Does Banks' Managerial Ability Mitigate ESG Washing?

Abstract

As stakeholder demand for sustainability disclosures grows, understanding the drivers of authentic ESG reporting is crucial. Examining a global sample, we find that banks led by more capable managers are less likely to engage in ESG washing behaviour. This negative relationship is stronger for public, high-reputation, high-liquidity banks and those in high-HDI countries. Consistent with upper echelons and signalling theories, high ability managers constrain opportunistic disclosure and produce more authentic reporting, particularly under integrated reporting frameworks, profit warnings, and controversies over accounting or executive compensation. However, elevated executive remuneration and compensations tied to performance weaken this restraining effect. We also document that managerial ability exerts its greatest effect on greenwashing, a moderate effect on governance washing, and the smallest effect on social washing. Our findings remain robust across alternative samples, model specifications, variable definitions, and endogeneity corrections.

Keywords: Managerial ability, ESG washing, greenwashing, upper echelons theory, signalling theory, banking industry.

1. Introduction

Amid growing stakeholder scrutiny and regulatory pressures to advance sustainable development, banks face increasing demands to demonstrate genuine commitment to environmental, social, and governance (ESG) principles. Although authentic ESG initiatives enhance reputation and stakeholder trust, many banks engage in ESG washing (or ESG greenwashing) by overstating or misrepresenting their sustainability efforts to conceal underlying shortcomings (Huang *et al.*, 2024). Managerial ability, broadly defined as top executives' skills, judgement, and strategic acumen, may play a pivotal role in shaping these behaviours (Demerjian *et al.*, 2012). Theoretical perspectives, however, offer conflicting predictions. Upper-echelons and signalling theories imply that capable managers should foster authentic ESG adoption, while agency theory warns that skilled managers may instead exploit disclosures opportunistically. Hence, this study aims to investigate the relationship between banks' managerial ability and ESG washing behaviour, delivering actionable insights for regulators, investors, and industry leaders.

We are motivated to focus on the banking industry for several reasons. First, banks serve as delegated monitors in credit markets, since they possess superior informational advantages to screen prospective borrowers and allocate economic resources, positioning them as critical drivers of sustainable finance practices (Scholtens, 2009; Gao *et al.*, 2021). Second, banks bear greater stakeholder responsibilities than many other firms, because their social licence depends on transparent accounts of sustainable practices, an expectation intensified by the public nature of deposits and loans (Breton and Côté, 2006). Third, the prospect of taxpayer backed bailouts during crises raises public demands that banks provide reliable sustainability information when rescued by governments (Breton and Côté, 2006; Wu and Shen, 2013). Finally, the rapid expansion of ESG linked loans and heightened scrutiny, as reflected in regulatory proposals

such as the FCA's anti greenwashing measures and high-profile investigations into Deutsche Bank and DWS, make banks an important context for studying intentional ESG washing.[1, 2]

To empirically investigate the study objective, our analysis involves a sample of 461 banks from 58 countries over the 2015-2023 period. Following Long *et al.* (2025), we measure ESG washing as the normalised gap between each bank's disclosure and performance scores. Consistent with Demerjian *et al.* (2012) and Andreou *et al.* (2016), we measure managerial ability by first estimating profit efficiency using stochastic frontier analysis and then isolating the residual efficiency attributable to management beyond observable characteristics. We construct these main variables using data from LSEG Workspace, Bloomberg, Orbis Bank Focus, and the World Development Indicators. Our empirical approach employs a baseline bank and year fixed effects regression that relates ESG washing to managerial ability while controlling for core bank fundamentals and country level factors. To address endogeneity and selection bias, we apply two instrumental variables with two stage least squares, two-step system GMM, propensity score matching, entropy balancing, and Oster's δ stability test.

Our baseline findings suggest that banks with higher managerial ability engage in significantly less ESG washing. This relationship holds across alternative samples, model specifications, variable definitions, and endogeneity corrections. Consistent with upper echelons and signalling theories, more capable managers appear to use their personal characteristics to report authentic ESG performance as a credible signal of quality, which contradicts the opportunistic predictions of agency theory. Moderation analyses show that the restraining effect of managerial ability on ESG washing is strongest under integrated reporting, following profit warnings, and during periods of heightened scrutiny (e.g., accounting or

[1] Global cases of greenwashing by banks and financial firms increased by 70%. See details at https://www.reuters.com/sustainability/banks-behind-70-jump-greenwashing-incidents-2023-report-2023-10-03/

[2] Banks face mounting risk of fines, regulatory probes over sustainability claims. See details at https://www.spglobal.com/market-intelligence/en/news-insights/articles/2023/2/banks-face-mounting-risk-of-fines-regulatory-probes-over-sustainability-claims-74385257

executive compensation controversies). By contrast, this mitigating effect is weakened when CEO pay is heavily performance-linked, or overall executive compensation is high. Heterogeneity tests highlight negative associations between managerial ability and all three components of ESG washing, with the strongest effect on greenwashing, a moderate effect on governance washing, and the weakest effect on social washing. Subsample analyses further indicate that this mitigating influence is evident in public, high-reputation, high-liquidity banks and those in high-HDI countries, but not in private, low-reputation, low-liquidity or low-HDI contexts.

Taken together, these findings offer several novel contributions to both empirical and theoretical debates. First, this is the first empirical study (to the best of our knowledge) to provide evidence that managerial ability mitigates ESG washing within the banking sector. Second, we extend the literature on upper echelons and signalling theories by showing that high managerial ability not only reduces symbolic ESG disclosures through manager's strategic cognition and personal values but also enhances the credibility of genuine ESG performance as a signal to investors. Third, this is the first study to identify six moderating factors in the relationship between managerial ability and ESG washing. Fourth, we highlight that the impact of managerial ability on the components of ESG washing is strongest for greenwashing, moderate for governance washing, and weakest for social washing. Finally, we document the bank and country level characteristics under which managerial ability is especially effective at mitigating ESG washing.

These insights carry important implications for multiple stakeholders. Bank managers should prioritise the development and implementation of authentic ESG initiatives to leverage their cognitive strengths, reinforce stakeholder trust, and support long term value creation. Investors need to improve due diligence and reduce portfolio risk by incorporating managerial ability into their assessment of banks' sustainability performance. Regulators should strengthen

integrated reporting requirements and consider targeted oversight of executive compensation structures to discourage opportunistic ESG disclosures and to empower capable managers who favour genuine sustainability action. Depositors will benefit from increased transparency and lower reputational risk exposure when their banks are led by high-ability managers. Finally, ESG advocates should focus on transparency in executive incentives and reporting frameworks to leverage managerial competence in reducing ESG washing.

The paper proceeds as follows. Section 2 reviews the relevant literature and develops the hypotheses. Section 3 describes the data and empirical strategy. Section 4 reports the baseline results and Section 5 presents additional analyses. Section 6 tests robustness and Section 7 concludes.

2. Literature review and hypothesis development

There are three principal theoretical perspectives that offer contrasting predictions about how managerial ability relates to banks' ESG-washing behaviour: upper echelons theory, signalling theory, and agency theory. Upper echelons theory argues that executives' backgrounds, values, and cognitive frames shape strategic choices and, through those choices, firm outcomes (Hambrick and Mason, 1984; Hambrick, 2007). From this perspective, more capable managers are expected to implement substantive ESG strategies by virtue of their superior competence and ethical commitments, as demonstrated in Demerjian *et al.* (2013) and Yuan *et al.* (2019). Such substantive engagement should, in turn, reduce the likelihood of ESG washing. Signalling theory, which focuses on reducing information asymmetry between managers and external stakeholders (Spence, 2002), provides a complementary explanation. Supporting this view, Zhang and Wiersema (2009) suggest that high ability CEOs strategically use observable signals to communicate their value and build trust with potential shareholders. Consequently, capable managers should prefer authentic ESG engagement both to resolve

information gaps and to demonstrate their competence. Together, these two theories imply that managerial ability encourages authentic ESG engagement and limits opportunistic disclosure.

By contrast, agency theory offers an opposing prediction. When managers act as agents whose interests diverge from those of shareholders, agency conflicts create incentives for opportunistic behaviour (Jensen and Meckling, 2019). From this viewpoint, highly capable managers should increase ESG-washing, since their superior information and strategic skills allow them to opportunistically manipulate disclosures for personal gain or reputational advantage, thereby misaligning with shareholders' interests. Because these theories point in contradictory predictions, an empirical investigation is necessary to establish which mechanism predominates in the banking context and to produce evidence-based guidance for regulators and investors.

The empirical literature on managerial ability presents a similarly mixed picture, underscoring why our research question is unresolved. Extensive research documents a range of positive effects of managerial ability. Managers with greater capability are linked to clearer information environments, higher earnings quality, and stronger innovation outputs (Demerjian *et al.*, 2013; Chen *et al.*, 2015; Baik *et al.*, 2018). CEOs with higher ability also tend to lead firms that deliver superior operating and stock market performance (Chang *et al.*, 2010). Similarly, more capable managers appear to lessen the negative consequences of credit-risk factors on ratings (Cornaggia *et al.*, 2017), and firms led by such managers typically show lower levels of tax avoidance (Koester *et al.*, 2017). During periods of crisis, strong managerial ability reduces underinvestment problems (Andreou *et al.*, 2017), while evidence also links CEO ability to better investment efficiency and to the exploitation of higher-quality investment opportunities (Lee *et al.*, 2018; Gan, 2019).

At the same time, a growing stream of studies highlights potential downsides of elevated managerial ability. High-ability managers take greater risks, adopt overinvestment, and

increase stock price crash risk (Habib and Hasan, 2017; Yung and Chen, 2018). They also pursue opportunistic financial reporting and drive up audit fees in distressed firms (Gul *et al.*, 2018). Investors often demand higher expected returns from firms whose CEOs possess broad managerial ability (Mishra, 2014). Taken together, these mixed findings suggest that the net effect of managerial ability is context dependent and whether banks benefit unequivocally from more able managers remains an open question.

Turning specifically to sustainability research, the evidence is also mixed but somewhat tilted toward positive effects. Several studies find that greater managerial ability improves corporate social responsibility (CSR) outcomes and encourages long-term commitments to socially responsible activities (Yuan *et al.*, 2019; Doukas and Zhang, 2020). Welch and Yoon (2023) report that high-ability managers often direct resources toward ESG activities that improve shareholder value. On the other hand, countervailing results exist, for example, (Chen *et al.*, 2020) find that CEOs with higher managerial ability engage in lower levels of CSR activity. Given that much of the sustainability literature emphasises positive consequences of managerial competence, we expect that higher managerial ability will reduce banks' propensity to engage in ESG washing. Accordingly, we test the following hypothesis for this study:

H: Banks' managerial ability has a negative relationship with their ESG washing behaviour.

3. Empirical design

3.1 Data

Our sample construction begins with merging bank-level data from two primary databases. Annual ESG performance scores are obtained from London Stock Exchange Group (LSEG) Workspace (formerly Thomson Reuters Refinitiv), while ESG disclosure scores are collected from Bloomberg. The variables required to measure managerial ability are sourced from Orbis Bank Focus and the World Development Indicators. All bank-level control

variables are obtained from LSEG Workspace, except the reputation measure, which is collected from S&P Capital IQ Pro. To mitigate survival bias, we consider both active and inactive banks in our study. Merging across databases relies first on unique identifiers (LEI, ISIN, and ticker codes) and applies fuzzy matching on bank names only where the mentioned identifiers are missing. Country-level controls include the human development index from the United Nations Development Programme, along with GDP growth and foreign direct investment data from the World Development Indicators. We select these databases because equivalent data are unavailable or insufficient elsewhere. The notations, definitions, and data sources for all variables are mentioned in Table 1.

(Insert Table 1 about here)

Since Bloomberg's global ESG disclosure data are available beginning in 2015, our initial panel extended from 2015 through 2024. However, after imposing the non-zero and non-missing-value requirements of our stochastic frontier analysis (SFA), all observations from 2024 were dropped. All variables are winsorised at the 1% level in both tails to reduce the influence of extreme outliers. The resulting unbalanced panel consists of 3,372 observations from 461 banks across 58 countries over the period 2015-2023. Bank types in this sample include bank holding company (57.12%), commercial banks (36.36%), Islamic banks (5.22%), savings banks (1.25%), and investment banks (0.06%). Table 2 presents the number of banks, total observations, and the percentage contribution of each country.

(Insert Table 2 about here)

3.2 Measuring ESG washing

Following Long *et al.* (2025), we define ESG washing as the difference between a bank's reported ESG disclosure score and its independently assessed ESG performance score. This definition is consistent with prior literature, including Zhang (2022), Yu *et al.* (2020), and Liu

and Li (2024). Since ESG disclosure and performance scores are measured on different scales, we normalise both variables before computing their difference to construct the ESG washing metric. Specifically, we apply z-score standardisation (Equation 1), consistent with Long *et al.* (2025) and min-max normalisation (Equation 2), following Liu and Li (2024). A positive ESG washing value indicates that a bank holds a stronger peer-relative position in ESG disclosure than in ESG performance, suggesting a tendency to offset weaker ESG outcomes with more extensive reporting.

$$ESGW\_Z_{i,t} = \left(\frac{ESG_{dis,i,t} - \overline{ESG_{dis}}}{\sigma(ESG_{dis})}\right) - \left(\frac{ESG_{per,i,t} - \overline{ESG_{per}}}{\sigma(ESG_{per})}\right) \quad (1)$$

$$ESGW\_M_{i,t} = \left(\frac{ESG_{dis,i,t} - min(ESG_{dis})}{max(ESG_{dis}) - min(ESG_{dis})}\right) - \left(\frac{ESG_{per,i,t} - min(ESG_{per})}{max(ESG_{per}) - min(ESG_{per})}\right) \quad (2)$$

Here, $ESG_{dis,i,t}$ and $ESG_{per,i,t}$ are ESG disclosure and performance scores of bank *i* in year *t*, respectively. $\overline{ESG_{dis}}$ and $\overline{ESG_{per}}$ are means of the ESG disclosure and performance scores, respectively. $\sigma(ESG_{dis})$ and $\sigma(ESG_{per})$ are standard deviations of ESG disclosure and performance scores, respectively. $max(ESG_{dis})$ and $max(ESG_{per})$ are maximum values of ESG disclosure and performance scores, respectively. $min(ESG_{dis})$ and $min(ESG_{per})$ are minimum values of ESG disclosure and performance scores, respectively. $ESGW\_Z_{i,t}$ and $ESGW\_M_{i,t}$ are ESG washing based on z-scores and min-max normalization measurements, respectively.

3.3 Measuring managerial ability

Our estimation methodology for managerial ability follows a two-step approach adapted from Demerjian *et al.* (2012), with methodological choices guided by Andreou *et al.* (2016). In the first step, we estimate firm-level profit efficiency using stochastic frontier analysis (SFA). In the second step, we purge the resulting efficiency scores of bank characteristics that

are unlikely to reflect managerial skill, leaving a residual that we interpret as managerial ability. We prefer SFA to the deterministic data envelopment analysis (DEA) for our baseline analysis. This is because SFA explicitly accommodates statistical noise in inputs, outputs, and prices, while still allowing us to impose economically meaningful functional-form structure on the production process. Empirical banking studies also show that flexible parametric forms such as the Translog successfully captures profit, cost, and revenue efficiency (Mester, 1997; Altunbas and Chakravarty, 2001; Berger, 2003). However, we also report DEA-based results as a robustness test for completeness. As profitability typically underlies banks' strategic decisions, our analysis measures bank performance using profit-efficiency scores.

To estimate profit efficiency, we implement a single-step Battese and Coelli (1995) stochastic frontier model, which jointly estimates the efficient frontier and the determinants of inefficiency via maximum likelihood. The profit frontier is written in log form as below:

$$ln\pi_{i,t} = f(y_{i,t},\ p_{i,t}, \beta) + \ v_{i,t} - u_{i,t}, \tag{3}$$

where $\pi_{i,t}$ is profit before taxes of bank *i* at time *t*. $y_{i,t}$ and $p_{i,t}$ are vectors of output levels and input prices, respectively. β is the vector of parameters to be estimated. The disturbance $v_{i,t}$ is a two-sided stochastic error term assumed to be independent and identically distributed with N(0, σ_v^2), while $u_{i,t} \geq 0$ is the non-negative inefficiency term. We assume $u_{i,t}$ follows a truncated normal distribution, $u_{i,t} \sim N^+(m_{i,t},\ \sigma_u^2)$, where the mean $m_{i,t}$ is modelled as a function of observed determinants of inefficiency:

$$m_{i,t} = \ \delta_0 + z_{i,t}\delta + \mu_{i,t}. \tag{4}$$

Here, $z_{i,t}$ is a vector of observable explanatory variables (inefficiency determinants), δ is a parameter vector, and $\mu_{i,t}$ is an error term. We estimate Equations (3) and (4) jointly by maximum likelihood and then derive firm-level profit inefficiency $u_{i,t}$. Profit efficiency is then computed as $PE_{SFA,i,t} = \exp(-u_{i,t})$.

To operationalise $f(\cdot)$, we specify a Translog functional form for the profit function, imposing linear homogeneity in prices (Coelli *et al.*, 2005). Using three output categories, three input prices, equity, and a time trend, the Translog profit specification is:

$$ln\pi_{i,t} = \alpha_0 + \sum_{i=1}^{3} \alpha_i lny_{i,t} + \sum_{j=1}^{3} \beta_j lnp_{j,t} + \frac{1}{2}\sum_{i=1}^{3}\sum_{k=1}^{3} \sigma_{i,k}\, lny_{i,t}\, lny_{k,t} + \frac{1}{2}\sum_{j=1}^{3}\sum_{h=1}^{3} \gamma_{j,h}\, lnp_{j,t}\, lnp_{h,t} + \sum_{i=1}^{3}\sum_{j=1}^{3} \theta_{i,j}\, lny_{i,t}\, lnp_{j,t} + d_1 lnequity + \frac{d_2}{2} lnequity^2 + r_1 t + \frac{r_2}{2} t^2 + v_{i,t} - u_{i,t}, \quad (5)$$

with $u_{i,t} \sim \mathcal{N}^{+}(m_{i,t}, \sigma_u^2)$ and $m_{i,t}$ as in Equation (4). In the Translog specification, we impose symmetry on the second-order coefficients (e.g., $\sigma_{i,k} = \sigma_{k,i}$, $\gamma_{j,h} = \gamma_{h,j}$, $\theta_{i,j} = \theta_{j,i}$ where appropriate) and linear homogeneity in prices. Linear homogeneity implies the usual restrictions on first and second derivatives with respect to prices (e.g., $\sum_{j=1}^{3} \beta_j = 1$, and analogous zero-sum restrictions on cross-second derivatives), which ensures consistency with neoclassical production theory while preserving substitution flexibility among inputs.

We adopt the intermediation approach to define the bank profit frontier (Sealey Jr and Lindley, 1977; Berger and Humphrey, 1997). Under this approach, banks are viewed as intermediaries that transform deposits and other borrowed funds into loans and earning assets using labour and physical capital. Therefore, both operating and interest expenditures are considered, and deposits enter as an input. Following Pasiouras *et al.* (2009) and Altunbas *et al.* (2000), our output variables are gross loans, other earning assets, and off-balance-sheet items, while the inputs are labour costs, borrowed funds, and physical capital. As macroeconomic conditions significantly affect banks' efficiency (Dietsch and Lozano-Vivas, 2000), we employ GDP growth, inflation, and unemployment as the determinants of the efficiency, following Barth *et al.* (2013) and Basile and De Benedictis (2008). We also include equity and a time trend to account for bank heterogeneity and technical change. The sources,

notations, definitions, and summary statistics of the efficiency frontier function variables are mentioned in Table 3. Thus, the Equation (4) takes the following form:

$$m_{i,t} = \delta_0 + \delta_1 Z1_{i,t} + \delta_2 Z2_{i,t} + \delta_3 Z3_{i,t} + \delta_4 EQ_{i,t} + \delta_5 t_{i,t} + \mu_{i,t}, \quad (6)$$

(Insert Table 3 about here)

where the Z variables capture macroeconomic and country characteristics that influence bank inefficiency, EQ is bank equity, and t is the time trend. This estimation thus yields both firm-level inefficiency estimates and coefficients on the inefficiency drivers in a single maximum-likelihood step.

Once the profit efficiency scores are obtained from the SFA frontier, the second step disentangles managerial ability from other bank-specific effects. Consistent with Demerjian *et al.* (2012) and Andreou *et al.* (2016), we regress the SFA profit efficiency score on a set of bank characteristics and year fixed effects. The residual from this regression is used as our managerial ability measure. The estimating equation is:

$$PE_{SFA,i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 EMP_{i,t} + \beta_3 AGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 FCF_{i,t} + \sum_{t=1}^{T} \theta_t d_t + \varepsilon_{i,t}. \quad (7)$$

Here, *SIZE* is the natural log of total assets, *EMP* is the natural log of total employees, *AGE* is the natural log of the bank's age (years since establishment), *LEV* is total debt to common equity, *FCF* is an indicator equal to one if cash flow for the year is positive and zero otherwise, d_t represents the year dummies, and $\varepsilon_{i,t}$ is the error term. All the independent variable data are collected from LSEG Workspace, except *AGE* which is obtained from S&P Capital IQ Pro. We select these databases because equivalent data are unavailable or insufficient elsewhere. Table 4 presents the regression results of Equation (7). The residual $\hat{\varepsilon}_{i,t}$ (actual minus predicted profit efficiency) is used, as in Demerjian *et al.* (2012), as our measure of managerial ability because it captures the portion of efficiency attributable to managers rather than to observable bank characteristics or time effects.

(Insert Table 4 about here)

3.4 Empirical model

Given that fixed-effects panel estimators account for both time-invariant and time-varying unobserved heterogeneity (Wooldridge, 2010; Bliese *et al.*, 2020), we estimate a bank- and year-fixed effects model to examine the relationship between managerial ability and ESG washing:

$$ESGW_{i,t} = \beta_0 + \beta_1 MA_{i,t} + \sum_{n=2}^{7} \beta_n X_{n,i,t} + \sum_{n=8}^{10} \beta_n C_{n,j,t} + \tau_t + \lambda_i + \varepsilon_{i,t}, \quad (8)$$

where the subscripts i, t, and j index bank, year, and country, respectively. These subscripts are omitted in subsequent discussions for readability unless needed. The dependent variable *ESGW* denotes ESG washing, which we measure in two alternative ways: z-score standardisation and min–max normalisation. The key explanatory variable *MA* captures managerial ability as computed following Demerjian *et al.* (2012). The vector *X* contains six bank-level fundamentals that prior work suggests may affect ESG washing – liquidity, growth, leverage, profitability, reputation, and size (Yu *et al.*, 2020; Long *et al.*, 2025). The vector C includes three country-level controls – GDP growth, human development index, and foreign direct investment (Yu *et al.*, 2020; Zhang, 2023), which capture macroeconomic conditions relevant to banks' ESG washing behaviour.

Consistent with prior literature on managerial ability, the independent variables are not lagged (Yuan *et al.*, 2019), since it is plausible that highly capable managers would disclose accurate ESG performance and thereby mitigate ESG washing within the same year of their appointment. To check the sensitivity of our results to timing assumptions, we also run a robustness test in which all control variables are lagged by one year. The definitions and notations of all the variables are detailed in Table 1. ε is the error term.

3.5 Endogeneity treatment

Although Equation (8) includes bank and time fixed effects to mitigate endogeneity, residual endogeneity may still be present. For example, banks that engage in ESG-washing may replace incumbent managers with more capable ones to mitigate reputational damage or improve ESG disclosures, creating a reverse-causality problem. Similarly, as Wooldridge (2016) emphasises, regression analyses cannot guarantee that all relevant determinants have been observed. Relevant factors omitted from Equation (8) could produce omitted-variable bias. Together, these concerns imply that the coefficients from Equation (8) could be biased and not support causal interpretation.

To address these concerns and enable causal interpretation, we adopt an instrumental variable (IV) approach. Following Gan (2019), we employ two IVs: the managerial ability of the closest bank (measured by total gross loans) and the country–year median of managerial ability. We implement instrumental variable estimation via two-stage least squares (2SLS), following the exposition in Angrist and Imbens (1995). The first- and second-stage specifications are written as:

$$MA_{i,t} = \gamma_0 + \gamma_1 IV_{i,t} + \sum_{n=2}^{7} \gamma_n X_{n,i,t} + \sum_{n=8}^{10} \gamma_n C_{n,j,t} + \tau_t + \alpha_i + u_{i,t} \quad (9)$$

$$ESGW_{i,t} = \delta_0 + \delta_1 \widehat{MA}_{i,t} + \sum_{n=2}^{7} \delta_n X_{n,i,t} + \sum_{n=8}^{10} \delta_n C_{n,j,t} + \tau_t + \alpha_i + \vartheta_{i,t} \quad (10)$$

In Equation (9), we obtain fitted values $\widehat{MA}_{i,t}$ of the endogenous regressor (*MA*) by regressing it on the instruments and controls. In Equation (10), these fitted values are used to estimate the causal effect on the outcome (*ESGW*). The error terms in the first and second stages are $u_{i,t}$ and $\vartheta_{i,t}$, respectively. Description of the remaining variables and subscripts appears in Section 3.4.

For the instruments to deliver valid causal inference, they must satisfy the usual identifying assumptions. First, the relevance condition requires that the selected instruments are meaningfully correlated with banks' managerial ability (Wooldridge, 2016). This expectation is consistent with institutional isomorphism theory, which suggests that organisations adopt similar practices as proximate and peer institutions to gain legitimacy under uncertainty (DiMaggio and Powell, 1983). Geographic proximity facilitates knowledge spillovers and benchmarking, incentivising banks to emulate nearby institutions' managerial practices to improve decision-making and reduce inefficiencies (Degryse and Ongena, 2005). Similarly, the country-year median managerial ability reflects institutional quality and regulatory frameworks, leading banks to conform to national managerial norms to comply with governance standards and enhance legitimacy (Porta *et al.*, 1998; Bloom and Van Reenen, 2010). As illustrated by the scatter plots in Figure 1, the fitted lines show a positive association, and Section 4.2 reports formal first-stage statistics that confirm instrument strength. Therefore, we expect the instruments to be strongly correlated with banks' managerial ability.

(Insert Figure 1 about here)

Second, the exclusion restriction requires that the instruments affect ESG washing only through managerial ability and not directly (Cerulli, 2015). Prior studies indicate that ESG washing is largely driven by bank-level characteristics such as leverage, liquidity, profitability, and size (Yu *et al.*, 2020; Long *et al.*, 2025). Because our instruments capture broader, external features of the competitive and regulatory environment rather than idiosyncratic bank attributes, they are unlikely to exert a direct effect on an individual bank's ESG washing behaviour beyond their influence on managerial ability. Third, the exogeneity condition requires that the instruments be uncorrelated with the second-stage error term (Wooldridge, 2010). While one could raise concerns that changes in credit concentration may affect both ESG washing and the instruments, such idiosyncratic changes are unlikely to systematically

alter either the closest bank's managerial ability or the country-year median. Besides, identification of unobserved variables is fundamentally challenging because the space of possible factors may be unbounded, and a substantial portion of them are not recoverable from observed information (Wooldridge, 2016). Given these considerations, we regard the instruments as plausibly exogenous.

Recognising that ESG washing may be dynamically persistent, we also adopt a dynamic panel approach. Specifically, following Li *et al.* (2023), we estimate a two-step system GMM (SYS-GMM) estimator as in Blundell and Bond (1998). In the first-differenced equation, we instrument the dependent variable with its own lagged values from $t-2$ and earlier. In the levels equation, we use the dependent variable's first differences as instruments. Strictly exogenous control variables are included as instruments in the levels specification. We also include time dummies to absorb time-specific shocks and to strengthen the validity of the moment conditions.

To further strengthen causal identification through sample design, we complement these approaches with propensity score matching (PSM), which mitigates selection bias in quasi-experimental and observational studies (Randolph and Falbe, 2014). We match each treated bank to its five nearest control banks (within a 0.1 caliper) using the seven bank-level controls from our baseline regression, resulting in a matched sample of 401 banks from 53 countries.[3] Following Treepongkaruna *et al.* (2022), we conduct diagnostic checks on matching quality. Column (1) of Table 5 reports a logistic regression for treatment assignment on the full sample (pre-match), while Column (2) repeats the logistic specification for the post-match sample. The similarity in coefficient significance across two columns indicates balance on observable

[3] The treated group includes banks with higher managerial ability, and the control group includes banks with lower managerial ability. A bank is considered to have higher capable managers if its managerial ability score exceeds the median managerial ability score. The treated and control groups comprise 215 banks from 37 countries and 186 banks from 33 countries, respectively.

characteristics between treated and control banks. We then re-run the baseline fixed-effects regression (Equation 8) on the matched sample.

(Insert Table 5 about here)

Complementing PSM, we apply entropy balancing as an additional check against observable confounding. This method follows a maximum-entropy reweighting procedure that enforces exact balance on specified moments (Hainmueller, 2012). Using the same treatment and control sets as in the PSM analysis, entropy balancing reweights units so that the reweighted treatment and control groups match on mean, variance and skewness of the covariates, mitigating the practical limitations of propensity score-based adjustments (Watson and Elliot, 2016). Finally, to assess sensitivity to omitted variable bias, we implement the Oster (2019) bounding procedure as in Heimer *et al.* (2019) and Islam *et al.* (2025). Based on this approach, we compute the δ statistic that quantifies the degree of selection on unobservables relative to observables required to nullify the estimated effect. An absolute δ greater than 1 suggests that unobserved selection would need to be stronger than observed selection to overturn our findings. We also report identifiable β-bounds (Oster bounds). If the bounds exclude zero, we reject the null hypothesis that omitted variables drive the results.

4. Baseline results

4.1 Descriptive statistics

The summary statistics are presented in Table 6, where the values remain within the expected ranges. ESG-washing metrics calculated using z-scores show higher standard deviation than those derived from min-max normalisation, consistent with the study by Liu and Li (2024). Since z-score standardisation scales by the variables' standard deviations without bounding the results, it amplifies outliers and spreads values more widely, producing larger

minimum and maximum of ESG-washing scores. On the other hand, min-max normalisation compresses all scores into a fixed range and thus yields lower extremes.

(Insert Table 6 about here)

Figure 2 presents the average ESG washing behaviour based on z-scores in the banking sector from 2015 to 2023. From 2017 onward, the ESG washing score increases markedly from below zero to peak levels by 2021 and remains elevated through 2023, indicating a pronounced and sustained uptick in overall washing behaviour. This growing pattern is consistently observed across all subdimensions, including environmental, social, and governance, each transitioning from early-period declines to increasingly higher levels of washing over the latter half of the study period. Apart from our main study objective, we will also examine the impact of managerial ability on these ESG components in Section 5.2.

(Insert Figure 2 about here)

Building on the observed upward trend, Figure 3 demonstrates a negative relationship between ESG performance and ESG washing. This suggests that banks with higher ESG performance tend to present a more accurate picture of their activities, whereas those with lower scores are more likely to engage in greater washing behaviour. The same inverse correlation holds for environmental, social, and governance dimensions. This finding aligns with the study by Lee and Raschke (2023) and Deng *et al.* (2025) that there is a negative relationship between ESG performance and greenwashing.

(Insert Figure 3 about here)

We test all independent variables included in the regression model for multicollinearity. As shown in Table 7, Pearson correlation coefficients among the baseline independent variables are all below 0.8, a commonly used rule-of-thumb threshold (Senaviratna and Cooray, 2019). We also compute variance inflation factors (VIFs), which range from 1.04 to 1.73 in our sample. Given that a VIF exceeding 10 is commonly considered to indicate a

multicollinearity problem (Neter *et al.*, 1983), the observed VIFs further support the absence of multicollinearity among the independent variables.

(Insert Table 7 about here)

4.2 Baseline regression results

Table 8 reports the estimates from Equation (8) using two alternative measures of ESG washing, one based on z-score standardisation and the other on min–max normalisation. The findings indicate a robust negative relationship between banks' managerial ability and ESG washing under both measurement approaches, with all relevant coefficients statistically significant at the 1% level. Regarding the control variables, reputation consistently presents a negative and statistically significant coefficient across all specifications, implying that banks with stronger reputations engage in less ESG washing. This finding aligns with the study by Long *et al.* (2025) that firm reputation has a significant negative relationship with greenwashing. Additionally, profitability shows a statistically significant negative coefficient in Column (1), suggesting that more profitable banks tend to engage in less ESG washing behaviour. This concurs with the finding of Deng *et al.* (2025) that firms with higher return on asset tend to engage in lower greenwashing.

(Insert Table 8 about here)

4.3 Addressing endogeneity

As discussed in Section 3.5, Equation (8) may not fully identify causal effects because of potential endogeneity concerns. To address these limitations, we adopt an instrumental variable (IV) strategy using closest bank's managerial ability and the country–year median of managerial ability as instruments. The first-stage estimates, presented in Panel A of Table 9,

show that both instruments are positively and strongly associated with bank-level managerial ability, with coefficients significant at the 1% level in Columns (1) to (6).

(Insert Table 9 about here)

To assess instrument quality, we perform weak-instrument diagnostics using the Cragg and Donald (1993) Wald F statistic and compare them with the Stock and Yogo (2002) critical values. These tests confirm strong identification of the instruments. We also report Sargan tests for overidentifying restrictions in Columns (5) and (6), and the associated p-values fail to reject instrument validity. Taken together, these diagnostics indicate that our instruments are strongly and appropriately related to managerial ability. Building on the strong first stage results, Panel B of Table 9 reports the second-stage IV estimates. The predicted managerial ability from the first stage is negatively associated with bank ESG washing, where the coefficients are statistically significant across Columns (1) to (6) at levels ranging from 1% to 10%. These IV estimates are consistent with our baseline findings and support the inference that higher managerial ability reduces banks' ESG washing.

As an additional check against dynamic panel bias and potential endogeneity of regressors, we estimate two-step system GMM (SYS-GMM) results reported in Table 10. Columns (1) and (2) show a negative effect of banks' managerial ability on ESG washing, statistically significant at a 10% level. The AR(2) test fails to reject the absence of second-order autocorrelation in all specifications. The Hansen test does not reject the null of instrument exogeneity, indicating that the instruments used in the SYS-GMM framework are appropriately specified. Thus, these SYS-GMM findings corroborate the IV results and further strengthen the robustness of our baseline conclusions.

(Insert Table 10 about here)

We also apply propensity score matching (PSM) and entropy balancing methods to reduce selection bias and control for observable confounders. The regression results estimated on the

matched sample in Columns (1) to (2) of Table 11 show significant coefficients in line with the baseline, while the entropy-balanced specifications in Columns (3) to (4) present similar significant effects. Since our main result persists after both PSM and entropy balancing, it is unlikely that observable selection is driving the observed relationship.

(Insert Table 11 about here)

Finally, to assess the potential influence of omitted variables, we apply the Oster (2019) bounds test and present the results in Table 12. The δ statistics imply that unobserved confounders would need to be more than nine times and ten times stronger than observed selection in Columns (1) and (2), respectively, to fully account for the estimated effect. Moreover, the identified bounds for the treatment effect (β) under the same specifications do not include zero. Altogether, the IV, SYS-GMM, matching, entropy balancing, and Oster tests provide converging evidence that the baseline estimates are robust and are unlikely to be driven solely by endogeneity or omitted variables.

(Insert Table 12 about here)

4.4 Discussion

Our baseline results suggest that banks led by more capable managers tend to engage in lower levels of ESG washing. This outcome is consistent with prior work showing that managerial ability is positively associated with ESG performances (Yuan *et al.*, 2019; Cao *et al.*, 2025). The observed decline in ESG washing may therefore reflect higher genuine ESG performance, as illustrated in Figure (3). Lee and Raschke (2023) and Deng *et al.* (2025) also document a significant negative relationship between ESG performance and firm-level greenwashing. Complementing these findings, Welch and Yoon (2023) show that highly capable managers channel resources into ESG activities in ways that enhance shareholder

value. Given that greenwashing lowers market value (Du, 2015), banks with high-ability managers would have incentives to avoid ESG washing which aligns with our evidence.

Beyond statistical significance, the magnitudes we estimate are economically meaningful. A one-standard-deviation increase in managerial ability corresponds to a 4.921% decrease in ESG washing when measured using z-score standardisation (calculated as = 0.545*0.053/0.587) and a 4.818% decrease using min–max normalisation (calculated as = 0.110*0.053/0.121).[4] These economically meaningful magnitudes indicate that improvements in managerial capability lead to tangible decreases in banks' ESG misrepresentation. This underscores the importance of investing in manager selection and training to reinforce authentic ESG performance, aligning incentives towards authentic sustainability outcomes. Overall, these findings highlight that enhancing managerial ability materially improves ESG reporting integrity across banks and may significantly improve stakeholder trust in the long run.

The empirical patterns we document are theoretically coherent. They are consistent with the upper echelons theory in that executives' cognitive bases and personal characteristics drive strategic decisions. Based on this, highly capable bank managers are more likely to mitigate ESG washing due to their superior cognitive capabilities and moral orientation, as documented in Demerjian *et al.* (2013) and Yuan *et al.* (2019). Similarly, the evidence aligns with signalling theory since adept managers appear to report actual ESG performance as a credible signal of bank quality to investors and stakeholders. These genuine actions reduce scepticism about managerial integrity and serve as reliable indicators of future value. However, our findings do not support an agency-theory prediction in which high-ability managers should opportunistically employ symbolic ESG disclosures to serve self-interested ends. Instead,

[4] Table 6 presents the standard deviations for the ESG washing based on z-scores, ESG washing based on min-max normalisation, and managerial ability as 0.587, 0.121, and 0.053, respectively.

competent bank managers act in shareholders' long-term interests by embedding authentic ESG integration. Their expertise and concern for reputation drive genuine corporate responsibility over opportunistic manipulation of ESG narratives.

5. Additional analysis

5.1 Moderation analysis

Given the importance of this study's baseline evidence, we conduct a moderation analysis to estimate interaction effects between managerial ability and six potential moderators on banks' ESG washing behaviour. We collect the moderator data from LSEG Workspace as they are unavailable or insufficient elsewhere. The notations, definitions, and sources of all the moderators are mentioned in Table 1. Table 13 reports a nuanced, context-dependent relationship between managerial ability and ESG washing. The negative main association, whereby greater managerial ability is associated with reduced ESG washing, is amplified under conditions of heightened external scrutiny. In particular, accounting controversies and compensation-related controversies appear to discipline managerial behaviour and reduce opportunistic ESG reporting. This finding is consistent with prior literature that media attention and analyst scrutiny reduce corporate greenwashing (Liu *et al.*, 2023; Yue and Li, 2023), which suggests that visibility and third-party oversight raise the reputational and informational costs of embellishing sustainability claims.

(Insert Table 13 about here)

Integrated narrative strategies and episodes of profit warnings further reinforce this discipline effect. Firms that explicitly integrate extra-financial concerns into the management discussion and analysis (MD&A) exhibit lower tendencies toward ESG washing, consistent with the mitigating role of integrated disclosure practices (Yue *et al.*, 2025). Likewise, instances of increased transparency surrounding earnings, such as profit warnings, reduce the

scope for embellishment and, when transparency is sufficiently high, eliminate greenwashing incentives (Wu *et al.*, 2020). Together, these mechanisms indicate that clear, coherent narrative integration and timely, transparent communication constrain opportunistic presentation of sustainability performance.

By contrast, compensation structures tied to market performance counteract these disciplinary forces. When CEO pay is explicitly linked to total shareholder return and when aggregate senior executive pay is elevated, the association between managerial ability and reduced ESG washing is reversed, with highly able managers more likely to present sustainability efforts in an aggressive or opportunistic manner. This reversal is in line with evidence that certain managerial compensation arrangements increase environmental harm (Minor, 2016) and that large executive pay gaps are associated with greater greenwashing (Li and Chen, 2024). These results indicate that compensation design, through market-linked rewards and concentrated pay distributions, create countervailing incentives that lead even capable managers to prioritise short-term market signals over faithful ESG disclosure.

We also depict these moderation patterns visually in Figures 4 and 5. Figure 4 plots predicted ESG washing across the spectrum of managerial ability under each moderating condition. It highlights steeper declines for banks facing controversies and for those that adopt integrated reporting practices, while showing upward slopes for banks with performance-linked pay schemes and higher top executive compensations. Figure 5 complements this by displaying the marginal effect of managerial ability on ESG washing across moderator values, with confidence bounds that reinforce the same patterns. Overall, the findings underscore the joint importance of external scrutiny, integrated disclosure practices, and careful design of executive pay in shaping managers' ESG reporting incentives.

(Insert Figures 4 and 5 about here)

5.2 Heterogeneity analysis of ESG washing

Building on the baseline results, we perform a heterogeneity analysis to better understand how managerial ability influences the three constituent dimensions of ESG washing – greenwashing, social washing, and governance washing. Each component is measured using the same procedures applied to the aggregate ESG-washing measure. The notations, definitions, and sources of all the components are detailed in Table 1. The heterogeneity analysis results are presented in Table 14, suggesting that managerial ability has a negative relationship with all the components. However, increases in such ability are most strongly associated with reductions in greenwashing, moderately associated with reductions in governance washing, and least associated with reductions in social washing.

These heterogeneous effects indicate that managerial ability is important across all ESG domains, although its impact varies by the specific type of ESG claim. Our evidence aligns with the study by Cao *et al.* (2025), who documents a relatively stronger link between managerial ability and environmental outcomes than with social or governance performance. This implies that highly able managers are more vigilant and effective in mitigating environmental misstatements than in constraining social or governance disclosures.

(Insert Table 14 about here)

5.3 Bank- and country-based subsample analysis

Ownership structure, specifically whether a bank is public or private, is crucial in reducing ESG washing because public banks are subject to stricter regulatory oversight and clearer sustainability mandates that may limit opportunistic disclosure (Lamoreaux, 2016). Consistent with this, results in Panel A of Table 15 indicate that managerial ability significantly reduces ESG washing in public banks. By contrast, this effect is absent in private banks, suggesting that the ownership changes the incentive and monitoring channels through which managerial

ability influences ESG reporting. Our finding is consistent with Marquis *et al.* (2016), who show that publicly listed firms, facing greater scrutiny and disclosure requirements, are less likely to engage in greenwashing.

(Insert Table 15 about here)

In addition to ownership, corporate reputation also matters for mitigating ESG washing because highly reputed firms incur greater reputational costs if exposed for misleading ESG disclosures (Rhee and Haunschild, 2006). Panel B of Table 15 shows that managerial ability is associated with lower ESG washing only among high-reputation banks, indicating that reputation strengthens the incentives for capable managers to pursue authentic ESG communication. This is in line with prior work finding that firms facing greater potential reputational damage are less inclined to engage in greenwashing (Berrone *et al.*, 2017).

Since liquid banks face tighter market discipline and transparency demands, adequate liquidity is key to reducing ESG washing (Diamond and Verrecchia, 1991). The evidence from Panel C of Table 15 suggests that managerial ability significantly lowers ESG washing in high-liquidity banks but not in those with limited liquidity, underlining the major role of market monitoring. This evidence aligns with existing literature, which shows that higher liquidity enhances firm accountability and reduces opportunistic disclosure behaviour (Dittmar *et al.*, 2003; Pizzetti *et al.*, 2021).

Finally, national context shapes these dynamics where a higher country-level human development index (HDI) is associated with stronger institutions, greater public awareness, and more active civil society, factors that collectively enforce corporate responsibility (Pinar *et al.*, 2022). Panel D of Table 15 reports that managerial ability is linked to lower ESG washing only for banks operating in high-HDI countries. This finding supports previous studies, documenting that stronger country-level governance and social expectations in more developed economies foster more credible ESG behaviour by firms (Baldini *et al.*, 2018).

6. Robustness test

We conduct a series of robustness checks to verify that our baseline results are not driven by model specification. Specifically, we re-estimate the baseline specification (Equation 8) using different sets of control variables (bank- and country-level) and alternative fixed effects (bank and time). As shown in Table 16, these variants corroborate the baseline findings. Since the baseline estimates are obtained from stochastic frontier analysis, we also re-run the analysis using a data envelopment analysis (DEA) approach. Columns (1) and (2) of Table 17 report these results and confirm their consistency with the main estimates. As mentioned in Section 3.1, our sample mainly comprises bank holding companies. Given that it is useful to focus only on the commercial banks considering their structural differences (Salas and Saurina, 2002), we repeat the analysis restricting the sample to commercial banks. Columns (3) and (4) show that the results persist for this subsample.

(Insert Table 16 about here)

To address potential endogeneity and control definition concerns, we implement several additional tests. Given that the effects of the controls may be lagged, we measure all control variables at *t-1*. This ensures the robustness of our results to dynamic timing assumptions and helps mitigate potential endogeneity concerns. Columns (5) and (6) of Table 17 demonstrate that our findings remain unchanged when using lagged controls. Moreover, we control for the regulatory influence of third-party reviewers by including an indicator for audit firms (e.g., the Big Four). Columns (7) and (8) show that this adjustment does not alter the results. Although our baseline specification controls for growth using market-to-book value of common equity, we re-estimate the models applying two alternative growth proxies. Here, we use changes in operating revenue and changes in total revenue as first and second alternative growth variables, following Long *et al.* (2025) and Deng *et al.* (2025), respectively. Columns (9) to (12) indicate that the main results are robust to these alternative growth measures.

(Insert Table 17 about here)

We also test whether our findings are driven by countries or periods. Table 2 reports that the United States (US) accounts for 52.491% of observations in our sample. To ensure that US observations do not unduly influence the results, we re-run the baseline regressions excluding US banks. Columns (13) and (14) of Table 17 show that our estimates remain materially unchanged. Because our sample spans the COVID-19 period, we exclude this period and re-estimate the baseline models. Following Aljughaiman *et al.* (2023), we treat 2020-2021 as the pandemic interval. Columns (15) and (16) confirm the robustness of our results to the exclusion of the COVID period.

Finally, we assess robustness to alternative sample construction and heterogeneity by bank size and growth. To improve cross-country balance, we re-estimate the baseline models using samples that require at least three banks per country and, separately, at least five banks per country. Columns (17) to (20) of Table 17 show consistent coefficients across these balanced samples. Because small and low-growth banks may face unique constraints and oversight compared to larger or faster-growing banks, we also examine these subsamples separately. The results reported in Columns (21) to (24) indicate that our baseline findings hold for small and low-growth banks as well.

7. Conclusion

This research seeks to investigate how banks' managerial ability influences ESG-washing behaviour. Overall, the results suggest a significant negative relationship between banks' managerial ability and their ESG washing, with banks led by more capable managers engaging less in symbolic or misleading sustainability disclosures. The study findings are robust to alternative samples, model specifications, variable definitions, and endogeneity corrections. This evidence aligns with upper-echelons theory, as highly capable bank managers

leverage their cognitive bases and personal characteristics to mitigate ESG washing. In line with signalling theory, these managers use genuine ESG performance to credibly signal quality to investors and stakeholders, thereby enhancing trust in management integrity and future value. Contrary to the predictions of agency theory, high-ability managers tend to avoid symbolic ESG disclosures and instead integrate authentic ESG practices that serve shareholders' long-term interests. Collectively, these results extend the literature on upper-echelons and signalling theories in the context of sustainable finance.

We further examine conditions under which managerial ability is more or less effective at restraining ESG washing. Our moderation analysis shows that high-ability managers are effective at reducing banks' ESG washing in contexts characterised by stronger transparency and oversight, for example when banks adopt integrated reporting, issue profit warnings, or face heightened scrutiny following accounting or executive-compensation controversies. By contrast, this restraining effect weakens or reverses when banks use performance-linked CEO pay or maintain elevated senior executive pay, suggesting that compensation structure prompts even capable managers to embellish sustainability disclosures.

Turning to heterogeneity across ESG dimensions, managerial ability is negatively associated with greenwashing, social washing, and governance washing. The strongest effect is a reduction in greenwashing, followed by a moderate reduction in governance washing, and the smallest effect in social washing. These differential effects suggest that managerial competence matters across all ESG domains, but its influence varies by the type of ESG claim. Subsample analyses show that the negative relationship between managerial ability and ESG washing is concentrated in environments with stronger external monitoring and institutional quality. Specifically, managerial ability significantly reduces ESG washing in public, high-reputation, high-liquidity banks, and those operating in high-HDI countries. In contrast, the effect is absent in private, low-reputation, low-liquidity banks and in low-HDI countries. These

evidence underscore that governance environment and market discipline amplify the capacity of competent managers to deter opportunistic ESG disclosures.

Our findings have several policy and practice implications. First, policymakers should mandate integrated ESG reporting frameworks and standardised disclosure metrics to strengthen transparency and reduce opportunities for ESG washing. Second, regulatory bodies need to align executive compensation with genuine ESG performance rather than short-term market signals to discourage symbolic sustainability claims. Third, oversight authorities should intensify monitoring and enforcement in countries with weaker institutional quality to ensure that private or low-reputation banks adhere to robust ESG standards. Fourth, capacity-building programmes, such as certification and continuous professional development, should strengthen managerial competence in implementing authentic ESG practices. Finally, international cooperation on ESG reporting norms and cross-border regulatory coordination may help harmonise expectations and bolster the credibility of global sustainable finance.

However, one important limitation of our research is that it considers only the banking sector. Future research could extend this framework to non-bank financial institutions and to firms outside the financial sector. Future work could further examine the influence of banks' managerial ability on alternative measures of ESG-washing.

References

Aljughaiman, A. A., Nguyen, T. H., Trinh, V. Q. and Du, A. (2023), "The Covid-19 outbreak, corporate financial distress and earnings management", *International Review of Financial Analysis,* Vol. 88, 102675.

Altunbas, Y. and Chakravarty, S. P. (2001), "Frontier cost functions and bank efficiency", *Economics Letters,* Vol. 72 No. 2, pp. 233-240.

Altunbas, Y., Liu, M.-H., Molyneux, P. and Seth, R. (2000), "Efficiency and risk in Japanese banking", *Journal of Banking & Finance,* Vol. 24 No. 10, pp. 1605-1628.

Andreou, P. C., Karasamani, I., Louca, C. and Ehrlich, D. (2017), "The impact of managerial ability on crisis-period corporate investment", *Journal of Business Research,* Vol. 79, pp. 107-122.

Andreou, P. C., Philip, D. and Robejsek, P. (2016), "Bank liquidity creation and risk-taking: does managerial ability matter?", *Journal of Business Finance & Accounting,* Vol. 43 No. 1-2, pp. 226-259.

Angrist, J. D. and Imbens, G. W. (1995), "Two-stage least squares estimation of average causal effects in models with variable treatment intensity", *Journal of the American Statistical Association,* Vol. 90 No. 430, pp. 431-442.

Baik, B., Brockman, P. A., Farber, D. B. and Lee, S. (2018), "Managerial ability and the quality of firms' information environment", *Journal of Accounting, Auditing & Finance,* Vol. 33 No. 4, pp. 506-527.

Baldini, M., Maso, L. D., Liberatore, G., Mazzi, F. and Terzani, S. (2018), "Role of country- and firm-level determinants in environmental, social, and governance disclosure", *Journal of Business Ethics,* Vol. 150 No. 1, pp. 79-98.

Barth, J. R., Lin, C., Ma, Y., Seade, J. and Song, F. M. (2013), "Do bank regulation, supervision and monitoring enhance or impede bank efficiency?", *Journal of Banking & Finance,* Vol. 37 No. 8, pp. 2879-2892.

Basile, R. and De Benedictis, L. (2008), "Regional unemployment and productivity in Europe", *Papers in Regional Science,* Vol. 87 No. 2, pp. 173-193.

Battese, G. E. and Coelli, T. J. (1995), "A model for technical inefficiency effects in a stochastic frontier production function for panel data", *Empirical Economics,* Vol. 20 No. 2, pp. 325-332.

Berger, A. N. (2003), "The economic effects of technological progress: Evidence from the banking industry", *Journal of Money, Credit and Banking,* Vol. 35 No. 2, pp. 141-176.

Berger, A. N. and Humphrey, D. B. (1997), "Efficiency of financial institutions: International survey and directions for future research", *European Journal of Operational Research,* Vol. 98 No. 2, pp. 175-212.

Berrone, P., Fosfuri, A. and Gelabert, L. (2017), "Does greenwashing pay off? Understanding the relationship between environmental actions and environmental legitimacy", *Journal of Business Ethics,* Vol. 144 No. 2, pp. 363-379.

Bliese, P. D., Schepker, D. J., Essman, S. M. and Ployhart, R. E. (2020), "Bridging methodological divides between macro-and microresearch: Endogeneity and methods for panel data", *Journal of Management,* Vol. 46 No. 1, pp. 70-99.

Bloom, N. and Van Reenen, J. (2010), "Why do management practices differ across firms and countries?", *Journal of Economic Perspectives,* Vol. 24 No. 1, pp. 203-224.

Blundell, R. and Bond, S. (1998), "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics,* Vol. 87 No. 1, pp. 115-143.

Breton, G. and Côté, L. (2006), "Profit and the legitimacy of the Canadian banking industry", *Accounting, Auditing & Accountability Journal,* Vol. 19 No. 4, pp. 512-539.

Cao, R. Q., Zhou, S. B. and Gu, V. C. (2025), "Exploring the relationship between managerial ability and ESG performance: a stochastic data envelopment analysis approach", *Annals of Operations Research*, pp. 1-21.

Cerulli, G. (2015), *Econometric evaluation of socio-economic programs,* Springer-Verlag GmbH, Germany.

Chang, Y. Y., Dasgupta, S. and Hilary, G. (2010), "CEO ability, pay, and firm performance", *Management Science,* Vol. 56 No. 10, pp. 1633-1652.

Chen, J., Liu, X., Song, W. and Zhou, S. (2020), "General managerial skills and corporate social responsibility", *Journal of Empirical Finance,* Vol. 55, pp. 43-59.

Chen, Y., Podolski, E. J. and Veeraraghavan, M. (2015), "Does managerial ability facilitate corporate innovative success?", *Journal of Empirical Finance,* Vol. 34, pp. 313-326.

Coelli, T. J., Prasada Rao, D. S., O'donnell, C. J. and Battese, G. E. (2005), *An introduction to efficiency and productivity analysis,* Springer.

Cornaggia, K. J., Krishnan, G. V. and Wang, C. (2017), "Managerial ability and credit ratings", *Contemporary Accounting Research,* Vol. 34 No. 4, pp. 2094-2122.
Cragg, J. G. and Donald, S. G. (1993), "Testing identifiability and specification in instrumental variable models", *Econometric Theory,* Vol. 9 No. 2, pp. 222-240.
Degryse, H. and Ongena, S. (2005), "Distance, lending relationships, and competition", *The Journal of Finance,* Vol. 60 No. 1, pp. 231-266.
Demerjian, P., Lev, B. and McVay, S. (2012), "Quantifying managerial ability: A new measure and validity tests", *Management Science,* Vol. 58 No. 7, pp. 1229-1248.
Demerjian, P. R., Lev, B., Lewis, M. F. and McVay, S. E. (2013), "Managerial ability and earnings quality", *The Accounting Review,* Vol. 88 No. 2, pp. 463-498.
Deng, B., Peng, Z., Albitar, K. and Ji, L. (2025), "Top management team stability and ESG greenwashing: Evidence from China", *Business Strategy and the Environment,* Vol. 34 No. 1, pp. 450-467.
Diamond, D. W. and Verrecchia, R. E. (1991), "Disclosure, liquidity, and the cost of capital", *The journal of Finance,* Vol. 46 No. 4, pp. 1325-1359.
Dietsch, M. and Lozano-Vivas, A. (2000), "How the environment determines banking efficiency: A comparison between French and Spanish industries", *Journal of Banking & Finance,* Vol. 24 No. 6, pp. 985-1004.
DiMaggio, P. J. and Powell, W. W. (1983), "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields", *American Sociological Review,* Vol. 48 No. 2, pp. 147-160.
Dittmar, A., Mahrt-Smith, J. and Servaes, H. (2003), "International corporate governance and corporate cash holdings", *Journal of Financial and Quantitative Analysis,* Vol. 38 No. 1, pp. 111-133.
Doukas, J. A. and Zhang, R. (2020), "Corporate managerial ability, earnings smoothing, and acquisitions", *Journal of Corporate Finance,* Vol. 65, 101756.
Du, X. (2015), "How the market values greenwashing? Evidence from China", *Journal of Business Ethics,* Vol. 128 No. 3, pp. 547-574.
Gan, H. (2019), "Does CEO managerial ability matter? Evidence from corporate investment efficiency", *Review of Quantitative Finance and Accounting,* Vol. 52 No. 4, pp. 1085-1118.
Gao, H., Li, K. and Ma, Y. (2021), "Stakeholder orientation and the cost of debt: Evidence from state-level adoption of constituency statutes", *Journal of Financial and Quantitative Analysis,* Vol. 56 No. 6, pp. 1908-1944.
Gul, F. A., Khedmati, M., Lim, E. K. and Navissi, F. (2018), "Managerial ability, financial distress, and audit fees", *Accounting Horizons,* Vol. 32 No. 1, pp. 29-51.
Habib, A. and Hasan, M. M. (2017), "Managerial ability, investment efficiency and stock price crash risk", *Research in International Business and finance,* Vol. 42, pp. 262-274.
Hainmueller, J. (2012), "Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies", *Political Analysis,* Vol. 20 No. 1, pp. 25-46.
Hambrick, D. C. (2007), "Upper echelons theory: An update", Academy of Management Briarcliff Manor, NY 10510 pp. 334-343.
Hambrick, D. C. and Mason, P. A. (1984), "Upper echelons: The organization as a reflection of its top managers", *Academy of Management Review,* Vol. 9 No. 2, pp. 193-206.
Heimer, R. Z., Myrseth, K. O. R. and Schoenle, R. S. (2019), "YOLO: Mortality beliefs and household finance puzzles", *The Journal of Finance,* Vol. 74 No. 6, pp. 2957-2996.
Huang, K.-J., Bui, D. G., Hsu, Y.-T. and Lin, C.-Y. (2024), "The ESG washing in banks: Evidence from the syndicated loan market", *Journal of International Money and Finance,* Vol. 142, 103043.

Islam, M. J. A., Moreira, F. and Douch, M. (2025), "Does Banks' environmental engagement impact funding costs?", *Journal of International Financial Markets, Institutions and Money,* Vol. 103, 102184.
Jensen, M. C. and Meckling, W. H. (2019), "Theory of the firm: Managerial behavior, agency costs and ownership structure", *Corporate Governance*, Gower, pp. 77-132.
Koester, A., Shevlin, T. and Wangerin, D. (2017), "The role of managerial ability in corporate tax avoidance", *Management Science,* Vol. 63 No. 10, pp. 3285-3310.
Lamoreaux, P. T. (2016), "Does PCAOB inspection access improve audit quality? An examination of foreign firms listed in the United States", *Journal of Accounting and Economics,* Vol. 61 No. 2-3, pp. 313-337.
Lee, C.-C., Wang, C.-W., Chiu, W.-C. and Tien, T.-S. (2018), "Managerial ability and corporate investment opportunity", *International Review of Financial Analysis,* Vol. 57, pp. 65-76.
Lee, M. T. and Raschke, R. L. (2023), "Stakeholder legitimacy in firm greening and financial performance: What about greenwashing temptations?☆", *Journal of Business Research,* Vol. 155, 113393.
Li, M. and Chen, Q. (2024), "Executive pay gap and corporate ESG greenwashing: Evidence from China", *International Review of Financial Analysis,* Vol. 95, 103375.
Li, W., Li, W., Seppänen, V. and Koivumäki, T. (2023), "Effects of greenwashing on financial performance: Moderation through local environmental regulation and media coverage", *Business Strategy and the Environment,* Vol. 32 No. 1, pp. 820-841.
Liu, Y., Zhang, J. and Dai, Y. (2023), "Analyst following and greenwashing decision", *Finance Research Letters,* Vol. 58, 104510.
Liu, Z. and Li, X. (2024), "The impact of bank fintech on ESG greenwashing", *Finance Research Letters,* Vol. 62, 105199.
Long, L., Wang, C. and Zhang, M. (2025), "Does social media pressure induce corporate hypocrisy? Evidence of ESG greenwashing from China", *Journal of Business Ethics,* Vol. 197 No. 2, pp. 311-338.
Marquis, C., Toffel, M. W. and Zhou, Y. (2016), "Scrutiny, norms, and selective disclosure: A global study of greenwashing", *Organization Science,* Vol. 27 No. 2, pp. 483-504.
Mester, L. J. (1997), "Measuring efficiency at US banks: Accounting for heterogeneity is important", *European Journal of Operational Research,* Vol. 98 No. 2, pp. 230-242.
Minor, D. (2016), "Executive compensation and environmental harm", *Harvard Business School Strategy Unit Working Paper,* No. 16-076.
Mishra, D. R. (2014), "The dark side of CEO ability: CEO general managerial skills and cost of equity capital", *Journal of Corporate Finance,* Vol. 29, pp. 390-409.
Neter, J., Wasserman, W. and Kutner, M. H. (1983), *Applied linear regression models,* Richard D. Irwin.
Oster, E. (2019), "Unobservable selection and coefficient stability: Theory and evidence", *Journal of Business & Economic Statistics,* Vol. 37 No. 2, pp. 187-204.
Pasiouras, F., Tanna, S. and Zopounidis, C. (2009), "The impact of banking regulations on banks' cost and profit efficiency: Cross-country evidence", *International Review of Financial Analysis,* Vol. 18 No. 5, pp. 294-302.
Pinar, M., Stengos, T. and Topaloglou, N. (2022), "Stochastic dominance spanning and augmenting the human development index with institutional quality", *Annals of Operations Research,* Vol. 315 No. 1, pp. 341-369.
Pizzetti, M., Gatti, L. and Seele, P. (2021), "Firms talk, suppliers walk: Analyzing the locus of greenwashing in the blame game and introducing 'vicarious greenwashing'", *Journal of Business Ethics,* Vol. 170 No. 1, pp. 21-38.

Porta, R. L., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. W. (1998), "Law and finance", *Journal of Political Economy,* Vol. 106 No. 6, pp. 1113-1155.
Randolph, J. J. and Falbe, K. (2014), "A step-by-step guide to propensity score matching in R", *Practical Assessment, Research & Evaluation,* Vol. 19 No. 18.
Rhee, M. and Haunschild, P. R. (2006), "The liability of good reputation: A study of product recalls in the US automobile industry", *Organization Science,* Vol. 17 No. 1, pp. 101-117.
Salas, V. and Saurina, J. (2002), "Credit risk in two institutional regimes: Spanish commercial and savings banks", *Journal of Financial Services Research,* Vol. 22 No. 3, pp. 203-224.
Scholtens, B. (2009), "Corporate social responsibility in the international banking industry", *Journal of Business Ethics,* Vol. 86 No. 2, pp. 159-175.
Sealey Jr, C. W. and Lindley, J. T. (1977), "Inputs, outputs, and a theory of production and cost at depository financial institutions", *The Journal of Finance,* Vol. 32 No. 4, pp. 1251-1266.
Senaviratna, N. and Cooray, T. (2019), "Diagnosing multicollinearity of logistic regression model", *Asian Journal of Probability and Statistics,* Vol. 5 No. 2, pp. 1-9.
Spence, M. (2002), "Signaling in retrospect and the informational structure of markets", *American Economic Review,* Vol. 92 No. 3, pp. 434-459.
Stock, J. H. and Yogo, M. (2002), "Testing for weak instruments in linear IV regression", National Bureau of Economic Research Cambridge, Mass., USA.
Treepongkaruna, S., Kyaw, K. and Jiraporn, P. (2022), "Shareholder litigation rights and ESG controversies: A quasi-natural experiment", *International Review of Financial Analysis,* Vol. 84, 102396.
Watson, S. K. and Elliot, M. (2016), "Entropy balancing: a maximum-entropy reweighting scheme to adjust for coverage error", *Quality & Quantity,* Vol. 50 No. 4, pp. 1781-1797.
Welch, K. and Yoon, A. (2023), "Do high-ability managers choose ESG projects that create shareholder value? Evidence from employee opinions", *Review of Accounting Studies,* Vol. 28 No. 4, pp. 2448-2475.
Wooldridge, J. M. (2010), *Econometric analysis of cross section and panel data,* MIT press.
Wooldridge, J. M. (2016), *Introductory econometrics a modern approach,* South-Western Cengage Learning.
Wu, M.-W. and Shen, C.-H. (2013), "Corporate social responsibility in the banking industry: Motives and financial performance", *Journal of Banking & Finance,* Vol. 37 No. 9, pp. 3529-3547.
Wu, Y., Zhang, K. and Xie, J. (2020), "Bad greenwashing, good greenwashing: Corporate social responsibility and information transparency", *Management Science,* Vol. 66 No. 7, pp. 3095-3112.
Yu, E. P.-y., Van Luu, B. and Chen, C. H. (2020), "Greenwashing in environmental, social and governance disclosures", *Research in International Business and Finance,* Vol. 52, 101192.
Yuan, Y., Tian, G., Lu, L. Y. and Yu, Y. (2019), "CEO ability and corporate social responsibility", *Journal of Business Ethics,* Vol. 157 No. 2, pp. 391-411.
Yue, J. and Li, Y. (2023), "Media attention and corporate greenwashing behavior: Evidence from China", *Finance Research Letters,* Vol. 55, 104016.
Yue, S., Yang, M., Cao, J. and Yang, J. (2025), "Do management climate change concerns mitigate greenwashing? Evidence from China", *Emerging Markets Review,* Vol. 67, 101308.

Yung, K. and Chen, C. (2018), "Managerial ability and firm risk-taking behavior", *Review of Quantitative Finance and Accounting,* Vol. 51 No. 4, pp. 1005-1032.
Zhang, D. (2022), "Environmental regulation, green innovation, and export product quality: What is the role of greenwashing?", *International Review of Financial Analysis,* Vol. 83, 102311.
Zhang, D. (2023), "Does green finance really inhibit extreme hypocritical ESG risk? A greenwashing perspective exploration", *Energy Economics,* Vol. 121, 106688.
Zhang, Y. and Wiersema, M. F. (2009), "Stock market reaction to CEO certification: The signaling role of CEO background", *Strategic Management Journal,* Vol. 30 No. 7, pp. 693-710.

Figure 1: Scatter plots of instrumental variables and banks' managerial ability

This figure presents the relationship between banks' average managerial ability scores and two instrumental variables: the average managerial ability score of the closest bank (left panel) and the average country-year median managerial ability score (right panel). The data cover 58 sample countries from 2015 to 2023. Each panel includes a linear fit line to illustrate the correlation.

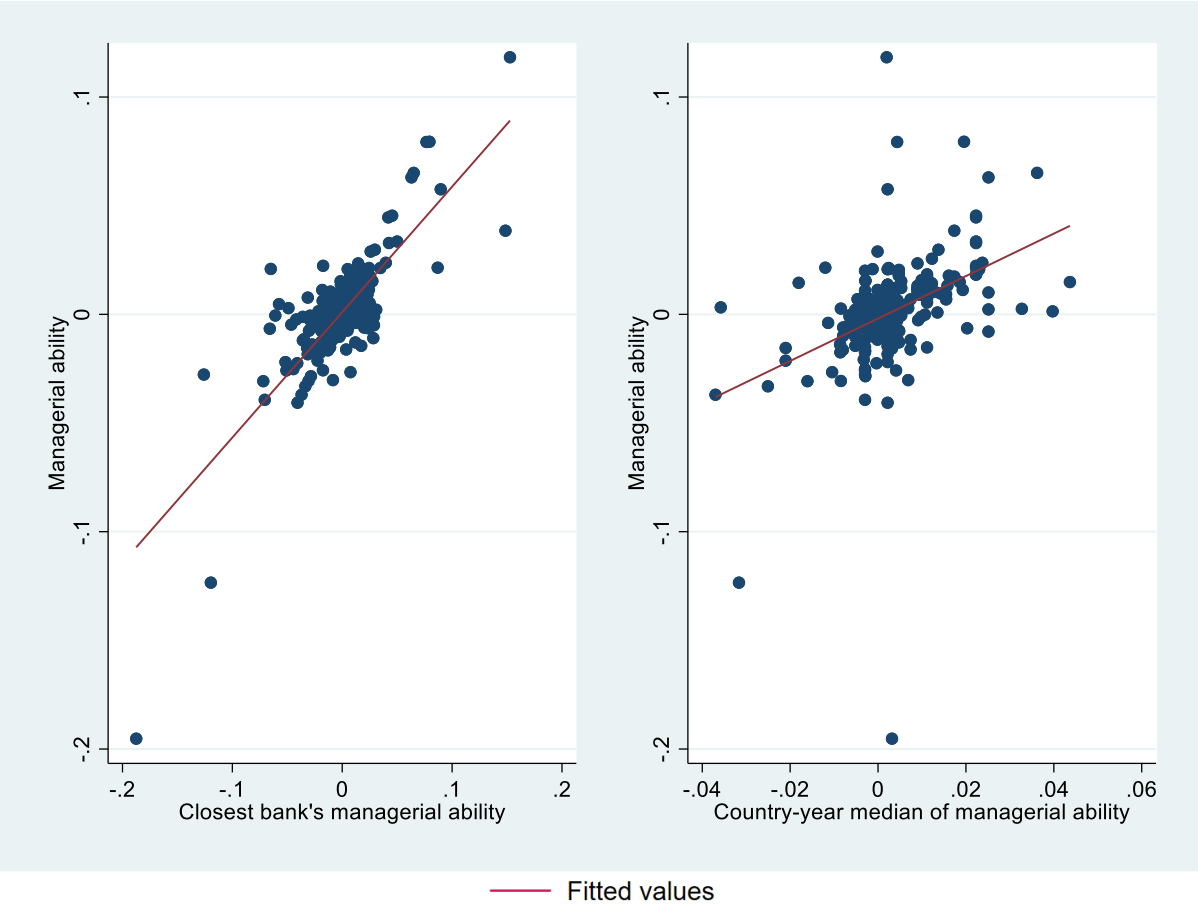

Figure 2: ESG washing trend in the banking industry

This figure presents the trends in the average ESG washing levels for the 461 sample banks in this study from 2015 to 2023. Each panel shows the annual average of ESG washing (top left), environmental washing (top right), social washing (bottom left), and governance washing (bottom right) over the study period.

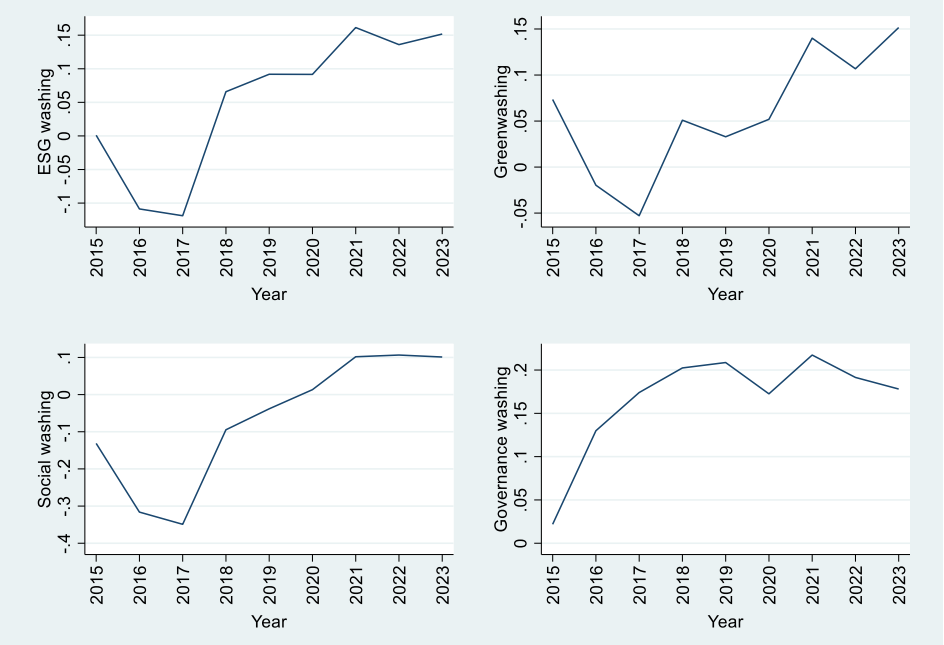

Figure 3: ESG performance and washing behaviour in the banking industry

This figure presents the relationship between the average ESG performance scores and the average levels of ESG washing for the 461 sample banks in this study from 2015 to 2023. Each panel shows the scatterplot and fitted trend line for the average ESG washing (top left), average environmental washing (top right), average social washing (bottom left), and average governance washing (bottom right) in relation to their respective average performance scores.

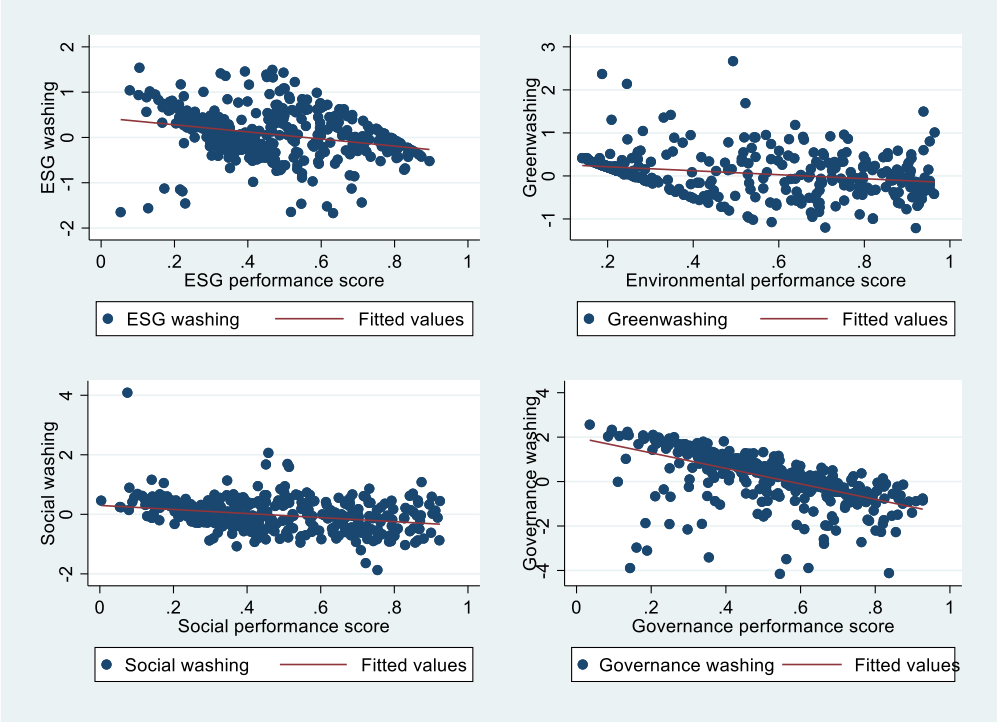

Figure 4: Moderation effect on banks' managerial ability and ESG washing relationship

This figure plots predicted ESG washing (ESGW), with 95% confidence intervals, against managerial ability (MA) for 461 banks from 2015 to 2023 under six moderating conditions. The six panels break down as follows: the top-left compares banks with (AC = 1) and without (AC = 0) accounting controversies; the top-right contrasts those with (CTSR = 1) and without (CTSR = 0) a CEO compensation link to total shareholder return (TSR); the middle-left shows banks with (ECC = 1) and without (ECC = 0) executive compensation controversies; the middle-right contrasts those with (ISM = 1) and without (ISM = 0) an integrated MD&A strategy; the bottom-left compares banks issuing (PW = 1) and not issuing (PW = 0) profit warnings; and the bottom-right plots slopes at low (15.038), medium (15.660) and high (16.350) levels of total senior executive compensation (TSEC), illustrating how each of these six factors moderates the MA-ESGW relationship.

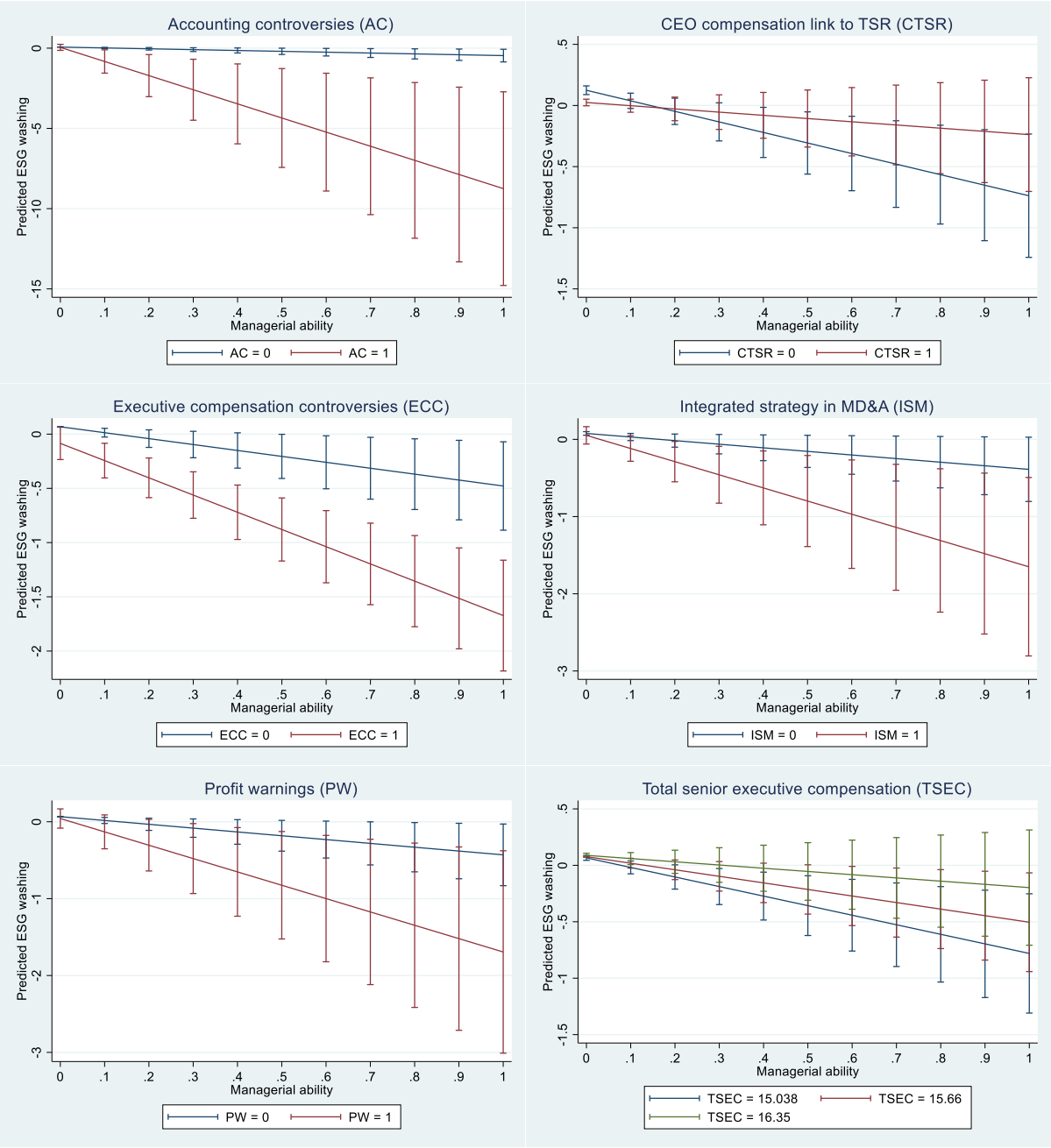

Figure 5: Marginal effect of managerial ability on ESG washing across moderators

This figure plots the marginal effect of managerial ability (MA) on ESG washing (ESGW), with 95% confidence intervals, across varying levels of four moderating conditions for 461 banks from 2015 to 2023. The top-left panel shows how the effect of managerial ability varies with accounting controversies; the top-right shows variation across the CEO compensation link to total shareholder return; the middle-left presents effects by executive compensation controversies; the middle-right shows how integrated strategy in MD&A shapes the relationship; the bottom-left depicts the effect across profit warnings; and the bottom-right illustrates the MA-ESGW link at differing levels of total senior executive compensation.

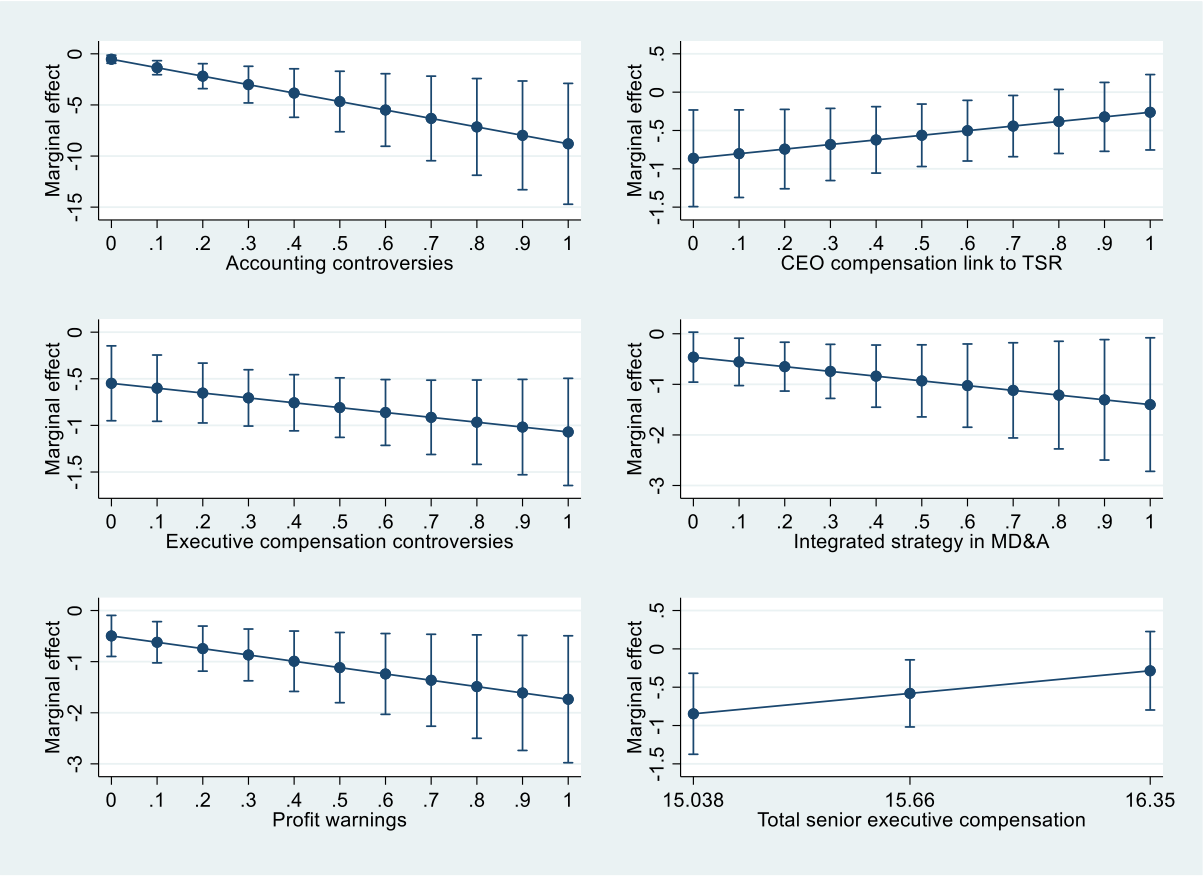

Table 1: The notations, definitions, and sources of study variables

Variables	Notations	Definitions	Sources
Dependent variables			
ESG washing based on min-max normalisation	ESG_M	The difference between a bank's min-max normalised ESG disclosure and min-max normalised ESG performance in a year, indicating the extent to which its disclosures are inflated relative to its performance	Bloomberg and LSEG Workspace
ESG washing based on z-scores	ESGW_Z	The difference between a bank's z-score standardised ESG disclosure and z-score standardised ESG performance in a year, capturing how much its reported disclosures exceed its actual ESG practices	Bloomberg and LSEG Workspace
Main independent variable			
Managerial ability	MA	Managerial ability is measured following Demerjian *et al.* (2012). First, we estimate each bank's profit efficiency using stochastic frontier analysis (SFA). We then regress those efficiency scores on observable bank characteristics. The resulting regression residuals, i.e. the portion of efficiency unexplained by observed factors, are interpreted as managerial ability.	Orbis Bank Focus and World Development Indicators
Bank-level control variables			
Growth	GRO	Market-to-book value of common equity	LSEG Workspace
Leverage	LEV	Total debt to common equity	LSEG Workspace
Liquidity	LIQ	Liquid assets divided by total assets	LSEG Workspace
Profitability	ROA	Income before discontinued operations and extraordinary items divided by total assets	LSEG Workspace
Reputation	REP	Natural logarithm of a bank's age in years since establishment	S&P Capital IQ Pro
Size	SIZE	Natural logarithm of total assets at year-end	LSEG Workspace
Country level control variables			
Foreign direct investment	FDI	Natural logarithm of level of foreign direct investment, net inflows (BoP, current US$)	World Development Indicators
GDP growth	GDP	Annual GDP per capita growth in percentage	World Development Indicators
Human development index	HDI	Natural logarithm of human development index. The human development index (HDI) combines normalised measures of health, education, and standard of living into a single summary indicator of average human development, calculated as the geometric mean of these three dimensions.	United Nations Development Programme
Moderation analysis variables			
Accounting controversies	AC	An indicator variable equal to 1 if a bank received media attention for controversies related to	LSEG Workspace

		aggressive or non-transparent accounting practices and 0 otherwise	
CEO compensation link to TSR	CTSR	An indicator variable equal to 1 if a CEO's pay is tied to total shareholder return (TSR) and 0 otherwise	LSEG Workspace
Executive compensation controversies	ECC	An indicator variable equal to 1 if a bank received media scrutiny regarding high executive or board remuneration and 0 otherwise	LSEG Workspace
Integrated strategy in MD&A	ISM	An indicator variable equal to 1 if a bank explicitly discusses both financial and extra-financial factors in its management discussion and analysis (MD&A) or business review section of the annual report (for U.S. banks, this is within the 10-K MD&A and for U.K. banks, it is within the Strategic Report) and 0 otherwise.	LSEG Workspace
Profit warnings	PW	An indicator variable equal to 1 if a bank issued a profit warning during the year and 0 otherwise	LSEG Workspace
Total senior executive compensation	TSEC	Total compensation paid to all senior executives as reported by a bank	LSEG Workspace
Heterogeneity analysis variables			
Greenwashing based on min-max normalisation	ENV_M	The difference between a bank's min-max normalised environmental disclosure and min-max normalised environmental performance in a year, indicating the extent to which its disclosures are inflated relative to its performance	Bloomberg and LSEG Workspace
Greenwashing based on z-scores	ENV_Z	The difference between a bank's z-score standardised environmental disclosure and z-score standardised environmental performance in a year, capturing how much its reported disclosures exceed its actual environmental practices	Bloomberg and LSEG Workspace
Social washing based on min-max normalisation	SOC_M	The difference between a bank's min-max normalised social disclosure and min-max normalised social performance in a year, indicating the extent to which its disclosures are inflated relative to its performance	Bloomberg and LSEG Workspace
Social washing based on z-scores	SOC_Z	The difference between a bank's z-score standardised social disclosure and z-score standardised social performance in a year, capturing how much its reported disclosures exceed its actual social practices	Bloomberg and LSEG Workspace
Governance washing based on min-max normalisation	GOV_M	The difference between a bank's min-max normalised governance disclosure and min-max normalised governance performance in a year, indicating the extent to which its disclosures are inflated relative to its performance	Bloomberg and LSEG Workspace
Governance washing based on z-scores	GOV_Z	The difference between a bank's z-score standardised governance disclosure and z-score standardised governance performance in a	Bloomberg and LSEG Workspace

		year, capturing how much its reported disclosures exceed its actual governance practices	
Robustness test variables			
Audit firm	BIG4	An indicator variable equal to 1 if a bank's auditor is one of the Big Four firms and 0 otherwise	S&P Capital IQ Pro
Alternative growth variable 1	AGV1	Change in total operating revenue calculated as total operating revenue this year minus total operating revenue last year divided by total operating revenue last year	LSEG Workspace
Alternative growth variable 2	AGV2	Change in total revenue calculated as total revenue this year minus total revenue last year divided by total revenue last year	LSEG Workspace

Table 2: Banks and observations per country

Country	No. of banks	No. of observations	Percentage of observations	Cumulative percentage of observations
Argentina	6	34	1.008	1.008
Australia	5	22	0.652	1.661
Austria	4	32	0.949	2.610
Bahrain	4	36	1.068	3.677
Belgium	1	9	0.267	3.944
Brazil	2	12	0.356	4.300
Canada	6	54	1.601	5.902
Chile	2	15	0.445	6.346
China	21	169	5.012	11.358
Colombia	5	38	1.127	12.485
Cyprus	1	6	0.178	12.663
Denmark	7	55	1.631	14.294
Egypt	5	28	0.830	15.125
Finland	3	23	0.682	15.807
France	3	26	0.771	16.578
Germany	2	18	0.534	17.112
Greece	4	36	1.068	18.179
Hong Kong	5	45	1.335	19.514
Hungary	1	9	0.267	19.781
Iceland	1	9	0.267	20.047
Indonesia	6	28	0.830	20.878
Ireland	1	7	0.208	21.085
Israel	1	7	0.208	21.293
Italy	10	83	2.461	23.754
Japan	1	2	0.059	23.814
Kazakhstan	1	9	0.267	24.081
Kenya	2	8	0.237	24.318
Kuwait	4	36	1.068	25.386
Lebanon	1	4	0.119	25.504
Malaysia	8	59	1.750	27.254
Mexico	2	3	0.089	27.343
Morocco	2	14	0.415	27.758

Netherlands	1	9	0.267	28.025
Norway	1	9	0.267	28.292
Oman	1	9	0.267	28.559
Peru	2	18	0.534	29.093
Philippines	7	63	1.868	30.961
Poland	5	26	0.771	31.732
Portugal	1	9	0.267	31.999
Qatar	5	36	1.068	33.066
Romania	2	14	0.415	33.482
Russia	3	21	0.623	34.104
Saudi Arabia	8	58	1.720	35.824
Singapore	3	22	0.652	36.477
Slovakia	1	6	0.178	36.655
Slovenia	1	9	0.267	36.922
South Africa	4	33	0.979	37.900
South Korea	4	32	0.949	38.849
Spain	6	51	1.512	40.362
Sweden	3	27	0.801	41.163
Switzerland	2	2	0.059	41.222
Thailand	2	18	0.534	41.756
Togo	1	9	0.267	42.023
Turkey	4	30	0.890	42.912
United Arab Emirates	14	106	3.144	46.056
United Kingdom	8	47	1.394	47.450
United States	244	1770	52.491	99.941
Vietnam	1	2	0.059	100.000
Total	461	3372		

Table 3: The sources, notations, definitions, and summary statistics of efficiency frontier function variables

Variables	Notations	Definitions	Mean	Standard deviation	Minimum	Median	Maximum
Dependent variable (Source: Orbis Bank Focus)							
Total profit	π	(Total revenue – total costs)/total assets	0.107	0.798	-0.059	0.024	29.201
Inputs (Source: Orbis Bank Focus)							
Cost of labour	I1	Staff expenses/total assets	0.023	0.042	0.003	0.013	0.504
Cost of borrowed funds	I2	Interest expenses/total customer deposits	0.020	0.037	0.000	0.011	0.652
Cost of physical capital	I3	Other operating expenses/total fixed assets	11.793	42.377	0.012	1.239	634.857
Outputs (Source: Orbis Bank Focus)							
Gross loans	O1	Total customer gross loans and advances/total assets	1.415	2.683	0.068	0.722	35.813
Other earning assets	O2	Total other earning assets/total assets	0.038	0.176	0.000	0.013	3.499
Off-balance-sheet items	O3	Total off-balance sheet exposure/total assets	0.777	2.439	0.000	0.240	42.522
Determinants of efficiency (Source: World Development Indicators)							
GDP growth	Z1	Annual GDP per capita growth in percentage	2.310	2.047	0.000	1.830	8.874
Inflation	Z2	Annual GDP deflator in percentage	3.486	8.772	-25.958	1.900	150.001
Unemployment	Z3	Total unemployment/total labour force	5.526	3.769	0.100	4.560	34.007
Control variable (Source: Orbis Bank Focus)							
Total equity	EQ	Total equity/total assets	0.221	0.417	0.022	0.119	4.761

Table 4: Estimating managerial ability

This table presents the regression results used in estimating managerial ability. The results are derived using Equation (7). The sample represents a total of 461 banks and 58 countries, covering 2015 to 2023. The standard errors are mentioned within the parentheses. *** and ** denote statistical significance at the 1% and 5% levels, respectively.

	PE
SIZE	0.006
	(0.007)
EMP	0.013**
	(0.006)
AGE	-0.051***
	(0.008)
LEV	0.005
	(0.005)
FCF	0.011**
	(0.005)
Time fixed effects	Yes
Observations	2850

Table 5: Propensity score matching – Diagnostic testing

This table presents the results of a diagnostic test used to assess the matching quality of the propensity scores estimated. The matched sample represents a total of 401 banks and 53 countries, covering 2015 to 2023. The treated group includes 215 banks from 37 countries, and the control group includes 186 banks from 33 countries. Table 1 presents the definitions of the variables. The standard errors, clustered by bank types, are robust to heteroscedasticity and are mentioned within the parentheses. *** denotes statistical significance at the 1% level.

	Pre-match treatment – managerial ability (1)	Post-match treatment – managerial ability (2)
Size	0.099***	0.112***
	(0.015)	(0.006)
Growth	0.197***	0.197***
	(0.023)	(0.036)
Reputation	0.007	0.036
	(0.059)	(0.074)
Profitability	95.432***	103.722***
	(2.062)	(3.060)
Liquidity	-1.209***	-2.096***
	(0.383)	(0.526)
Leverage	-0.121***	-0.076***
	(0.037)	(0.028)
Pseudo R-squared	0.062	0.068
Observations	3199	2929

Table 6: Summary statistics

This table presents summary statistics of the study variables based on annual data covering 2015 to 2023. Table 1 includes the definitions of the variables. All the variables are winsorised at the 1st and 99th percentiles.

	Mean	Standard Deviation	Minimum	Median	Maximum
ESG washing (z-score based)	0.062	0.587	-1.669	0.064	1.539
ESG washing (min-max normalised)	0.231	0.121	-0.096	0.232	0.526
Managerial ability	0.001	0.053	-0.195	0.003	0.163
Size	10.175	1.826	8.095	9.775	14.900
Growth	1.432	0.905	0.173	1.266	6.400
Reputation	4.252	0.823	2.639	4.538	5.549
Profitability	0.010	0.006	-0.012	0.010	0.031
Liquidity	0.228	0.106	0.048	0.208	0.580
Leverage	1.079	0.863	0.004	0.820	2.767
Gross domestic product	2.310	2.047	0.000	1.830	8.874
Human development index	0.892	0.062	0.738	0.924	0.953
Foreign direct investment	25.213	1.816	20.043	26.093	26.960

Table 7: Correlation matrix

This table presents correlations among the study variables based on annual data covering 2015 to 2023. Table 1 includes the notations and definitions of the variables. ***, **, and * denote statistically significant correlations at the 1%, 5%, and 10% levels, respectively.

	MA	SIZE	GRO	REP	ROA	LIQ	LEV	GDP	HDI
SIZE	0.004								
GRO	0.068***	-0.171***							
REP	0.001	0.207***	-0.098***						
ROA	0.174***	-0.156***	0.259***	-0.110***					
LIQ	0.001	0.231***	-0.016	0.125***	0.008				
LEV	-0.006	0.445***	-0.128***	0.085***	-0.282***	0.086***			
GDP	-0.016	0.114***	-0.064***	-0.101***	-0.028*	0.023	0.000		
HDI	-0.033*	-0.231***	-0.002	0.252***	-0.180***	-0.071***	-0.086***	-0.266***	
FDI	-0.056***	-0.291***	0.056***	0.107***	-0.082***	-0.202***	-0.150***	0.034*	0.503***

Table 8: Banks' managerial ability and ESG washing

This table presents the results of Equation (8) regarding the relationship between banks' managerial ability and ESG washing. The results are derived using fixed-effect estimation, covering 2015 to 2023. The sample represents a total of 461 banks and 58 countries. Table 1 presents the definitions of the variables. The standard errors are robust to heteroscedasticity and are mentioned within the parentheses. They are clustered by bank in Columns (1) and (3), and by country in Columns (2) and (4). ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	ESGW_Z (1)	ESGW_Z (2)	ESGW_M (3)	ESGW_M (4)
Managerial ability	-0.545***	-0.545***	-0.110***	-0.110***
	(0.201)	(0.167)	(0.041)	(0.033)
Size	0.020	0.020	0.004	0.004
	(0.089)	(0.084)	(0.018)	(0.017)
Growth	0.014	0.014	0.003	0.003
	(0.020)	(0.019)	(0.004)	(0.004)
Reputation	-1.325**	-1.325***	-0.283**	-0.283***
	(0.567)	(0.357)	(0.118)	(0.076)
Profitability	-5.125*	-5.125	-0.978	-0.978
	(3.028)	(3.132)	(0.619)	(0.631)
Liquidity	-0.152	-0.152	-0.028	-0.028
	(0.273)	(0.313)	(0.055)	(0.061)
Leverage	-0.041	-0.041	-0.009	-0.009
	(0.039)	(0.026)	(0.008)	(0.005)
Gross domestic product	-0.014	-0.014	-0.003	-0.003
	(0.009)	(0.009)	(0.002)	(0.002)
Human development index	4.450	4.450	0.862	0.862
	(3.356)	(4.200)	(0.681)	(0.852)
Foreign direct investment	0.023	0.023	0.004	0.004
	(0.024)	(0.018)	(0.005)	(0.003)
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.683	0.683	0.693	0.693
Observations	2048	2048	2048	2048

Table 9: Instrumental variable regression

This table presents the results of Equations (9) and (10) in a two-stage least squares regression approach. The instrumental variables are closest bank's managerial ability and country-year median of managerial ability. Table 1 presents the definitions of the variables. The standard errors are mentioned within the parentheses. *** and * denote statistical significance at the 1% and 10% levels, respectively. The weak identification test reports the Cragg and Donald (1993) Wald F statistic where †† and † indicate that this statistic is <10% and 10-15% maximal IV-size critical values of Stock and Yogo (2002), respectively. The sample represents a total of 461 banks and 58 countries, covering 2015 to 2023. To conserve space, the results of the control variables are not reported.

Panel A – First stage output						
	MA (1)	MA (2)	MA (3)	MA (4)	MA (5)	MA (6)
Closest bank's managerial ability	0.088***	0.088***			0.080***	0.080***
	(0.024)	(0.024)			(0.021)	(0.021)
Country-year median managerial ability			1.055***	1.055***	1.001***	1.001***
			(0.048)	(0.048)	(0.050)	(0.050)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Weak identification test	13.501†	13.501†	474.887††	474.887††	210.081††	210.081††
Sargan test p-value					0.203	0.239
Observations	1984	1984	2048	2048	1984	1984
Panel B – Second stage output						
	ESGW_Z (1)	ESGW_M (2)	ESGW_Z (3)	ESGW_M (4)	ESGW_Z (5)	ESGW_M (6)
Managerial ability (predicted)	-3.800*	-0.717*	-1.120***	-0.204***	-0.367***	-0.256***
	(2.143)	(0.434)	(0.365)	(0.075)	(0.392)	(0.080)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F statistic	6.14***	4.79***	7.81***	6.03***	7.84***	5.97***
Observations	1984	1984	2048	2048	1984	1984

Table 10: Two-step system GMM

This table presents the relationship between banks' managerial ability and ESG washing using the two-step system GMM approach. Table 1 presents the definitions of the variables. The standard errors are mentioned within the parentheses. *** and * denote statistical significance at the 1% and 10% levels, respectively. The sample represents a total of 461 banks and 58 countries, covering 2015 to 2023. To conserve space, the results of all the control variables are not reported.

	ESGW_Z (1)	ESG_M (2)
Managerial ability	-0.758*	-0.436*
	(0.453)	(0.260)
L.ESGW_Z	0.635***	
	(0.071)	
L.ESGW_M		0.563***
		(0.088)
Bank-level controls	Yes	Yes
Country-level controls	Yes	Yes
Time dummies	Yes	Yes
AR(1): *p-value*	0.000	0.000
AR(2): *p-value*	0.131	0.104
Hansen test: *p*-value	0.349	0.150
Groups	331	332
Instruments	39	42
Observations	1653	1659

Table 11: Propensity score matching and entropy balancing

This table presents the relationship between banks' managerial ability and ESG washing using the propensity score matching and entropy balancing methods. Columns (1) to (2) and (3) to (4) show the results based on the propensity score matching approach and the entropy balancing approach, respectively. The standard errors, clustered by banks, are robust to heteroscedasticity and are mentioned within the parentheses. Table 1 presents the definitions of the variables. To conserve space, the results of the control variables are not reported. *** denotes statistical significance at the 1% level.

	Propensity score matching		Entropy balancing	
	ESGW_Z (1)	ESGW_M (2)	ESGW_Z (3)	ESGW_M (4)
Managerial ability	-0.598***	-0.121***	-0.656***	-0.133***
	(0.207)	(0.042)	(0.233)	(0.048)
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.677	0.686	0.697	0.701
Observations	1987	1987	1987	1987

Table 12: Selection on unobservables in regression estimates

This table presents results from the stability test proposed by Oster (2019). The coefficient of interest (β) and r-squared (R^2) in rows 'Controlled' and 'Uncontrolled' are employed as inputs. Controlled inputs refer to estimates from the baseline regression with observed controls included, while uncontrolled inputs come from a regression without those controls. Controlled R^2 is used to calculate the maximum attainable R^2 (R^2max).

		ESGW_Z (1)	ESGW_M (2)
Controlled	Beta (β) statistic	-0.545	-0.110
	R-squared	0.074	0.059
Uncontrolled	Beta (β) statistic	-0.667	-0.133
	R-squared	0.009	0.008
Delta (δ) statistic (β = 0, R^2max = 1.3*R^2)		9.453	9.567
Oster bounds (δ = 1, R^2max = 1.3*R^2)		[-0.545, -0.500]	[-0.110, -0.101]

Table 13: Moderation Analysis

This table reports the regression estimates for analysing the impact of banks' managerial ability on ESG washing with additional interactions to identify potential moderating factors. The results are derived using Equation (8) fixed-effect estimation. The sample represents a total of 461 banks and 58 countries, covering 2015 to 2023. Table 1 presents the definitions of the variables. To conserve space, the results of the control variables are not reported. The standard errors are mentioned within the parentheses. Except for Columns (3), (4), (7), and (8), they are clustered by banks and robust to heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A				
Moderating variable	Accounting controversies		CEO compensation link to TSR	
	ESGW_Z (1)	ESGW_M (2)	ESGW_Z (3)	ESGW_M (4)
Managerial ability x Moderating variable	-8.274***	-1.741***	0.600*	0.132*
	(3.024)	(0.625)	(0.354)	(0.074)
Managerial ability	-0.529***	-0.107**	-0.863***	-0.183***
	(0.201)	(0.041)	(0.256)	(0.054)
Moderating variable	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	No
R-squared	0.684	0.694	0.687	0.682
Observations	2048	2048	2040	2040
Panel B				
Moderating variable	Executive compensation controversies		Integrated strategy in MD&A	
	ESGW_Z (5)	ESGW_M (6)	ESGW_Z (7)	ESGW_M (8)
Managerial ability x Moderating variable	-1.042***	-0.218***	-1.236**	-0.234*
	(0.319)	(0.080)	(0.618)	(0.127)
Managerial ability	-0.546***	-0.111***	-0.465**	-0.100**
	(0.208)	(0.042)	(0.213)	(0.044)
Moderating variable	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes

Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No
R-squared	0.668	0.681	0.659	0.672
Observations	2048	2048	1691	1691
Panel C				
Moderating variable	Profit warnings		Total senior executive compensation	
	ESGW_Z (9)	ESGW_M (10)	ESGW_Z (11)	ESGW_M (12)
Managerial ability x Moderating variable	-1.239* (0.629)	-0.276** (0.134)	0.428* (0.219)	0.086* (0.046)
Managerial ability	-0.497** (0.205)	-0.099** (0.042)	-7.276** (3.453)	-1.472** (0.719)
Moderating variable	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.687	0.697	0.677	0.689
Observations	2031	2031	1854	1854

Table 14: Heterogeneity Analysis

This table presents the relationship between banks' managerial ability and components of ESG washing. The results are derived using Equation (8) fixed-effect estimation, with ENVW, SOCW, and GOVW replacing ESGW in Columns (1) to (2), (3) to (4), and (5) to (6), respectively. The sample represents a total of 461 banks and 58 countries, covering 2015 to 2023. Table 1 presents the definitions of the variables. To conserve space, the results of the control variables are not reported. The standard errors are mentioned within the parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Greenwashing		Social washing		Governance washing	
	ENVW_Z (1)	ENVW_M (2)	SOCW_Z (3)	SOCW_M (4)	GOVW_Z (5)	GOVW_M (6)
Managerial ability	-0.514*** (0.177)	-0.139*** (0.050)	-0.395** (0.179)	-0.080** (0.039)	-0.452* (0.263)	-0.091* (0.055)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.630	0.757	0.682	0.718	0.752	0.741
Observations	2048	2048	2048	2048	2048	2048

Table 15: Bank- and country-based subsample analysis

This table presents the relationship between banks' managerial ability and ESG washing in different bank- and country-based subsamples. The results are derived using Equation (8) fixed-effect estimation, covering 2015 to 2023. Since the median reputation, liquidity, and human development index (HDI) of this study's sample are 4.538, 0.208, and 0.924 respectively, banks with values more than these medians are grouped as high reputation banks, high liquidity banks, and high-HDI banks, respectively. Conversely, banks with values at or below these medians are classified as low reputation banks, low liquidity banks, and low-HDI banks, respectively. Table 1 presents the definitions of the variables. To conserve space, the results of the control variables are not reported. The standard errors are mentioned within the parentheses. Except for Columns (13) to (16), they are clustered by banks and robust to

heteroscedasticity. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A – Ownership structure				
	Public banks		Private banks	
	ESGW_Z (1)	ESGW_M (2)	ESGW_Z (3)	ESGW_M (4)
Managerial ability	-0.547***	-0.110***	0.267	0.042
	(0.205)	(0.042)	(0.783)	(0.162)
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.679	0.689	0.916	0.925
Observations	2004	2004	44	44
Panel B – Reputation				
	High reputation banks		Low reputation banks	
	ESGW_Z (5)	ESGW_M (6)	ESGW_Z (7)	ESGW_M (8)
Managerial ability	-0.641**	-0.126**	-0.378	-0.079
	(0.255)	(0.052)	(0.313)	(0.064)
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.649	0.675	0.720	0.712
Observations	1177	1177	869	869
Panel C – Liquidity				
	High liquidity banks		Low liquidity banks	
	ESGW_Z (9)	ESGW_M (10)	ESGW_Z (11)	ESGW_M (12)
Managerial ability	-0.659**	-0.126**	-0.342	-0.073
	(0.281)	(0.057)	(0.288)	(0.060)
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.734	0.748	0.705	0.702
Observations	955	955	1022	1022
Panel D – Human development index				
	High-HDI banks		Low-HDI banks	
	ESGW_Z (13)	ESGW_M (14)	ESGW_Z (15)	ESGW_M (16)
Managerial ability	-0.420*	-0.087*	-0.355	-0.066
	(0.249)	(0.052)	(0.272)	(0.055)
Bank-level controls	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.671	0.686	0.737	0.745
Observations	1126	1126	959	959

Table 16: Robustness tests – Different model specifications

This table presents the results of Equation (8) regarding the relationship between banks' managerial ability and ESG washing. The results are derived using the random-effect estimation in Columns (1) to (2) and the fixed-effect estimation in Columns (3) to (16). Table 1 presents the definitions of the variables. The standard errors are mentioned within the parentheses. *** denotes statistical significance at the 1% levels. The sample represents a total of 461 banks and 58 countries, covering 2015 to 2023. To conserve space, the results of the control variables are not reported.

Panel A								
	ESGW_Z (1)	ESGW_M (2)	ESGW_Z (3)	ESGW_M (4)	ESGW_Z (5)	ESGW_M (6)	ESGW_Z (7)	ESGW_M (8)
Managerial ability	-0.322**	-0.0643**	-0.332**	-0.0664**	-0.334**	-0.0646**	-0.340**	-0.0661**
	(0.142)	(0.0291)	(0.144)	(0.0294)	(0.141)	(0.0291)	(0.142)	(0.0292)
Bank-level controls	No	No	No	No	No	No	No	No
Country level controls	No	No	No	No	No	No	No	No
Bank fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
Time fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
R-squared	0.003	0.003	0.646	0.660	0.041	0.026	0.660	0.669
Observations	2446	2446	2406	2406	2446	2446	2406	2406
Panel B								
	ESGW_Z (9)	ESGW_M (10)	ESGW_Z (11)	ESGW_M (12)	ESGW_Z (13)	ESGW_M (14)	ESGW_Z (15)	ESGW_M (16)
Managerial ability	-0.247*	-0.0499*	-0.287**	-0.0563*	-0.552***	-0.112***	-0.545***	-0.110***
	(0.147)	(0.0301)	(0.144)	(0.0297)	(0.174)	(0.0356)	(0.170)	(0.0350)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country level controls	No	No	No	No	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
R-squared	0.650	0.663	0.666	0.675	0.667	0.680	0.683	0.693
Observations	2406	2406	2406	2406	2048	2048	2048	2048

Table 17: Additional robustness tests

This table presents the results of Equation (8) regarding the relationship between banks' managerial ability and ESG washing. Since the median bank size and growth of this study's sample are 9.775 and 1.266 respectively, banks with values lower than these medians are grouped as small banks and low-growth banks respectively. Table 1 presents the definitions of the variables. The standard errors, clustered by banks, are robust to heteroscedasticity and are mentioned within the parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. To conserve space, the results of all the control variables are not reported.

Panel A				
	Using DEA approach		Commercial banks	
	ESGW_Z (1)	ESGW_M (2)	ESGW_Z (3)	ESGW_M (4)
Managerial ability	-0.314*	-0.0668*	-0.803**	-0.158**
	(0.180)	(0.0370)	(0.321)	(0.0644)
Bank-level controls	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.677	0.688	0.734	0.746
Observations	1970	1970	699	699
Panel B				
	Using lagged controls		Controlling for audit firms	
	ESGW_Z (5)	ESGW_M (6)	ESGW_Z (7)	ESGW_M (8)
Managerial ability	-0.320*	-0.0620*	-0.553***	-0.112***
	(0.173)	(0.0358)	(0.203)	(0.0417)
Bank-level controls	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.700	0.707	0.682	0.692
Observations	2081	2081	2041	2041
Panel C				
	First alternative growth variable		Second alternative growth variable	
	ESGW_Z (9)	ESGW_M (10)	ESGW_Z (11)	ESGW_M (12)
Managerial ability	-0.524***	-0.107**	-0.489**	-0.0992**
	(0.199)	(0.0411)	(0.203)	(0.0422)
Bank-level controls	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.707	0.714	0.705	0.712
Observations	1825	1825	1826	1826
Panel D				
	Excluding United States		Excluding COVID-19 period	
	ESGW_Z (13)	ESGW_M (14)	ESGW_Z (15)	ESGW_M (16)
Managerial ability	-0.600**	-0.117**	-0.510*	-0.103*

	(0.287)	(0.0580)	(0.262)	(0.0538)
Bank-level controls	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.740	0.740	0.675	0.689
Observations	807	807	1437	1437
Panel E				
	Excluding countries with less than three banks		Excluding countries with less than five banks	
	ESGW_Z (17)	ESGW_M (18)	ESGW_Z (19)	ESGW_M (20)
Managerial ability	-0.516**	-0.104**	-0.516**	-0.103**
	(0.206)	(0.0424)	(0.226)	(0.0463)
Bank-level controls	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.683	0.693	0.689	0.696
Observations	2009	2009	1871	1871
Panel F				
	Small banks		Low-growth banks	
	ESGW_Z (21)	ESGW_M (22)	ESGW_Z (23)	ESGW_M (24)
Managerial ability	-0.502**	-0.104**	-0.521**	-0.105**
	(0.241)	(0.0517)	(0.248)	(0.0510)
Bank-level controls	Yes	Yes	Yes	Yes
Country level controls	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.657	0.665	0.730	0.745
Observations	934	934	941	941