AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Underpricing and long-term market performance of initial public offerings in Indonesia: A quantile regression approach

Nugroho Sasikirono,¹ Sumiati Sumiati,² Nur Khusniyah Indrawati²

¹ Faculty of Economics and Business, Universitas Airlangga, Indonesia

² Faculty of Economics and Business, Brawijaya University, Indonesia

corresponding e-mail: [nugroho69\[at\]yahoo\[dot\]com](mailto:nugroho69[at]yahoo[dot]com)

address: Department of Management, Faculty of Economics and Business, Universitas Airlangga,
Jalan Airlangga 4, Surabaya, Indonesia

Abstract: This study aims to identify the relationship between underpricing and long-term market performance of IPOs in the Indonesian Stock Exchange (IDX), as well as determinants of IPOs' market performance. We based our paper on the idea that it is more meaningful and relevant to investigate underpricing and long-term market performance determinants at different distribution points. OLS and quantile regression analysis is applied to 105 samples of IPOs during 2009-2013. The results of OLS and quantile regressions indicate that assets value, age, proceeds, and underwriters' reputation are determinants of long-term market performance; while assets, age and proceeds also become underpricing determinants. Among these factors, proceeds become the most important determinant of underpricing and long-term market performance.

JEL Classifications: G11, G24

Keywords: Underpricing, long-term market performance, Indonesia, quantile regression

Citation: Sasikirono, N., Sumiati, S., & Indrawati, N. K. (2018). Underpricing and long-term market performance of initial public offerings in Indonesia: A quantile regression approach. *Business and Economic Horizons*, 14(1), 152-167. <http://dx.doi.org/10.15208/beh.2018.13>

1. Introduction

The development of capital market in Indonesia cannot be separated from the increased awareness of stakeholders about the function of the capital market as an alternative source of funds and investment. As of March 2017, 536 companies have been listed on the Indonesia Stock Exchange. As a source of funding, the capital market is a vehicle that can be used to raise long-term funds from the community that will be channelled into productive sectors. Capital markets also allow investors to find alternative investment options that suit their risk preferences.

The most often mechanism used by issuers to enter the capital market for the first time is the initial public offerings. Initial public offerings is a corporate action in the form of a stock offering for the first time to the public. Through IPO activities, some of the company's funding needs will be collected from the public and affect public's ownership of the company's stocks. Because of its nature, the information asymmetry problem of IPOs is enormous, both information asymmetry between issuers and investors as well as between investors.

The information asymmetries that occur in the IPO encourage the emergence of a typical phenomenon in the IPO, among others are the trend of positive return on the first day of stock trading (i.e. underpricing) and tendency of lower long-term return of IPO stocks than benchmark's, in a period of three to five years post IPO (i.e. long term IPO

underperformance). Ibbotson (1975) and Carter & Manaster (1990) suggest that underpricing occurs in the United States. Long-term market performance IPOs were examined by Ritter (1991). Ritter's findings show that the long-term market performance of IPOs in the US is lower than their benchmarks' up to a period of three to five years after the IPO. Similar studies have also found the phenomenon of lower long-run stock performance in various countries: England (Esenlaub, Gregori, & Tonks, 2000); Denmark (Jakobsen & Sorensen, 2001), China (Cai, Liu, & Mase, 2008).

Hypotheses have been presented to explain underpricing phenomena; such as: underwriter compensation (Baron, 1982), winner's curse (Rock, 1986), signaling (Allen & Faulhaber, 1989). Baron (1982) explains that underpricing is a compensation for services provided by underwriters. Rock (1986) states that underpricing is a mechanism to increase investor motivation in the primary market by providing profit for both informed and uninformed investors. Allen & Faulhaber (1989) stated that underpricing is a signal delivery mechanism by high-quality firms so investors can differentiate them from low-quality firms.

Ritter (1998) states two theories that can explain the low long-term performance of IPO, namely: the divergence of opinion hypothesis, and the impresario hypothesis. The divergence opinion hypothesis explains that underpricing arises as a result of opinions gap about the value of the issuer between optimistic and non-optimistic investors in the IPO. Information asymmetry that leads to uncertainty can encourage optimistic investor valuation to be very high and generate positive initial returns. As time passes and the entry of new information, information gaps become less and have impacts on the decline in returns. The impresario hypothesis states that systematically, issuers and underwriters set IPO stock prices lower than their intended value (intrinsic value) in order to motivate investors to buy stocks. Based on the impresario hypothesis, underpricing is the marketing cost of the new stock. This results in correction of stock prices in the long run and declining returns.

Several factors influence the market performance of the IPO. Ritter (1984) argues that the smaller the proceeds the higher the risk of IPO, which will therefore increase underpricing. This negative relationship are also studied in: Guo, Lev, & Shi (2006); Pande & Vaidyanathan (2009); Carter, Dark, & Sapp (2010). Page & Reyneke (1997) found that underperformance tends to occur in stocks of companies with relatively small sizes. The negative relationship between the size of the firm and the initial return are also found by French (1980), Jones & Ligon (2009). Age of the company is also a risk proxy. Therefore, the younger the age of the company will lead to high initial return (Ritter, 1984; Loughran & Ritter, 2004). Kirkulak & Davis (2005) found that there is a relationship between industry type and underpricing of IPO in Japan. Similar studies by Ritter (1991), Goergen, Kurshed, & Mudambi (2007) also show the relationship between industry type and underpricing. Another market performance determinant is the underwriter's reputation. The prestigious underwriter will seek to set the IPO price closer to its intrinsic value and therefore the underwriter's reputation is negatively related to initial returns and positively to long-term market performance (Carter & Manaster, 1990; Carter, Dark, & Sapp, 2010).

Understanding underpricing and its relation to long-term market performance is very important for investors and issuers. The ability to understand returns patterns will provide an opportunity for investors to get more optimal returns. Issuers are also concerned with the phenomenon of underpricing and long-term market performance. For issuers, underpricing and long-term market performance is closely related to external equity costs as well as information on the level of capital market efficiency. This study aims to identify

the relationship between underpricing and long-term market performance of IPOs in Indonesia Stock Exchange. This study also examines other determinants of long-term market performance of IPOs. We based our paper on the idea that it is more meaningful and relevant to investigate underpricing and long-term market performance determinants at different distribution points rather than covering the overall distribution.

2. Literature review

According to Ibbotson (1975) the average initial return of IPOs in America is positive. This finding opens up an insight into underpricing on an IPO. Loughran, Ritter, & Rydqvist (1994) found underpricing IPOs in 25 world capital markets. Underpricing occurs even in countries with emerging market capital markets, such as Malaysia (Ahmad-Zaluki et al., 2007) and India (Pande & Vaidyanathan, 2009).

There are different explanations of the underpricing phenomenon. Baron (1982) states that asymmetric information between issuers and underwriters encourages underwriters to exploit their superiority regarding market information by setting low initial prices making it easier to market new stocks. Rock (1986), in winners' curse hypothesis, explains that underpricing is done in order to keep the capital market attractive by providing adequate compensation to informed and uninformed investors as they are willing to participate in taking risks to buy the stock. Habib & Ljungqvist (2001) stated that underpricing serves as a marketing tool because it provides a domino effect on future investor demand (i.e. when the company does seasoned offerings). In line with Habib & Ljungqvist, Jenkinson (1990) states that underpricing is done to give a good impression of the company that is expected to increase interest in buying stocks in seasoned offerings. Griffith (2004) states that underpricing facilitates the existence of improper practices, such as giving benefits to certain parties. Allen & Faulhaber (1989) and Welch (1989) argue that underpricing is done by the company to inform its quality to the public. Therefore, only qualified issuers are capable of underpricing.

Ritter (1991) compares the long-run return of stocks in the US IPO and the return of benchmarks three years after the IPO. He found that IPO stocks had lower performance than their benchmarks. This study has sparked other studies in many countries; English (Levis, 1993), Brazil and Chile (Agarwal, Leal, & Hernandez, 1993), Australia (Lee, Taylor, & Walter, 1996). All the research gave the same result.

There are different explanations about the underlying causes of long-term underperformance of IPOs. The divergence opinion hypothesis explains that underpricing emerges as a result of an opinion gap on the value of issuers between optimistic and non-optimistic investors on IPOs that result in high initial returns. As time goes by and the entry of new information, information gaps are reduced and lead to a decline in market prices. Ritter (1991) concludes that low performance occurs during periods of high IPO waves (known as hot market phenomenon) because firms take advantage of positive investor sentiments, known as windows of opportunity. Investor optimism pushed stock prices to tend overvalued. The hot market phenomenon, therefore, is characterized by higher initial returns and lower long-term market performance. The impresario hypothesis states that, systematically, issuers and underwriters set the IPO stock price lower than the value it should be in order to increase buying interest for investors. In line with the increasing information about the company, in the long term the stock price will be corrected and generate a declining return.

There are several factors affecting IPO market performance. Loughran, Ritter, & Rydqvist (1994) in research on international capital markets found that the higher the issuer's risk, the higher is the underpricing, and the lower is the long-run stock performance of the IPO. There are several risk proxies, such as IPO proceeds (total funds collected), size, and age of the company. Ritter (1984) argues that the smaller the proceeds, the higher is the risk of IPO, which will therefore increase underpricing. Positive relationship between risk level and underpricing was also studied by Durukan (2002), Guo, Lev, & Shi (2006), Pande & Vaidyanathan (2009), Carter, Dark, & Sapp (2010), Butler, Keefe, & Kieschnick (2014). Page & Reyneke (1997) found that the underperformance phenomenon tended to occur in stocks of companies with relatively small sizes. The negative relationship between the size of the firm and the initial return was also found by French (1980), Loughran & Ritter (2004), and Jones & Ligon (2009). The company's age is also a risk proxy, i.e., the younger the company's age the higher the IPO risk and therefore lead to high initial return. Previous research confirms negative relationships with the company's age (see e.g. Ritter, 1984; Durukan, 2002; Loughran & Ritter, 2004; Murugesu & Santhapparaj, 2010). Kirkulak & Davis (2005) show the relationship between industry type and IPO underpricing in Japan. Different approaches to investigate the relationship between industry type and underpricing also conducted by Ritter (1991), Goergen, Kurshed, & Mudambi (2007). Carter & Manaster (1990) found a relationship between underwriter's reputation and initial return. The prestigious underwriter will try to set the IPO price close to intrinsic value. Therefore reputation is negatively related to initial return, and positively to long-term market performance (Carter & Manaster, 1990; Kenourgios, Papathanasiou, & Melas, 2007; Carter, Dark, & Sapp, 2010).

3. Data

Based on the record of Indonesia Stock Exchange, there are 112 IPOs during the period 2009 to 2013. IPO-related information including: name of the issuer, asset value, age at the time of conducting the IPO, as well as the name of the underwriter, and the industry group are obtained from the prospectus of stock offerings available at the Indonesian Capital Market Directory (ICMD) and Indonesia Capital Market Electronic Library (ICamel). Daily stock price information obtained from Indonesian Capital Market Directory. There were 4 prospectuses cannot be found and 3 issuers did not have complete monthly stock price information for 36 months post IPO due to delisting or trade suspension. The final sample size was 105 companies that conducted IPO for 2009-2013 period, covering 93.75% of total IPOs.

TABLE 1. SAMPLE

YEAR	IPO	SAMPLE	%
2009	12	9	75.00%
2010	23	20	86.96%
2011	25	25	100.00%
2012	22	21	95.45%
2013	30	30	100.00%
Total	112	105	93.75%

Source: Own calculations based on data from the Indonesia Stock Exchange (IDX)

4. Methodology

IPOs underpricing is calculated using Market Adjusted Initial Return. The first step is to calculate initial return by the formula:

$$IR_i = \frac{P_{i1} - P_{IPO}}{P_{IPO}}, \quad (1)$$

where P_{i1} is the closing price of first trading day IPO stock, and P_{IPO} is IPO price. A better initial returns measures is performed by considering a "normal" return on the same trading day as Ritter (1991), known as the Market Adjusted Initial Return (MAIR).

$$MAIR_i = IR_i - Rm_1, \quad (2)$$

where Rm_1 is the market return on the first trading day of IPO stock.

The long-term market performance of IPOs is measured by Cumulative Abnormal Return 36 (CAR36) months post first trading day of IPO shares. CAR36 is calculated by the formula:

$$AR_{it} = R_{it} - Rm_t \quad (3)$$

and

$$CAR36 = \sum_{t=1}^{36} AR_{it}, \quad (4)$$

where AR_{it} is the abnormal return of stock i on period t and Rm_t is the market return on period t . In addition, the cumulative average abnormal returns (CAAR) month t are calculated by:

$$CAAR_t = \sum_{i=1}^{36} \frac{\sum_{t=1}^n AR_{it}}{n_t}, \quad (5)$$

where n is the number of observations in month t .

Other variables used to examine the determinants of long-term market performance as well as underpricing include: size of the firm measured by natural logarithm of total assets one year before IPO (LNTAS), IPO size measured by natural logarithm of proceeds (LNPROC), company's position on the life cycle stage as one of the proxy of risk is measured by natural logarithm of company's age (LNAGE).

Other variable, the underwriter's reputation (DUWREP), determined by the approach of Kenourgios, Papathanasiou, & Melas (2007), that is grouping underwriters into two groups based on the mean of the underwriting value proportion. The proportion of the underwriting value is the value of the IPO conducted by certain underwriter during the observation period divided by all IPO value of the same period. Underwriters that have a higher-than-mean proportion of underwriting values get reputation dummy scores 1, else 0. Measurement of the effect of industry is carried out using the adapted method of Goergen, Khurshed, & Mudambi (2007); by grouping 9 industry sectors in Indonesia Stock Exchange into three sector groups: basic industry group (covering agriculture and mining sector), manufacturing group (covering sectors: basic and chemical industry, various industry, and consumer goods industry) and service groups (including sectors: property, infrastructure, finance, trade, and investment services). Two sector groups were used in the study and stated as dummy variables, i.e. manufacturing (DMANF) and services (DSERV) groups.

OLS and quantile regressions are used in testing the relation between underpricing and long-term market performance as well as determinants of both, by the following models:

$$CAR36 = \beta_0 + \beta_1 MAIR + \beta_2 LNAGE + \beta_3 LNTAS + \beta_4 LNPROC + \beta_5 DUWREP + \beta_6 DMANF + \beta_7 DSERV + \varepsilon \quad (6)$$

$$MAIR = \beta_0 + \beta_1 LNAGE + \beta_2 LNTAS + \beta_3 LNPROC + \beta_4 DUWREP + \beta_5 DMANF + \beta_6 DSERV + \varepsilon \quad (7)$$

We use the quantile regressions developed by Koenker & Bassett (1978) and Koenker (2005). The objective of ordinary least squares (OLS) regressions is to estimate the mean of the dependent variable conditional on the value of the independent variables. The estimated coefficients in OLS regression represent the average change in dependent variable associated with a change in independent variable. In this way the OLS regression may not be appropriate in dealing with extreme values and outliers in the distribution of the dependent variables. The use of OLS will result in some interest groups such as issuers with the lowest initial return may be ignored. Estimation with quantile regressions in addition to the more traditional ordinary least square regression allows us to compare the marginal effect of independent variables across the conditional distribution of dependent variables. The coefficients estimates obtained for a specific quantity of the variables change in that conditional quantities of the variables change by a one unit change in the

explanatory variable. The quantitative regression approach may be made by the issuer's size or risks of other quantities. In addition, unlike OLS regression, the estimated coefficients of the quantile regressions are not sensitive to outliers of the dependent variable.

Following the specification of the quantile regressions, consider (y_i, x_i) $i = 1, \dots, N$ is a sample derived from a population, where x_i is a $K \times 1$ vector of independent variables and y_i representing the dependent variable, a quantile regression model is generally specified as follows:

$$y_i = x_i \beta_{(q)} + \varepsilon_{i(q)} \quad (8)$$

For a given quantile of $0 < q < 1$ the value of $\beta(q)$ is obtained by minimizing the average weighted distance of y_i and y'_i as follows:

$$\beta_{(q)} = \text{avg} \min \left(q \sum_{y_i \geq x_i \beta_{(q)}} |y_i - x_i \beta_{(q)}| + (1-q) \sum_{y_i < x_i \beta_{(q)}} |y_i - x_i \beta_{(q)}| \right) \quad (9)$$

5. Results

5.1. Descriptive

Table 2 presents a description of 105 IPOs over the period 2009-2013. Although the number of IPOs in the study period is not as large as in the developed countries, there are significant differences in characteristics of IPOs in Indonesia. The company with the largest total assets at the time of the IPO, PT Bank Tabungan Negara Tbk., recorded total assets worth IDR45 trillion. The smallest asset, IDR34.82 billion, was owned by PT Visi Telekomunikasi Infrastruktur Tbk. which is engaged in trading business sector. The lowest proceeds (IDR30.1 billion) by PT Visi Telekomunikasi Infrastruktur Tbk. was only about 0.48% of the largest proceeds of IDR6.3 trillion made by PT Indofood CBP Sukses Makmur Tbk. This indicates that the policy of capital market deregulation conducted by the government of Indonesia (Economic Policy of the Government of the Republic of Indonesia December 1987) is quite positive. The average firm's age at the IPO is 15 years and the cashing out motive still found as it is 10.5% of the issuers are at least 40 years old. The proportion of issuers from the service industry is 65.7% while from the manufacturing industry only 18%. The prestigious underwriters guarantee 65% of IPOs in Indonesia.

The mean of market adjusted initial return during the study period is 20.19% (t-stat 7.402). Not all of the IPO earn initial return is positive, only 79%, and the rest is negative. The lowest initial return (-26.82%) was IPO of PT SMR Utama Tbk in 2011, while the IPO of PT Indopoly Swakarsa Industri Tbk in 2011 was the highest (122.85%). Overall, IPOs in

2010 resulted in a positive initial return; one thing that is different from IPOs in other years. Initial return positive in the IPO of 2010 occurred because in general, market participants, in this case the issuers and underwriters need to motivate investors to invest in the capital market after the economic crisis that occurred in 2008-2009. This resulted in the highest mean initial return of IPOs 2010 compared to other years.

TABLE 2. DESCRIPTIVE FOR 105 IPO COMPANIES

VARIABLES	Q1	MEDIAN	Q3	MEAN	STANDARD DEVIATION	MIN.	MAX.
CAR36 (%)	-53.35	-9.79	47.81	3.27	90.02	-203.6	294.67
MAIR (%)	0.531	9.809	38.825	20.185	27.942	-26.82	122.85
ASSETS (IDR bill.)	534.00	1198.60	2712.80	3400.60	6559.30	34.82	44992.00
PROCEEDS (IDR bill.)	130.40	300.10	895.00	672.20	952.10	30.10	6291.60
AGE (year)	8.32	17.12	23.98	19.89	15.26	1.10	90.42
DUWREP	0	1	1	0.648	0.480	0	1
DMANIN	0	0	0	0.181	0.387	0	1
DSRVIN	0	1	1	0.657	0.477	0	1

Source: SAS output

Notes: DUWREP is dummy of underwriter reputation determined by the approach of Kenourgios et al. (2007), DMANIN is dummy of manufacturing industry, and DSRVIN is dummy of service industry.

The average CAR36 of IPO for the period 2009-2013 is +3.27% with the standard deviation of 90.02% and t-stat 0.372. This shows that the long-term market performance of IPOs does not differ significantly from market returns. This condition is different from the results of studies in countries with advanced capital markets that show long run underperformance of IPOs (Ritter, 1991; Su & Bangassa, 2011; Amor & Kooli, 2016). However, it is worth noting that there is a wide spread on CAR36. The highest CAR36 is + 294.67% of PT Sarana Menara Nusantara Tbk. and the lowest -203.6% of PT Logindo Samudra Makmur Tbk., with 56% of the IPO resulting negative CAR36.

5.2. Long-term market performance

IPO market performance tends to increase until the 15th month after IPO and after that decreased up to the 36th month. Up to fifteenth month, t-stat indicates that IPO stocks outperform the market. Nevertheless the performance up to the thirty-sixth month showed no significant difference with the market. This result is partially similar to the 1990-2005 IPO performance study in Indonesia (Emasari & Tamara, 2010).

Figure 1 shows that the short-run performance of IPO stocks of certain year tends to continue on its long-term performance. The average MAIR of the IPO in 2011 and 2013, which is lower than the average MAIR during the observation period, continues on a declining CAAR36. The high MAIR of the 2010 and 2012 IPOs resulted in a positive CAAR36. A different phenomenon is shown by IPO 2009 with a lower average MAIR compared to the average MAIR during the observation period but has a positive CAAR36. The year 2009 was the year of the financial crisis in Indonesia, therefore it was possible that the IPO stocks during that year were undervalued, resulting in increasing CAAR36.

TABLE 3. CUMULATIVE AVERAGE ABNORMAL RETURNS FOR IPOs IN 2009-2013

Month after IPO	Mean	t-stat
3	10.752	2.420
6	11.650	2.256
9	9.998	1.676
12	11.930	1.921
15	13.386	1.860
18	6.174	.860
21	4.990	.666
24	7.854	.984
27	9.272	1.091
30	5.915	.677
33	3.714	.411
36	3.268	.372

Source: SPSS output.

FIGURE 1. MARKET ADJUSTED INITIAL RETURN AND CUMULATIVE AVERAGE ABNORMAL RETURNS 36 MONTHS (CAAR36) OF INDONESIAN IPOs IN 2009-2013 BY IPO YEAR

Table 4 presents the regressions results. The first column contains the OLS regression estimates followed by the columns that show estimates of the 25th, 50th, and 75th quantiles, respectively. Both OLS and quantile regressions analysis show no relation between underpricing and long-term market performance. Indonesian investors tend not to link long-term performance with initial performance of IPOs stocks. This may be due to the dynamic condition of the Indonesian economy, causing investors to only observe the latest factors in making decisions. Underpricing in Indonesia is done to avoid winner's curse problem. The Indonesian market is characterized by low capability and low investment minded of individual investors. This resulted in investor confidence in the capital market is still low. The number of individual investors in Indonesia in 2013, based on data from the Indonesia Central Securities Depository, is only about 321,000 or equivalent to 0.13% of the population. Without underpricing these unskilled investors will always be in a losing position. Therefore underpricing is needed to maintain and increase the motivation of investors to invest in the capital market, especially the stock market. Therefore, it is not surprising that there is no relationship between underpricing and long-term market performance of IPOs in Indonesia.

TABLE 4. REGRESSIONS RESULT FOR CUMULATIVE ABNORMAL RETURNS 36 MONTHS

	OLS	Q10	Q25	Q50	Q75	Q90
(Constant)	402.831* (-1.68)	146.147 (0.48)	-21.087 (-0.11)	28.037 (0.10)	872.979** (2.40)	826.72 (1.51)
MAIR	0.047 (0.14)	0.233 (0.73)	0.014 (0.07)	-0.180 (-0.44)	0.193 (0.25)	0.558 (0.52)
LNAGE	-12.726 (-1.16)	29.883 (1.55)	4.224 (0.47)	-14.243 (-1.21)	-17.304 (-1.11)	-15.028 (-0.68)
LNTAS	21.315** (2.30)	9.031 (0.77)	13.965** (2.27)	12.725 (1.34)	18.695 (1.01)	45.256** (2.15)
LNPROC	-36.824*** (-3.09)	-20.421 (-1.58)	-15.806* (-1.71)	-14.787 (-1.13)	-52.242*** (-2.64)	-73.833*** (-2.87)
DUWREP	17.516 (0.83)	-21.814 (-1.02)	-3.389 (-0.21)	19.355 (0.75)	87.486** (2.32)	28.210 (0.48)
DMANF	4.452 (0.15)	-54.276 (-1.07)	-27.635 (-1.21)	13.740 (0.36)	62.886 (1.36)	18.647 (0.32)
DSERV	6.200 (0.24)	-25.293 (-0.86)	-9.114 (-0.51)	27.265 (1.12)	32.867 (0.94)	1.560 (0.03)

Source: SAS output.

Notes: Table 4 reports the results from OLS and quantile regressions of CAR36 during period 2009 - 2013. T-statistics are in parentheses. *, **, *** - indicate significance at the 10, 5, and 1% levels, respectively.

The OLS analysis shows that the firm size, measured by the natural logarithm of total assets shows a positive relationship with CAR36. The value of the company's assets contributes to the company's high operational performance and has positive impacts on the IPO's long-term market performance. However, quantile regression analysis shows that the positive relationship occurs only in 25th and 90th quantiles. The lower regression coefficient on 25th quantile is due to the small size of the firm's assets.

Proceeds are negatively related to CAR36. Ritter (1984) states that proceeds are a risk proxy. This study shows that, in the long run, investors still use proceeds as a proxy for securities risk. The results show that the tendency to use proceeds as a proxy for risk in the long run is getting stronger in the period 2010-2014. This finding is in line with Amor & Kooli (2016). Compared with the OLS results, quantile regressions show that the

relationship between proceeds with CAR36 is weaker at lower quantile (i.e. 25th quantile) and stronger on higher quantile (i.e. 75th quantile). Investors seem to also take the risk of losing funds into account. Therefore the reward for the potential loss of funds will increase in line with the amount of proceeds.

OLS results show no relationship between the underwriter's reputations with CAR36. However quantile regressions indicate that in the 75th quantile, highly reputable underwriter is associated with higher long-term market performance. Spearman's rho shows a positive correlation (significance at 1%) between the underwriter's reputation with assets and proceeds, which means that prestigious underwriters tend to generate larger CAR36 on issuers with large assets values and proceeds compared with non-prestigious ones.

5.3. Determinants of underpricing

There is a negative relationship between age of the company, at time of IPO, and underpricing. Investors view that the younger the age of the company, the higher the risk, the higher the return required for the IPO. The relationship found in this study is consistent with Loughran & Ritter (2004) and Ozdemir & Upneja (2016). The relationship between age and underpricing along the quantile of dependent variables is consistent with the prediction, which is increasing in line with the quantile percentage.

TABLE 5. REGRESSION RESULT FOR MARKET ADJUSTED INITIAL RETURNS

	OLS	Q10	Q25	Q50	Q75	Q90
(Constant)	141.269** (2.01)	21.166 (0.25)	53.455 (0.96)	187.853* (1.97)	250.661* (1.90)	75.510 (0.43)
LNAGE	-6.837** (-2.13)	-6.328* (-1.71)	-4.778* (-1.76)	-6.228** (-2.18)	-8.529* (-1.72)	-11.452 (-1.16)
LNTAS	4.889* (1.80)	5.780* (1.74)	1.561 (0.62)	2.779 (0.87)	6.5856 (1.20)	7.745 (0.98)
LNPROC	-9.347*** (-2.73)	-6.679* (-1.85)	-3.122 (-1.10)	-8.912** (-2.10)	-14.341** (-2.20)	(-8.474) (-0.90)
DUWREP	-2.335 (-0.37)	1.849 (0.26)	-0.977 (-0.22)	-5.211 (-0.60)	-7.249 (-0.59)	-9.176 (-0.56)
DMANF	12.916 (1.43)	4.856 (0.31)	3.671 (0.41)	10.855 (1.23)	4.999 (0.36)	32.390 (1.03)
DSERV	12.418 (1.65)	4.133 (0.39)	1.33 (0.22)	8.848 (1.40)	7.274 (0.65)	29.402 (1.49)

Source: SAS output.

Notes: Table 5 reports the results from OLS and quantile regressions of MAIR during period 2009 - 2013. T-statistics are in parentheses. *, **, *** - indicate significance at the 10, 5, and 1% levels, respectively.

Analysis shows that proceeds, which is a proxy of risk, is negatively related to the initial returns. This suggests that investors require higher returns for riskier IPOs. As expressed by Ritter (1984), the higher the proceeds of the lower the risk of IPO. This finding is in line with Tian (2011) and Ozdemir & Upneja (2016). The relationship between proceeds with underpricing on the quantile 50th and 75th of the dependent variables corresponds to that predicted. The coefficient on 50th quantile is not significantly different from the OLS estimation, but the coefficient on 75th quantile is significantly different.

Although OLS shows that the value of a company's assets is related to underpricing, it is only the lowest quantile. Our findings are different from those of previous research (Loughran & Ritter, 2004; Tian, 2011). There is a tendency to attribute company size to company quality. The greater the company's assets, the higher is the company's quality. The higher the company's quality, the higher is the willingness to leave money on the table.

5.4. Robustness check against long-term market performance

Robustness test on long-term performance is done by using buy and hold abnormal return 36 months (BHAR36) measure, which is calculated as follows:

$$BHAR_{i,t} = \left[\prod_{t=start}^{end} (1 + r_{i,t}) - 1 \right] - \left[\prod_{t=start}^{end} (1 + r_{mt}) - 1 \right] \quad (10)$$

Table 6 shows OLS and quantile regressions results for BHAR36. The relationship of proceeds and total assets with long-term market performance is consistent with the previous analysis. Nevertheless there are some significant differences in coefficients on the three quantiles with OLS results. OLS results that are higher than coefficients in the 75th quantile may be due to the tendency of the BHAR method to overstate (understate) return when there is a positive (negative) trend (Fama, 1998; Mitchell & Stafford, 2000). Unlike the regression results of CAR36, there is a relationship between the age of the firm and the long-term market performance.

TABLE 6. REGRESSION RESULT FOR BUY AND HOLD ABNORMAL RETURNS 36 MONTH

	OLS	Q10	Q25	Q50	Q75	Q90
(Constant)	784.899 (1.53)	-278.896*** (-2.24)	-114.193 (-0.77)	147.379 (0.58)	1016.346*** (2.63)	3279.370** (2.62)
MAIR	-0.598 (-0.83)	-0.024 (-0.17)	0.135 (0.69)	-0.215 (-0.59)	-0.948 (-1.22)	-2.616 (-1.07)
LNAGE	-56.797** (-2.42)	10.906 (1.26)	12.734* (1.86)	-4.422 (-0.39)	-34.547* (-1.86)	-66.520 (-0.95)
LNTAS	58.220*** (2.95)	6.881 (1.36)	9.663* (1.80)	15.061 (1.60)	17.990 (0.7)	114.961 (1.54)
LNPROC	-85.515*** (-3.37)	-1.082 (-0.20)	-10.034 (-1.22)	-23.185* (-1.68)	-53.781** (-2.08)	-229.745*** (-3.26)
DUWREP	26.385 (0.58)	-1.231 (-0.49)	5.851 (0.44)	27.786 (1.32)	53.350 (1.57)	109.883 (0.90)
DMANF	33.381 (0.51)	-10.607 (-0.55)	-17.416 (-0.86)	8.511 (0.27)	41.665 (0.57)	65.348 (0.38)
DSERV	34.336 (0.63)	6.589 (0.49)	4.127 (0.27)	10.997 (0.44)	24.766 (0.57)	4.445 (0.03)

Source: SAS output.

Notes: Table 6 reports the results from OLS and quantile regressions of BHAR36 during period 2009 - 2013. T-statistics are in parentheses. *, **, *** - indicate significance at the 10, 5, and 1% levels, respectively.

Although the results of OLS and quantile regression on the 75th quantile are consistent with the forecast theory, 25th quantile indicates the opposite. At low quantiles, age is associated with the success of failing startup times and growth potential. Older companies on this quantile are deemed to have succeeded from failures in the early years of their founding and thereby demonstrating better growth potential. As predicted by signaling theory (Welch, 1989), such companies will perform sequential financing and use IPOs as a means of introducing themselves and delivering signals about quality through greater underpricing. These results are in line with Meidiaswati's findings (2017) which indicate that firms with an average age of 15 years when the IPO tends to do first-seasoned offerings in the next 3.3 years.

5.5. Robustness check against Underpricing

Robustness test on underpricing is done by using initial return as performance measure (Table 7). Analysis using OLS and quantile regressions showed consistent results. Age and proceeds have negative effect on initial return. Quantile regressions show the value of increasing coefficients in the distribution of quantiles. Asset value is related to initial return only on OLS model, although the relationship is fully determined by the value of variable above 75th quantile.

TABLE 7. REGRESSION RESULT FOR INITIAL RETURNS

	OLS	Q10	Q25	Q50	Q75	Q90
(Constant)	137.946* (1.97)	4.493 (0.06)	76.877* (1.71)	168.635* (1.85)	231.004* (1.71)	101.592 (0.49)
LNAGE	-6.835** (-2.13)	-7.380** (-2.05)	-2.936 (-1.16)	-6.574*** (-2.66)	-7.618 (-1.57)	-12.210 (-1.26)
LNTAS	5.032* (1.86)	5.648* (1.73)	1.317 (0.55)	2.600 (0.94)	6.040 (1.17)	7.800 (1.06)
LNPROC	-9.350*** (-2.74)	-5.834* (-1.77)	-3.909 (-1.41)	-7.99** (-1.99)	-13.167** (-2.05)	-9.336 (-0.89)
DUWREP	-2.986 (-0.47)	0.493 (0.08)	-0.983 (-0.24)	-5.446 (-0.58)	-8.529 (-0.72)	-10.804 (-0.66)
DMANF	13.022 (1.45)	7.645 (0.45)	2.153 (0.24)	12.263 (1.30)	7.056 (0.51)	34.254 (0.92)
DSERV	12.125 (1.62)	6.348 (0.57)	1.089 (0.18)	9.431 (1.39)	9.108 (0.74)	26.756 (1.10)

Source: SAS output.

Notes: Table 7 reports the results from OLS and quantile regressions of IR during period 2009 - 2013. T-statistics are in parentheses. *, **, *** - indicate significance at the 10, 5, and 1% levels, respectively.

6. Conclusions

This study aims to identify the relationship between underpricing and long-term market performance of IPOs in Indonesia Stock Exchange during the period 2009-2013. In addition to looking for these relationships, the study also investigates the relationship between age, proceeds, total assets, underwriter reputation, and industry type with long-term market performance as well as underpricing IPO stocks. To get a better explanation, the analysis carried out with OLS and quantile regressions. The results show that the

market performance of IPOs until the 15th month outperforms the market, both in terms of underpricing and long-term market performance. However, after the 15th month until the third year after the IPO there is no significant difference between the stock return of the IPO and the market return. This condition is different from the findings in countries with advanced capital markets. This could be happened because the market reaction to information about IPO in Indonesia is faster (i.e. only the fifteenth month) or slower than such countries. Further studies can be undertaken to anticipate a slower market reaction by increasing the period of observation of long-term market performance. It is also worth considering that fifteen months actually is the time of initial return formation.

OLS and quantile regressions results indicate that asset value, age, proceeds, and underwriter reputation are determinants of long-term market performance; while asset, age and proceeds are also underpricing determinants. Among these factors, proceeds and age become the main determinant of underpricing. Proceeds also becomes the main determinant of long-term market performance. This means that proceeds form an IPO risk profile and in turn affect on the required rate of return on investment.

Analysis of BHAR36 as a measure of long-term performance indicates that at some level underpricing is used as a means for issuers to announce their quality as predicted by signaling theory. The results also show that underpricing is not merely a "marketing expense" to stimulate investor interest in buying, but rather the mechanism taken by issuers and underwriters to avoid winner's curse problem. Underpricing, in Indonesia, seems to be used as a mechanism by issuers and underwriters to ensure that, on average, informed and uninformed or skilled and unskilled investors get positive returns from their investments in the primary market. This, combined with the tendency of Indonesian investors to focus on the latest information, due to the volatile nature of Indonesia's economic conditions, resulted in no relationship between underpricing and long-term market performance. Future studies can be directed to investigate other theories that can better explain the phenomenon of underpricing and long-term market performance of IPOs in Indonesia.

References

- Adriansyah, A., & Messinis, G. (2016) Intended use of IPO proceeds and firm performance: A quantile regression approach. *Pacific-Basin Finance Journal*, 36, 14-30.
- Agarwal, R. Leal, R. & Hernandez, L. (1993) The aftermarket performance of initial public offerings in Latin America. *Financial Management*, 22, 42-53.
- Ahmad-Zaluki, N.A. Campbell, A. Goodacre, A. (2007). The long run share price performance of Malaysian Initial Public Offerings (IPOs). *Journal of Business Finance & Accounting*, 34(1-2), 78-110.
- Allen, F., & Faulhaber, G.R. (1989). Signaling by underpricing in the IPO market. *Journal of Financial Economics*, 23, 303-323.
- Amor, B. S. Kooli, M. (2016) Intended use of proceeds and post-IPO performance. *The Quarterly Review of Economics and Finance*, 65, 168-181.
- Baron, D.P. (1982). A model of the demand for investment banking advising and distribution services for new issues. *The Journal of Finance*, 37(4), 955-976.
- Butler, A.W. Keefe, M.O., & Kieschnick, R. (2014). Robust determinants of IPO underpricing and their implications for IPO research. *Journal of Corporate Finance*, 27, 367-383
- Cai, X. Liu, G.S., & Mase, B. (2008). The long-run performance of initial public offerings and its determinants: the case of China. *Review of Quantitative Finance and Accounting*, 30, 419-432.

- Carter, R. B., & Manaster, S. (1990). Initial public offerings and underwriter reputation. *The Journal of Finance*, 45(4), 1045-1067.
- Carter, R. B. Dark, F. H. Sapp, T. R.A. (2010). Underwriter reputation and IPO issuer alignment 1981-2005. *The Quarterly Review of Economics and Finance*, 50, 443-455.
- Durukan, B.M. (2002). The relationship between IPO returns and factors influencing IPO performance: case of Istanbul Stock Exchange. *Managerial Finance*, 28(2), 18-38.
- Emasari, L. Tamara, D. (2010). Investigation towards the long-run performance of initial public offerings: evidence from Indonesian capital market. *Journal of Applied Finance and Accounting*, 2(2), 100-125.
- Espenlaub, S. Gregori, A.G., & Tonks, I. (2000). Re-assesing the long term underperformance of UK initial public offerings. *European Financial Management*, 6(3), 319-342.
- Fama, E.F. (1998). Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics*, 49, 283-306.
- French, K. R. (1980). Stock returns and the weekend effect. *Journal of Financial Economics*, 8, 55-70.
- Goergen, M. Khurshed, A., & Mudambi, R. (2007). The long run performance of UK IPOs: can it be predicted? *Managerial Finance*, 33(6), 401-419.
- Griffith, S. (2004). Spinning and underpricing: A legal and economic analysis of the preferential allocation of shares in initial public offerings. *Brooklyn Law Review*, 69, 583-649.
- Guo, R. Lev, B., & Shi, C. (2006). Explaining the short- and long-term IPO anomalies in the US by R&D. *Journal of Business Finance and Accounting*, 33(3-4), 550-579.
- Habib, M., & Ljungqvist, A. (2001). Underpricing and entrepreneurial wealth losses in IPOs: theory and evidence. *Review of Financial Studies*, 14, 433-458.
- Ibbotson, R.G. (1975). Price performance of common stock new issue. *Journal of Financial Economics*, 2, 235 - 272.
- Jakobsen, B., & Sorensen O. (2001). Decomposing and testing long term returns: an application on Danish IPOs. *European Financial Management*, 7(3), 393-417.
- Jenkinson, T. J. (1990). Initial public offerings in the United Kingdom, the United States, and Japan. *Journal of the Japanese and International Economies*, 4(4), 428-449.
- Jones, T.L., & Ligon, J.A. (2009). The day of the week effect in IPO initial returns. *The Quarterly Review of Economics and Finance*, 49, 110-127.
- Kenourgios, D. F. Papathanasiou, S. Melas, E. R. (2007). Initial performance of Greek IPOs, underwriters reputation and oversubscription. *Managerial Finance*, 33(5), 332-343.
- Kirkulak, B., & Davis, C. (2005). Underwriter reputation and underpricing: Evidence from the Japanese IPO market. *Pacific-Basin Finance Journal*, 13, 451-470.
- Koenker, R., & Bassett Jr. G. (1978). Regression quantiles, *Econometrica*, 46, 33-50.
- Koenker, R., & Hallock, K.F. (2001). Quantile regression. *Journal of Economic Perspectives*, 15(4), 143-156.
- Koenker, R. (2005). *Quantile regression*, Cambridge University Press, New York.
- Lee, P. S. Taylor, & Walter, T. (1996). Australian IPO underpricing in the short and long-run. *Journal of Banking and Finance*, 20, 1189-1210.
- Levis. M. (1993). The long-run performance of initial public offerings: The UK Experience 1980-1988. *Financial Management*, 22(1), 28-41.
- Loughran, T. Ritter, J., & Rydqvist, K. (1994). Initial public offerings: international insight. *Pacific-Basin Finance Journal*, 2, 165-199.
- Loughran, T., & Ritter, J. (2004). Why has IPO underpricing changed over time?, *Financial Management*, Autumn, 5 - 37.

- Mitchell, M., & Stafford, E. (2000). Managerial decision and long-term stock price performance. *Journal of Business*, 73, 287-329.
- Meidiaswati, H. (2017). *Asymmetric information at first seasoned equity offering in the Indonesian capital market*, Dissertation, Postgraduate Program, The Faculty of Economics and Business, Universitas Airlangga.
- Murugesu, J., & Santhapparaj, A.S. (2010). Impact of risk disclosure in the prospectus on valuation and initial returns of initial public offerings in Malaysia. *The IUP Journal of Applied Finance*, 16(6), 30-53.
- Ozdemir, O. Upneja, A. (2016). The role of internationalization on the IPO performance of service firms: examination of initial returns, long-run returns, and survivability. *International Business Review*, 25, 997-1009.
- Page Reyneke, M. J. (1997). The timing and subsequent performance of initial public offerings (IPOs) on the Johannesburg Stock Exchange. *Journal of Business Finance and Accounting*, 24(9-10), 1401-1420.
- Pande, A., & Vaidyanathan, R. (2009). Determinants of IPO Underpricing in the Nation Stock Exchange of India'. *Journal of Applied Finance*, 15(1), 27-35.
- Ritter, J. R. (1984). The "hot issue" market of 1980. *Journal of Business*, 57, 215-240.
- Ritter, J. R. (1991). The long run performance of initial public offerings. *Journal of Finance*, 46, 3-27.
- Ritter, J. R. (1998). Initial public offerings. *Contemporary Finance Digest*, 2(1), 5-30.
- Rock, K. (1986). Why new issues are underpriced. *Journal of Financial Economics*, 15, 187-212.
- Tian, L. (2011). Regulatory underpricing: determinants of Chinese extreme IPO returns. *Journal of Empirical Finance*, 18, 78-90.
- Welch, I. (1989). Seasoned offerings, imitation costs, and the underpricing of initial public offerings. *Journal of Finance*, 44, 421-449.