IC disclosure in the IPO and its impact on cost of capital and firm value. However, few studies are found in the setting of initial public offering (IPO) particularly in emerging countries including Indonesia. Bukh et al. (2005), Singh and Van der Zahn (2008) and Rimmel et al. (2009) have studied the determinants of IC disclosure in the IPO. On the other side, Singh and Van der Zahn (2007) and Too et al. (2015) have examined the link between IC and cost of capital which is proxied by IPO underpricing. However, inconsistent findings are found. Singh and Van der Zahn (2007) find that IC disclosure has positive impact on underpricing, while no significant effect is found in the study of Too et al. (2015), which is not in line with the signalling theory that has been proved in the literature of disclosure (e.g. Jog and McConomy, 2003; Schrand and Verrecchia, 2004).

This paper re-examines the determinants of IC disclosure in the IPO and its impact on cost of capital (underpricing) in the context of Indonesia, an emerging market for several reasons. First, the level of underpricing in Indonesia is relatively higher than other emerging countries particularly in Asia and Latin America. Ljungqvist (2006) shows that over the period of 1990–2001, the average IPO underpricing in Asia-Pacific and Latin America is 17.9%, while 21% is the average underpricing in Indonesia. Moreover, the level of underpricing in Indonesia increases over the years. Gumanti and Alkaf (2011) show that the average underpricing during 1990–2006 is 22.35%, while Widiyanti and Kusuma (2013) document that from 2008 to 2011, IPO underpricing in Indonesia is 28.75%. On the contrary, the average underpricing in Malaysia decreases in the recent years as found by Ljungqvist (2006) and Too et al. (2015). Second, limited studies have empirically investigated the impact of IC disclosure in the prospectus of IPO on underpricing in the context of Indonesia. Most studies focus on the determinants of IC disclosure in the financial and annual reports (Purnomosidhi, 2006; Sihotang and Winata, 2008; Uzliawati et al., 2014; Soebyakto et al., 2015). Third, there has been a significant increase in the IPOs of Indonesian firms. Seventy-one firms have decided to be publicly traded firms during the period of 2005–2009, then 118 firms have been listed in the Indonesia Stock Exchange (IDX) in 2010–2014.

Taking the signalling theory, we include ownership retention and underwriting portion to explain the extent to which IC is disclosed in the prospectus. Moreover, we also investigate the effect of IC disclosure to minimise underpricing. Going deeper, this study also examines the mediating effect of IC disclosure in the link between ownership retention and underpricing as well as between underwriting portion and underpricing. The use of signalling theory as a basis of assessment and analysis in explanation of intellectual capital disclosure of company has been done in several times by previous
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The study is based on thought that high-quality company will provide information on resources and future prospects widely and voluntarily to reduce the level of information asymmetry. Thus, potential investors can distinguish other company with low quality. In addition, confidence of stakeholders (especially potential investors) about company quality and prospect in the future will increase, so it will give a higher value to the company. This argument is also supported by studies of Welker (1995), Guo et al. (2004) and Yosano et al. (2015) which show that disclosure can reduce the level of information asymmetry. Moreover, in IC disclosure context and cost of capital, the studies of Orens et al. (2009) and Boujelbene and Affes (2013) prove that IC disclosure can reduce cost of capital.

We contribute to the existing literature in the following ways. First, our study on IC disclosure is conducted in the context of an emerging and focuses on a particular setting which is IPO. Second, we extend the signalling theory, more specifically in the issue of IC disclosure in the IPO. Third, practical contribution could be considered as this study brings a noteworthy implication in which IC disclosure could be a good signal. The remainder of this paper is organised as follows. Section 2 reviews previous work on related issues which lead to hypothesis development. In Section 3, we describe our research method. Section 4 reports the empirical results, while Sections 5 and 6 provide conclusion, limitations and recommendations.

2 Literature review

2.1 Theoretical background

The relevant theory to explain the voluntary disclosure is signalling theory (Suwardjono, 2013), which has been introduced by Spence (1973) and has been developed by Leland and Pyle (1977) in the setting of IPO. They explain that in the IPO, there is an information asymmetry between founders (previous owners) and potential investors regarding quality and prospect of firm. The previous owners have more information than potential investors. Therefore, to minimise information asymmetry, the founders have to provide a signal to convince potential investors on the prospect of offered firm. According to Certo et al. (2001), signalling theory has two characteristics:

1. Signal could be observed and known before the IPO.
2. Signal should be difficult to be imitated by low quality firms.

Signalling theory has been a basis to study IC disclosure (e.g. Bukh et al., 2005; Garcia-Meca et al., 2005; Oliveira, et al., 2007; Singh and Van der Zahn, 2007, 2008). This theory explains that well-performed firms will voluntarily provide a signal regarding the quality and prospect in the future in order to convince potential investors. In addition, information disclosure regarding quality and superiority will provide benefits for firms including improving corporate image and reduce cost of capital (Vergauwen and Alem, 2005; An et al., 2011).
2.2 Ownership retention and intellectual capital disclosure

Study on the link between ownership retention and IC disclosure is pioneered by Singh and Van der Zahn (2008). They explain that qualified firms, proxied by higher ownership retention rate, will extend their IC disclosure to enhance their value in the IPO. Signalling theory postulates that ownership retention in the IPO is a signal on the quality of firms due to the fact that the founders bear risk in the form of opportunity to diversify risk in the market portfolio which is more profitable (Leland and Pyle, 1977). Therefore, the founders will attempt to provide a good signal by disclosing all information needed by potential investors to make an investment decision (Firth and Liau-Tan, 1998; Singh and Van der Zahn, 2008). Moreover, Singh and Van der Zahn (2008) explain that the founders will extend the disclosure, more specifically on the information related to intellectual capital that the firms have. Previous studies provide evidence that ownership has a positive relation with the extent to which IC is disclosed.

$H_1$: Ownership retention has a positive impact on the extent to which intellectual capital is disclosed in the prospectus of IPO.

2.3 Underwriting portion and intellectual capital disclosure

In addition to the founders, underwriter and managing underwriter are the important parties in the IPO. They set the contract with the issuers for IPOs with or without obligation to buy the remaining shares which are unsold (Indonesian Law No. 8/1995). However, managing underwriter has more important role in the IPO than that of underwriter due to managing underwriter has to organise the execution of IPO. Therefore, they are assigned to prepare the prospectus and subsequently responsible for its content. Thus, they have to deeply review and evaluate the information contained in the prospectus (Widarjo and Bandi, 2015).

According to the signalling theory, qualified firms will convey signal regarding their prospect and superiority to the market (An et al., 2011). To ease market in observing and reviewing such signal, it should be expensive and difficult to be imitated by low-performing firms. Therefore, signalling theory could be applied in the link between underwriting portion by managing underwriter and the extent to which IC is disclosed. Managing underwriter is assumed to be risk aversion. Therefore, they will release a guarantee when they are confident with the prospect of the issuers. They will also attempt to reduce risk and encourage management to disclose more information regarding prospect and quality of firms including IC in order to minimise the information asymmetry. Therefore, potential investors will have sufficient information to make a decision (Firth and Liau-Tan, 1998; Singh and Van der Zahn, 2008).

$H_2$: Underwriting portion by managing underwriter has a positive effect on the extent to which IC is disclosed in the prospectus.

2.4 Intellectual capital disclosure and underpricing

Underpricing is a condition in which the IPO price is lower than share price in the secondary market which is mostly caused by information asymmetry (Baron, 1982; Ljungqvist, 2006). Private information disclosure is an alternative to minimise the information asymmetry. Singh and Van der Zahn (2007) explain that information
disclosure could contribute for decision-making of investors. In this contemporary business, which puts more weight on science and technology, IC is a main factor to create value for a firm. Therefore, IC disclosure is relevant information to reduce information asymmetry between issuers and potential investors (Singh and Van der Zahn, 2007).

In the context of IC disclosure and underpricing, previous studies have shown inconsistent findings on the link between the two variables. Singh and Van der Zahn (2007) find that IC disclosure has a negative and significant effect on underpricing. However, no evidence is found in the study of Too et al. (2015).

Nevertheless, according to the signalling theory, the extent to which information is disclosed is negatively correlated with information asymmetry between issuers and potential investors (Jog and McConomy, 2003; Guo et al., 2004; Yosano, 2015). Therefore, potential investors could disentangle high- and low-quality firms. They will appreciate those have higher performance which subsequently enhance firm value and diminish cost of capital (Boujelbene and Affes, 2013).

**H3:** Underpricing is negatively affected by IC disclosure.

### 2.5 Ownership retention, underwriting portion and underpricing (indirect effect)

Some previous studies have investigated the relation between ownership retention and underpricing (Mikkelson and Shah, 1994; Jain and Kini, 1994; Jog and McConomy, 2003; Robinson et al., 2004; Gumanti and Niagara, 2006) as well as the link between underwriter reputation and underpricing (Baron, 1982; Rock, 1986; Beatty and Ritter, 1986; Carter and Manaster, 1990; Chen and Mohan, 2002; Jog and McConomy, 2003; Loughran and Ritter, 2004; Sahoo and Rajib, 2009; Dimovski et al., 2011). However, results are inconclusive. Jain and Kini (1994) show that there is a direct relationship between ownership retention and underpricing, yet Mikkelson and Shah (1994) find the inverse relation between these two variables. Non-linear relationship between retention and underpricing is found in the study of Robinson et al. (2004). At the retention rate of 45%, underpricing is at its height, but in general, ownership retention is negatively associated with underpricing. Gumanti and Niagara (2006) confirm the signalling hypothesis in which ownership retention reduces underpricing.

However, those findings lead to conclusion that ownership retention and underwriting portion are not sufficiently enough to convince potential investors on the quality and prospect of firms. Therefore, the founders and managing underwriter should do more by disclosing more information particularly the intellectual capital as it is generally known that information is needed by users to take action and decision (McGuire, 2011; Purnamasari, 2015). Therefore, IC disclosure could be a tool for management and managing underwriter to convey the quality and prospect of firms to potential investors.

**H4a:** IC disclosure mediates the relationship between ownership retention and underpricing.

**H4b:** IC disclosure mediates the relationship between underwriting portion and underpricing.
3 Research method

3.1 Sample

Our sample consists of IPOs over the period of 2000–2014. We exclude observations that have not met our criteria. The first criterion is all offered shares are initial shares offered to the public. Second, the IPOs should be underpricing.

3.2 Variables

3.2.1 Main variables

3.2.1.1 Underpricing

Underpricing is a condition in which the IPO price is lower than share price in the secondary market (Singh and Van der Zahn, 2007; Sahoo and Rajib, 2009). According to Singh and Van der Zahn (2007) and Sahoo and Rajib (2009), underpricing is measured as the initial return.

\[
UNDP = \frac{P_{t1} - P_{t0}}{P_{t0}} \times 100\%
\]

where UNDP is underpricing, \( P_{t1} \) is closing price in the first day of secondary market, \( P_{t0} \) is IPO price.

3.2.1.2 Intellectual capital disclosure

Disclosure is relating to information delivery which is considered important and useful for financial report users besides which can be stated through the main financial statements (Suwardjono, 2013), while the intellectual capital is knowledge that can be converted into value (Abeysekera, 2008). Intellectual capital can also be interpreted as knowledge of intellectual wealth and experience which can be used to create wealth (Stewart, 1997). Thus, intellectual capital disclosure can be defined as information delivery in financial report which is related with knowledge resources of company (human capital, structural capital and relational capital) that aim to provide an overview of company quality and competitive advantage.

The wide of IC disclosure is measured by an index developed by Singh and Van der Zahn (2008). They classify IC into six categories:

1. human resources (28 items)
2. customer (14 items)
3. information technology (6 items)
4. process (9 items)
5. research and development (9 items)
6. strategy (15 items).
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Accordingly, we do a content analysis on the information disclosed in the prospectus and give score for each item disclosed. Referring to Singh and Van der Zahn (2008), the scoring technique is an unweighting dichotomous scale, the value of 1 for disclosed item and 0 otherwise.

The percentage of the IC disclosure is calculated as follows:

\[
\text{ICD} = \frac{\sum_{ij} ij \text{Ditem}}{\sum_{ij} ij \text{ADitem}}
\]

where ICD is the level of IC disclosure, Ditem is total score of IC disclosure found in the prospectus, ADitem is number of items in the index of IC disclosure.

3.2.1.3 Ownership retention

Ownership retention is the percentage of ownership which is retained by founder in the IPO. According to the works of Downes and Heinkel (1982), McGuinness (1993), Keasey and McGuiness (1992), Keasey and Short (1997) and Singh and Van der Zahn (2008), ownership retention is measured as follows:

\[
\text{OR} = \frac{(N - N_p - N_s)}{N}
\]

where OR is ownership retention, N is number of outstanding shares after IPO, \(N_p\) is number of shares offered in the IPO, \(N_s\) is number of shares sold by the founder after IPO.

3.2.1.4 Underwriting portion

Underwriting portion is a percentage of shares which is guaranteed by the underwriter in the IPO. It is measured as the number of guaranteed shares divided by offered shares. This portion represents the risk that be covered by underwriter stated in the contract.

3.2.2 Control variables

3.2.2.1 Industry type

Industry type is represented by a dummy variable to distinguish between high-tech firms (1) and low-tech firms (0) following the study of Bukh et al. (2005) and Rimmel et al. (2009).

3.2.2.2 Firm age

Firm age is measured as the number of days between incorporation and listed in the Indonesia stock exchange through IPO (White et al., 2007; Singh and Van der Zahn, 2008). To deal with heteroscedasticity, we transform this variable into natural logarithm.

3.3 Empirical model

We estimate our empirical models using the Ordinary Least Square (OLS) technique. The empirical models to be estimated are the following:
1. Regression models to test hypotheses 1 and 2

\[
\text{ICD} = \alpha_0 + \beta_1 \text{OWNRET} + \beta_2 \text{UP} + e
\]  
(1)

\[
\text{ICD} = \alpha_0 + \beta_1 \text{OWNRET} + \beta_2 \text{UP} + \beta_3 \text{Industry} + \beta_4 \text{LnAge} + e
\]  
(2)

2. Regression models to test hypothesis 3

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{ICD} + e
\]  
(3)

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{ICD} + \beta_2 \text{Industry} + \beta_3 \text{LnAge} + e
\]  
(4)

3. Regression models to test hypothesis 4 (testing the indirect effect)

According to Baron and Kenny (1986), to investigate the indirect effect of independent variable on dependent variable, some requirements should be met:

1. Independent variable should have a significant effect on the mediating variable.
2. Independent variable should have a significant effect on dependent variable.
3. Mediating variable should have a significant effect on dependent variable.

\[
\text{ICD} = \alpha_0 + \beta_1 \text{OWNRET} + e
\]  
(5)

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{OWNRET} + e
\]  
(6)

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{ICD} + e
\]  
(7)

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{OWNRET} + \beta_2 \text{ICD} + e
\]  
(8)

\[
\text{ICD} = \alpha_0 + \beta_1 \text{UP} + e
\]  
(9)

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{UP} + e
\]  
(10)

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{ICD} + e
\]  
(11)

\[
\text{UNDP} = \alpha_0 + \beta_1 \text{UP} + \beta_2 \text{ICD} + e
\]  
(12)

where ICD is IC disclosure, OWNRET is ownership retention, UP is underwriting portion, UNDP is underpricing, Industry is industry type, LnAge is natural logarithm of firm age, e is error term.

4. Results and discussion

4.1 Descriptive statistics

We study 86 IPOs in the Indonesia Stock Exchange (IDX) over the period of 2000–2014. Table 1 exhibits the descriptive statistics and correlation. The average of underpricing is 24.1%. When compared with underpricing level in Singapore, in amount of 27.13% (Singh and Van der Zahn, 2007), underpricing level in Indonesia is lower than in Singapore. However, much higher than that of Malaysian IPOs which is in average is 23%.
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Table 1  Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>UNDP</th>
<th>ICD</th>
<th>OWNRET</th>
<th>UP</th>
<th>Industry</th>
<th>LnAge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>0.000</td>
<td>0.100</td>
<td>0.550</td>
<td>0.380</td>
<td>0.000</td>
<td>5.960</td>
</tr>
<tr>
<td>Max</td>
<td>0.990</td>
<td>0.690</td>
<td>0.900</td>
<td>1.000</td>
<td>1.000</td>
<td>9.960</td>
</tr>
<tr>
<td>Mean</td>
<td>0.241</td>
<td>0.399</td>
<td>0.778</td>
<td>0.886</td>
<td>0.314</td>
<td>8.347</td>
</tr>
<tr>
<td>SD</td>
<td>0.192</td>
<td>0.151</td>
<td>0.088</td>
<td>0.157</td>
<td>0.466</td>
<td>0.882</td>
</tr>
</tbody>
</table>

UNDP 1.000
ICD −0.475** 1.000
OWNRET −0.126 0.311** 1.000
UP −0.305** 0.364** 0.266* 1.000
Industry 0.076 0.095 0.377** 0.053 1.000
LnAge −0.101 0.113 0.150 0.112 −0.183 1.000

***, * Significant at 5% and 10%, respectively.

Notes: UNDP = underpricing; ICD = intellectual capital disclosure; OWNRET = ownership retention; UP = underwriting portion; Industry = industry type; LnAge = natural logarithm of firm age.

The average of IC disclosure is 39.9%, which is relatively higher than that of in Malaysia (34.99%), according to Rashid et al. (2012). The mean of ownership retention is 77.8%, with the minimum (maximum) is 55% (90%). A total of 88.6% is the average of underwriting portion which means that most of offered shares are guaranteed by managing underwriter, only small portions are guaranteed by underwriter. The correlation analysis result shows that, in overall, correlation level between independent variables are relatively low. It can be concluded that there is no multicollinearity problem. In addition, the results of residual normality test, autocorrelation and heteroscedasticity also show that there are no problems with regard to classical assumptions in regression model.

4.2 Hypothesis testing

Models 1 and 2 of Table 2 show that ownership retention has a positive effect on IC disclosure, which confirms our first hypothesis. It means that the more the shares are retained by the founders (previous owner), the more the intellectual capital is disclosed in the prospectus of IPO which is in line with the signalling hypothesis (Leland and Pyle, 1977; Hartono, 2006; Singh and Van der Zahn, 2008).

Table 2  Regression results (hypotheses 1 and 2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-value</td>
<td>Coefficient</td>
<td>t-value</td>
</tr>
<tr>
<td>Constant</td>
<td>−0.165</td>
<td>−1.159</td>
<td>−0.244</td>
<td>−1.296</td>
</tr>
<tr>
<td>OWNRET</td>
<td>0.393</td>
<td>2.239**</td>
<td>0.372</td>
<td>1.895*</td>
</tr>
<tr>
<td>UP</td>
<td>0.290</td>
<td>2.941***</td>
<td>0.286</td>
<td>2.857***</td>
</tr>
<tr>
<td>Industry</td>
<td>0.003</td>
<td>0.087</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnAge</td>
<td>0.012</td>
<td>0.659</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2  Regression results (hypotheses 1 and 2) (continued)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-value</td>
<td>Coefficient</td>
<td>t-value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.162</td>
<td></td>
<td>0.146</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-value</td>
<td>9.241</td>
<td></td>
<td>4.644</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td></td>
<td>0.002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>86</td>
<td></td>
<td>86</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***, **, * indicates significance at the 0.01; 0.05; and 0.1 level respectively.

Notes:  OWNRET = ownership retention; UP = underwriting portion; Industry = industry type; LnAge = natural logarithm of firm age.

Likewise, our regression results in Table 2 exhibit that underwriting portion has a positive and significant effect on the extent to which intellectual capital is disclosed in the prospectus. The more the managing underwriter has the portion in the IPO, the higher the level of IC disclosure. In the process of IPO, managing underwriter is responsible to prepare the prospectus as well as to promote the offered shares. According to the full commitment guarantee contract, if the offered shares are not sold in the market, managing underwriters have to buy those shares. Therefore, they will attempt to reduce their own risk by extending the information to be disclosed to the potential investors including the intellectual capital.

This findings provide an evidence that the level of IC disclosure is determined by the risks which are covered by the founders and managing underwriter. In general, our empirical results support the signalling hypothesis (Leland and Pyle, 1977; Singh and Van der Zahn, 2008).

Table 3 provides the regression results to test hypothesis 3. We do find that IC disclosure is negatively associated with underpricing. The more the intellectual capital is disclosed in the prospectus of IPO, the lower the level of underpricing. It indicates that the higher the IC disclosure, it could reduce the information asymmetry which subsequently eases potential investors to make decision. It is consistent with the findings of Beatty and Ritter (1986), Jag and McConomy (2003) and Schrand and Verrechia (2004).

Table 3  Regression results (hypothesis 3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 3</th>
<th></th>
<th></th>
<th>Model 4</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-value</td>
<td>Coefficient</td>
<td>t-value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.482</td>
<td>9.265***</td>
<td>0.497</td>
<td>2.722***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICD</td>
<td>−0.604</td>
<td>−4.950***</td>
<td>−0.616</td>
<td>−4.954***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
<td>0.049</td>
<td>1.211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>−0.003</td>
<td>−0.142</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.217</td>
<td>0.213</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-value</td>
<td>24.498</td>
<td>8.668</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>86</td>
<td>86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at 1%, respectively.

Notes:  ICD = intellectual capital disclosure; Industry = industry type; LnAge = natural logarithm of firm age.
Determinants of intellectual capital disclosure

Intellectual capital disclosure is a tool to convey the quality of firms which could be observed by potential investors in the prospectus. For those without intensive intellectual capital, it is difficult to imitate as the cost is quite expensive.

Tables 4 and 5 provide the regression results for the mediating effects of IC disclosure on the link between ownership retention and underpricing as well as between underwriting portion and underpricing.

Table 4 shows that the coefficient of ownership retention is positive and significant. However, in the model 6, it is shown that the effect of ownership retention on underpricing is not significant. Although, model 7 and model 8 are significant, according to Baron and Kenny (1986), it could be concluded that IC disclosure does not fully mediate the link between ownership retention and underpricing.

Table 4  Regression results (hypothesis 4a)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
<th>Model 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff.</td>
<td>t-value</td>
<td>Coeff.</td>
<td>t-value</td>
</tr>
<tr>
<td>Constant</td>
<td>−0.015</td>
<td>−0.106</td>
<td>0.453</td>
<td>2.462***</td>
</tr>
<tr>
<td>OWNRET</td>
<td>0.531</td>
<td>3.001***</td>
<td>−0.272</td>
<td>−1.160</td>
</tr>
<tr>
<td>ICD</td>
<td>−0.604</td>
<td>−4.950***</td>
<td>−0.614</td>
<td>−4.753***</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.097</td>
<td>0.016</td>
<td>0.271</td>
<td>0.226</td>
</tr>
<tr>
<td>$F$-value</td>
<td>9.008</td>
<td>1.346</td>
<td>24.498</td>
<td>12.141</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.004</td>
<td>0.249</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>$N$</td>
<td>86</td>
<td>86</td>
<td>86</td>
<td>86</td>
</tr>
</tbody>
</table>

***, ** Significant at 1% and 5%, respectively.

Notes: CD = intellectual capital disclosure; OWNRET = ownership retention.

Model 9 of Table 5 exhibits that the coefficient of underwriting portion is positive and significant. Likewise, the coefficients in models 10, 11 and 12 are also significant. According to Baron and Kenny (1986), all of three criteria show that IC disclosure fully mediates the relationship between underwriting portion and underpricing. Therefore, our result confirms the hypothesis 4b. IC disclosure mediates the relation between underwriting portion and underpricing, which indicates that the signal conveyed by underwriting portion is responded by potential investors.

Table 5  Regression results (hypothesis 4b)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 9</th>
<th>Model 10</th>
<th>Model 11</th>
<th>Model 12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff.</td>
<td>t-value</td>
<td>Coeff.</td>
<td>t-value</td>
</tr>
<tr>
<td>Constant</td>
<td>0.089</td>
<td>1.020</td>
<td>0.570</td>
<td>5.000***</td>
</tr>
<tr>
<td>UP</td>
<td>0.349</td>
<td>3.585***</td>
<td>−0.371</td>
<td>−2.931***</td>
</tr>
<tr>
<td>ICD</td>
<td>−0.604</td>
<td>−4.950***</td>
<td>−0.534</td>
<td>−4.103***</td>
</tr>
</tbody>
</table>
Table 5  Regression results (hypothesis 4b) (continued)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 9</th>
<th>Model 10</th>
<th>Model 11</th>
<th>Model 12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff.</td>
<td>t-value</td>
<td>Coeff.</td>
<td>t-value</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.133</td>
<td>0.093</td>
<td>0.271</td>
<td>0.246</td>
</tr>
<tr>
<td>$F$-value</td>
<td>12.853</td>
<td>8.589</td>
<td>24.498</td>
<td>13.519</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.001</td>
<td>0.004</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>$N$</td>
<td>86</td>
<td>86</td>
<td>86</td>
<td>86</td>
</tr>
</tbody>
</table>

*** Significant at 1%, respectively.

Notes: ICD = intellectual capital disclosure; UP = underwriting portion.

Disclosure is a way to convey information about prospect and quality of company. The wider the disclosure on intellectual capital, it will minimise information asymmetry. Thus, potential investors have sufficient information in decision-making (Welker, 1995; Jog and McConomy, 2003; Schrand and Verrecchia, 2004; Guo et al., 2004; Yosano, 2015). The result of this study provides an overview of information disclosure importance (especially intellectual capital information) in influencing perception and behaviour of investors in making investment decision (Chan, 1983; Too et al., 2015).

4.3 Analysis of sensitivity

In this study, a sensitivity analysis was conducted in two phases. In the first phase, researchers divided sample into two groups, which are companies that have high IC intensity (high-tech) and companies that have low IC intensity (low-tech). In the second phase, researchers tested research model by using alternative measurement on intellectual capital disclosure variable. The results of first phase sensitivity analysis are presented in Tables 6 and 7, while second phase sensitivity analysis is presented in Tables 8 and 9.

Table 6  Result of sensitivity analysis (hypotheses 1 and 2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>High-tech</th>
<th>Non high-tech</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-value</td>
</tr>
<tr>
<td>Constant</td>
<td>−0.609</td>
<td>−1.800*</td>
</tr>
<tr>
<td>OWNRET</td>
<td>0.781</td>
<td>2.227**</td>
</tr>
<tr>
<td>UP</td>
<td>0.425</td>
<td>2.599**</td>
</tr>
<tr>
<td>LnAge</td>
<td>0.019</td>
<td>0.622</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.251</td>
<td>0.232</td>
</tr>
<tr>
<td>$F$-value</td>
<td>5.365</td>
<td>3.615</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.012</td>
<td>0.028</td>
</tr>
<tr>
<td>$N$</td>
<td>27</td>
<td>27</td>
</tr>
</tbody>
</table>

**, * Significant at 5% and 10%, respectively.

Notes: OWNRET = ownership retention; UP = underwriting portion; LnAge = natural logarithm of firm age.
Table 7  Result of sensitivity analysis (hypothesis 3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>High-tech Model 3</th>
<th>High-tech Model 4</th>
<th>Non-High-tech Model 3</th>
<th>Non-High-tech Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-value</td>
<td>Coefficient</td>
<td>t-value</td>
</tr>
<tr>
<td>Constant</td>
<td>0.598</td>
<td>4.983***</td>
<td>0.057</td>
<td>0.146</td>
</tr>
<tr>
<td>ICD</td>
<td>−0.800</td>
<td>−2.951***</td>
<td>−0.865</td>
<td>−3.214***</td>
</tr>
<tr>
<td>LnAge</td>
<td>0.070</td>
<td>1.447</td>
<td>0.029</td>
<td>−1.260</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.258</td>
<td>0.261</td>
<td>0.220</td>
<td>0.228</td>
</tr>
<tr>
<td>$F$-value</td>
<td>8.710</td>
<td>5.593</td>
<td>17.343</td>
<td>9.554</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.007</td>
<td>0.010</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>$N$</td>
<td>27</td>
<td>27</td>
<td>59</td>
<td>59</td>
</tr>
</tbody>
</table>

*** Significant at 1%, respectively.

Notes: ICD = intellectual capital disclosure; LnAge = natural logarithm of firm age.

Table 8  Result of sensitivity analysis (hypothesis 1 and 2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-value</td>
</tr>
<tr>
<td>Constant</td>
<td>−0.036</td>
<td>−0.282</td>
</tr>
<tr>
<td>OWNRET</td>
<td>0.344</td>
<td>2.206**</td>
</tr>
<tr>
<td>UP</td>
<td>0.268</td>
<td>3.058***</td>
</tr>
<tr>
<td>Industry</td>
<td>−0.007</td>
<td>−0.210</td>
</tr>
<tr>
<td>LnAge</td>
<td>−0.008</td>
<td>0.532</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.168</td>
<td>0.152</td>
</tr>
<tr>
<td>$F$-value</td>
<td>9.580</td>
<td>4.802</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td>0.002</td>
</tr>
<tr>
<td>$N$</td>
<td>86</td>
<td>86</td>
</tr>
</tbody>
</table>

***, ** Significant at 1% and 5%, respectively.

Notes: OWNRET = ownership retention; UP = underwriting portion; Industry = industry type; LnAge = natural logarithm of firm age.
Table 9   Result of sensitivity analysis (hypothesis 3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-value</td>
</tr>
<tr>
<td>Constant</td>
<td>0.577</td>
<td>8.768***</td>
</tr>
<tr>
<td>ICD_Alter</td>
<td>−0.716</td>
<td>−5.310***</td>
</tr>
<tr>
<td>Industry</td>
<td>0.044</td>
<td>1.114</td>
</tr>
<tr>
<td>LnAge</td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.251</td>
<td></td>
</tr>
<tr>
<td>F-value</td>
<td>28.200</td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>86</td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at 1%, respectively.

Notes: ICD_Alter = intellectual capital disclosure Alternatif; Industry = industry type; LnAge = natural logarithm of firm age.

The sensitivity testing results of models 1 and 2 in Table 6 shows that there is consistency with the earlier test results on hi-tech companies. In hi-tech companies, ownership retention and underwriting share portion of managing underwriter have positive and significant impact on IC disclosure. These result indicate that the previous owners and the managing underwriter extend IC disclosure in prospectus to show company quality and prospect, in which the IC is an important resource in value creation and competitive advantage of companies (Bukh et al., 2005; Rimmel et al., 2009). Moreover, on the hi-tech companies, IC existence can be observed and supported by valid evidence (such as high quality of human resource, sophistication of information technology, number of patents, research intensity and development).

But on the non-high-tech companies, there are differences in result, especially in relation between variable of ownership retention and IC disclosure. These conditions show that in the non-high-tech companies, the previous owners are more selective and careful in disclosing intellectual capital of the company. These actions are likely to avoid legal problems in the future and to maintain credibility of the company. If in the future there is inappropriate information with statement in prospectus, investors can claim the company.

On early models of third hypothesis testing, IC disclosure extent was measured by disclosure index developed by Singh and Van der Zahn (2008), while in sensitivity testing of model was using IC disclosure index developed by Bukh et al. (2005). Index Bukh et al. (2005) was used by consideration that the index has been often used as a reference by previous researchers in several different countries (Rimmel et al., 2009; Branswijck and Everaert, 2012; Nielsen and Farooq, 2015).

The sensitivity analysis results of models 1 and 2 in Table 8 show the regression coefficient value of ownership retention variable and the underwriting portion is positive and significant on the level of 5 and 10%. When compared with the regression analysis result in Table 3, it can be concluded that sensitivity analysis result is consistent with previous analysis result. It means that positive effect of ownership retention variable and underwriting portion on intellectual capital disclosure is consistent both using disclosure index Singh and Van der Zahn (2008) and disclosure index Bukh et al. (2005).
The sensitivity analysis models 3 and 4 show consistent results with previous analysis. The testing results of model 3 in Table 9 show the regression coefficient of intellectual capital disclosure variable which is measured by index Bukh et al. (2005) is negative and significant on the level 1%. Consistency of testing results is also seen in regression coefficient of model 4 which also is negative and significant on the level 1%. Thus, it can be concluded that intellectual capital disclosure in IPO prospectus has negative impact on underpricing.

5 Conclusion

We investigate the determinants of IC disclosure and its impact on IPO underpricing. Our results reveal that ownership retention and underwriting portion are the main factors in determining the level of IC disclosure in the IPOs. Potential decrease of wealth which can occur due to low offered stock price in the capital market and full commitment contract of managing underwriter for purchase of all shares which are not sold at IPO is the motivating factor in expanding the private information (in this case IC information) to potential investors to demonstrate company quality and prospect in the future. It indicates that the signalling of firm quality and risk motivate to extend the information on intellectual capital disclosed in the prospectus.

Nevertheless, in the non-high-tech companies, ownership retention level is not strong enough to motivate previous owner to disclose IC companies. In the non-high-tech companies, IC ownership retention is relatively low. Although the risk level which is guaranteed by previous owner is high, they are more careful in disclosing IC information of companies. The possibility is to maintain company reputation in the future and to avoid potential law problem as a result of inaccuracy in information delivery.

Moreover, we find that there is a positive response of potential investors on intellectual capital disclosure in the IPO, which is shown by lower underpricing for firms which disclose more intellectual capital. It indicates that the wider the disclosure on intellectual capital, it will minimise information asymmetry. Thus, investors have more information to forecast the prospect of firms.

Theoretically, this study extends the previous research results of IC disclosure in IPO context, especially in developing countries. Practically, this research provides an overview for company and managing underwriter about the importance of IC disclosure in reducing cost of capital at IPO.

6 Limitation and recommendations

Nevertheless, we acknowledge some limitations of this study. First, relatively small sample could lead to a bias due to the lack of degree of freedom. Second, items to measure the disclosure in the IPO are based on our judgement. We strongly recommend that this study could be extended in a cross-country study especially emerging countries. Moreover, future studies may include some explanatory variables such as underwriter reputation and corporate governance (Uyar et al., 2013; Rashid et al., 2012; Abeysekera, 2010; Singh and Van der Zahn, 2008) and some control variables such as firm size and ownership structure (Hidalgo et al., 2011; Abeysekera, 2010).
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References


Determinants of intellectual capital disclosure


W. Widarjo and Bandi


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