International Journal of Business Excellence

ISSN online: 1756-0055 - ISSN print: 1756-0047
https://www.inderscience.com/ijbex

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DOI: 10.1504/IJBEX.2026.10078486

Article History:

Received:	22 December 2025
Last revised:	10 January 2026
Accepted:	02 April 2026
Published online:	09 June 2026

Inventory turnover and corporate performance in an emerging market: a nonlinear dynamic analysis

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Abstract: This study investigates the dynamic nonlinear relationship between inventory turnover and corporate performance in Vietnam, an emerging market. Utilising a panel dataset comprising 7,261 firm-year observations from 571 non-financial firms listed on the Vietnamese stock exchange between 2008 and 2022, we apply the least squares dummy variable corrected (LSDVC) estimator to address dynamic panel bias, endogeneity, and unobserved heterogeneity. The empirical findings consistently reveal a significant inverted U-shaped relationship between inventory turnover and corporate performance, indicating that increasing inventory turnover enhances profitability up to an optimal threshold, beyond which excessive inventory reduction diminishes performance due to higher operational risk and reduced flexibility. Robustness tests using alternative performance measures, inventory metrics, and the system GMM estimator confirm the stability of this nonlinear effect. By identifying the turnover level that maximises firm performance, this study contributes to the inventory-finance literature and offers practical guidance for firms seeking to optimise inventory strategies in emerging markets.

Keywords: inventory turnover; corporate performance; panel data estimation; least squares dummy variable corrected; LSDVC; dynamic panel model.

Reference to this paper should be made as follows: Hung, P.T.M., Nguyen, T.K., Loan, P.T.B. and Diem, T.V.H. (2026) 'Inventory turnover and corporate performance in an emerging market: a nonlinear dynamic analysis', *Int. J. Business Excellence*, Vol. 38, No. 11, pp.1–22.

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1 Introduction

Inventory often represents a significant portion of a firm's assets and directly contributes to the cost of goods sold, making it critical to both financial performance and operational efficiency. Inventory turnover (IT) – the rate at which inventory moves from purchase to sale – serves as a key metric for assessing a firm's efficiency in managing working capital. Effective inventory management can reduce holding costs, improve liquidity, and enhance capital efficiency (Eroglu and Hofer, 2011). However, classic economic order quantity (EOQ) theory (Wilson, 1934) and subsequent studies (e.g., Blinder and Maccini, 1991) caution that excessively low inventory levels may increase order frequency, raise procurement costs, reduce bargaining power, and expose firms to stock-out risks and supply chain disruptions (Blinder and Maccini, 1991).

Operational efficiency theories suggest that inventory turnover influences firm outcomes through cost management, demand responsiveness, and the mitigation of input price volatility (Isaksson and Seifert, 2014). While a higher inventory turnover is generally linked to greater efficiency and profitability, recent studies highlight that this relationship may not be strictly linear.

A separate but growing body of literature has highlighted the nonlinear relationship between inventory turnover and corporate performance. Park and Kim (2021), focusing on the US restaurant industry, examine the linear and nonlinear effects of inventory turnover on profitability. However, the curvilinear effect is not statistically supported. Their use of a static model underscores the importance of context-specific modelling in capturing operational risks inherent to particular industries. The nonlinear relationship between inventory turnover and corporate performance is not well documented. Several studies have proposed an inverted U-shaped relationship in which performance initially increases with higher turnover due to lower holding costs and better capital utilisation. However, beyond an optimal turnover point, the benefits diminish, and rising ordering costs or stock-out risks reduce profitability (Eroglu and Hofer, 2011; Isaksson and Seifert, 2014; Lei et al., 2024). Eroglu and Hofer (2011) are the first to demonstrate that nearly half of 54 industries had a curvilinear relationship between inventory leanness and firm performance. Isaksson and Seifert (2014) report similar evidence for US manufacturing firms. Lei et al. (2024), drawing on panel data from Chinese listed firms, provide robust evidence of a statistically significant inverted U-shaped relationship between inventory turnover and firm performance. Related evidence from Liu et al. (2024), who use inventory leanness in SMEs, also supports an inverted U-shaped relationship, suggesting that excessive inventory reduction may adversely affect firm performance. Yeboah et al. (2025) provide similar evidence using inventory days for US consumer goods firms within a dynamic framework. Consistent with broader recent evidence, these findings imply an inverted U-shaped effect, where the marginal benefits of increased turnover decline after reaching a critical threshold.

Studies most closely related to our research include Lei et al. (2024), Yeboah et al. (2025), Liu et al. (2024), Park and Kim (2021) and Eroglu and Hofer (2011), which collectively advance understanding of the inventory-performance relationship. Lei et al. (2024) and Yeboah et al. (2025) document nonlinear effects in Chinese and US contexts, respectively. Lei et al. (2024) combine static estimation with dynamical systems simulations, while Yeboah et al. (2025) focus on inventory days within a working capital framework. Liu et al. (2024) examine nonlinear effects within a lean strategy framework using composite measures in SMEs. Park and Kim (2021) report only linear effects in a single-industry setting, while Eroglu and Hofer (2011) provide foundational but largely static evidence. However, the dynamic nonlinear relationship between inventory turnover and corporate performance remains underexplored in emerging markets such as Vietnam. Therefore, to address this gap, this study investigates the nonlinear and dynamic effects of inventory turnover on corporate performance of publicly listed firms in Vietnam. Emerging markets, such as Vietnam, may present different inventory dynamics due to more volatile demand patterns, limited supply chain infrastructure, and managerial variations. However, research on the nonlinear and dynamic inventory turnover-corporate performance relationship remains limited. Existing studies address inventory practices in Vietnamese firms, but largely overlook potential nonlinearities or time-varying effects. By employing a dynamic nonlinear model that includes quadratic and lagged dependent

variables, this research aims to provide robust empirical evidence tailored to the unique conditions of Vietnam's emerging market. The findings provide valuable insights for firms aiming to optimise inventory strategies and enhance operational efficiency and profitability in volatile and competitive market conditions.

2 Literature review and hypothesis development

Inventory management plays a critical role in optimising business operations, with inventory turnover (IT) is widely recognised as a key performance indicator (Wilson, 1934). Classical inventory models, such as the EOQ, emphasise the trade-off between ordering and holding costs to determine optimal inventory levels and avoid both stockouts and excess stock, thereby reducing operational disruptions and minimising total costs (Blinder and Maccini, 1991). Beyond cost minimisation, inventory management influences operational efficiency and liquidity. As noted by Gitman et al. (2015), a high turnover ratio reflects effective inventory control and strong sales performance, whereas a low ratio may indicate excess or obsolete stock. Building on this theoretical foundation, recent studies further emphasise the financial implications of inventory practices. Specifically, Zhang and Li (2025) argue that higher inventory turnover is associated with more efficient inventory management and lower holding costs. In contrast, lower turnover may lead to liquidity constraints and heightened financial difficulties (Huang, 2025), which in turn can adversely affect firm performance (Suu et al., 2026). Taken together, these arguments suggest that inventory turnover is generally expected to exert a positive linear effect on firm performance by enhancing efficiency and reducing costs. However, this positive effect may not be monotonic, as excessively lean inventory strategies can introduce operational risks. Other scholars caution that overly aggressive inventory reduction can lead to higher ordering costs, reduced economies of scale, and diminished flexibility in meeting demand fluctuations (Isaksson and Seifert, 2014). Muchaendepi
et al. (2019) likewise observe that although JIT may improve efficiency, it depends on strong supplier coordination and short lead times. Overall, inventory turnover generally supports performance, but its effects may be nonlinear.

Numerous empirical studies on the relationship between inventory turnover and profitability yield mixed evidence. Eroglu and Hofer (2011) report a positive association between efficient inventory management and firm profitability, which indicate that lean inventory achieves improved supply chain efficiency and reduced holding costs, ultimately enhancing cash flow and financial outcomes. Kinney and Wempe (2002) find that adopting just-in-time (JIT) manufacturing practices was linked to increase ROA, while Alnaim and Kouaib (2023) observed that firms implementing JIT achieved inventory turnover growth six to eight times higher than non-adopters.

In addition to studies focusing directly on inventory turnover, a related strand of literature provides indirect evidence by examining inventory efficiency within broader working capital frameworks. Recent studies have expanded the discussion on the inventory-performance nexus by approaching inventory efficiency from broader working capital and operational strategy perspectives. Akdogan (2025), using data from firms listed on Borsa Istanbul in Türkiye, treats inventory turnover as one of several financial indicators embedded in aggressive, moderate, and conservative working capital strategies. Through machine learning and SHAP analyses, the study suggests that

inventory turnover can become an important determinant of firm value under particular working capital configurations, although it does not directly estimate a standalone inventory turnover-performance relationship. In a different setting, Haque et al. (2024) examine US manufacturing firms over the period 1992–2019 and focus on inventory leanness rather than inventory turnover directly. Their findings show that leaner inventory strategies are associated with stronger financial and market performance, while the stability of inventory turnover is used as a conditioning factor in additional analyses. This suggests that the performance implications of inventory management may depend not only on the level of inventory efficiency but also on the consistency of inventory practices. Complementing this view, supporting evidence is provided by Cosima et al. (2026) in the context of Zimbabwe-listed consumer service firms. Although the study does not test inventory turnover as an isolated determinant of corporate performance, it shows that inventory management, as part of working capital management, has a strong positive association with profitability in an emerging market environment.

Recent research highlights the importance of sustainability and sector-specific contexts in the inventory-performance relationship. Mashud et al. (2021) show that environmentally sustainable inventory practices in carbon-constrained greenhouse farming could achieve profitability levels comparable to those of traditional approaches. In the service sector, particularly the restaurant industry, Mun and Jang (2015) observe that insufficient inventory might compromise customer service quality, whereas excessive inventory could increase storage and spoilage costs. Park and Kim (2021) find a positive link between inventory turnover and profitability in US restaurants, moderated by input-price volatility.

Kiymaz et al. (2024) provide cross-country comparative evidence from six developed economies and five emerging economies. Using days sales in inventory (DSI) as a proxy for the inventory component of working capital, they find that longer inventory holding periods are positively associated with firm performance in developed economies but negatively associated with firm performance in emerging economies. These findings imply that the inventory turnover-performance relationship is context-dependent and may vary across institutional and macroeconomic environments. Consistent with this view, Kamada (2025), in the context of fashion retail firms, shows that the performance effects of lean inventory strategies are conditional rather than universal, as improvements in profitability are observed only when supported by sufficient information technology intensity.

A growing body of research identifies a nonlinear, inverted U-shaped relationship between inventory and firm performance. Eroglu and Hofer (2011) show that firm performance peaks at an optimal turnover level, beyond which efficiency gains diminish. Similarly, Isaksson and Seifert (2014) and Lei et al. (2024) confirm this relationship in different contexts, emphasising the trade-off between operational efficiency and rising risks when inventories are reduced excessively. This inverted U-shaped effect is commonly modelled through the inclusion of the squared term of inventory turnover in empirical analyses (Eroglu and Hofer, 2011; Isaksson and Seifert, 2014; Mun and Jang, 2015). Consistent with this line of reasoning, Liu et al. (2024), in the context of small and medium-sized enterprises (SMEs), document an inverted U-shaped relationship between inventory leanness and financial performance, suggesting that excessive reductions in inventory may adversely affect firm outcomes. Similarly, Yeboah et al. (2025), using a sample of publicly traded US consumer goods firms, provide further evidence of a

nonlinear relationship by showing that inventory days exhibit an inverted U-shaped association with operating margins, particularly among cyclical firms, where profitability depends on balancing stock-out risk against the costs of overstocking. By contrast, Park and Kim (2021), in the context of the US restaurant industry, find that while inventory turnover is positively associated with financial performance, the curvilinear effect is not statistically supported by the data, suggesting that the inventory turnover-corporate performance nexus may vary across sectors and depend on industry-specific risk conditions such as commodity price exposure.

In emerging markets such as Vietnam, firms often face heightened macroeconomic volatility, resource constraints, and underdeveloped supply chain infrastructure, which can amplify the risks associated with both high and low turnover. In Vietnam, Truong (2023) reported that the inventory conversion period negatively affected both profitability and operating cash flow among manufacturing firms. Evidence from firms listed on the Ho Chi Minh Stock Exchange (HOSE) further indicates that longer inventory days are associated with weaker financial outcomes, underscoring the strategic importance of efficient inventory management in emerging markets. Extending this evidence, Huynh et al. (2025), using a larger sample of firms listed on Vietnam's Stock Exchange over the period 2012–2022, find that days of inventory outstanding (DIO) has a negative and statistically significant impact on both return on assets and return on equity, suggesting that inefficient inventory management continues to weaken firm performance in the Vietnamese context. Despite an expanding body of literature on inventory management, few studies have explicitly tested the inverted U-shaped relationship in Vietnam's capital market, creating a research gap that the present study seeks to address. Accordingly, this study hypothesises that the relationship between inventory turnover and corporate performance among publicly listed firms in Vietnam follows an inverted U-shaped pattern, reflecting the complex and context-dependent nature of inventory management in an emerging market economy.

Drawing from the literature, this study proposes the following hypotheses:

H1 The relationship between inventory turnover and corporate performance among publicly listed firms in Vietnam follows an inverted U-shaped pattern.

3 Data sources

This study utilises a dynamic panel dataset comprising 7,261 firm-year observations from 571 non-financial firms listed on the Vietnamese stock exchanges (HOSE and HNX) over the period 2008–2022. The financial and operational data were collected from the audited financial statements publicly disclosed by the firms and compiled from FiinPro, a comprehensive financial database widely used in Vietnam for academic and professional research. To maintain data reliability and consistency, only firms with complete and continuous financial records over the analysed period were included. To mitigate the influence of outliers, all continuous variables were winsorised at the first and 99th percentiles.

4 Methodology and research model

4.1 Model specification

The static panel data model is employed in the corporate performance literature to estimate the nonlinear relationship between inventory turnover and corporate performance (Park and Kim, 2021). However, the model cannot control for the effects of omitted variables that change slowly over time. Therefore, we follow Gołaś (2020), Kumar et al. (2023) and Cave et al. (2023) to include a lagged dependent variable to specify a dynamic panel data model. Accordingly, our model can control for the effects of omitted variables that change slowly over time. The model incorporates both linear and quadratic terms of inventory turnover to test for an inverted U-shaped relationship, as well as lagged dependent variables to account for potential endogeneity and persistence in corporate performance.

The regression model is specified as follows:

$$\begin{aligned} CP_{i,t} = {} & \beta_0 + \beta_1 CP_{i,t-1} + \beta_2 INVTURN_{i,t-1} + \beta_3 INVTURN_{i,t-1} + \beta_4 SIZE_{i,t-1} \\ & + \beta_5 LEV_{i,t-1} + \beta_6 AGE_{i,t-1} + \beta_7 CAPINT_{i,t-1} + \varepsilon_{i,t} + \lambda_i + \phi_t \end{aligned} \quad (1)$$

where CPi,t denotes the performance of firm i in year t, measured by either return on assets (ROA) or return on equity (ROE). $INVTURN_{i,t-1}$ represents the lagged inventory turnover ratio, while $INVTURN2_{i,t-1}$ is its squared term, included to capture potential nonlinear effects. $SIZE_{i,t-1}$ denotes firm size, measured as the natural logarithm of total assets. $LEV_{i,t-1}$ represents financial leverage, calculated as the ratio of total debt to total equity. $AGE_{i,t-1}$ refers to firm age, measured as the natural logarithm of the number of years since establishment. $CAPINT_{i,t-1}$ indicates capital intensity, measured as the ratio of fixed assets to total assets. λ_i captures industry-specific fixed effects, ϕ_t denotes year-fixed effects, and $\varepsilon_{i,t}$ is the error term.

Including the lagged dependent variable $CP_{i,t-1}$ controls for autocorrelation in corporate performance and mitigates potential reverse causality, given that firms with higher profitability may also demonstrate greater efficiency in inventory management (Capkun et al., 2009).

4.2 Variable measurement

Return on assets (ROA) and return on equity (ROE) are widely adopted profitability indicators. Specifically, ROA1 is computed as earnings before interest and taxes (EBIT) divided by total assets (Herman et al., 2025; Abudy and Shust, 2025; Liu et al., 2026), while ROE1 is calculated as EBIT divided by total equity (Choi et al., 2024; Li and Song, 2025; Paramayuda et al., 2025). For robustness checks, ROA2 and ROE2 are derived by substituting profit after tax for EBIT in the numerator.

While the primary inventory efficiency indicator employed in this study is the traditional inventory turnover (INVTURN) – calculated as cost of goods sold (COGS) divided by average inventory (Peng et al., 2025; Zhu et al., 2026; Yang, 2026) – this measure may not fully capture sales-driven inventory dynamics, particularly in industries characterised by high sales volatility or non-traditional cost structures.

To address this limitation and in line with prior literature (Prajapati, 2015; Rao, 2009; Vastag and Whybark, 2005), we incorporate supplementary sales-based inventory

turnover metrics. Specifically, INVTURN2 is defined as sales divided by ending inventory, providing an alternative perspective that directly links inventory utilisation to revenue generation rather than production cost. Additional variants include SALTURN7, which measures total revenue (inclusive of extraordinary items) divided by ending inventory, and INVTURN4, which calculates COGS divided by ending inventory (Mukhopadhyay and Adelaja, 2025; Mukandwal et al., 2026; Tang et al., 2025). Employing both COGS-based and sales-based indicators facilitates robustness checks, ensuring that the relationship between inventory efficiency and corporate performance is not an artefact of a single turnover definition, and mitigates potential biases stemming from industry-specific practices or accounting conventions. For comparability and ease of interpretation, all inventory-related variables (INVTURN1, INVTURN2, INVTURN3, and INVTURN4) are scaled by dividing their raw values by 1,000. This adjustment does not alter the substantive meaning of the measures but ensures that regression coefficients are presented in a more interpretable numerical range. Without such scaling, coefficients could appear unduly small due to the magnitude of the turnover ratios, potentially obscuring their economic significance. The transformation thus enhances the clarity of presentation while preserving the underlying relationships in the data.

In addition, several firm-level characteristics are included as control variables to account for potential confounding effects. Firm size (SIZE) is measured as the natural logarithm of total assets, reflecting the scale of operations and potential economies of scale. Financial leverage (LEV) is defined as the ratio of total liabilities to total equity, capturing the firm's capital structure and financial risk profile. Firm age (AGE) is calculated as the natural logarithm of the number of years since the firm's establishment, serving as a proxy for organisational maturity and accumulated market experience. Capital intensity (CAPINT) is measured by the ratio of total fixed assets to total assets, indicating the extent to which a firm's resources are committed to long-term physical assets.

4.3 Estimation technique

To address the bias arising from the inclusion of a lagged dependent variable in a fixed-effects framework and to account for the dynamic nature of the relationship between inventory turnover and corporate performance, this study employs the least squares dummy variable corrected (LSDVC) estimator developed by Bruno (2005a, 2005b). The LSDVC method is specifically designed to correct small-sample bias in dynamic panel data models with fixed effects and is particularly well-suited for datasets with a relatively small time dimension (T) and a moderate cross-sectional dimension (N), which is a common feature of firm-level data in emerging markets. Empirical evidence demonstrates that LSDVC has been effectively applied in various contexts involving corporate performance indicators such as return on assets (ROA) and return on equity (ROE). For instance, Misra and Sahoo (2026) investigate the determinants of profitability in Indian banks, finding that growth efficiency exerts a stronger influence on ROA and ROE than current efficiency, and emphasise the robustness of LSDVC in small-sample settings. Similarly, Yildirim et al. (2024) examine the impact of energy prices on the corporate performance of Turkish banks over the 2012–2022 period, and Misra and Sahoo (2026) investigate the determinants of profitability among Indian commercial banks from 2005 to 2024, applying LSDVC to mitigate small-sample bias and reporting statistically significant effects on ROA. In a methodological contribution, Perić (2019)

compares the performance of widely used dynamic panel estimators via Monte Carlo simulations, showing that LSDVC outperforms Arellano-Bond and Blundell-Bond GMM estimators in terms of bias and root mean squared error when the sample size is limited. Following Bruno (2005a), this study uses the Blundell-Bond (1998) estimator as the initial consistent estimator and applies bootstrapped standard errors with 100 replications to enhance inference reliability. Additionally, in the robustness check, we use the system generalised method of moments (SGMM) estimator to confirm our results.

5 Results and discussions

5.1 Descriptive statistics and correlation matrix

Table 1 reports the descriptive statistics for the variables included in the research model. The average values of return on assets (ROA) and return on equity (ROE) are 6.86% and 11.19%, respectively. Both profitability measures exhibit negative minimum values, indicating that while many firms are profitable, a subset incurs losses. ROE shows greater variability than ROA, suggesting a wider range of shareholder returns. The distribution of ROE is moderately right-skewed, driven by firms with exceptionally high equity returns.

Table 1 Descriptive statistics

STATS	*ROA1*	*ROE1*	*INVTURN1*	*INVTURN2*	*SIZE*	*LEV*	*AGE*	*CAPINT*
N	7,821	7,821	7,473	7,821	7,821	7,821	7,821	7,821
MEAN	0.0686	0.1119	0.0265	0.0431	2.7096	0.4830	3.0102	0.2187
P50	0.0498	0.1038	0.0057	0.0068	2.6968	0.4956	3.0910	0.1539
SD	0.0903	0.1666	0.0847	0.1569	1.5677	0.2232	0.7274	0.2031
MIN	–0.1338	–0.4828	0.0005	0.0005	2.3772	0.0422	0.6931	0.0004
P10	–0.0170	–0.0556	0.0019	0.0023	2.5200	0.1689	2.0794	0.0222
P25	0.0073	0.0192	0.0032	0.0038	2.6026	0.3077	2.5649	0.0638
P75	0.1112	0.2013	0.0131	0.0166	2.8083	0.6630	3.5835	0.3135
P90	0.1860	0.3112	0.0444	0.0646	2.9114	0.7718	3.8501	0.5206
MAX	0.4016	0.6005	0.6794	1.3010	3.1602	0.9162	4.1431	0.8582

Note: ROA1 – return on assets, ROE1 – return on equity, INVTURN – inventory turnover ratio, SALTURN – sales turnover ratio, SIZE – firm size, LEV – financial leverage, AGE – firm age, CAPINT – fixed asset ratio.

Inventory turnover is measured using two proxies: INVTURN1 and INVTURN2, with mean values of 0.0265 and 0.0431, respectively. Both variables display high standard deviations, reflecting significant heterogeneity in inventory management practices. These variations may stem from sectoral differences or disparities in operational efficiency. Outliers were retained to preserve the heterogeneity of the sample.

Firm size (SIZE) has a mean of 2.71, but the spread suggests considerable variation in firm scale. Financial leverage (LEV) has a mean of 48.3%, with some firms reaching up to 91.6%, indicating a reliance on debt financing for certain entities. Firm age (AGE) and capital intensity (CAPINT) also show substantial dispersion, which may contribute to differing performance dynamics across firms. Overall, the data demonstrate wide

variability in key firm characteristics, warranting further investigation through multivariate analysis.

Table 2 presents the Pearson correlation coefficients among the key variables in the research model. As expected, profitability indicators show low but statistically significant positive correlations with the inventory turnover measures. For instance, ROA is positively associated with INVTURN1 (r = .12, p < .01) and INVTURN2 (r = .12, p < .01) while ROE shows weaker but still significant relationships with both inventory proxies. These modest correlations indicate that while inventory turnover may influence profitability, the relationship is likely complex and possibly mediated by other variables.

Table 2 Correlation matrix

	ROA1	*ROE1*	*INVTURN1*	*INVTURN2*	*SIZE*	*LEV*	*AGE*	*CAPINT*
ROA1	1							
ROE1	0.8766*	1						
INVTURN1	0.1233*	0.0805*	1					
INVTURN2	0.1216*	0.0656*	0.9038*	1				
SIZE	–0.1330*	–0.0855*	–0.0438*	–0.0406*	1			
LEV	–0.5132*	–0.3097*	–0.1347*	–0.1298*	0.3216*	1		
AGE	0.0178	–0.003	–0.1055*	–0.0948*	0.1503*	0.0409*	1	
CAPINT	–0.0321*	–0.0732*	0.1031*	0.1029*	0.1101*	–0.0243*	–0.0188*	1

Note: ***, ** and * indicate significance levels of 1%, 5%, and 10%, respectively; ROA1 – return on assets, ROE1 – return on equity, INVTURN – inventory turnover ratio, SALTURN – sales turnover ratio, SIZE – firm size, LEV – financial leverage, AGE – firm age, CAPINT – fixed asset ratio.

All correlation coefficients among explanatory variable pairs in Table 2 are lower than 0.8. Based on Klein's rule of thumb (Gujarati, 2015), we confirm the explanatory variables do not exhibit severe multicollinearity.

5.2 Baseline results

Table 3 presents the baseline regression results examining the nonlinear relationship between inventory turnover and corporate performance, estimated using the least squares dummy variable corrected (LSDVC) estimator for equation (1). Models 1 and 2 use return on assets (ROA1), while models 3 and 4 employ return on equity (ROE1) as the dependent variables. Inventory turnover is captured using two proxies, INVTURN1 and INVTURN2, with their respective squared terms included to assess nonlinear effects. Models 1 and 3 use INVTURN1, and models 2 and 4 apply INVTURN2. Our empirical objective is to examine the nonlinear relationship between inventory turnover and corporate performance. Hence, our independent variables of interest are inventory turnover and squared inventory turnover. Given Hypothesis 1: "there is a nonlinear impact of inventory turnover on the corporate performance of publicly listed firms in the Vietnamese stock market that follows an inverted U-shaped pattern", the coefficients of inventory turnover and its squared term are expected to be positive and negative, respectively, and statistically significant.

Table 3 The nonlinear relationship between inventory turnover and corporate performance – baseline results

Variables	*ROA1*		*ROE1*	
Models	*(1)*	*(2)*	*(3)*	*(4)*
INVTURN1	0.3441***		0.6814***	
	(0.0804)		(0.1653)	
INVTURN1SQR	–0.8111***		–1.5545***	
	(0.2671)		(0.5484)	
INVTURN2		0.3200***		0.5214***
		(0.0405)		(0.0847)
INVTURN2SQR		–0.5472***		–0.8696***
		(0.0865)		(0.1813)
SIZE	–0.0001	–0.0006	–0.0042	–0.0048
	(0.0016)	(0.0015)	(0.0033)	(0.0031)
LEV	–0.0701***	–0.0656***	0.1002***	0.1286***
	(0.0060)	(0.0064)	(0.0123)	(0.0128)
AGE	0.0018	–0.0019	0.0126	0.0130
	(0.0043)	(0.0049)	(0.0089)	(0.0094)
CAPINT	–0.0113	–0.0071	–0.0440***	–0.0344***
	(0.0072)	(0.0062)	(0.0147)	(0.0128)
L.ROA1	0.5092***	0.5335***		
	(0.0102)	(0.0121)		
L.ROE1			0.5314***	0.5152***
			(0.0119)	(0.0111)
Controls	YI	YI	YI	YI
Observations	6,822	7,276	6,822	7,276
Number of firmid	565	571	565	571

Note: ***, ** and * indicate significance levels of 1%, 5%, and 10%, respectively; standard errors are presented in parentheses; ROA1 – return on assets, ROE1 – return on equity, INVTURN – inventory turnover ratio, SIZE – firm size, LEV – financial leverage, AGE – firm age, CAPINT – fixed asset ratio; industry and year-fixed effects (FI) are included in all models.

To arrive at a more complete picture of the nonlinear relationship between inventory turnover and corporate performance, we first report the regression results for the inventory turnover-corporate performance relationship. As shown in Table 3, both inventory turnover proxies exhibit positive and statistically significant coefficients at the 1% level, suggesting that efficient inventory management initially enhances corporate performance. However, the negative and statistically significant squared terms (INVTURN1SQR and INVTURN2SQR) confirm the presence of an inverted U-shaped relationship, implying diminishing marginal returns as inventory turnover increases beyond an optimal point. This nonlinearity between inventory turnover and corporate performance aligns with Lei et al. (2024), who emphasise the trade-off between inventory efficiency and operational flexibility, particularly in emerging markets. The inverted

U-shaped pattern also echoes the working capital literature, highlighting the diminishing marginal returns associated with excessive inventory optimisation. Theoretically, this phenomenon can be framed within the context of the trade-off theory of working capital management and Jensen and Meckling's (1976) agency theory, where firms balance the costs of holding excessive inventory against the risks of stockouts and operational rigidity.

In the specific context of Vietnam, this relationship is particularly salient due to the unique structural and institutional characteristics of its emerging market economy. Vietnamese firms often face challenges such as limited access to capital markets, underdeveloped supply chain infrastructure, and volatile demand patterns. These factors exacerbate the risks associated with both overstocking and understocking. For example, excessive inventory reduction, often motivated by lean management initiatives, may lead to frequent stockouts or missed sales in a market where supply chain disruptions are common, thereby reducing profitability. On the other hand, maintaining excessive inventory can strain financial resources and increase holding costs, which is particularly burdensome for firms with constrained capital access. Thus, the observed inverted U-shaped curve reflects a balance point where firms optimise inventory levels to maximise performance under these contextual constraints.

Empirically, our estimation of the turning points – ranging from 0.21 to 0.29 for both ROA1 and ROE1 – quantifies the threshold where the relationship shifts from positive to negative. This finding provides robust evidence of an optimal inventory turnover range for Vietnamese listed firms, beyond which further inventory reduction becomes detrimental. The identification of these turning points extends the inventory turnover-corporate performance literature by demonstrating nonlinearity within an emerging market setting, a dimension that has received limited attention in prior studies. In sum, the results offer strong empirical support for Hypothesis 1, confirming the nonlinear, inverted U-shaped impact of inventory turnover on corporate performance among publicly listed firms in Vietnam's stock market.

Regarding financial leverage (LEV), the results reveal contrasting effects depending on the performance metric. In the ROA models 1 and 2, LEV is negative and significant, suggesting that high debt burdens constrain asset productivity, consistent with the agency theory of debt (Ahmed et al., 2023; Ronoowah and Seetanah, 2024), but contrary to Arhinful and Radmehr (2023). Conversely, in the ROE models 3 and 4, LEV is positive and significant, supporting the leverage amplification effect on shareholder returns (Arhinful and Radmehr, 2023). The capital intensity variable (CAPINT) shows a consistently negative and statistically significant relationship with ROE, indicating that firms with higher fixed asset ratios may experience reduced financial flexibility and profitability.

Interestingly, the SIZE and AGE variables are statistically insignificant, suggesting that neither firm scale nor maturity has a uniform effect on corporate performance in this context. This neutrality could reflect countervailing forces: larger firms benefit from economies of scale but may suffer from bureaucratic inertia. Moreover, age-related learning effects may be offset by rigidity and path dependency (Coad et al., 2018). Lagged performance indicators (L.ROA1 and L.ROE1) are highly significant and positive in all models, highlighting performance persistence and confirming the dynamic nature of firm profitability in transitional economies.

5.3 Robustness test

In this section, we undertake several additional tests to check for the robustness of our results. Specifically, we test for the robustness of the nonlinear relationship between inventory turnover and corporate performance to:

1 alternative measures of corporate performance

2 alternative measures of inventory turnover

3 an alternative econometric method.

Table 4 Robustness tests – alternative measures of corporate performance

Variables	*ROA2*		*ROE2*	
Models	*(1)*	*(2)*	*(3)*	*(4)*
INVTURN1	0.3062***		0.5491***	
	(0.0685)		(0.1340)	
INVTURN1SQR	–0.7452***		–1.2936***	
	(0.2277)		(0.4450)	
INVTURN2		0.2721***		0.4309***
		(0.0349)		(0.0685)
INVTURN2SQR		–0.4701***		–0.7315***
		(0.0748)		(0.1468)
SIZE	0.0005	–0.0003	–0.0034	–0.0045*
	(0.0013)	(0.0013)	(0.0027)	(0.0025)
LEV	–0.0787***	–0.0704***	–0.0105	0.0094
	(0.0051)	(0.0055)	(0.0100)	(0.0106)
AGE	–0.0015	–0.0009	0.0007	0.0031
	(0.0037)	(0.0038)	(0.0072)	(0.0075)
CAPINT	–0.0233***	–0.0176***	–0.0608***	–0.0493***
	(0.0061)	(0.0053)	(0.0119)	(0.0105)
L.ROA2	0.5045***	0.5100***		
	(0.0103)	(0.0123)		
L.ROE2			0.5039***	0.5033***
			(0.0115)	(0.0114)
Controls	YI	YI	YI	YI
Observations	6,822	7,276	6,822	7,276
Number of firmid	565	571	565	571

Note: ***, ** and * indicate significance levels of 1%, 5%, and 10%, respectively; standard errors are presented in parentheses; ROA1 – return on assets, ROE1 – return on equity, INVTURN – inventory turnover ratio, SIZE – firm size, LEV – financial leverage, AGE – firm age, CAPINT – fixed asset ratio; industry and year-fixed effects (FI) are included in all models.

5.3.1 Alternative measures of corporate performance

Corporate performance measures based on after-tax earnings may be affected by tax policy distortions, firm-specific tax strategies, and accounting treatments, which do not necessarily reflect firms' true operating performance and thus introduce noise into empirical results. To address this, we adopt two alternative measures that use earnings after tax: ROA2, defined as earnings after tax divided by total assets (Zhang, 2026; Wu et al., 2024; Suu et al., 2026), and ROE2, defined as earnings after tax divided by total equity (Wu et al., 2024; Suu et al., 2026).

Table 4 presents the results of the robustness checks. The estimated coefficients for the inventory turnover (INVTURN1 and INVTURN2) and the squared inventory turnover terms (INVTURN1SQR and INVTURN2SQR) remain positive and negative, respectively, and statistically significant at the 1% level across all specifications. These results confirm the presence of an inverted U-shaped relationship between inventory turnover and corporate performance. The consistency of this nonlinear effect, even when using alternative performance definitions, strengthens the validity of our main findings and supports the argument that inventory management efficiency initially enhances performance but may become detrimental beyond a certain threshold.

5.3.2 Alternative measures of inventory turnover

In the baseline regression, two distinct proxies for inventory turnover are employed to capture the hypothesised nonlinear relationship between inventory turnover and corporate performance, characterised by an inverted U-shaped curve. Following Basker et al. (2018), Gunasekaran et al. (2004) and Cannon (2008), we apply two alternative measures of inventory turnover widely adopted in the literature and re-estimate equation (1) to examine the robustness of this nonlinearity. Specifically, the proxies for inventory turnover are calculated by dividing total revenue and cost of goods sold (COGS), respectively, by ending inventory. The two measures are scaled down by 1,000 to adjust for magnitude differences. This adjustment ensures consistent comparisons across firms and tests whether the inverted U-shaped relationship between inventory turnover and corporate performance holds under different operationalisations.

Table 5 reports dynamic panel estimates using the LSDVC estimator, with an alternative measure of sales turnover (INVTURN3) being total revenue divided by ending inventory, and inventory turnover (INVTURN4) being COGS divided by ending inventory. The results reaffirm the nonlinear effect of inventory turnover on corporate performance. The signs and significance of both inventory turnover and its squared terms remain consistent with baseline results.

5.3.3 An alternative econometric method

In our baseline results, we employ Bruno's (2005a) corrected least-squares dummy variable (LSDVC) approach to estimate the nonlinear relationship between inventory turnover and corporate performance. However, the requirement of a strict exogeneity assumption in the LSDVC model may lead to estimation biases. The SGMM estimator is well-documented as being appropriate and is commonly used in dynamic models (Blundell-Bond, 1998). Empirically, Johan et al. (2024) and Omri and Guenichi (2026) employ the SGMM estimator to investigate the impact of the cash conversion cycle on firm performance in BRICS countries and the effect of ESG disclosure on corporate

financial performance in US firms, respectively. Therefore, the SGMM approach is utilised as a robustness check to check whether our results are potentially robust to the econometric method.

Table 5 Robustness tests – alternative measures of inventory turnover

Variables	*ROA1*		*ROE1*	
Models	*(1)*	*(2)*	*(3)*	*(4)*
INVTURN3	0.3276***		0.5460***	
	(0.0383)		(0.0794)	
INVTURN3SQR	–0.5356***		–0.8769***	
	(0.0770)		(0.1596)	
INVTURN1		0.3140***		0.5050***
		(0.0664)		(0.1376)
INVTURN1SQR		–0.7817***		–1.1800**
		(0.2236)		(0.4642)
SIZE	–0.0010	–0.0008	–0.0050	–0.0047
	(0.0015)	(0.0015)	(0.0031)	(0.0031)
LEV	–0.0613***	–0.0618***	0.1292***	0.1271***
	(0.0064)	(0.0064)	(0.0128)	(0.0129)
AGE	0.0016	0.0009	0.0131	0.0120
	(0.0044)	(0.0044)	(0.0094)	(0.0094)
CAPINT	–0.0042	–0.0044	–0.0332***	–0.0335***
	(0.0062)	(0.0063)	(0.0128)	(0.0129)
L.ROA1	0.5162***	0.5214***		
	(0.0121)	(0.0121)		
L.ROE1			0.5146***	0.5183***
			(0.0111)	(0.0111)
Controls	YI	YI	YI	YI
Observations	7,276	7,276	7,276	7,276
Number of firmid	571	571	571	571

Note: ***, ** and * indicate significance levels of 1%, 5%, and 10%, respectively; standard errors are presented in parentheses; ROA1 – return on assets, ROE1 – return on equity, INVTURN – inventory turnover ratio, SIZE – firm size, LEV – financial leverage, AGE – firm age, CAPINT – fixed asset ratio; industry and year-fixed effects (FI) are included in all models.

Table 6 presents the results of the SGMM regression analyses that were used to test whether the nonlinear inventory turnover-corporate performance relationship varies by an alternative econometric technique. In order to ensure the validity of the SGMM regression, the test for the absence of second-order serial correlation and the Hansen test of overidentifying restrictions are reported. The Hansen test results fail to reject the null hypothesis of instrument validity ($p > 0.1$), suggesting that the instruments used are appropriate and uncorrelated with the error term. Similarly, the AR(2) test results indicate no evidence of second-order serial correlation in the first-differenced residuals,

supporting the consistency of the GMM estimators. These results collectively confirm the robustness of the model. The coefficients of INVTURN1 and INVTURN2 are positive and statistically significant at the 1% level. In the meantime, the coefficients of INVTURN1SQR and INVTURN2SQR are negative and statistically significant at the 1% level. This suggests that the inverted U-shaped pattern remains significant, where inventory management plays a central role in operations.

Table 6 Robustness tests – an alternative econometric method

Variables	*ROA1*		*ROE1*	
Models	*(1)*	*(2)*	*(3)*	*(4)*
INVTURN1	0.6753***		0.3488***	
	(0.2159)		(0.0981)	
INVTURN1SQR	–0.6133***		–0.8599***	
	(0.0543)		(0.3241)	
INVTURN2		0.2172***		0.2844***
		(0.0432)		(0.0632)
INVTURN2SQR		–0.3899***		–0.4280***
		(0.0883)		(0.1181)
SIZE	0.0014*	0.0015**	0.0009	0.0010
	(0.0007)	(0.0007)	(0.0011)	(0.0012)
LEV	–0.0886***	–0.0865***	0.0705***	0.0748***
	(0.0112)	(0.0106)	(0.0090)	(0.0092)
AGE	0.0060***	0.0064***	0.0094***	0.0100***
	(0.0014)	(0.0014)	(0.0020)	(0.0020)
CAPINT	–0.0123***	–0.0141***	0.0096	0.0074
	(0.0044)	(0.0044)	(0.0066)	(0.0067)
L.ROA1	0.6133***	0.6144***		
	(0.0543)	(0.0519)		
L.ROE1	0.2454***		0.6652***	0.6549***
	(0.0649)		(0.0520)	(0.0516)
CONSTANT	0.0268	0.0233	–0.0425	–0.0448*
	(0.0169)	(0.0169)	(0.0261)	(0.0264)
AR(2) test – p-value	0.1490	0.1630	0.6190	0.5990
Hansen test – p-value	0.4160	0.6900	0.8530	0.8610
Controls	YI	YI	YI	YI
Observations	7,389	7,360	7,394	7,356
Number of firmid	565	564	565	564

Note: ***, ** and * indicate significance levels of 1%, 5%, and 10%, respectively; standard errors are presented in parentheses; ROA1 – return on assets, ROE1 – return on equity, INVTURN – inventory turnover ratio, SIZE – firm size, LEV – financial leverage, AGE – firm age, CAPINT – fixed asset ratio; industry and year-fixed effects (FI) are included in all models.

6 Conclusions

6.1 Contributions of the study

This study investigates the nonlinear relationship between inventory turnover and corporate performance in the context of publicly listed Vietnamese firms, incorporating advanced econometric techniques to validate the robustness of the findings. The key result affirms the existence of an inverted U-shaped relationship between inventory turnover and corporate performance, suggesting that although increased inventory efficiency initially enhances profitability, its marginal benefit diminishes beyond a threshold – potentially harming performance due to understocking or operational strain.

This study makes several important contributions to the literature. First, it extends the literature on inventory turnover and corporate performance to the context of Vietnam, an emerging market characterised by volatile demand conditions, evolving supply chain structures, and resource constraints. While prior studies have primarily focused on developed markets, this study provides empirical evidence from an underexplored institutional setting, thereby enriching the understanding of inventory management in emerging economies. Second, the study empirically confirms an inverted U-shaped relationship between inventory turnover and corporate performance, highlighting the existence of an optimal inventory turnover level rather than a purely linear effect. This finding contributes to the growing body of research emphasising the nonlinear nature of the inventory turnover-corporate performance nexus and provides more nuanced insights into the trade-off between operational efficiency and risk. Third, from a theoretical perspective, the findings offer indirect support for agency-based arguments (Jensen and Meckling, 1976). Specifically, both excessive inventory accumulation and overly aggressive inventory reduction may reflect inefficiencies in managerial decision making, suggesting that inventory turnover can serve not only as an operational efficiency indicator but also as a proxy for managerial behaviour under conditions of information asymmetry and limited monitoring. Finally, the study strengthens the empirical design by employing multiple inventory turnover proxies and applying the least squares dummy variable corrected (LSDVC) estimator to address dynamic panel bias, endogeneity, and unobserved heterogeneity. The robustness of the results is further confirmed using alternative performance measures and the system GMM estimator, thereby enhancing the reliability of the findings.

The findings offer several implications. For practitioners, the findings emphasise the importance of optimising, rather than merely increasing, inventory turnover. Managers should identify industry-specific thresholds where further increases in turnover may no longer contribute positively to profitability.

From a policy standpoint, the results call for context-sensitive regulatory guidance on inventory efficiency and financial leverage. Policymakers should support digital adoption in inventory systems, enhance financial disclosure requirements, and encourage access to affordable debt financing for SMEs. Sectoral benchmarks and collaborative research initiatives can also help firms and regulators monitor and improve operational and corporate performance effectively.

Future studies could extend this framework by exploring sectoral heterogeneity, incorporating external macroeconomic shocks (e.g., inflation, interest rate volatility), or using more granular inventory components. Comparative studies across ASEAN markets

could also offer cross-country validation of the inverted U-shaped inventory turnover-corporate performance relationship.

6.2 Limitations

Despite these contributions, the study has several limitations. First, the analysis is restricted to publicly listed non-financial firms in Vietnam, which may limit the generalisability of the findings to private firms or firms operating in different industries. Second, corporate performance is measured using accounting-based indicators, which may not fully capture market-based performance or broader dimensions of firm resilience. Third, although the results document a robust inverted U-shaped relationship, the study does not directly test the underlying mechanisms through which excessive or insufficient inventory turnover affects performance, such as stock-out risk, holding costs, or supply chain disruptions.

6.3 Future research directions

Future research may extend this analysis in several directions. First, future work could examine industry-specific nonlinearities, particularly for private firms and across sectors with different inventory characteristics such as manufacturing, retail, and perishable goods sectors. Second, subsequent studies may incorporate market-based and risk-based outcomes, such as Tobin's Q, cash flow volatility, or financial distress, to capture broader dimensions of corporate performance. Finally, future research should investigate the mechanisms and boundary conditions underlying the nonlinear relationship, including financing constraints, supply chain disruptions, commodity price volatility, and digital inventory capabilities.

Declarations

All authors declare that they have no conflicts of interest.

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