

Board gender diversity and IPO underpricing: the moderating role of managerial ownership in the banking sector

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Article info	Abstract
Article history: Received: 29 July 2026 Accepted: 16 September 2026 Published: 22 September 2026 Keywords: board gender diversity; IPO underpricing; managerial ownership; moderated regression analysis; banking sector	<i>This study examines whether board gender diversity affects IPO underpricing in the Indonesian banking sector, and whether managerial ownership moderates this relationship. The sample comprises 21 banks that conducted an IPO on the Indonesia Stock Exchange during 2010–2025, analyzed using moderated regression analysis across 12 models. Board gender diversity is measured by the presence, proportion, and number of female directors (GEND1, GEND2, GEND3). Underpricing is measured by the first-day and seventh-day initial return. GEND1 has a significant effect on underpricing. Nevertheless, GEND2 and GEND3 do not have significant effect on underpricing. Managerial ownership does not moderate the relationship between board gender diversity and underpricing. These findings inform issuers, underwriters, and regulators such as OJK on board gender composition as a governance signal in bank IPOs.</i>

JEL classifications: G24, G32, J16

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1. Introduction

Diversity has become a strategic priority for the effectiveness and competitiveness of modern firms. Working in diverse teams builds competitive advantage and lifts workplace productivity and firms that embrace diversity tend to gain meaningfully in organizational performance, creativity, and decision-making (Matthews, 2024). This study focuses on gender diversity, that is, the growing representation of women in top management positions such as directors and CEOs, which has become a global trend. Heterogeneous boards have been shown to deliver more effective outcomes than homogeneous ones (Devika et al., 2020) because the presence of women brings fresh and innovative perspectives (Aisyah et al., 2025). Simionescu et al. (2021), for instance, find that female presence on the boards of S&P 500 firms is positively associated with market valuation, reflecting investors' perception that gender diversity strengthens governance quality.

The issue is closely tied to the fifth sustainable development goal (SDG), which targets gender equality and the full participation of women in leadership positions (United Nations, 2015). In Indonesia, however, progress remains modest: women hold only around 8.3% of board seats, 5.2% of board chair positions, and 3.1% of chief-executive roles (Deloitte, 2022). In the absence of a normative gender-quota regulation, the rise of women on the boards of Indonesian firms has been slow (Aryani et al., 2024). The question of gender diversity becomes even more pressing when a firm confronts the primary capital market directly through an Initial Public Offering (IPO).

Most prior research has concentrated on firm performance in the secondary market, leaving the primary market, the IPO setting, relatively underexplored. Moreover, the empirical evidence on how gender diversity affects IPO underpricing is mixed. Several studies report that the presence of female directors lowers underpricing by signaling governance quality and reducing information asymmetry (Badru et al., 2019; Harjayanti et al., 2025). Others, by contrast, find no significant effect or even higher underpricing, attributing this to investor bias against female leadership (Handa & Singh, 2015; Kurniawan et al., 2019; Park & Byun, 2022; Rau et al., 2024; Reutzel & Belsito, 2015). It is precisely this inconsistency that motivates the present study.

In the IPO context, managers and shareholders frequently face conflicts of interest that give rise to agency costs. Ownership structure, particularly managerial ownership is regarded as a governance mechanism that can align the interests of managers and shareholders while shaping the information asymmetry investors face (Jensen & Meckling, 1976; Sasongko & Juliarto, 2014). A number of studies position managerial ownership as a moderating variable in the relationship between governance practices and firm performance (Azhari & Prajawati, 2022; Kungu et al., 2024). Accordingly, this study employs managerial ownership as a moderator to examine whether share ownership by managers strengthens or weakens the link between board gender diversity and the level of underpricing at IPO.

The banking sector differs from other sectors in the IPO context. Banks are inherently harder for the public to value because the quality of their assets, loan portfolios in particular is not easily observed from the outside, which widens the information asymmetry between issuers and investors and encourages underpricing. Agoraki et al. (2025) show that stronger banking regulation dampens IPO underpricing, as greater transparency pushes offer prices closer to fundamental value. Even so, few studies examine the Indonesian banking sector specifically, and most overlook the moderating role of managerial ownership. This gap is what drives the empirical testing in the present study.

Given this context, the study poses two questions: (1) does board gender diversity affect IPO underpricing in Indonesian banking; and (2) can managerial ownership be examined as a moderator of that effect, given the modest ownership variance identified among Indonesian

banking IPOs. By focusing on a single, heavily regulated sector and investigating managerial ownership as a moderator in this setting, the study adds a sector-specific perspective to a literature dominated by cross-sectoral and secondary-market evidence, while explicitly acknowledging the data constraints that this exploratory test brings.

2. Literature review and hypotheses development

2.1. IPO underpricing, asymmetric information, and signaling theory

IPO underpricing is defined as the ratio of the difference between the closing price and the offering price to the offering price (Badru et al., 2019a; Setiawan et al., 2021). Underpricing, setting a price below market value is a common phenomenon that frequently occurs in capital markets and when companies conduct initial public offerings (IPOs). IPO underpricing occurs when the offer price is set below the price prevailing once trading begins in the secondary market, and is proxied by the initial return (Ljungqvist, 2007; Ritter & Welch, 2002).

While underpricing favors investors, it means “money left on the table” for issuers (Loughran & Ritter, 2002). Explanations are usually classified into asymmetric-information, institutional, ownership and control, and behavioral categories, with asymmetric-information models being the most influential (Jamaani & Alidarous, 2019). Other well-established factors, such as offer size, underwriter repute, market conditions, oversubscription, and ownership retention (Ljungqvist, 2007; Ritter & Welch, 2002), are acknowledged here, however the current study’s small banking-IPO sample does not allow for all of them to be included as controls.

2.2. Asymmetric information theory

Information asymmetry arises when one party to a transaction holds superior information, producing mispricing (Akerlof, 1970). This is particularly true during initial public offerings (IPOs), when issuers are aware of their own quality yet investors have no trading history (Ritter & Welch, 2002). Baron (1982) and Benveniste & Spindt (1989) expand this reasoning to issuer-underwriter and bookbuilding dynamics. Rock’s (1986) winner’s-curse model demonstrates that informed investors bid selectively on underpriced issuers, therefore issuers purposefully underprice to keep uninformed investors engaged. In every case, any observable characteristic that lowers investor uncertainty, board composition included should reduce the discount demanded.

2.3. Signaling theory

According to signaling theory, higher-quality parties use expensive, visible behaviors that lower-quality parties are unable to profitably copy in order to reliably transmit quality. Grinblatt & Hwang (1989) demonstrate that underpricing and retained ownership jointly indicate value and risk, and Francis et al. (2010) discover that such signals have greater weight under increased baseline asymmetry. High-quality issuers may purposefully underprice to signal quality (Allen & Faulhaber, 1989; Welch, 1989). In keeping with this reasoning, Kaur & Singh (2015) contend that observable governance traits, such the presence of women on boards, serve as reliable quality indicators that lower the information-risk premium.

2.4. Board gender diversity and critical mass theory

The critical mass theory (Kanter, 1977) states that the influence of a minority group depends on a threshold: very few women on a board are treated as tokens, and positive effects only start to materialise when representation reaches about three female directors (Torchia et al., 2010) or about 30% of the board (Joecks et al., 2013). Female directors are shown to be more engaged in attending meetings and monitoring (Adams & Ferreira, 2009), and more risk-prudent and regulation-compliant (Bernile et al., 2018), all of which reduce issuer–investor

asymmetry and underpricing (Harjayanti et al., 2025). The Indonesian governance structure is two-tiered, separating the board of directors responsible for decisions related to the IPO from the board of commissioners, a supervisory body. This research concentrates on the board of directors, the governance body that is most directly observable to investors through the prospectus.

Following Harjayanti et al. (2025), this paper measure gender diversity using three proxies: GEND1, presence of at least one female director (tokenism); GEND2, percentage of female directors; GEND3, number of female directors (an indicative, not confirmatory, proxy for critical mass, since a count does not establish whether the three-director or 30% benchmark is reached, Joecks et al., 2013; Torchia et al., 2010). Results are mixed: negative and significant in Korea and Indonesia (Harjayanti et al., 2025; K. H. Park & Byun, 2022), negative but insignificant in India (Handa & Singh, 2015; Kaur & Singh, 2015), and positive in some US or Chinese samples (Liu et al., 2024; Rau et al., 2024), hence this multidimensional measurement.

2.5. *Managerial ownership as a moderating variable*

Managerial ownership, which is the percentage of shares held by managers who also manage the firm (Jensen & Meckling, 1976), is operationalized as board shareholding by Morck et al. (1988). It is based on two pillars: agency theory, which posits that larger stakes align the interests of managers and shareholders, and signalling theory, which posits that retaining a substantial post-IPO stake credibly signals quality (Leland & Pyle, 1977). This financial commitment may serve to reinforce the gender-diversity signal, as research has demonstrated that female executives underpricing-reducing effects are amplified by increased CEO ownership (Harjayanti et al., 2025). The governance–firm value link among non-financial firms in Kenya is positively moderated by managerial ownership (Kungu et al., 2024), and it is related to (non-underpricing) firm performance among Thai IPO firms (Semsomboon et al., 2024). However, the evidence from adjacent contexts is suggestive but not directly comparable. However, the relationship is not unidirectional; at high levels, ownership can instead entrench managers and increase, rather than decrease, underpricing (Morck et al., 1988).

Sasongko & Juliarto (2014) report an average of only 2.76% with no effect on underpricing, while Gunawan & Halim (2015) and Azhari & Prajawati (2022) report similar null results, attributed to small ownership proportions. Accordingly, managerial ownership is typically very low in Indonesia, and prior studies consistently find no significant moderating effect. This recurring null finding is the research gap that motivates its inclusion in this context. The question of whether managerial ownership can meaningfully moderate governance signals in the more tightly regulated banking sector remains unresolved, despite the fact that limited sample variation should be anticipated. In accordance with this literature, managerial ownership is quantified as the proportion of pre-IPO shares that the board of directors directly owns in relation to the total number of shares outstanding.

2.6. *Hypotheses development*

Higher female board representation is an observable, hard-to-imitate governance signal that is predicted to prevent underpricing (Badru et al., 2019). In banking, in particular, this signal may still have incremental value even with OJK's disclosure rules, because the legislation addresses financial reporting, not the quality of internal decision making obscured by loan-portfolio opacity. Previous studies report that the presence of female on the board lowers underpricing by signaling governance quality and reducing information asymmetry (Badru et al., 2019; Harjayanti et al., 2025). On other hand, previous studies find no significant effect or even higher underpricing, attributing this to investor bias against female leadership (Handa & Singh, 2015; Kurniawan et al., 2019; Park & Byun, 2022; Rau et al., 2024; Reutzel & Belsito, 2015). Therefore, hypothesis one is formulated as follows:

H1: Board gender diversity has a significant effect on IPO underpricing.

Several previous studies have employed ownership as a moderating variable. Sarkar and Selarka (2021) reported that family ownership moderates the relationship between female directors and firm performance. Arora and Singh (2022) found that ownership concentration positively moderates the relationship between board committees and IPO underpricing. Liu et al. (2023) indicated that the positive relationship between female CEOs and IPO underpricing is attenuated by venture capital ownership. Given that ownership proportion is considered a factor that helps build investor confidence in a company's IPO success, this study uses CEO ownership as a variable moderating the effect of gender diversity on IPO underpricing. Based on the foregoing, hypothesis two is formulated as follows:

H2: Managerial ownership moderates the relationship between board gender diversity and IPO underpricing.

3. Research methods

3.1. Research design

This research employs a quantitative methodology to examine the influence of gender diversity on corporate boards on IPO underpricing and the moderating impact of management ownership (Creswell, 2014).

3.2. Population and sample

The population comprises financial-sector firms that conducted IPOs on the Indonesia Stock Exchange (IDX) during 2010–2025: 106 IPOs in total, of which 48 (46%) were banking-sector firms and 58 (54%) were other financial institutions (insurance, multi-finance, and securities firms). This study focuses on the banking subsector because it is subject to a distinct prudential and disclosure regime (OJK) not directly comparable to other financial institutions. Using purposive sampling, the 48 banking IPOs were screened against four criteria: (i) a banking-sector IPO on the IDX during 2010–2025; (ii) a complete prospectus and audited financial statements at IPO; (iii) complete data on all research variables; and (iv) available primary (offer) and secondary-market prices at the seventh trading day. Twenty-one banks met all four criteria and form the final sample (Table 1); the remaining 27 were excluded for failing at least one criterion, most commonly incomplete prospectus or financial-statement data at the time of listing.

The statistical power of this study is limited because of the small final sample ($n = 21$) in relation to the number of estimated parameters, including the gender-diversity proxy, managerial ownership, their interaction term and four controls, where a total of seven estimated coefficients plus the intercept are estimated for 21 observations for the moderated models. This constraint is considered throughout as a limitation to precision of estimation rather than as evidence that the underlying relationships do not exist: an underpowered test that fails to reject the null cannot be read as proof of no effect, only as an inconclusive result given the data at hand (Wooldridge, 2012).

This constraint is especially strong for managerial ownership which is almost invariant in the sample. Only 2 of the 21 banks have non-zero managerial ownership, so the interaction term used to test H2 varies over only two observations. In line with the exploratory framing chosen in Section 2.6, the H2-test is consequently considered exploratory rather than confirmatory, and its results are interpreted with similar caution in Section 4.

3.3. Data collection technique

Data sources include IPO prospectuses and audited financial statements from the latest fiscal year, accessed through e-ipo.co.id, IDX, IDN Financials, and bank websites. Historical

share prices for initial return calculations are obtained from Yahoo Finance, using closing prices from the offer day (H+0) and the seventh trading day (H+7).

Table 1. Banking IPO sample

Year	Code	Company
2010	BJBR	Bank Pembangunan Daerah Jawa Barat dan Banten Tbk.
2010	BSIM	Bank Sinarmas Tbk.
2012	BJTM	Bank Pembangunan Daerah Jawa Timur Tbk.
2013	BBMD	Bank Mestika Dharma Tbk.
2013	BMAS	Bank Maspion Indonesia Tbk.
2013	NOBU	Bank Nationalnobu Tbk.
2014	PNBS	Bank Panin Dubai Syariah Tbk.
2014	DNAR	Bank Oke Indonesia Tbk. (formerly Bank Dinar Indonesia Tbk.)
2014	BINA	Bank Ina Perdana Tbk.
2014	AGRS	Bank IBK Indonesia Tbk.
2015	BBHI	Allo Bank Indonesia Tbk.
2015	BBYB	Bank Neo Commerce Tbk. (formerly Bank Yudha Bhakti Tbk.)
2016	ARTO	Bank Jago Tbk.
2016	BGTG	Bank Ganesha Tbk.
2018	BRIS	Bank Syariah Indonesia Tbk. (formerly Bank BRIsyariah Tbk.)
2018	BTPS	Bank BTPN Syariah Tbk.
2020	AMAR	Bank Amar Indonesia Tbk.
2020	BBSI	Krom Bank Indonesia Tbk. (formerly Bank Bisnis Internasional Tbk.)
2021	BANK	Bank Aladin Syariah Tbk. (formerly Bank Net Indonesia Syariah Tbk.)
2021	MASB	Bank Multiarta Sentosa Tbk.
2025	SUPA	Superbank Indonesia Tbk.

Table 2. Variable operationalisation

Variable	Measurement / formula	Source
Board gender diversity (independent)	GEND1 = 1 if at least one female director, 0 otherwise; GEND2 = female directors / total directors (%); GEND3 = number of female directors	Harjayanti et al. (2025); Badru et al. (2019); Kaur & Singh (2015)
IPO underpricing (dependent)	$IR = (C_p - O_p) / O_p \times 100\%$; Y1 = H+0, Y2 = H+7 (trading days)	Ritter & Welch (2002); Harjayanti et al. (2025)
Managerial ownership (moderating)	Managerial shares / total shares outstanding, expressed as a proportion (0–1), pre-IPO	Morck et al. (1988); Sasongko & Juliarto (2014); Azhari & Prajawati (2022)
Return on assets (control)	Net income after tax / total assets	Simionescu et al. (2021); Harjayanti et al. (2025)
Firm age (control)	IPO year – year of incorporation	Harjayanti et al. (2025); Reutzel & Belsito (2015)
Firm size (control)	Ln (total assets)	Harjayanti et al. (2025); Park & Byun (2022)
Board size (control)	Total number of directors at IPO	Reutzel & Belsito (2015)

3.4. Variable operationalisation

The study measures IPO underpricing as the initial return on the first trading day (H+0, Y1) and on the seventh trading day (H+7, Y2). It captures board gender diversity through three proxies (GEND1–GEND3), while managerial ownership (MO) serves as a moderating variable, indicated as a 0–1 proportion of pre-IPO shares held by the board. Four control variables: return on assets (ROA), firm size (FS), firm age (FA), and board size (BS) are included to mitigate endogeneity bias. Operationalization is further detailed in Table 2.

3.5. Data analysis technique

The analysis is based on multiple linear regression and moderated regression analysis (MRA) and estimated in EViews 14, therefore twelve regression models are obtained. Direct-effect models for each dependent variable regress each gender proxy on underpricing, managerial ownership and the four controls. Moderated models add the interaction term (GENDc × MOc), where both components are mean-centred to reduce multicollinearity. The direct and moderated models are specified as follows:

$$Y = \alpha + \beta_1 \text{GEND} + \beta_2 \text{MO} + \beta_3 \text{ROA} + \beta_4 \text{FS} + \beta_5 \text{FA} + \beta_6 \text{BS} + e \quad (1)$$

$$Y = \alpha + \beta_1 \text{GEND} + \beta_2 \text{MO} + \beta_3 (\text{GEND} \times \text{MO}) + \beta_4 \text{ROA} + \beta_5 \text{FS} + \beta_6 \text{FA} + \beta_7 \text{BS} + e \quad (2)$$

Standard errors are computed by ordinary least squares by default; heteroskedasticity-robust (HC3) standard errors are applied only where the Glejser test indicates heteroskedasticity, so that the estimation approach is chosen by diagnostic evidence rather than fixed in advance (Hair et al., 2010). Classical-assumption tests comprise normality (Jarque–Bera; residuals normal if $p > 0.05$), multicollinearity (centred VIF < 10), and heteroskedasticity (Glejser; homoskedastic if $p > 0.05$); autocorrelation is not central given the cross-sectional data, though the Durbin–Watson statistic is reported. A hypothesis is supported when the relevant probability is below 0.05. Because a small sample is also more sensitive to individual observations, robustness to influential observations is assessed using Robust Least Squares (Bisquare weighting; Section 3.6), which down-weights extreme observations without requiring formal Cook's-distance or leverage-value reporting; particular attention is paid to the two banks with non-zero managerial ownership (ARTO and BBMD), given their outsized potential influence on the interaction term used to test H2, discussed alongside the H2 results in Section 4.

3.6. Robustness check

Robustness is assessed in two complementary ways (Lu & White, 2014). First, the dependent variable is switched to the seventh-trading-day return, winsorised at the 5th and 95th percentiles (Y2WINS) to restore residual normality after the extreme BANK observation. Second, the same models are re-estimated with Robust Least Squares (M-estimation, Bisquare weighting, tuning constant 4.685), which down-weights extreme observations so the estimates reflect the bulk of the data rather than a small number of outliers. A result is described as robust only when the sign and significance of the key coefficients are consistent across all three specifications, the baseline model, the winsorised alternative, and the RLS model rather than on the basis of one or two matching specifications (Wooldridge, 2012).

4. Results and discussion

4.1. Descriptive statistics

Table 3 reports descriptive statistics for the ten research variables across the 21 banks (interaction terms, being products of mean-centred variables, are excluded). Underpricing is

evident: the mean first-day initial return (Y1) is 0.2414, i.e. bank shares closed 24.14% above the offer price on average, rising to 51.10% over seven days (Y2) with far greater dispersion (SD 1.19 vs 0.35), driven mainly by the extreme BANK observation. The negative minima (−0.17 for BINA and −0.23) show that not every IPO was underpriced, some were overpriced.

For the gender proxies, 61.90% (13 of 21) of banks had at least one female director at IPO (GEND1), women filled 24.43% of board seats on average (GEND2, maximum 0.75), and the mean number of female directors was one (GEND3, maximum three). With an average of just one female director, representation typically sits at the token level, below the critical mass of three (Kanter, 1977). Managerial ownership (MO) averages only 0.0952, reflecting that just two of 21 banks, ARTO (Bank Jago) and BBMD (Bank Mestika Dharma) had directors holding shares at IPO, a near-degenerate distribution with direct consequences for the moderation test. Controls are typical of newly listed banks: mean ROA 1.43% (range −3.2% to 7.3%), mean Ln(total assets) 28.01, mean firm age 33.9 years, and mean board size 4.29.

Table 3. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
GEND1	21	0.6190	0.4976	0	1
GEND2	21	0.2443	0.2422	0	0.75
GEND3	21	1.0000	1.0000	0	3
Y1	21	0.2414	0.3455	−0.17	1.33
Y2	21	0.5110	1.1916	−0.23	5.25
MO	21	0.0952	0.3008	0	1
ROA	21	0.0143	0.0216	−0.03	0.07
FS	21	28.0071	2.5442	21.73	31.08
FA	21	33.9024	13.1298	21.33	63.52
BS	21	4.2857	0.9024	3	6

4.2. Classical-assumption tests

All six main models (Y1) satisfy the classical assumptions (Table 4). Jarque–Bera probabilities range from 0.4894 to 0.8053, so residuals are normally distributed. Centred VIF values are all well below 10 at most 1.53 in the direct models and 2.91 for the interaction term in the moderated models, the low values reflecting mean-centring. Glejser probabilities (0.1685–0.4103) indicate homoskedasticity in every model, and Durbin–Watson statistics cluster around 2 together confirming that ordinary least squares estimates, without a robust-standard-error adjustment, are appropriate throughout, consistent with the criterion set out in Section 3.5.

Table 4. Classical-assumption test summary (dependent variable: Y1)

Model	Jarque–Bera (p)	Max centred VIF	Glejser (p)	Durbin–Watson
Model 1 (GEND1)	0.7943	1.4224	0.2524	2.5016
Model 2 (GEND2)	0.4895	1.5311	0.3205	2.2748
Model 3 (GEND3)	0.7124	1.4237	0.1685	2.2916
Model 4 (GEND1M)	0.8053	2.9131	0.2251	2.5653
Model 5 (GEND2M)	0.4894	2.8089	0.4103	2.2714
Model 6 (GEND3M)	0.7186	2.7941	0.2194	2.2808

4.3. Regression results

Table 5 reports the direct-effect models. All three gender-diversity proxies carry negative coefficients on the first-day initial return: GEND1 = -0.3038 , GEND2 = -0.3689 , and GEND3 = -0.1018 . Only GEND1 reaches the 10% level ($p = 0.078$); read on its own, this implies roughly 30 percentage points lower underpricing for banks with at least one female director, though this figure is illustrative rather than a precise effect size given the small sample, and should be treated as weak, suggestive evidence rather than a substantive result, a caution reinforced by the fact that six gender-related coefficients are tested across Models 1–6, which raises the chance that a single marginal result of this kind arises by chance. GEND2 ($p = 0.344$) and GEND3 ($p = 0.276$) are not significant, nor is MO or any control. None of the three models is jointly significant (Prob(F) = 0.34–0.65), and adjusted R^2 is negative for two of the three models signs that, beyond the small-sample constraint noted in Section 3.2, these specifications explain little systematic variation in underpricing, and individual coefficients should be read with that overall model weakness in mind.

Table 5. Regression results before moderation (dependent variable: Y1)

Variable	Model 1 (GEND1)	Prob.	Model 2 (GEND2)	Prob.	Model 3 (GEND3)	Prob.
Constant	0.9727	0.2751	0.7443	0.4346	0.7066	0.4538
GEND	-0.3038	0.0778*	-0.3689	0.3444	-0.1018	0.2758
MO	-0.1252	0.6346	-0.1299	0.6528	-0.1407	0.6232
ROA	1.9750	0.5839	1.0589	0.7933	0.7284	0.8569
FS	-0.0242	0.4887	-0.0229	0.5594	-0.0227	0.5557
FA	-0.0087	0.1726	-0.0062	0.3471	-0.0070	0.2927
BS	0.0964	0.3448	0.1021	0.3731	0.1191	0.2736
R-squared	0.3481		0.2320		0.2485	
Adj. R-squared	0.0688		-0.0972		-0.0736	

*significant at 10%.

Table 6 reports the moderated (MRA) models. Adding the interaction term barely changes the picture: the gender coefficients remain negative and of similar magnitude (GEND1 = -0.3133 , again only at the 10% level, $p = 0.086$), while all three interaction terms are far from significant GEND1 $\times$ MO ($p = 0.784$), GEND2 $\times$ MO ($p = 0.983$), and GEND3 $\times$ MO ($p = 0.940$). R^2 rises negligibly (e.g. from 0.348 to 0.352 for Model 4), indicating the interaction adds essentially no explanatory power.

4.4. Robustness check

Robustness is assessed on the moderated specification along two dimensions: an alternative dependent variable (the winsorised seventh-day return, Y2WINS) and an alternative estimator (Robust Least Squares, RLS). Table 7 compares the key coefficients across the main model (Y1) and both robustness runs. Two patterns hold across specifications. First, board gender diversity remains insignificant at the 5% level throughout; taking all four specifications together (Y1 before and after moderation, Y2WINS by OLS, and Y2WINS by RLS), all twelve gender coefficients carry a negative sign, the direction is consistent across specifications, though this consistency should not be read as evidence of a statistically robust effect, since none of the coefficients reaches conventional significance. Second, every interaction term stays insignificant across all specifications, so the absence of a detectable moderating effect is likewise consistent rather than specification-dependent.

Table 6. Moderated regression results (dependent variable: Y1)

Variable	Model 4 (GEND1M)	Prob.	Model 5 (GEND2M)	Prob.	Model 6 (GEND3M)	Prob.
Constant	0.9127	0.3351	0.7498	0.4639	0.7257	0.4737
GEND	−0.3133	0.0859*	−0.3683	0.3650	−0.1017	0.2947
MO	−0.2153	0.6155	−0.1225	0.7905	−0.1149	0.8000
GEND×MO	0.1686	0.7843	−0.0419	0.9832	−0.0488	0.9400
ROA	2.2371	0.5624	1.0388	0.8094	0.6528	0.8798
FS	−0.0239	0.5094	−0.0229	0.5741	−0.0227	0.5706
FA	−0.0080	0.2507	−0.0063	0.3989	−0.0072	0.3345
BS	0.1039	0.3426	0.1014	0.4104	0.1166	0.3228
R-squared	0.3520		0.2320		0.2488	
Adj. R-squared	0.0031		−0.1815		−0.1557	

*significant at 10%.

Table 7. Robustness check: main model (Y1) vs winsorised H+7 (Y2WINS)

Key variable	Y1 coef.	Prob.	Y2WINS (OLS)	Prob.	Y2WINS (RLS)	Prob.
GEND1	−0.3133	0.0859	−0.3561	0.1843	−0.4021	0.1949
GEND2	−0.3683	0.3650	−0.3118	0.5974	−0.2886	0.6457
GEND3	−0.1017	0.2947	−0.0697	0.6226	−0.0643	0.6696
GEND1×MO	0.1686	0.7843	−0.1252	0.8924	−0.1426	0.8976
GEND2×MO	−0.0419	0.9832	−1.0467	0.7208	−1.0308	0.7415
GEND3×MO	−0.0488	0.9400	−0.3765	0.6967	−0.3647	0.7232

Y1 = initial return H+0; Y2WINS = winsorised initial return H+7; OLS = ordinary least squares; RLS = Robust Least Squares (Bisquare).

One change is worth reporting explicitly: the marginal 10% signal on GEND1 does not persist at H+7, its probability rises from 0.086 to 0.184 (OLS) and 0.195 (RLS) even though the coefficient grows slightly in magnitude (from −0.313 to −0.356 and −0.402). A plausible reading is that the board-composition signal is strongest on the first trading day, when information asymmetry is at its peak, and weakens as ordinary trading dynamics take over during the first week; however, this study does not conduct a formal statistical test of the difference between the H+0 and H+7 coefficients, so the pattern should be read as a tentative, descriptive observation rather than a confirmed timing effect. The close agreement between the OLS and outlier-resistant RLS estimates does indicate that the findings are not an artefact of extreme observations such as BANK or BSIM, but reflect the pattern in the bulk of the data.

Table 8 reports 95% confidence intervals for the six key gender and interaction coefficients from Tables 5 and 6, computed from the coefficients, p-values, and degrees of freedom already reported there (no re-estimation involved). The intervals are wide relative to the point estimates even GEND1's, [−0.646, 0.039], only narrowly excludes zero on the lower side underscoring how imprecisely these effects are estimated from a 21-bank sample, and reinforcing that the marginal GEND1 result should not be read as a precise or settled effect size.

4.5. Discussion

The first hypothesis (H1) predicted a significant negative effect of board gender diversity on underpricing. All three proxies yield negative coefficients, but none reaches 5% significance and only GEND1 is significant at the 10% level; H1 is therefore not supported at conventional

significance levels, although the direction is consistent with the prediction and should be weighed against the weak, illustrative nature of that evidence discussed in Section 4.3. The negative sign is coherent with asymmetric-information and signaling theory: at IPO, investors face a large information gap (Akerlof, 1970; Ritter & Welch, 2002), and the winner's curse (Rock, 1986) forces issuers to underprice; any observable characteristic that lowers uncertainty should reduce the discount. Disclosed female representation can act as a credible governance signal (Kaur & Singh, 2015), reinforced by evidence that female directors monitor more actively and are more risk-prudent (Adams & Ferreira, 2009; Bernile et al., 2018). Notably, as discussed in Section 4.4, that signal appears strongest on the first trading day and to weaken by day seven, a tentative pattern, not a formally tested difference consistent with the idea that its effectiveness depends on the moment of measurement, when information asymmetry peaks.

Table 8. 95% confidence intervals for key coefficients (Y1)

Coefficient	Estimate	95% CI	Prob.
GEND1 (Model 1)	−0.3038	[−0.646, 0.039]	0.078
GEND2 (Model 2)	−0.3689	[−1.178, 0.440]	0.344
GEND3 (Model 3)	−0.1018	[−0.294, 0.091]	0.276
GEND1×MO (Model 4)	0.1686	[−1.135, 1.472]	0.784
GEND2×MO (Model 5)	−0.0419	[−4.259, 4.175]	0.983
GEND3×MO (Model 6)	−0.0488	[−1.422, 1.325]	0.940

Note: intervals derived from the coefficient, p-value, and degrees of freedom reported in Tables 5–6 (t-distribution, two-tailed); not a re-estimation.

The pattern across proxies is illuminating through critical mass theory (Kanter, 1977). Because most sampled banks have female representation well below the critical threshold of three directors (Torchia et al., 2010) or 30% (Joecks et al., 2013), variation in the proportion (GEND2) and count (GEND3) proxies is too narrow to produce a detectable effect; the most legible signal to the market is simply the presence or absence of a female director, which explains why the dummy (GEND1) carries the strongest statistical signal. This supports measuring diversity multidimensionally, since a single proxy risks an incomplete conclusion.

Relative to prior work, the finding sits in the middle of the mixed-evidence spectrum. The negative direction aligns with Harjayanti et al. (2025) in Indonesia, Park & Byun (2022) in Korea, and Badru et al. (2019) in Malaysia, while the lack of significance echoes Handa & Singh (2015) and Kaur & Singh (2015) in India, who attribute insignificance to sub-critical female representation and Setiawan et al. (2021) in Indonesia. It contrasts with the positive associations of Rau et al. (2024) and Liu et al. (2024). The divergence from the anchor study (Harjayanti et al., 2025) is largely one of scope: that study used 384 cross-sectoral IPOs, whereas this study deliberately restricts the sample to 21 banks, trading statistical power for sectoral homogeneity. Banking's tight OJK regulation also compresses baseline asymmetry, leaving less room for board characteristics to reduce it further, consistent with Francis et al. (2010), who show signals matter more where verification is scarce.

The second hypothesis (H2) predicted that managerial ownership moderates the diversity–underpricing relationship. All interaction terms are insignificant ($p = 0.784$ – 0.983 in the main model) and add virtually no explanatory power, so H2 is not supported or, more precisely, the moderating role of managerial ownership is not statistically demonstrated in this sample, a conclusion that holds under both the winsorised H+7 and the RLS specifications. The result is driven by the near-degenerate distribution of managerial ownership: only two of 21 banks (ARTO and BBMD) report non-zero values, so the interaction term varies over just two observations, making the estimate imprecise and turning those two banks into influential leverage points (Section 3.5). This is consistent with Indonesian evidence that low managerial

ownership fails to moderate (Azhari & Prajawati, 2022) or to affect underpricing (Sasongko & Juliarto, 2014), and reflects a banking ownership structure concentrated in institutional controlling shareholders rather than a measurement flaw. Because theory itself is two-directional, ownership can align interests but can also entrench managers (Morck et al., 1988), the non-support for H2 is best read as an absence of evidence stemming from a structural data limitation, not as evidence that no moderating effect exists. The gender coefficients remain stable when the interaction is added, so the H1 findings are unaffected by the H2 result.

5. Conclusions and recommendations

This study examined whether board gender diversity affects IPO underpricing in the Indonesian banking sector, and whether managerial ownership moderates this relationship, using moderated regression analysis on 21 banks listed on the IDX during 2010–2025. Board gender diversity shows no statistically significant effect on underpricing at the 5% level. Although the presence of a female director (GEND1) is marginally significant at the 10% level ($p = 0.078$ before moderation, $p = 0.086$ after) and all twelve gender coefficients across the four specifications share a negative direction, this evidence is weak and should not be read as an established relationship, particularly given the small sample and the multiple-testing caution already noted in Section 4.3; H1 is therefore not supported. Managerial ownership likewise does not moderate the relationship: every interaction term is insignificant ($p = 0.784$ – 0.983 in the main model), so H2 is not supported. This should not be read as evidence that managerial ownership plays no moderating role in principle, only two of the 21 banks (ARTO and BBMD) report non-zero managerial ownership, so the interaction term is effectively identified by two observations, and the finding reflects this structural data limitation rather than a definitive absence of moderation.

These findings offer directional, though not statistically decisive, support for signaling and critical mass theory: board gender composition appears to function as a governance signal read by the market, but its effectiveness is bounded by the issuer's regulatory environment, banking's strict OJK oversight likely narrows the room for an additional signal and by measurement timing, since the GEND1 signal present at H+0 does not persist at H+7 (Section 4.4). The rarity of director-level share ownership in Indonesian banking (2 of 21 issuers) further shows that testing managerial-ownership moderation requires first confirming the moderator has adequate variation. Practically, these results are tentative rather than settled: for issuers, board gender composition may be one factor worth weighing in IPO preparation alongside director competence; for underwriters and regulators such as OJK and the IDX, the evidence is preliminary and sector-specific, sufficient to support continued encouragement of board-diversity disclosure but not a mandatory quota. This empirical evidence should also be kept separate from the broader normative case for gender diversity on social-equity and governance grounds, which this study does not test.

This study has several limitations. The sample is small (21 banks), limiting statistical power in models with six or seven parameters; future research should extend the sample period or adopt cross-sectoral or cross-country designs. Managerial ownership's near-zero variation in this sector means H2 cannot be reliably tested here; future studies could use moderators with greater variation, such as institutional ownership or underwriter reputation. Additional determinants of underpricing established in the literature including underwriter reputation, offer size, and market timing were not included as controls, as complete data on these variables were not consistently available across the 21-bank sample; this is acknowledged as a scope limitation. Richer diversity measures, such as the Blau or Shannon index, and an explicit critical-mass threshold specification would also allow future work to capture non-linear effects that the present proxies cannot.

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