

Corporate performance disparities in ASEAN: the role of market competition, female leadership and firm size

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Abstract

Purpose – This paper aims to examine how market competition, female leadership and firm size jointly shape corporate performance disparities in the Association of Southeast Asian Nations (ASEAN) and links corporate performance to inclusive and sustainable business development.

Design/methodology/approach – Drawing on data from the World Bank Enterprise Surveys, we conducted multivariate regression analysis with Blinder-Oaxaca decomposition to identify the drivers of performance gaps across income groups, chief executive officer gender, firm size and survey waves. We further apply a double machine learning (DML) framework to assess the robustness of the estimated relationships while allowing for nonlinear and heterogeneous effects.

Findings – Market competition has a limited association with ASEAN firms' performance. Small firms face persistent performance disadvantages, but female leadership partly mitigates these constraints. While gender- and size-based performance gaps can be explained by differences in observable resource endowments, female-led and small firms encounter unexplained barriers to accessing critical resources. The core patterns remain robust under DML, except for the negative association between income level and firm performance.

Practical implications – The findings suggest that policies aimed at sustainable business development in ASEAN should go beyond aggregate growth promotion. Improving small and medium-sized enterprises' access to finance, digital tools, quality certification and managerial resources, while strengthening support for women-led firms, can help reduce structural performance disparities and enhance inclusive regional competitiveness.

Originality/value – This research contributes to Asian business and economic studies by providing multi-country firm-level evidence on how competition, gendered leadership and firm size interact to shape corporate performance in ASEAN. Using multiple methods, it delivers a rigorous and policy-relevant assessment of corporate performance disparities.

Keywords ASEAN, Corporate performance, Market competition, Female leadership,

Sustainable business development

Paper type Research article

JEL Classification — L25, J16, O53

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1. Introduction

Understanding the determinants of corporate performance is critical for informing effective industrial and macroeconomic policies that promote economic development. In emerging markets, small firms play a disproportionately large role in economic activity. Small and medium-sized enterprises (SMEs) account for approximately 90% of corporate activity and 40% of gross domestic product (GDP) globally (World Bank, 2019), while micro, small and medium-sized enterprises contribute roughly 45% of GDP in the Association of Southeast Asian Nations (ASEAN) (UNDP, 2024). Improving small-firm performance is therefore central to national competitiveness as well as inclusive and sustainable regional growth, particularly because recent Asian evidence shows that government support, innovation capability and resource access are closely connected to SME resilience and performance (Nguyen *et al.*, 2024).

Against this backdrop, this paper examines the determinants of corporate performance in the ASEAN region and aims to understand what drives its disparities between firms. ASEAN provides a particularly informative setting, as it encompasses significant variation in income levels, institutional quality and market development within a relatively integrated regional framework, making it a natural laboratory for studying firm dynamics in emerging economies. While firms in high-income countries are generally expected to outperform those in lower-income economies (Amin *et al.*, 2023), other evidence suggests that firms in some emerging markets achieve higher profitability driven by cost advantages and growth dynamics (Goldschmidt *et al.*, 2011). This suggests that firm performance is shaped by more than macroeconomic conditions. We contribute to the literature by shifting the focus from aggregated country-level comparisons to firm-level microeconomic factors, offering a more granular understanding of what drives firm success in the ASEAN region. By leveraging the heterogeneity within ASEAN, it also provides insights that may extend to broader Asian and developing countries. We focus on three important microeconomic factors – market competition, chief executive officer (CEO) gender and firm size – and analyze both their individual and interaction effects, particularly how CEO gender interacts with competition intensity and firm size to shape firm outcomes. To our knowledge, such a joint analysis remains rare in the ASEAN context, particularly when combined with machine learning-based causal inference tools. Furthermore, limited evidence exists on how these factors jointly shape firm performance across heterogeneous Asian emerging economies, highlighting an important gap in the regional business and development literature.

Market competition and firm size are widely recognized as key determinants of firm behavior. Competitive pressure can influence pricing, innovation and investment strategies, often compelling firms to improve efficiency to sustain market share (OECD, 2014). While macroeconomic factors undoubtedly shape firm outcomes, micro-level factors, such as firm size, are also significant (Nikmah and Hung, 2024). Firm size, meanwhile, affects access to finance, economies of scale and strategic flexibility. Larger firms benefit from resource advantages, while smaller firms may be more agile but remain capacity-constrained, particularly in emerging and institutionally diverse regions such as ASEAN.

In recent years, the gender of a firm's leader (e.g. CEO) has emerged as another critical determinant of firm outcomes. Previous research suggests that female CEOs tend to adopt more risk-averse decision-making styles, which may lead to different performance outcomes depending on market conditions and firm characteristics. In ASEAN, where 95% of all firms are SMEs, understanding how female leadership interacts with competition and firm size is especially relevant, as leadership traits, firm structure and market forces may jointly shape performance patterns under varying institutional and market conditions across member states.

Gender equality is increasingly recognized as integral to sustainable development. The United Nations' 2030 Agenda for Sustainable Development identifies gender parity as essential for inclusive economic growth (United Nations, 2015; ASEAN, 2023). Therefore, examining the performance implications of female leadership offers policy-relevant insights at the intersection of economic and social objectives. This perspective is consistent with recent

evidence that women's participation in corporate governance can shape sustainable growth through financial-policy channels (Lestari *et al.*, 2024).

This study offers several key contributions to the existing literature. First, while prior research often examines the direct impact of market competition, firm size or CEO gender on corporate performance separately, few studies analyze their interaction effects within a unified framework, particularly in the ASEAN context, where heterogeneous institutional environments and varying levels of market development, as reflected by the World Bank Income Classification based on Gross National Income (GNI) per capita, intersect with distinct socio-cultural norms and gender expectations. This intersection makes ASEAN a particularly informative setting for examining how these factors jointly shape firm performance. Second, empirical work on emerging markets rarely applies modern causal machine-learning tools, such as double machine learning (DML), to disentangle the independent and joint impacts of microeconomic determinants. By integrating firm-level ASEAN data with machine learning, this study also responds to the growing use of interpretable machine-learning tools in Asian firm performance research, where methods such as logistic regression and decision trees have been used to predict financial performance and reveal heterogeneous performance patterns (Supsermpol *et al.*, 2025). The analysis therefore provides a more granular and causally interpretable account of firm performance, with implications that may extend to broader Asian and developing-country contexts and offer insights for both policy design and firm-level strategy.

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature and identifies research gaps; Section 3 describes the data and methodology; Section 4 presents the empirical results, followed by robustness checks in Section 5; finally, Section 6 concludes the study.

2. Literature review and research gaps

2.1 Theoretical framework

The structure-conduct-performance (SCP) paradigm originating from Chamberlin and Robinson's early contributions and later formalized by Bain (1968), posits that industry structure shapes firms' strategic conduct, which in turn determines performance outcomes. As illustrated in Figure A1 [1] market structure (such as the number of competitors, product differentiation and entry barriers) influences competitive behaviors, including pricing strategies, innovation and coordination, forming the core logic of the SCP framework.

Based on institutional economics, the effect of market structure on firm conduct is contingent on institutional quality. As North (1986) argues, stronger institutions, characterized by secure property rights, effective contract enforcement and access to finance, enhance firms' capacity to respond efficiently to competitive pressures. Consequently, similar market structures may generate divergent performance outcomes across countries. Empirical evidence supports this heterogeneity. There is an inverted U-shaped relationship between competition intensity and performance; for instance, in some economies, moderate concentration improves performance but excessive competitive pressure weakens it (Tuyet and Ninh, 2023). In other markets, high concentration can be associated with low performance (Koltay *et al.*, 2023). These contrasts highlight the relevance of the SCP framework for regions such as ASEAN, where institutional heterogeneity shapes how market structure conditions firm conduct and performance.

Closely related to industry structure is the role of firm size, which can be understood through the lens of economies of scale. As firms expand output, they often benefit from lower average costs through improved technology adoption, financial capacity, procurement and access to skilled labor (Rasmussen, 2012). Larger firms are thus well positioned to exploit scale efficiencies. However, scale advantages are not indefinite. Recent Asia-Pacific evidence suggests that firm growth may initially improve profitability, but that profitability gains can diminish as firms become larger, indicating that excessive scale may generate inefficiencies

rather than continuous performance improvements (Yadav *et al.*, 2022). In sectors requiring flexibility, customization or rapid adaptation, smaller firms may therefore retain advantages over larger competitors. Moreover, existing studies often treat firm size as a secondary control variable rather than a primary determinant, leaving open the question of whether economies or diseconomies of scale dominate in institutional environments characterized by resource scarcity, financing constraints or market volatility. This gap motivates a closer examination of firm size effects in ASEAN, where SMEs constitute the majority of enterprises and institutional conditions vary markedly across member states.

Beyond structural factors, leadership characteristics introduce an additional behavioral dimension to firm performance analysis. Drawing on risk-aversion theory, a growing literature suggests that female CEOs tend to adopt more risk-averse decision-making styles (Hoang *et al.*, 2019). Such risk preferences may stabilize performance in volatile or highly competitive environments (Nadeem *et al.*, 2019), yet they may also constrain growth in industries where risk-taking is essential for innovation or rapid expansion.

The impact of gendered leadership also interacts with firm size and competitive intensity. Women often perform more effectively in SMEs or in organizations that allow direct oversight and flexibility (Afolabi and Aghaunor, 2024), while disciplined decision-making under competitive environments may amplify the benefits of female leadership (Dezsö and Ross, 2012). Structural and cultural constraints (including gender bias, limited access to finance and societal expectations regarding leadership traits) can, however, weaken the performance returns to female leadership, particularly in developing countries (Zhang *et al.*, 2022). These complexities reinforce the need to examine CEO gender not in isolation, but alongside market competition, firm size and institutional settings, forming an integral part of this study's conceptual framework.

2.2 Empirical review

Empirical studies from developed economies generally find positive links between market competition and firm performance, with studies from the US, UK, Germany and France showing that competitive markets enhance productivity and efficiency (Januszewski *et al.*, 2002; Wang *et al.*, 2014). However, the effects are context-dependent, as some market structures may not incentivize efficiency under specific conditions (Hay and Liu, 1997). Research on firm size in developed economies shows that larger firms tend to have more stable growth, while smaller firms are more volatile, though size alone does not guarantee superior performance (Hall, 1987). Regarding female leadership, it is consistently associated with lower risk-taking and greater stability in developed economies. Female CEOs and boards often improve performance, particularly when workforce diversity is higher (Shropshire *et al.*, 2021; Kang *et al.*, 2024; Flabbi *et al.*, 2019), although other governance factors exhibit mixed effects (Omri and Alfaleh, 2024).

Evidence from developing economies varies. Using firm-level data from Tanzanian manufacturing firms, Goedhuys *et al.* (2008) show that productivity is shaped less by conventional technological variables and innovation than by business-environment factors. Chinese manufacturing firms demonstrate an inverted U-shaped relationship between competition and innovation efficiency, indicating that excessive competition may hinder collaboration and degrade long-term performance (Huang, 2023). Findings regarding gender also vary widely in developing contexts. Research across 23 developing countries shows that women face financing constraints that indirectly hinder performance (Marques, 2015). Across 126 primarily developing countries, female-managed firms exhibit 11% lower labor productivity than male-managed firms, largely due to lower investments in technology and protective measures (Islam *et al.*, 2020). Evidence from India shows declined performance following the appointment of female CEOs (Jadiyappa *et al.*, 2019), whereas evidence from China reveals narrowed firm performance gaps when political connections are removed (Sun and Zou, 2021). Additionally, manufacturing firms in developing countries often prioritize

high production levels despite efficiency gaps, reflecting pressures that differ from those in higher-income economies (Kruse *et al.*, 2023). Research on firm size remains comparatively sparse, leaving meaningful gaps for discussion.

In the ASEAN region, empirical work remains limited. Evidence from Vietnam shows that competition enhances performance for high-performing firms, though no significant effects emerge for return on assets (Ha and Tran, 2021). CEO characteristics such as age and tenure matter, yet gender receives little emphasis (Suherman *et al.*, 2021). In Thailand, female CEOs make positive contributions to long-term firm development, although short-term performance may suffer in highly competitive or capital-constrained environments, possibly due to risk-aversion or gender-related perceptions (Singhathep and Pholphirul, 2015).

Existing studies confirm the importance of competition and leadership, but rarely examine market competition, firm size, CEO gender and institutional heterogeneity jointly across ASEAN economies. Many studies either focus on single countries or treat ASEAN as a homogeneous block, overlooking substantial cross-country variation in income levels, institutional structures and firm demographics. While theories suggest an advantage for larger firms, empirical evidence from ASEAN remains limited and inconclusive, particularly regarding whether scale economies or diseconomies dominate in predominantly SME-based economies. Likewise, the specific implications of CEO gender under varying competitive intensities and firm-size conditions remain largely underexplored.

This paper addresses these gaps by offering a multi-country, firm-level analysis across ASEAN, focusing on market competition, CEO gender and firm size and examining both direct and interaction effects. In doing so, we contribute to the literature by (1) providing new empirical evidence on the role of market structure in shaping firm performance in ASEAN; (2) introducing gender-sensitive firm-level analysis into ASEAN's regional context and (3) highlighting the interplay between firm characteristics and institutional context in explaining performance disparities. By incorporating national income levels and employing Blinder-Oaxaca decomposition alongside machine learning-based robustness checks, this research offers novel insights into the structural and behavioral dimensions of firm success in one of the world's most dynamic economic regions.

This study examines three research questions: (1) how market competition influences corporate performance in ASEAN; (2) how firm size shapes performance across institutional and competitive contexts and (3) how CEO gender influences performance under different competition and size conditions. These form the basis of the analytical framework in Figure A2 [1].

3. Data and methodology

3.1 Data

This study utilizes firm-level data from the World Bank Enterprise Surveys (WBES), covering multiple waves across nine ASEAN countries (excluding Brunei due to data limitations). The combined sample includes 6,199 firms, with country-specific sample sizes ranging from 115 to 1,805 firms. The surveys capture firm characteristics, including ownership, management, size, sales performance and production inputs, using stratified random sampling by industry, firm size and region for national representativeness. All data are publicly available from WBES, which employs harmonized questionnaires and standardized sampling across economies. Temporal coverage varies: Vietnam, Indonesia and the Philippines have data for 2015 and 2023; Cambodia for 2016 and 2023; Malaysia for 2015 and 2019 and Laos for 2009 and 2018. Single-year datasets are available for Singapore for 2023, Thailand for 2016 and Myanmar for 2016. This variation allows both cross-sectional and time-comparative analyses.

The dependent variable is the logarithm of total annual sales, reflecting firm-level output for the most recently completed fiscal year. It is measured in each country's domestic currency and then converted to US dollars to maintain consistency. Figure A3 [1] illustrates the spatial distribution of the non-logarithmic variable. Market competition, one of the key explanatory

variables, is measured by the number of competitors who provide similar products or services in the market. This study adopts the World Bank income classification to group countries. The World Bank classifies countries' income levels based on GNI per capita, calculated using the Atlas method, which adjusts for exchange rate fluctuations and provides a more stable measure of economic development. This classification is widely used to capture differences in development levels rather than overall economic size, making it particularly suitable for cross-country comparisons in heterogeneous regions. Following the World Bank's 2024–2025 income classification (Metreau *et al.*, 2024), Singapore, Malaysia, Indonesia and Thailand are categorized as higher-income economies (i.e., either high- or upper-middle-income countries), while Cambodia, Laos, Myanmar, the Philippines and Vietnam are classified as lower-middle-income economies. Summary statistics of the dependent variable as well as our key explanatory and control variables are presented in Table A1 [1], highlighting several notable cross-country patterns below.

The distribution of key variables across ASEAN reflects underlying differences in economic size, market structure and private-sector composition. For example, total annual sales are considerably higher on average in larger economies such as Indonesia, the Philippines and Vietnam, while smaller markets such as Laos and Myanmar naturally exhibit lower firm-level sales. Competition intensity also differs: Malaysia reports a higher mean number of competitors, while most countries show relatively low competition levels; this is consistent with more segmented or localized markets. The prevalence of small firms is highest in Laos and Myanmar, where micro and small enterprises dominate, whereas Vietnam and Singapore display more balanced firm-size distributions. Female CEO representation likewise differs across countries; for instance, Thailand records a relatively high proportion of female-led firms, compared to lower shares in Indonesia and Vietnam.

3.2 Methodology

Building on Sun and Zou (2021), this study extends the empirical specification to account for potential heterogeneities, nonlinearities and interaction effects. Specifically, we include the square of firm age (years of operation) to capture nonlinear life-cycle effects and introduce interaction terms between CEO gender and two key firm characteristics (market competition intensity and firm size) to explore conditional effects. By allowing the marginal effect of CEO gender to change with competition and size, the model more accurately captures the heterogeneous behavioral responses documented in the literature. We begin with an ordinary least squares (OLS) regression using the pooled ASEAN sample, treating the entire region as a single economic unit. The baseline model is specified in Equation (1) below:

$$Y_{Ai} = \beta_0 + \beta_1 Competition_{Ai} + \beta_2 Income_{Ai} + \beta_3 Size_{Ai} + \beta_4 Gender_{Ai} + \beta_5 Gender_{Ai} \times Size_{Ai} + \beta_6 Gender_{Ai} \times Competition_{Ai} + \beta_7 \sum X_{Ai} + \varepsilon_{Ai} \quad (1)$$

where Y_{Ai} refers to the natural logarithm of total sales of firm i in the ASEAN region and $Competition_{Ai}$ represents our market competition measure (the number of competitors with similar goods or services). $Income_{Ai}$ is a dummy variable indicating if the country i is classified as a higher-income country in ASEAN. $Size_{Ai}$ is a binary variable equal to 1 if the firm is a small one and 0 otherwise. $Gender_{Ai}$ is another binary variable equal to 1 if the CEO of the company is female and 0 otherwise. $\sum X_{Ai}$ is a vector of other control variables, including the surveyed year dummy, country dummies, legal status, years of operation, square of years operated, international certification situation, website ownership and production input variables such as the log of total annual labor costs and the log of total annual raw material costs. In our extended specification, we further include country dummy variables to account for unobserved country-level heterogeneity across ASEAN economies. This allows us to control for systematic

differences in institutional environments, development levels and macroeconomic conditions that may affect firm performance.

We further apply the Oaxaca-Blinder decomposition method (Oaxaca, 1973; Blinder, 1973) to decompose the corporate performance disparities between lower-income and higher-income countries according to Equation (2):

$$\bar{Y}_L - \bar{Y}_H = (\hat{\delta} - \hat{\theta})\bar{X}_L + \hat{\theta}(\bar{X}_L - \bar{X}_H) \quad (2)$$

where $\bar{Y}_L$ is the averaged corporate sales performance in lower-income countries and $\bar{Y}_H$ is the averaged performance in higher-income countries. $\bar{X}_L$ and $\bar{X}_H$ represent the average characteristics (e.g. market competition, CEO gender and firm size) in these two groups, respectively. $\hat{\delta}$ and $\hat{\theta}$ are the estimated coefficients. $\hat{\theta}(\bar{X}_L - \bar{X}_H)$ is the explained component that captures the difference in corporate performance due to differences in firm characteristics between two groups. The unexplained component $(\hat{\delta} - \hat{\theta})\bar{X}_L$ reflects the difference arising from variations in coefficients across the two groups.

Similarly, we also decompose the corporate performance disparities by CEO gender, firm size and wave of survey:

$$\bar{Y}_M - \bar{Y}_F = (\hat{\gamma}_M - \hat{\gamma}_F)\bar{X}_M + \hat{\gamma}_F(\bar{X}_M - \bar{X}_F) \quad (3)$$

$$\bar{Y}_{NS} - \bar{Y}_S = (\hat{\sigma}_{NS} - \hat{\sigma}_S)\bar{X}_{NS} + \hat{\sigma}_S(\bar{X}_{NS} - \bar{X}_S) \quad (4)$$

$$\bar{Y}_{Y1} - \bar{Y}_{Y2} = (\hat{\varphi}_{Y1} - \hat{\varphi}_{Y2})\bar{X}_{Y1} + \hat{\varphi}_{Y2}(\bar{X}_{Y1} - \bar{X}_{Y2}) \quad (5)$$

In Equations (3)–(5), subscripts M , F , NS , S , $Y1$ and $Y2$ denote male-led firms, female-led firms, non-small-sized firms, small-sized firms and previous and most recent waves of the surveyed years, respectively.

4. Empirical results

4.1 Determinants of corporate performance in ASEAN

Table A2 [1] reports stepwise OLS regression results for the full ASEAN sample. Several key findings emerge. First, market competition intensity is positively and significantly associated with firm performance in Columns (1) and (2), as measured by the log total sales. Each additional “unit-1000” competitor was associated with a 0.01 increase in log sales (significant at the 1% level). This indicates that more competitive markets stimulate firm output in ASEAN. This result is consistent with the SCP framework: intensified market competition modifies a firm’s strategic conduct and translates structural pressure into improved firm performance in emerging institutional settings. This implies that policies promoting market entry and competition enforcement may enhance productivity by sustaining competitive pressure.

Second, firm size is also positively and significantly correlated with output. Across all specifications, small firms exhibited 0.31–0.46 lower log sales (all significant at the 1% level), reinforcing the idea that resource constraints, scale inefficiencies and limited access to financing may disproportionately affect the performance of smaller enterprises in the study region. This finding aligns with the economies-of-scale mechanism: larger firms are better able to exploit cost efficiencies and operational advantages that translate scale into higher performance, while smaller firms face structural disadvantages in resource allocation and

production efficiency. Targeted SME support policies may therefore narrow the productivity gap between small and large firms.

Third, CEO gender alone does not have a statistically significant impact on firm performance across Columns (1) to (3). However, important heterogeneity emerges when it interacts with firm size. In Column (3), the “female CEO $\times$ small firm” effect is significantly positive (0.17). This indicates that female-led small firms outperform their male-led counterparts, suggesting that gendered leadership dynamics confer advantages in specific operational contexts. One plausible explanation, consistent with the risk-aversion framework, is that female executives may adopt more cautious strategies that help small firms mitigate competitive pressure and stabilize performance. This points to the potential effectiveness of policies that support women’s entrepreneurship, such as improving female access to financing and leadership training, especially within the SME sector where the performance gains appear most pronounced.

These findings connect with prior literature. The size-related results align with [Rasmussen \(2012\)](#), while the context-dependent benefits of competition resonate with [Tu et al. \(2014\)](#). Meanwhile, the gender-size interaction represents a novel contribution in the ASEAN context. This is further supported by emerging ASEAN evidence, where competition effects are shown to be conditional on firm characteristics ([Ha and Tran, 2021](#)) and female leadership exhibits context-dependent performance under competitive or resource-constrained environments ([Singhathep and Pholphirul, 2015](#)). This suggests that policies should account for firm heterogeneity and institutional differences when promoting competition and inclusive leadership.

Fourth, to control for time-invariant national characteristics, Column (4) includes country fixed effects, and core results remain robust. Country-specific regression ([Table A6 \[1\]](#)) reveals detailed heterogeneity: competition negatively affects performance in more mature markets such as Singapore, Thailand and Vietnam, but is positive in less-developed economies such as Myanmar. This pattern supports the context-dependent view that competition does not always enhance performance, particularly in mature markets where excessive pressure may reduce efficiency ([Hay and Liu, 1997](#)). It is also consistent with the inverted U-shaped relationship documented by [Tuyet and Ninh \(2023\)](#), suggesting that competition becomes detrimental beyond an optimal threshold. Female leadership effects also vary across countries. Negative effects appear in Laos and the Philippines, while positive effects appear in Malaysia and Myanmar. Furthermore, female-led firms in Laos and Myanmar appear more vulnerable under intensified competition, reflecting differences in institutional support, financing access and market conditions. This is consistent with evidence that structural constraints weaken the returns to female leadership in developing contexts ([Islam et al., 2020](#); [Zhang et al., 2022](#)), whereas the relative advantage observed in smaller or more flexible settings aligns with [Afolabi and Aghaunor \(2024\)](#). Overall, these results indicate that the performance effects of competition and gender are highly context-dependent within ASEAN.

Among the control variables, coefficients for raw material and labor costs are consistently positive and significant, as expected. Additionally, firm-level attributes such as holding an internationally recognized certification and maintaining a company website are both positively associated with performance, underscoring the role of quality assurance and digitalization in enhancing firm competitiveness.

4.2 Decomposition analysis on the corporate performance disparities

To further examine the drivers of firm performance disparities across ASEAN, we implement a Blinder-Oaxaca decomposition, separating differences into explained (due to observable characteristics) and unexplained (due to differences in returns to these characteristics) components. [Table A3 \[1\]](#) presents decomposition results by national income group, CEO gender, firm size and survey year, with [Table A4 \[1\]](#) providing variable-level details.

Results reveal that firms in less-developed ASEAN countries outperform those in higher-income countries in terms of total sales. The explained component is driven primarily by labor and raw material costs, indicating that firms in less-developed economies rely on scale-based production strategies with high volumes and lower margins (Prahalad and Hammond, 2002; Kruse *et al.*, 2023). Other explanatory variables such as firm size, year of survey, international certification, legal registration and digital presence (e.g. having a company website) also contribute to the gap. This suggests that stronger institutions in higher-income countries do not necessarily translate into higher firm-level sales in more saturated markets (Agénor, 2016).

Gender-based decomposition shows that 86.36% of the performance gap between male- and female-led firms is explained by differences in observable inputs, with labor and raw material costs accounting for more than the total explained component. This indicates that male-led firms, on average, may employ higher-quality inputs or invest more heavily in key resources, possibly reflecting better access to finance, talent or supply chains. This implies that structural inequalities in resource access, rather than managerial capability, are the principal barrier to performance parity for female-led firms – consistent with findings from Jادیappa *et al.* (2019) and Oakley (2000), suggesting that improving access to key resources may help reduce performance disparities.

As expected, the performance gap between smaller and larger firms is substantial, with the explained component contributing 84.31% of the difference. The primary drivers are again labor and raw material costs, which account for 29% and 59% of the explained gap, respectively. Larger firms are better positioned to acquire and efficiently utilize high-quality inputs, often benefiting from economies of scale and stronger supplier relationships (Bernard *et al.*, 2007). Within the unexplained component, differences in returns to certification, legal status and labor costs are notable, suggesting persistent inefficiencies and managerial constraints among smaller firms, which may limit their ability to scale effectively in competitive markets.

Comparing survey waves, the explained components are large and negative, reflecting lower resource investment in earlier periods. As ASEAN economies have evolved, firms appear to have scaled up their operations, contributing to performance improvements in the more recent wave. Disaggregated results indicate that differences in firm size and female CEO status contribute significantly to the unexplained portion (58 and 18%, respectively). This may reflect greater agility or more inclusive leadership practices in recent years, which allow smaller firms or those led by women to adapt more effectively to economic shocks or competitive pressures.

5. Robustness check

To assess the robustness and causal interpretability of our baseline findings, we employ DML proposed by Chernozhukov *et al.* (2018). DML provides a modern approach for estimating treatment effects in the presence of high-dimensional covariates, offering greater protection against omitted variable bias and model misspecification. By leveraging sample-splitting [2], regularized estimation [3] and orthogonalization of the treatment and outcome variables [4], DML can yield more reliable causal inferences, particularly when controlling for a large number of potential confounders.

We run separate DML models for each treatment variable of interest. For each model, we specify a partially linear regression:

$$Y_i = \theta D_i + g(X_i) + \varepsilon_i \quad (6)$$

$$D_i = m(X_i) + v_i \quad (7)$$

where $Y_i = \log(\text{sales}_i)$, D_i is the treatment of interest (including competition, CEO gender, income level, firm size and survey year) and X_i is a high-dimensional set of covariates

including all control variables. Both the outcome function $g(X_i)$ and the treatment model $m(X_i)$ are estimated nonparametrically using random forest algorithms, allowing for flexible modeling of complex, nonlinear relationships. We apply K-fold cross-fitting to correct for overfitting and obtain valid post-selection inference. Table A5 [1] reports the estimated average treatment effects of key explanatory variables on firm performance, proxied by the logarithm of total sales.

The DML estimates are broadly consistent with our baseline results, particularly for competition, CEO gender and firm size. The signs and statistical significance of firm size remain stable across specifications, reinforcing the conclusion that larger firms tend to exhibit stronger performance outcomes. Moreover, the year dummies suggest a decline in firm-level output over time, which is consistent with previous findings.

The most notable departure from the baseline results concerns the role of income level. While previous OLS estimates indicated a negative and statistically significant relationship, the DML results in Column (3) reveal an insignificant effect. This shift may stem from the DML method's enhanced capacity to account for confounding variables and reduce omitted variable bias by incorporating flexible machine learning algorithms in both stages of estimation. Specifically, income level may be correlated with a range of firm-level characteristics – such as size, managerial quality or digital adoption – that are insufficiently captured in the linear OLS specification. Once these interactions are modeled more comprehensively, the apparent income effect diminishes, suggesting that the earlier OLS results may overstate their importance due to model misspecification.

In summary, the DML-based robustness checks confirm the validity of the main results while qualifying the role of income level. By strengthening causal interpretation, the DML approach enhances the policy relevance of the findings, particularly for debates on gender equity and firm competitiveness in ASEAN.

6. Conclusion

Given the dominance of SMEs in the ASEAN economy, understanding the determinants of their performance is crucial for regional competitiveness, inclusive growth and sustainable business development. Using firm-level survey data alongside regression, decomposition and DML techniques, this paper examines how market competition, CEO gender and firm size jointly shape corporate performance.

Our results indicate that intensified market competition does not uniformly enhance performance, and female leadership alone has limited effects in high-risk environments. While small firms face consistent disadvantages, female leadership is associated with a partial reduction of these constraints, as female-led small firms outperform their male-led counterparts. Conversely, female-led firms in less-developed ASEAN economies underperform on average, highlighting persistent barriers. Additionally, while firms in lower-income ASEAN nations initially appear to outperform those in high-income members, DML analysis reveals that national income level alone has no direct significant impact. This suggests that traditional OLS estimators may overestimate macroeconomic advantages and that institutional quality likely operates through indirect channels.

These findings offer three key policy implications for sustainable business development in ASEAN. First, improving access to finance, digital tools, quality certification and managerial training can narrow performance gaps and strengthen SME resilience, which is critical for long-term productivity and competitiveness. Second, competition policies should balance market openness with safeguards against excessive rivalry, ensuring that smaller firms are not crowded out by dominant players and that competition supports inclusive market development. Third, fostering gender-inclusive leadership through targeted training, networks and financing support is important for both equity and efficiency, and it can improve resource allocation and firm-level performance across ASEAN economies.

Future research should leverage panel data to capture dynamic firm responses over time. It could also incorporate market-based performance measures (such as Tobin's Q) using richer financial datasets. Finally, comparative studies beyond ASEAN can help assess the external validity of these findings and inform broader policy design. Such efforts would further enhance our understanding of firm performance dynamics across Asian and other emerging economies, extending the relevance of the SME resilience, gender-inclusive leadership and sustainable business development.

Notes

1. Please see it on the [Supplementary Online Appendix](#)
2. Sample-splitting involves dividing the dataset into training and estimation subsets to reduce overfitting and ensure honest inference.
3. Regularized estimation refers to the use of machine learning methods, such as random forests, that can handle high-dimensional covariates without overfitting.
4. Orthogonalization denotes the process of partialing out the influence of covariates from both the treatment and the outcome, producing a score function that is robust to confounding and model misspecification.

Supplementary material

The supplementary material for this article can be found online.

References

- Afolabi, S. and Aghaunor, C.T. (2024), "Women leadership, financial literacy and performance of small and medium scale enterprises in Nigeria", *World Journal of Advanced Research and Reviews*, Vol. 22 No. 2, pp. 2239-2253, doi: [10.30574/wjarr.2024.22.2.2182](https://doi.org/10.30574/wjarr.2024.22.2.2182).
- Agénor, P.R. (2016), "Caught in the middle? The economics of middle-income traps", *Journal of Economic Surveys*, Vol. 31 No. 3, pp. 771-791, doi: [10.1111/joes.12175](https://doi.org/10.1111/joes.12175).
- Amin, M., Islam, A.M. and Khalid, U. (2023), "Why are firms in high-income economies more productive than in middle-income economies? Decomposing the firm labor productivity gap", *Studies in Comparative International Development*, Vol. 58 No. 4, pp. 645-674, doi: [10.1007/s12116-023-09387-y](https://doi.org/10.1007/s12116-023-09387-y).
- ASEAN (2023), *ASEAN Declaration on Gender Equality and Family Development*, The ASEAN Secretariat, available at: <https://asean.org/asean-declaration-on-gender-equality-and-family-development/> (accessed 30 May 2026).
- Bain, J.S. (1968), *Industrial Organization*, Wiley, New York.
- Bernard, A.B., Jensen, J.B., Redding, S.J. and Schott, P.K. (2007), "Firms in international trade", *The Journal of Economic Perspectives*, Vol. 21 No. 3, pp. 105-130, doi: [10.1257/jep.21.3.105](https://doi.org/10.1257/jep.21.3.105).
- Blinder, A.S. (1973), "Wage discrimination: reduced form and structural estimates", *Journal of Human Resources*, Vol. 8 No. 4, pp. 436-455, doi: [10.2307/144855](https://doi.org/10.2307/144855).
- Chernozhukov, V., Chetverikov, D., Demirer, M., Duflo, E., Hansen, C., Newey, W. and Robins, J. (2018), "Double/debiased machine learning for treatment and structural parameters", *The Econometrics Journal*, Vol. 21 No. 1, pp. C1-C68, doi: [10.1111/ectj.12097](https://doi.org/10.1111/ectj.12097).
- Dezsö, C.L. and Ross, D.G. (2012), "Does female representation in top management improve firm performance? A panel data investigation", *Strategic Management Journal*, Vol. 33 No. 9, pp. 1072-1089, doi: [10.1002/smj.1955](https://doi.org/10.1002/smj.1955).
- Flabbi, L., Macis, M., Moro, A. and Schivardi, F. (2019), "Do female executives make a difference? The impact of female leadership on gender gaps and firm performance", *The Economic Journal*, Vol. 129 No. 622, pp. 2390-2423, doi: [10.1093/ej/uez012](https://doi.org/10.1093/ej/uez012).

- Goedhuys, M., Janz, N. and Mohnen, P. (2008), "What drives productivity in Tanzanian manufacturing firms: technology or business environment?", *European Journal of Development Research*, Vol. 20 No. 2, pp. 199-218, doi: [10.1080/09578810802060785](https://doi.org/10.1080/09578810802060785).
- Goldschmidt, R.G.B., Brito, L.A.L. and de Vasconcelos, F.C. (2011), "Country effect on firm performance: a multilevel approach", *Journal of Business Research*, Vol. 64 No. 3, pp. 273-279, doi: [10.1016/j.jbusres.2009.11.012](https://doi.org/10.1016/j.jbusres.2009.11.012).
- Ha, T.X. and Tran, T.T. (2021), "The effect of foreign ownership and product market competition on firm performance: empirical evidence from Vietnam", *The Journal of Asian Finance, Economics and Business*, Vol. 8 No. 11, pp. 79-86, doi: [10.13106/JAFEB.2021.VOL8.NO11.0079](https://doi.org/10.13106/JAFEB.2021.VOL8.NO11.0079).
- Hall, B.H. (1987), "The relationship between firm size and firm growth in the US manufacturing sector", *The Journal of Industrial Economics*, Vol. 35 No. 4, pp. 583-606, doi: [10.2307/2098589](https://doi.org/10.2307/2098589).
- Hay, D.A. and Liu, G.S. (1997), "The efficiency of firms: what difference does competition make?", *The Economic Journal*, Vol. 107 No. 442, pp. 597-617, doi: [10.1111/1468-0297.00179](https://doi.org/10.1111/1468-0297.00179).
- Hoang, T.T., Nguyen, C.V. and Van Tran, H.T. (2019), "Are female CEOs more risk averse than male counterparts? Evidence from Vietnam", *Economic Analysis and Policy*, Vol. 63, pp. 57-74, doi: [10.1016/j.eap.2019.05.001](https://doi.org/10.1016/j.eap.2019.05.001).
- Huang, X. (2023), "The roles of competition on innovation efficiency and firm performance: evidence from the Chinese manufacturing industry", *European Research on Management and Business Economics*, Vol. 29 No. 1, 100201, doi: [10.1016/j.iedeen.2022.100201](https://doi.org/10.1016/j.iedeen.2022.100201).
- Islam, A.M., Gaddis, I., Palacios López, A. and Amin, M. (2020), "The labor productivity gap between formal businesses run by women and men", *Feminist Economics*, Vol. 26 No. 4, pp. 1-31, doi: [10.1080/13545701.2020.1797139](https://doi.org/10.1080/13545701.2020.1797139).
- Jadiyappa, N., Jyothi, P., Sireesha, B. and Hickman, L.E. (2019), "CEO gender, firm performance and agency costs: evidence from India", *Journal of Economic Studies*, Vol. 46 No. 2, pp. 482-495, doi: [10.1108/jes-08-2017-0238](https://doi.org/10.1108/jes-08-2017-0238).
- Januszewski, S.I., Köke, J. and Winter, J.K. (2002), "Product market competition, corporate governance and firm performance: an empirical analysis for Germany", *Research in Economics*, Vol. 56 No. 3, pp. 299-332, doi: [10.1006/reec.2001.0278](https://doi.org/10.1006/reec.2001.0278).
- Kang, S., Bang, J. and Ryu, D. (2024), "Female CEOs' risk management and earnings performance during the financial crisis", *Asian Business and Management*, Vol. 23 No. 1, pp. 110-138, doi: [10.1057/s41291-023-00233-6](https://doi.org/10.1057/s41291-023-00233-6).
- Koltay, G., Lorincz, S. and Valletti, T. (2023), "Concentration and competition: evidence from Europe and implications for policy", *Journal of Competition Law and Economics*, Vol. 19 No. 3, pp. 466-501, doi: [10.1093/joclec/nhad012](https://doi.org/10.1093/joclec/nhad012).
- Kruse, H., Mensah, E., Sen, K. and de Vries, G. (2023), "A manufacturing (re)naissance? Industrialization in the developing world", *IMF Economic Review*, Vol. 71 No. 2, pp. 439-473, doi: [10.1057/s41308-022-00183-7](https://doi.org/10.1057/s41308-022-00183-7).
- Lestari, R.I., Indarto, I. and Budiati, Y. (2024), "Do women have a say? A moderated mediation model's influence on the leverage policy toward corporate sustainable growth", *Journal of Asian Business and Economic Studies*, Vol. 31 No. 3, pp. 233-245, doi: [10.1108/JABES-02-2023-0049](https://doi.org/10.1108/JABES-02-2023-0049).
- Marques, H. (2015), "Does the gender of top managers and owners matter for firm exports?", *Feminist Economics*, Vol. 21 No. 4, pp. 89-117, doi: [10.1080/13545701.2015.1029958](https://doi.org/10.1080/13545701.2015.1029958).
- Metreau, E., Young, K.E. and Eapen, S.G. (2024), *World Bank Country Classifications by Income Level for 2024-2025*, World Bank, available at: <https://blogs.worldbank.org/en/opendata/world-bank-country-classifications-by-income-level-for-2024-2025> (accessed 30 May 2026).
- Nadeem, M., Suleman, T. and Ahmed, A. (2019), "Women on boards, firm risk and the profitability nexus: does gender diversity moderate the risk and return relationship?", *International Review of Economics and Finance*, Vol. 64, pp. 427-442, doi: [10.1016/j.iref.2019.08.007](https://doi.org/10.1016/j.iref.2019.08.007).
- Nguyen, H.T., Vu, T.T.D., Nguyen, H.M. and Nguyen, D.B.P. (2024), "SMEs' innovation and government support during the COVID-19 pandemic", *Journal of Asian Business and Economic Studies*, Vol. 31 No. 3, pp. 203-215, doi: [10.1108/JABES-08-2023-0300](https://doi.org/10.1108/JABES-08-2023-0300).

- Nikmah, C. and Hung, R.-J. (2024), "The impact of ASEAN economic community, firm characteristics and macroeconomics on firm performance and firm value: an investigation of Shariah-compliant firms in Indonesia", *Heliyon*, Vol. 10 No. 11, e32740, doi: [10.1016/j.heliyon.2024.e32740](https://doi.org/10.1016/j.heliyon.2024.e32740).
- North, D.C. (1986), "The new institutional economics", *Journal of Institutional and Theoretical Economics*, Vol. 142 No. 1, pp. 230-237, available at: <https://www.jstor.org/stable/40726723>
- Oakley, J.G. (2000), "Gender-based barriers to senior management positions: understanding the scarcity of female CEOs", *Journal of Business Ethics*, Vol. 27 No. 4, pp. 321-334, doi: [10.1023/a:1006226129868](https://doi.org/10.1023/a:1006226129868).
- Oaxaca, R. (1973), "Male-female wage differentials in urban labor markets", *International Economic Review*, Vol. 14 No. 3, pp. 693-709, doi: [10.2307/2525981](https://doi.org/10.2307/2525981).
- OECD (2014), *Perspectives on Global Development 2014*, OECD, available at: https://www.oecd.org/en/publications/perspectives-on-global-development-2014_persp_glob_dev-2014-en.html (accessed 30 May 2026).
- Omri, N. and Alfaleh, A. (2024), "The effects of boardroom gender diversity on corporate performance: empirical evidence from a sample of European listed companies", *Business Economics*, Vol. 59 No. 2, pp. 86-100, doi: [10.1057/s11369-024-00351-9](https://doi.org/10.1057/s11369-024-00351-9).
- Prahalad, C.K. and Hammond, A. (2002), "Serving the world's poor, profitably", *Harvard Business Review*, Vol. 80 No. 9, pp. 48-59, available at: <https://barnabys.blogs.com/files/serving-the-ppor-prahalad.pdf>
- Rasmussen, S. (2012), "Economies of scale and size", in *Production Economics*, Springer, Berlin, Heidelberg, doi: [10.1007/978-3-642-30200-8_11](https://doi.org/10.1007/978-3-642-30200-8_11).
- Shropshire, C., Gao, F. and Kim, J. (2021), "Are female CEOs really more risk averse? Examining economic downturn and other-orientation", *Journal of Leadership and Organizational Studies*, Vol. 32 No. 5, 101476, doi: [10.1177/1548051821997404](https://doi.org/10.1177/1548051821997404).
- Singhathep, T. and Pholphirul, P. (2015), "Female CEOs, firm performance, and firm development: evidence from Thai manufacturers", *Gender, Technology and Development*, Vol. 19 No. 3, pp. 320-345, doi: [10.1177/0971852415596865](https://doi.org/10.1177/0971852415596865).
- Suherman, S., Usman, B., Mahfirah, T.F. and Vesta, R. (2021), "Do female executives and CEO tenure matter for corporate cash holdings? Insight from a Southeast Asian country", *Corporate Governance: International Journal of Business in Society*, Vol. 21 No. 5, pp. 939-960, doi: [10.1108/CG-07-2020-0290](https://doi.org/10.1108/CG-07-2020-0290)
- Sun, R. and Zou, G. (2021), "Political connection, CEO gender, and firm performance", *Journal of Corporate Finance*, Vol. 71, 101918, doi: [10.1016/j.jcorpfin.2021.101918](https://doi.org/10.1016/j.jcorpfin.2021.101918).
- Supsermpol, P., Huynh, V.N., Thajchayapong, S., Suppakitjarak, N. and Chiadamrong, N. (2025), "Predicting post-IPO financial performance: a hybrid approach using logistic regression and decision trees", *Journal of Asian Business and Economic Studies*, Vol. 32 No. 1, pp. 52-65, doi: [10.1108/JABES-06-2024-0292](https://doi.org/10.1108/JABES-06-2024-0292).
- Tu, T.A., Dinh, T.T.B., Nguyen, B.D. and Nguyen, V.D. (2014), "The Structure-Conduct-Performance paradigm revisited: an empirical analysis for Vietnamese firms", *Journal of International Economics and Management*, Vol. 69, pp. 90-96, available at: <https://jiem.ftu.edu.vn/index.php/jiem/article/view/122>
- Tuyet, N.-L.H. and Ninh, L.-K. (2023), "Competition and firm performance: evidence from Vietnam", *RAUSP Management Journal*, Vol. 58 No. 2, pp. 111-124, doi: [10.1108/RAUSP-03-2022-0094](https://doi.org/10.1108/RAUSP-03-2022-0094)
- UNDP (2024), "Building MSME resilience in Southeast Asia", *United Nations Development Programme*, available at: <https://irff.undp.org/publications/building-msme-resilience-southeast-asia> (accessed 30 May 2026).
- United Nations (2015), *Transforming Our World: The 2030 Agenda for Sustainable Development*, United Nations, available at: <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981> (accessed 30 May 2026).
- Wang, S.-F., Jou, Y.-J., Chang, K.-C. and Wu, K.-W. (2014), "Industry competition, agency problem, and firm performance", *Romanian Journal of Economic Forecasting*, Vol. 17 No. 4, pp. 76-93, available at: https://ipe.ro/rjef/rjef4_14/rjef4_2014p76-93.pdf

- World Bank (2019), *Small and Medium Enterprises (SMEs) Finance*, World Bank, available at: <https://www.enterprisesurveys.org/en/enterprisesurveys> (accessed 30 May 2026).
- Yadav, I.S., Pahi, D. and Gangakhedkar, R. (2022), "The nexus between firm size, growth and profitability: new panel data evidence from Asia-Pacific markets", *European Journal of Management and Business Economics*, Vol. 31 No. 1, pp. 115-140, doi: [10.1108/EJMBE-03-2021-0077](https://doi.org/10.1108/EJMBE-03-2021-0077).
- Zhang, G., Jia, Z. and Yan, S. (2022), "Does gender matter? The relationship comparison of strategic leadership on organizational ambidextrous behavior between male and female CEOs", *Sustainability*, Vol. 14 No. 14, p. 8559, doi: [10.3390/su14148559](https://doi.org/10.3390/su14148559).
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Further reading

- Cahyono, S., Ardianto, A., Noman, A.H.M. and Djajadikerta, H.G. (2025), "CEO social capital, board gender diversity and environmental disclosures of public companies in Southeast Asia", *Journal of Asian Business and Economic Studies*, Vol. 32 No. 4, pp. 227-239, doi: [10.1108/JABES-11-2024-0528](https://doi.org/10.1108/JABES-11-2024-0528).
- Ho, L., Nguyen, V.H. and Dang, T.L. (2024), "ESG and firm performance: do stakeholder engagement, financial constraints and religiosity matter?", *Journal of Asian Business and Economic Studies*, Vol. 31 No. 4, pp. 263-276, doi: [10.1108/JABES-08-2023-0306](https://doi.org/10.1108/JABES-08-2023-0306).

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