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Value and Size Premiums in the Philippine Equity Market: Evidence from an Extended Dataset with Volatility Analysis

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Abstract

This study provides an updated and extended empirical assessment of the size premium and return volatility clustering in the Philippine Stock Exchange (PSE), covering the period from July 2018 to June 2025. The analysis extends and updates the foundational work of Perez (2018) — the only prior published study examining size and value anomalies in the PSE using firm-level return data — across a sample period that encompasses the COVID-19 market disruption, the post-pandemic recovery, and the Bangko Sentral ng Pilipinas monetary tightening cycle of 2022 to 2023. Annual tercile portfolios are constructed using price per share as a proxy for firm size, and equal-weighted portfolio returns are computed at weekly and monthly frequencies. The value premium is excluded from the empirical scope due to the unavailability of structured historical fundamental data through publicly accessible sources for PSE-listed firms, a constraint that is acknowledged as a study limitation. Full-sample tests find no statistically significant size premium at either weekly (SML = 0.030%, $p = 0.793$) or monthly (SML = 0.145%, $p = 0.758$) frequency. This null result is consistent across all seven individual portfolio years examined and across three structurally distinct sub-periods — pre-COVID, COVID-recovery, and post-COVID tightening — confirming that the absence of a size premium in the Philippine market is a durable structural feature rather than a sample-specific artifact. Volatility clustering tests using the GARCH(1,1) framework reveal strong and uniform evidence of conditional heteroskedasticity at weekly frequency across all three size portfolios, with ARCH Lagrange Multiplier p -values < 0.001 and volatility persistence measures ranging from 0.863 to 0.936, while no clustering is detected at monthly frequency for any portfolio. This frequency-dependent pattern is consistent with the temporal aggregation theory of volatility and directly replicates the Perez (2018) volatility findings over an extended and more turbulent sample horizon. The findings have implications for asset pricing model application, portfolio risk management, and the development of Philippine equity market data infrastructure.

Keywords: *Philippine Stock Exchange; size premium; volatility clustering; GARCH; emerging equity markets; asset pricing anomalies; temporal aggregation*

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1. Introduction

The existence of systematic return premia associated with firm size and equity valuation ratios represents one of the most extensively studied and debated questions in empirical finance. Beginning with the foundational work of Banz (1981), who documented that small-capitalization stocks delivered returns in excess of what their market risk alone could explain, and Rosenberg, Reid, and Lanstein (1985), who identified a value premium linked to high book-to-market ratios, a substantial body of evidence has accumulated suggesting that equity markets do not price assets solely on the basis of systematic risk as measured by beta. These findings were formalized and integrated into a coherent multi-factor framework by Fama and French (1992, 1993), whose three-factor model — incorporating the market premium, a size factor (SMB, or small-minus-big), and a value factor (HML, or high-minus-low) — became the dominant empirical benchmark in cross-sectional asset pricing for more than two decades. The theoretical interpretation of these premia has remained contested: whether they represent

compensation for rational risk exposures, behavioral mispricings rooted in investor psychology, or structural features of specific markets is a question that continues to motivate empirical work across institutional settings and geographies.

The generalizability of the size and value effects beyond the United States and major European markets has been subject to sustained empirical scrutiny. Studies conducted in developed Asian markets, notably Japan, have found evidence broadly consistent with the Fama-French framework, though with important institutional and cyclical qualifications (Maeda, 2017). Evidence from emerging and frontier equity markets has been more mixed, with several studies reporting attenuated, absent, or even reversed premia in markets characterized by lower liquidity, concentrated ownership, thinner trading, and smaller listed universes (Quach et al., 2018). These contextual differences are not incidental: the mechanisms through which size and value premia are theorized to arise — whether through distress risk, investor sentiment, limits to arbitrage, or information asymmetry — operate differently in markets with distinct structural characteristics. A finding of no value or size effect in a smaller emerging market is therefore not simply a negative replication result; it constitutes substantive evidence about the conditions under which internationally established anomalies do and do not transfer.

The Philippine Stock Exchange (PSE) occupies a position that is underrepresented in this literature relative to its institutional significance. The PSE is one of the oldest stock exchanges in Asia, with origins traceable to the Manila Stock Exchange established in 1927 (Ho & Odhiambo, 2016). It currently lists approximately 270 to 285 companies across six sector indices — Financials, Industrials, Holdings, Property, Services, and Mining and Oil — with a total market capitalization equivalent to approximately 52 percent of Philippine nominal gross domestic product as of 2023 (OECD, 2024). Despite this scale, the Philippine equity market has attracted considerably less scholarly attention than the equity markets of China, Japan, South Korea, or even Indonesia and Thailand. This relative neglect is consequential: the PSE has its own distinct features, including a high degree of ownership concentration among conglomerate-linked listed firms, a relatively small free-float proportion for many listed equities, significant variation in trading liquidity across the listed universe, and a market that has been subject to a series of meaningful structural shocks over the past decade, including the post-2015 emerging-market selloff, the COVID-19 pandemic-induced collapse and recovery in 2020–2021, and the aggressive BSP monetary tightening cycle of 2022–2023 in response to elevated inflation.

The most directly relevant prior study is that of Perez (2018), which examined the value and size effects in the PSE using data available at that time and found no evidence of either anomaly in the full sample or in year-by-year analyses. That study also documented volatility clustering in portfolio return series at weekly frequencies, a finding more consistent with the broader literature, while noting that clustering was less evident at monthly frequencies. While the Perez (2018) study constitutes a valuable baseline, it predates a period of substantial market disruption and structural change. The COVID-19 pandemic produced significant declines and recoveries in PSE history (Maran, 2022; Navarro et al., 2023). The subsequent inflationary environment and the BSP's tightening cycle altered discount rates, equity valuations, and the relative pricing of growth versus value stocks in ways that may have had measurable implications for whether size and value premia emerged, disappeared, or intensified during this period (Atento, 2025; Espelita et al., 2025; Maran, 2022). No study has updated or re-examined these anomalies in the Philippine market since the original Perez (2018) paper, leaving a clear empirical gap in the regional asset pricing literature.

This paper addresses that gap by providing an updated and extended empirical assessment of the size premium and return volatility clustering in the Philippine Stock Exchange, using firm-level stock price data for PSE-listed companies over an extended sample period that encompasses the post-2018 years, the COVID-19 shock, and the subsequent monetary tightening cycle. The study constructs portfolios sorted by price per share as a proxy for firm size, following a methodology broadly consistent with Perez (2018) and adapted to the data constraints of the PSE. It tests whether the absence of a size premium documented in Perez (2018) persists over a materially extended horizon. It further examines whether portfolios defined by size classifications exhibit volatility clustering at weekly and monthly return frequencies, and whether clustering patterns differ across the two frequencies — a dimension relevant to the modeling and risk management practices of Philippine equity investors. The value premium is excluded from the analysis due to the unavailability of historical book value data through publicly accessible sources, as discussed in the methodology section.

The study pursues three specific objectives. First, it tests whether a statistically significant size premium — defined as a systematic return differential favoring small-priced portfolios over large-priced portfolios — exists in the PSE over the full updated sample period. Second, it examines the year-by-year and sub-period consistency of this finding to assess whether any anomaly evidence is driven by specific market episodes. Third, it applies GARCH-family models to weekly and monthly portfolio return series to test for volatility clustering and compare results across return frequencies.

The findings of this study carry implications for multiple audiences. For academic researchers, they contribute to the growing comparative evidence on the scope and limits of the Fama-French framework in emerging Asian equity markets. For portfolio managers and institutional investors active in Philippine equities, they provide updated empirical guidance on whether size-tilted strategies are supported by return data in this market. For market regulators and the PSE as an institution, the results bear on assessments of pricing efficiency and the informational environment of the exchange. The paper proceeds as follows: Section 2 reviews the related literature across five thematic areas. Section 3 describes the data, variables, and methodology. Section 4 presents the results and discussion. Section 5 deepens the interpretation of findings and develops implications. Section 6 provides conclusions and recommendations.

2. Review of Related Literature

2.1 Theoretical Foundations of the Value Effect and Size Effect in Asset Pricing

The theoretical lineage of the value and size effects in equity markets begins with the Capital Asset Pricing Model (CAPM), developed independently by Sharpe (1964), Lintner (1965), and Mossin (1966) as an extension of Markowitz's (1952) mean-variance portfolio theory. The CAPM asserts that the expected return of any asset is a linear function of its sensitivity to the market portfolio — its beta — implying that no systematic return differential should exist between stocks grouped by characteristics such as firm size or valuation ratios, once market risk is controlled (Ziane et al., 2024). For several decades following its introduction, the CAPM served as the dominant framework for asset pricing and the benchmark against which empirically observed return patterns were evaluated (Fama & French, 2004).

The first serious challenge to this framework in the context of firm size came from Banz (1981), who documented that small-capitalization stocks on the New York Stock Exchange earned returns significantly higher than those predicted by the CAPM over the period 1936 to 1975, even after adjusting for beta. This finding — widely referred to as the size effect or small-firm effect — could not be reconciled with the CAPM's assertion that beta alone captures cross-sectional return variation. Shortly thereafter, attention shifted to valuation-based anomalies. Stattman (1980) and Rosenberg, Reid, and Lanstein (1985) found that stocks with high book-to-market ratios — commonly characterized as value stocks — earned returns in excess of what their market risk would predict, while stocks with low book-to-market ratios — growth stocks — tended to underperform on a risk-adjusted basis. The value effect, sometimes also documented through price-to-earnings and price-to-cash flow ratios, attracted further validation from DeBondt and Thaler (1985), whose long-term reversal study provided behavioral reinforcement for the idea that markets systematically overprice growth and underprice value.

Fama and French (1992, 1993) provided the theoretical synthesis of these empirical anomalies, demonstrating that a three-factor model incorporating the market premium, a size factor constructed as the return differential between small and large capitalization portfolios (SMB), and a value factor constructed as the return differential between high and low book-to-market portfolios (HML) explained a substantially larger proportion of cross-sectional return variation than the CAPM alone. Fama and French (1993) argued that SMB and HML proxied for undiversifiable risk factors — specifically, distress risk — that rational investors required compensation for bearing. On this interpretation, value stocks and small-capitalization stocks are riskier in economically meaningful ways not captured by beta, and their higher average returns are therefore consistent with efficient pricing rather than anomalies.

This risk-based interpretation has been contested on both empirical and theoretical grounds. Lakonishok, Shleifer, and Vishny (1994) argued that the value premium was better explained by investor overreaction and extrapolation bias — the tendency of market participants to project recent earnings growth trends too far into the future, thereby overvaluing glamour stocks and undervaluing distressed value stocks — rather than by rational risk compensation. On this behavioral account, the value premium arises from a systematic cognitive error that is slow to be corrected because the arbitrage required to eliminate it is costly, risky, and capital-constrained. Daniel and Titman (1997) challenged the Fama-French interpretation more directly by showing that the covariance structure of returns — the factor loadings themselves — rather than exposure to underlying risk factors, better explains the cross-section of returns, suggesting that the book-to-market ratio is a characteristic rather than a risk proxy.

The subsequent literature has generated substantial refinements to both the risk-based and behavioral interpretations. Carhart (1997) extended the Fama-French model to include a momentum factor, documenting that much of what appeared to be alpha in managed portfolios was explainable by this fourth dimension. Fama and French (2015) subsequently introduced a five-factor model that augmented the original three factors with profitability (RMW) and investment (CMA) factors, reflecting evidence that profitable and conservatively investing firms earn higher returns, and partly absorbing the value factor's explanatory power in certain

specifications. Despite these extensions, the theoretical debate between risk-based and behavioral accounts of the value and size effects has not been definitively resolved, and continues to motivate empirical work across institutional contexts. This theoretical ambiguity is itself a reason to test whether the premia manifest consistently across equity markets with different structural characteristics, such as the Philippine Stock Exchange.

2.2 Empirical Evidence in Developed Markets: Persistence, Attenuation, and Debate

The empirical record of the value and size effects in developed markets is extensive but increasingly nuanced, with a significant body of post-publication evidence suggesting that both premia have weakened, disappeared, or become more variable following their original documentation (Anchev & Lapanan, 2023). Understanding this trajectory is important for contextualizing the Philippine evidence, as it raises the question of whether the absence of anomalies in a frontier-adjacent market reflects a local inefficiency, a data limitation, or simply the broader international trend toward premium attenuation.

In the United States, the original size effect documented by Banz (1981) attracted substantial replication and scrutiny over subsequent decades. Horowitz, Loughran, and Savin (2000) concluded that the size premium in the United States had effectively disappeared by the mid-1980s, attributing its earlier presence to a combination of data mining, the January effect, and the influence of micro-cap stocks. Schwert (2003) similarly argued that many documented anomalies, including the size effect, diminished or disappeared after they became widely known — a pattern consistent with the view that publication induces the arbitrage that eliminates the pricing inefficiency. In contrast, Asness, Frazzini, Israel, and Moskowitz (2015) argued that the size premium remains significant once quality controls are applied — specifically, that small stocks that are also high-quality firms consistently outperform, while the weakness of the raw size effect reflects the inclusion of small, low-quality or distressed firms that genuinely earn poor returns for rational risk reasons.

The value premium has shown greater cross-market persistence than the size effect in developed-market evidence (Asness et al., 2013), though it too has been subject to documented weakening (Gonçalves & Leonard, 2022). Fama and French (1998) extended the value premium evidence to international developed markets, finding that high book-to-market stocks outperformed low book-to-market stocks in twelve of thirteen major markets over the period 1975 to 1995. However, subsequent studies using post-publication data have found that the value premium in the United States and major European markets has narrowed substantially, particularly during the prolonged growth-stock outperformance cycle of the 2010s, when technology-oriented growth firms dominated equity returns (Gagliolo & Cardullo, 2020). Arnott, Harvey, Kalesnik, and Pontiff (2019) raised the broader concern of return predictability decay, suggesting that a number of documented anomalies — including value — have earned materially lower returns after publication than before it, raising questions about whether prior evidence reflects genuine risk premia or statistical artifacts.

Methodological contributions have also shaped the evidence base considerably. The choice between equal-weighted and value-weighted portfolio returns, the treatment of micro-cap stocks, the frequency of portfolio rebalancing, and the precise construction of the book-to-market ratio all materially affect estimated premia (Hou et al., 2017). Novy-Marx (2013) demonstrated that gross profitability — a measure not included in the original Fama-French framework — predicted returns as strongly as book-to-market, and that combining value and profitability screens produced more robust outperformance than either alone. This finding, subsequently incorporated into the Fama-French five-factor model (Liu & Yadohisa, 2018), reinforced the view that simple B/M-sorted portfolios may be an imprecise instrument for capturing the theoretically relevant dimension of value. Additionally, Israel and Moskowitz (2013) demonstrated that the value premium is largely concentrated in small-cap stocks, with much weaker evidence among large-cap firms — a finding with direct implications for how value and size effects are assessed in markets where the listed universe is heavily skewed toward a small number of large, highly capitalized conglomerate-linked firms, as is the case in the Philippines.

The evidence from European developed markets presents a broadly consistent but contextually qualified picture. Fama and French (1998) and subsequent studies documented value premia across the United Kingdom, Germany, France, and other major European exchanges, though the magnitude and consistency have varied across sub-periods and methodological specifications. The European experience also highlights the relevance of financial sector composition: Fianza and Morresi (2021) found evidence of both size and value anomalies in European bank stocks, suggesting that sector-specific factors may sustain anomalies even as they weaken in the broader market. Japan, which occupies a distinct position as both a developed and an Asian market, represents a significant non-US developed equity context and is addressed in the following section alongside the broader Asian evidence.

2.3 Evidence in Asian and Emerging Equity Markets

The evidence on value and size effects in Asian and emerging equity markets is substantially more heterogeneous than in developed markets, reflecting the considerable institutional, structural, and liquidity

diversity among these exchanges (Quach et al., 2018; Zhang et al., 2015). Several important patterns emerge from this literature: the value premium shows somewhat greater cross-regional robustness than the size premium (Lischewski & Voronkova, 2011; Quach et al., 2018); market liquidity and ownership concentration are important moderating factors (Prommin et al., 2016; Wang & Shailer, 2013); and the behavior of anomalies in crisis versus non-crisis periods differs meaningfully, with implications for the interpretation of full-sample results that cover structurally turbulent periods (Munir et al., 2022).

Japan has been extensively studied as an Asian equity market in the value and size anomaly literature (Chan et al., 1991). Chan, Hamao, and Lakonishok (1991) found strong evidence of a value effect in Japan using book-to-market, cash flow-to-price, and earnings-to-price ratios, with return differentials between high and low valuation portfolios that exceeded those typically found in the US market. The Japanese evidence is important for the Philippine context because Japan, like the Philippines, has a listed universe characterized by significant cross-shareholding arrangements (Dietzenbacher & Temurshoev, 2008; Muramiya & Takada, 2020) and concentrated corporate ownership structures (Claessens et al., 2000; Hu & Izumida, 2008; Todeva, 2005).

In other Asian markets, the evidence is more mixed. Drew, Naughton, and Veeraraghavan (2003) found significant size and value premia in the Shanghai Stock Exchange, attributing their presence partly to market immaturity and structural features of the Chinese A-share market that limit arbitrage. Studies of the Korean and Taiwanese equity markets have found evidence of a value premium and somewhat weaker evidence of a size premium, while research on the Thai and Malaysian markets has produced more ambiguous results that are sensitive to the sample period and methodology employed (Atento & Atento, 2025a, 2025b). The Indonesian market has attracted growing attention following the introduction of the IDX Value30 and IDX Growth30 indices, with recent evidence suggesting that value-investing strategies have outperformed growth strategies on the Indonesian exchange over certain periods, although with important caveats regarding sample length and index construction methodology (Atento & Atento, 2025a, 2025b).

Emerging market evidence from outside Asia reinforces the picture of conditional and context-dependent anomalies. Rouwenhorst (1999) examined 18 emerging equity markets and found evidence of size and value premia that were broadly consistent with developed-market findings, although with higher variance and lower statistical reliability. More recent studies have shown that the structural features specific to individual emerging markets — including the degree of financial development, the depth of institutional investor participation, the regulatory environment, and the extent of integration with global capital markets — significantly moderate both the existence and the magnitude of these premia (Atento & Atento, 2025a, 2025b). Particularly relevant is the evidence that in markets with thin trading and low liquidity — conditions that characterize a significant portion of the PSE-listed universe — apparent size premia may partly reflect liquidity premia rather than a genuine compensation for size-related risk, a confound that is difficult to fully disentangle without granular trading-volume data (Atento, 2025; Atento & Atento, 2025a, 2025b).

The role of crisis periods in shaping anomaly evidence deserves specific attention. Several studies have documented that the value premium behaves differently during financial crises than in normal market conditions: Griffin and Lemmon (2002) found that the value effect is stronger among firms with the highest financial distress risk, consistent with the rational risk interpretation, while behavioral accounts suggest that crisis periods may amplify the mispricing that underlies the value premium by driving investors toward indiscriminate selling of perceived risk assets (Atento, 2025). For emerging markets, the COVID-19 pandemic constitutes a natural experiment in this regard: the sharp and rapid market decline of early 2020, followed by an uneven recovery, plausibly affected the relative pricing of value and growth stocks and the performance of size-sorted portfolios in ways that a pre-2020 study such as Perez (2018) could not have captured. Whether the post-pandemic period has generated new anomaly evidence in the Philippine market is one of the central empirical questions motivating the present study.

2.4 The Philippine Stock Exchange: Structure, Development, and Prior Evidence

The Philippine Stock Exchange has a long institutional history by regional standards, with the Manila Stock Exchange established in 1927 and the current unified PSE formed in 1992 through the merger of the Manila and Makati exchanges. Despite this longevity, the PSE has remained a relatively thin and concentrated equity market compared to the major ASEAN peers of Malaysia, Indonesia, and Thailand (Atento, 2025). Currently, the exchange lists approximately 270 to 285 companies (Atento & Atento, 2025a, 2025b) organized under six sector indices — Financials, Industrials, Holdings, Property, Services, and Mining and Oil (Sucuahi, 2023) — with total market capitalization representing approximately 52 percent of Philippine nominal GDP in 2023 (OECD, 2024). The PSEi Composite Index, the benchmark index, comprises only 30 carefully selected stocks that represent the general movement of the stock market (Rahman, 2021).

This structural concentration is directly relevant to the question of whether size and value anomalies manifest in the PSE. The dominance of conglomerate holding companies — SM Investments, Ayala Corporation, JG Summit Holdings, Aboitiz Equity Ventures, and similar large conglomerates (Atento, 2025) — means that a substantial share of total market capitalization is concentrated in firms with complex cross-shareholding structures, diversified revenue streams across sectors, and book values that may not accurately reflect the economic value of their constituent businesses. These features complicate the construction of meaningful B/M ratios and make it more difficult to interpret the theoretical construct that the book-to-market ratio is intended to proxy — namely, the ratio of fundamental value to market value as a measure of relative mispricing or distress risk. At the same time, the smaller and less liquid stocks in the PSE's Second Board and SME Board present challenges of their own: thin trading, extended periods of inactivity, and bid-ask spreads that may make return calculations unreliable.

The limited prior empirical literature on PSE return behavior reflects several of these structural constraints. Bautista (2003) examined stock market volatility in the Philippines using GARCH specifications, finding evidence consistent with volatility clustering in PSE index returns — one of the earliest formal econometric analyses of PSE return dynamics. Subsequent studies have examined macroeconomic determinants of PSE performance, monetary policy transmission to PSE returns, and the impact of natural disasters and the COVID-19 pandemic on index-level returns, but firm-level cross-sectional return anomaly studies have remained rare (Atento, 2025; Atento & Atento, 2025a, 2025b). The most directly relevant antecedent is Perez (2018), which represents the only published study specifically examining the size and value effects in the PSE using individual stock data. That study found no evidence of a value premium or a size premium in the PSE over its sample period, in either the full dataset or year-by-year analyses, concluding that the anomalies documented extensively in other markets did not manifest in the Philippine context. It did, however, find volatility clustering in portfolio return series at weekly frequency, with weaker evidence at monthly frequency, a result that Perez (2018) attributed to the well-established phenomenon of temporal aggregation reducing the detectability of conditional heteroskedasticity.

The PSE has undergone meaningful structural developments since the Perez (2018) study. The COVID-19 pandemic produced a sharp decline of 31% in the PSEi between January and March 2020 (Asian Development Outlook 2020, 2020), and the BSP subsequently implemented a cumulative policy rate increase of 450 basis points between May 2022 and October 2023 in response to elevated domestic inflation, representing one of the most aggressive tightening cycles in BSP history (Atento, 2025). These developments altered the discount rate environment for equity valuation, potentially affecting the relative pricing of growth and value stocks in ways that were not present in the Perez (2018) sample period. In addition, the composition of the PSE listed universe has shifted through delistings, new listings, and the introduction of Real Estate Investment Trusts (REITs) since 2020, adding new asset classes and potentially changing the distribution of firm size and valuation ratios across the market. These developments collectively justify a re-examination of the Perez (2018) findings using an extended and updated dataset.

2.5 Volatility Clustering in Equity Returns: Theory, Evidence, and Measurement

Volatility clustering — the empirical regularity whereby periods of high return variability tend to be followed by further high variability, and periods of low variability by continued low variability — is among the most robustly documented stylized facts of financial time series (Wang et al., 2022). Formally, it implies that the conditional variance of returns is not constant over time but evolves in a predictable manner dependent on past squared innovations, a property directly at odds with the assumptions of many classical return models that treat variance as fixed (Wang et al., 2022). This feature was first formally modeled by Engle (1982) through the Autoregressive Conditional Heteroskedasticity (ARCH) framework, which allows conditional variance to be a function of lagged squared residuals. Bollerslev (1986) extended this to the Generalized ARCH (GARCH) model, which incorporates lagged conditional variance as an additional predictor, producing a more parsimonious representation of volatility persistence that has become the standard baseline specification in empirical financial econometrics.

The theoretical importance of volatility clustering for asset pricing and anomaly research lies in its implications for risk measurement and return inference (Atento, 2025). Standard tests of mean return differentials across portfolios — such as those used to evaluate the size and value effects — implicitly assume that returns are independently and identically distributed, or at a minimum that standard errors can be reliably estimated under conventional assumptions (Wang et al., 2022). When returns exhibit volatility clustering, these assumptions are violated, and the statistical inference in anomaly tests may be distorted (Wang et al., 2022). More substantively, the presence of volatility clustering in a portfolio's return series implies that the risk of holding that portfolio is time-varying: it is higher during periods of market stress and lower during calm periods (Szczygielski & Chipeta, 2023). If small-capitalization or value portfolios exhibit stronger or more persistent volatility clustering than their

large-capitalization or growth counterparts, this may itself constitute evidence relevant to the risk-based interpretation of the size and value premia.

Empirical evidence on volatility clustering in equity markets is extensive and consistent across both developed and emerging market contexts. Mandelbrot (1963) first described the clustering phenomenon in commodity prices, and subsequent decades of research have confirmed its presence in virtually every equity market for which high-frequency or medium-frequency return data are available (Zhao et al., 2024). For emerging and Asian equity markets specifically, studies have documented strong ARCH and GARCH effects in Chinese, Korean, Thai, Malaysian, and Indonesian equity indices (Widodo & Faizi, 2023). In the Philippine context, Bautista (2003) provided early evidence of GARCH effects in PSEi index returns, and subsequent work on the PSE has consistently found volatility dynamics broadly consistent with those observed in comparable emerging markets (Velip & Raju, 2020).

The relationship between return frequency and the detectability of volatility clustering is an important methodological dimension for the present study. It is well established in the financial econometrics literature that volatility clustering is more reliably detected at higher return frequencies — daily or weekly — than at lower frequencies such as monthly (Wang et al., 2022). This pattern arises from temporal aggregation: as the return interval is lengthened, the conditional variance structure of the underlying high-frequency returns is smoothed, reducing the observable autocorrelation in squared returns that ARCH and GARCH models rely upon (Wang et al., 2022). Taylor (1986) and subsequent work by Diebold (1988) formalized the aggregation theory of volatility, demonstrating that GARCH processes converge toward constant-variance processes as the measurement interval increases. This theoretical prediction has been broadly confirmed empirically, with studies across multiple markets showing that GARCH parameters estimated at monthly frequency are typically smaller and less precisely estimated than those obtained from weekly or daily data (Engle & Patton, 2001; Jacobsen & Dannenburg, 2003). For the present study, this implies that the comparison of volatility clustering results across weekly and monthly portfolio return frequencies is not merely a robustness check but a substantively meaningful test of whether the clustering phenomenon detected at higher frequencies survives temporal aggregation in the specific context of PSE portfolio returns.

Whether volatility clustering patterns differ systematically across portfolios sorted by size or value characteristics has received limited dedicated attention, but the available evidence offers some guidance. Value portfolios, which by construction contain stocks with higher distress risk exposure (Groot & Huij, 2018), may exhibit stronger clustering around periods of market-wide stress when their underlying risk is most likely to be realized. Perez (2018) found evidence consistent with this pattern in the PSE at weekly frequency, with volatility clustering detected across both value-growth and small-large portfolio groupings, but with evidence less robust at monthly frequency. Whether this pattern holds over an extended and structurally more turbulent sample period — one that includes the extraordinary volatility of the 2020 pandemic episode — is an empirical question that the present study is positioned to address.

2.6 Synthesis of Literature

The five thematic strands reviewed above converge on several durable patterns that collectively frame the empirical problem addressed by this paper. First, the theoretical foundations of the value and size effects are well established but internally contested. The Fama-French three-factor model provides the dominant empirical framework (Cochrane, 2008), yet the underlying source of the premia — whether rational risk compensation tied to distress, behavioral mispricing rooted in extrapolation bias, or a characteristic effect driven by firm-level attributes rather than systematic factor exposures — remains unresolved (Freyberger et al., 2017; Wilcox & Gebbie, 2013). This theoretical indeterminacy has a direct methodological implication: it is not possible to adjudicate between risk-based and behavioral interpretations using portfolio return evidence alone, and this study does not attempt to do so. What the portfolio-sorting approach can establish is whether the anomalies exist in the Philippine market at a statistically and economically meaningful level, leaving the interpretive question open for subsequent theoretical engagement.

Second, the developed-market evidence reveals a trajectory of attenuation rather than stability. The size premium in the United States has been substantially weakened since the mid-1980s, and its current presence depends on quality adjustments and the exclusion of micro-cap distress firms (Asness et al., 2018). The value premium has shown greater persistence across international developed markets but has also narrowed considerably in the post-2010 period, particularly in the United States and major European exchanges, where growth-oriented technology firms sustained a prolonged outperformance cycle. Methodological heterogeneity — in portfolio weighting, rebalancing frequency, B/M construction, and sample coverage — complicates direct comparisons across studies, but the broad direction of the evidence is clear: premia that were robust in the original

documentation periods have become less reliable and more context-dependent over time (Candemir, 2023; Hasler, 2021).

Third, the Asian and emerging-market evidence is characterized by substantial cross-country heterogeneity and conditional dependence on institutional context. Markets with greater liquidity depth, more active institutional investor participation, and lower ownership concentration tend to exhibit clearer anomaly evidence, whereas markets with thin trading, concentrated conglomerate ownership, and limited arbitrage capacity produce more ambiguous results. The Indonesian and Vietnamese markets have generated some recent evidence of value premia under specific conditions, while the broader ASEAN equity market literature remains sparse (Duong, 2024). Crucially, crisis periods — including the Global Financial Crisis and the COVID-19 pandemic — have been shown to alter the behavior of both value and size portfolios in ways that complicate the interpretation of full-sample results, particularly when the sample period spans both crisis and non-crisis episodes of materially different character (Bessler et al., 2021).

Fourth, the Philippine equity market occupies a structurally distinctive position within the regional literature. Its combination of a long institutional history (Bekaert & Harvey, 2000), a relatively small listed universe dominated by conglomerate holding companies, significant ownership concentration, variable liquidity across firm tiers, and a recent history of major structural shocks (Atento, 2025; OECD, 2024) places it in a category where standard anomaly results from deeper markets should not be assumed to apply. Perez (2018) established the only direct empirical baseline for value and size effects in the PSE, finding no evidence of either premium. The present study extends and updates that baseline across a materially different market environment, encompassing the COVID-19 market disruption, the post-pandemic recovery, and the BSP tightening cycle of 2022 to 2023.

Fifth, volatility clustering is robustly established as a property of equity return series across market types and frequencies, with greater detectability at higher frequencies due to the well-documented effects of temporal aggregation (Andersen & Bollerslev, 1997). The evidence from emerging and Asian markets, including early Philippine evidence from Bautista (2003) and the Perez (2018) portfolio-level findings, is broadly consistent with this pattern. Whether clustering differs systematically across portfolios sorted by size or value characteristics — and whether the extreme volatility events of the 2020 period have altered clustering dynamics in PSE portfolios — represents an open empirical question with direct relevance to risk assessment and portfolio management in the Philippine equity market.

2.7 Gaps in the Literature

Several specific gaps in the existing literature motivate and justify the present study. Each gap is precisely identified, as it directly shapes the paper's empirical design and contribution.

Temporal gap in Philippine anomaly research. The Perez (2018) study remains the only published empirical investigation of the value and size effects in the Philippine Stock Exchange using firm-level return data. No study has revisited or updated these findings in the seven years since that publication. This temporal gap is consequential because the post-2018 period encompasses developments of substantial financial and macroeconomic significance: the COVID-19 market crash of 2020 (Maran, 2022; Pinili & Murcia, 2023), the PSEi recovery through 2021 (Maran, 2022), the BSP monetary tightening cycle of 2022 to 2023 (Atento, 2025; Maran, 2022), and the introduction of REITs to the PSE listed universe (Atento, 2025). Whether the null anomaly findings of Perez (2018) are stable properties of the Philippine market or were specific to the sample period studied has not been tested.

Absence of sub-period analysis in the Philippine context. The Perez (2018) study analyzed the full sample and individual years but did not formally examine whether anomaly findings differ across structurally distinct market episodes. Given the documented sensitivity of value and size premia to crisis versus non-crisis conditions in the broader literature (Sarwar et al., 2015; Zaremba, 2014), and the occurrence of the COVID-19 pandemic and the BSP tightening cycle after 2018, a sub-period analysis distinguishing pre-COVID, pandemic, and post-pandemic phases represents a methodological dimension that the existing Philippine literature has not addressed.

Underexplored volatility dynamics at the portfolio level. While volatility clustering in PSE index returns has been documented at the aggregate level since Bautista (2003), the evidence on clustering within portfolios sorted by size and value characteristics is limited to the Perez (2018) findings, which predate the 2020 volatility episode. The extraordinary market disruption of the COVID-19 period — which produced return shocks of a magnitude not present in earlier Philippine equity data (Malini, 2020; Pinili & Murcia, 2023) — raises the empirical question of whether GARCH-detected clustering intensified, became more persistent, or exhibited structural changes in the post-2018 sample.

Insufficient attention to frequency-dependent volatility evidence in portfolio contexts. The theoretical and empirical literature on temporal aggregation in volatility models is well developed, but applications to portfolio-level return series sorted by firm characteristics — as opposed to individual stocks or market indices — remain limited, particularly in Asian frontier and emerging markets (Sahiner, 2022; Velip & Raju, 2020). Whether the frequency dependence of volatility clustering holds at the portfolio level in the PSE, and whether it differs across size portfolio groupings, is a gap in the market-specific literature that the present study addresses.

Geographic underrepresentation of the Philippines in cross-sectional asset pricing research. The broader ASEAN equity literature on anomalies has grown in recent years, with increasing attention to Indonesia, Vietnam, Malaysia, and Thailand (Mubaroq et al., 2025; Thampanya et al., 2020; Utami & Prasetyo, 2021). The Philippines, despite its comparable or larger market capitalization relative to several of these markets, has remained underrepresented (Najmudin et al., 2017; Sarsale, 2025). This geographic imbalance limits the regional comparative evidence available to researchers and practitioners.

2.8 Contribution of the Present Paper

This paper makes four specific and complementary contributions to the existing literature.

First, it provides the first systematic update of the Perez (2018) findings using an extended dataset. By constructing portfolios sorted by price-based size classification for PSE-listed equities over a sample period extending materially beyond 2018, the study tests whether the null findings on the size premium reported in the original study are robust to an extended horizon that includes the COVID-19 shock and the post-pandemic market environment.

Second, it introduces sub-period analysis as a systematic dimension of the Philippine anomaly investigation. By distinguishing results across pre-COVID, COVID, and post-COVID sub-periods, the study moves beyond the full-sample and year-by-year frameworks of the prior literature to assess whether anomaly evidence in the PSE is structurally stable or conditioned on specific market episodes.

Third, it updates the volatility clustering evidence for PSE portfolios with data that now includes the 2020 market disruption. By applying GARCH-family models to weekly and monthly portfolio return series over the extended sample, the study tests whether the frequency-dependent clustering patterns documented in Perez (2018) persist, intensify, or change in character when the 2020 volatility episode is included.

Fourth, it contributes to the geographic representation of the Philippines in the ASEAN asset pricing literature. By providing updated, methodologically transparent evidence on the size effect in the PSE, the study adds a Philippine data point to the regional comparative evidence base. The results — whether confirming or disconfirming the premium — are relevant to the broader question of whether the Fama-French anomalies generalize consistently across ASEAN equity markets or are conditioned on the specific institutional and structural features of individual exchanges.

3. Data, Variables, and Methodology

3.1 Research Design

This study employs a quantitative portfolio-based empirical design to test for the presence of the size premium in the Philippine Stock Exchange and to assess volatility clustering in size-sorted portfolio return series. The research design follows the cross-sectional portfolio sorting methodology introduced by Fama and French (1992, 1993), adapted to the structural and data constraints of the PSE-listed universe. Two parallel analytical objectives are pursued: the detection of systematic return differentials between portfolios sorted by a price-based proxy for firm size, and the assessment of volatility clustering properties within these portfolios using GARCH-family time-series models at weekly and monthly return frequencies.

The design is non-experimental and observational, drawing entirely on secondary market price data. No primary data collection, survey instrument, or field observation is involved. The study is explicitly positioned as an update and extension of Perez (2018), adopting a broadly comparable methodological structure to permit direct comparison of findings across sample periods. The value premium is not examined in this study due to the unavailability of structured historical fundamental data — specifically book value of equity and shares outstanding — for PSE-listed firms through publicly accessible digital sources at the time of data collection. This constraint is acknowledged as a limitation throughout.

3.2 Data Sources and Sample Coverage

Stock price data are sourced from Investing.com, downloaded as historical CSV files for each PSE-listed company included in the study. Investing.com provides historical daily closing price series for PSE-listed equities in Philippine Pesos (PHP), enabling direct comparability across stocks without currency conversion. The PSEi Composite Index was obtained from the same platform and serves as the market benchmark. Firm-level fundamental data — specifically book value of equity and shares outstanding — were not retrievable through publicly accessible APIs or structured databases for PSE-listed firms; structured balance sheet data were unavailable via Yahoo Finance, the Financial Modeling Prep API, or Stooq for the study period. This limitation, which is not unique to this study and reflects the broader data infrastructure gap documented for Philippine equity research (Atento, 2025), necessitated the use of price per share as the size proxy, as described in Section 3.3.

The price data cover the period from January 2018 to December 2025. Portfolio return series span from July 2018 — the first portfolio holding period — to June 2025 — the last holding period — yielding seven annual portfolio cycles. The sample is divided into three sub-periods for structural stability analysis: the pre-COVID period (July 2018 to December 2019), the COVID and recovery period (January 2020 to December 2021), and the post-COVID tightening period (January 2022 to June 2025).

The initial sample includes all PSE-listed companies for which continuous price data were available over the study period through Investing.com downloads. The following exclusion criteria are applied for each annual portfolio formation cycle. First, stocks with insufficient price data at the portfolio formation date are excluded. Second, stocks that record zero returns for more than 30 percent of weekly observations within a given holding year are excluded, as such patterns are indicative of stale pricing rather than genuine return behavior. After applying these filters, the final analytical sample ranges from 25 to 26 stocks per annual portfolio cycle.

3.3 Variable Construction

Individual stock returns are computed as logarithmic price relatives: $R_{i,t} = \ln(P_{i,t} / P_{i,t-1})$, where $P_{i,t}$ is the closing price of stock i at the end of period t . Returns are computed at both weekly and monthly frequencies from the same daily price series, resampled to weekly (Friday close) and month-end frequencies respectively.

Price per share at the annual portfolio formation date is used as the size-sorting variable. The natural logarithm of the closing price at the June 30 formation date is computed as the SIZE ranking variable. This approach is an acknowledged proxy for market capitalization. In the PSE context, price per share correlates systematically with firm size: the largest conglomerate-linked stocks — including SM Investments, BDO, Globe Telecom, and Ayala Corporation — consistently carry the highest share prices, while smaller and less liquid listed companies carry materially lower prices. The proxy introduces measurement imprecision relative to true market capitalization, and this limitation is discussed in Sections 5.1 and 5.5.

As noted in Section 3.1, the book-to-market ratio is not constructed in this study due to the data constraints described in Section 3.2. The value premium dimension is therefore excluded from the empirical analysis.

3.4 Portfolio Formation

Portfolios are formed annually on June 30 of each year from 2018 to 2024. At each formation date, all stocks satisfying the inclusion criteria are ranked by log price per share and assigned to tercile portfolios: Small (bottom tercile of price), Medium (middle tercile), and Large (top tercile). Tercile sorting is adopted given the limited size of the analytical sample, which ranges from 25 to 26 stocks per formation year after exclusion filters. Tercile sorting produces sufficient differentiation between the extreme price-based size groups while maintaining a meaningful number of stocks in each portfolio.

Portfolios are held from July 1 of the formation year to June 30 of the following year, after which portfolios are fully reformed based on updated price rankings. Equal-weighted portfolio returns are computed at weekly and monthly frequencies for each portfolio. The size premium (SML) is defined as the return of the Small portfolio minus the return of the Large portfolio. A positive and statistically significant SML indicates the presence of a size effect; a negative or statistically insignificant SML indicates its absence.

3.5 Anomaly Test Specifications

The size premium tests are conducted at the univariate level. Mean portfolio returns and mean SML premium returns are computed for the full sample and for each annual portfolio cycle and sub-period. Statistical significance is assessed using two-sided t-tests, testing the null hypothesis that the mean premium equals zero. Year-by-year mean premium returns are computed and reported to assess the consistency of findings across individual portfolio years, following the analytical structure of Perez (2018) to facilitate direct comparison of results.

3.6 Volatility Clustering Tests

Volatility clustering is tested using the GARCH(1,1) model of Bollerslev (1986) applied to each portfolio's return series at weekly and monthly frequencies separately. Prior to GARCH estimation, the return series of each portfolio is tested for the presence of ARCH effects using the Engle (1982) ARCH Lagrange Multiplier (LM) test with up to five lags. Rejection of the null hypothesis of no ARCH effects at the five percent significance level is treated as a precondition for GARCH estimation; portfolios whose return series do not exhibit detectable ARCH effects are reported as not exhibiting volatility clustering at the tested frequency.

The GARCH(1,1) model is specified as: $R_{p,t} = \mu + \varepsilon_t$, where $\varepsilon_t = \sigma_t z_t$, $z_t \sim \text{i.i.d.}(0,1)$, and $\sigma_t^2 = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2$. The parameters α and β capture the effects of past squared innovations and past conditional variance on current conditional variance, respectively. The sum $\alpha + \beta$ measures the persistence of volatility shocks; values close to unity indicate highly persistent clustering, while lower values indicate faster mean reversion. Statistical significance of α and β individually, and the sum $\alpha + \beta$, are reported for each portfolio at both return frequencies.

Results are compared across weekly and monthly frequencies to assess whether the temporal aggregation effect — whereby clustering is more pronounced at higher frequencies — holds in the PSE portfolio context. Comparisons are also made across the three size portfolios to assess whether Small, Medium, and Large portfolios exhibit systematically different volatility dynamics (Otaify, 2020).

3.7 Limitations of the Design

Several limitations of the research design are acknowledged and carried through to the interpretation of findings. The use of price per share as the size proxy, rather than true market capitalization, introduces measurement imprecision that may attenuate any genuine size-related return differential. The exclusion of the value premium from the empirical scope limits the completeness of the anomaly investigation. The limited listed universe of the PSE — reduced further to 25 to 26 stocks per portfolio cycle after exclusion filters — constrains the statistical power of all anomaly tests, and null findings should be interpreted in light of this power constraint. Thin trading and stale prices in the lower-priced stocks introduce measurement error into weekly return calculations that cannot be fully eliminated through exclusion filters alone. Finally, the sub-period analysis divides an already modest sample into three episodes, some of which contain a limited number of portfolio cycles, reducing the reliability of sub-period-specific inferences.

4. Results and Discussion

4.1 Descriptive Statistics

Table 1 presents the descriptive statistics for the equal-weighted returns of the three size-sorted portfolios — Small, Medium, and Large — at weekly and monthly return frequencies over the full sample period from July 2018 to June 2025.

Table 1: Descriptive Statistics of Size-Sorted Portfolio Returns

Portfolio	Frequency	N	Mean (%)	Median (%)	Std Dev (%)	Min (%)	Max (%)	Skewness	Kurtosis
Small	Weekly	366	0.0631	0.0750	2.9545	-23.5979	15.3182	-1.2018	14.1553
Medium	Weekly	366	-0.0088	0.1149	2.7409	-19.1673	13.5551	-1.0658	11.0490
Large	Weekly	366	0.0329	0.0864	2.8528	-20.8804	8.8552	-1.2217	9.3242
Small	Monthly	84	0.2500	0.5711	6.0309	-21.9239	22.8271	0.0373	2.9331
Medium	Monthly	84	-0.0311	-0.0060	5.3425	-25.3626	11.4035	-1.3385	5.4081
Large	Monthly	84	0.1051	0.7806	5.7385	-28.6641	13.9511	-1.4866	6.8087

Note: Returns are equal-weighted log returns expressed in percentage terms. Sample period: July 2018 to June 2025. Portfolios formed annually on June 30 by sorting stocks into terciles based on log price per share.

At the weekly frequency, mean returns across all three portfolios are close to zero and economically indistinguishable from one another. The Small portfolio records a mean weekly return of 0.0631 percent, the Large portfolio 0.0329 percent, and the Medium portfolio a marginally negative mean of -0.0088 percent. Standard deviations are broadly similar across portfolios, ranging from 2.74 percent for Medium to 2.95 percent for Small, indicating comparable weekly volatility levels regardless of price-based size classification. All three weekly return distributions exhibit negative skewness — consistent with the well-documented left-tail asymmetry of equity returns — and pronounced excess kurtosis, with the Small portfolio recording the highest kurtosis value of 14.16, followed by Medium at 11.05 and Large at 9.32. These values are substantially in excess of the normal distribution benchmark of zero, confirming that PSE portfolio returns are leptokurtic at the weekly frequency, a feature with direct implications for the GARCH analysis reported in Section 4.3.

At the monthly frequency, mean returns are numerically larger in absolute terms, reflecting the longer holding interval, but remain economically modest. The Small portfolio records a mean monthly return of 0.2500 percent, the Large portfolio 0.1051 percent, and the Medium portfolio -0.0311 percent. Standard deviations at the monthly frequency range from 5.34 percent for Medium to 6.03 percent for Small. Monthly distributions show less extreme excess kurtosis than their weekly counterparts — consistent with the theoretical aggregation effect — though all portfolios remain non-normal. The Small monthly distribution is notably more symmetric than the other two, with a skewness value close to zero (0.0373) and a kurtosis of 2.93, in contrast to the Large monthly portfolio which exhibits pronounced negative skewness of -1.49 and excess kurtosis of 6.81.

The portfolio composition data confirm that the Small portfolio consistently comprises low-priced PSE stocks — including ACEN, DMC, EMP, MEG, PCOR, PLUS, and VLL — with formation-date prices ranging from approximately PHP 1.25 to PHP 24 across the sample years. The Large portfolio consistently comprises the highest-priced stocks on the exchange — including AC, BDO, GLO, GTCAP, ICT, JFC, MER, and SM — with formation-date prices ranging from approximately PHP 90 to PHP 2,262. This composition is broadly stable across annual rebalancing cycles, reflecting the persistence of price-level rankings in the PSE listed universe over the study period.

4.2 Size Premium: Full-Sample Results

Table 2 presents the full-sample tests of the size premium, defined as the return differential between the Small and Large portfolios (SML).

Table 2: Full-Sample Size Premium Tests (Small Minus Large)

Frequency	N	Mean Small (%)	Mean Large (%)	SML Premium (%)	t-statistic	p-value	Significant
Weekly	366	0.0631	0.0329	0.0302	0.2621	0.7934	No
Monthly	84	0.2500	0.1051	0.1449	0.3094	0.7578	No

Note: SML Premium = return of Small portfolio minus return of Large portfolio. t-statistic tests the null hypothesis that the mean premium equals zero. Significance assessed at the 5% level.

The results provide no evidence of a statistically significant size premium in the Philippine Stock Exchange over the 2018-2025 sample period at either weekly or monthly return frequency. At the weekly frequency, the SML premium is 0.0302% per week, equivalent to approximately 1.57% annualized. The associated t-statistic of 0.2621 with a p-value of 0.7934 indicates that this differential is indistinguishable from zero at any conventional significance level. The premium is positive in direction — consistent with the expected direction of a size effect — but far too small and statistically unreliable to constitute evidence of a genuine anomaly. At the monthly frequency, the SML premium is 0.1449% per month, corresponding to approximately 1.74% annualized. The t-statistic of 0.3094 with a p-value of 0.7578 similarly confirms that the premium is statistically indistinguishable from zero.

These full-sample findings are directly consistent with those of Perez (2018), who found no evidence of a size effect in the PSE using data from an earlier period. The present study therefore confirms that the absence of a statistically significant size premium documented in that study is not specific to the earlier sample period but extends through a materially different market environment that includes the COVID-19 shock, the post-pandemic recovery, and the BSP monetary tightening cycle of 2022-2023.

4.3 Size Premium: Year-by-Year Consistency

Table 3 reports the year-by-year size premium estimates across the seven annual portfolio cycles from 2018/2019 to 2024/2025.

Table 3: Year-by-Year Size Premium Results

Year	Freq.	N	Mean Small (%)	Mean Large (%)	SML Prem (%)	t-stat	p-value	Sig.
2018/2019	Weekly	53	0.1372	0.2297	-0.0925	-0.3745	0.7095	No
2018/2019	Monthly	12	0.6037	0.8705	-0.2669	-0.2540	0.8042	No
2019/2020	Weekly	52	-0.9616	-0.6126	-0.3490	-0.8639	0.3917	No
2019/2020	Monthly	12	-4.1205	-2.6774	-1.4431	-1.1080	0.2915	No
2020/2021	Weekly	52	0.6203	0.3140	0.3064	0.8176	0.4174	No
2020/2021	Monthly	12	2.8115	1.3479	1.4636	0.7985	0.4415	No
2021/2022	Weekly	52	-0.0272	-0.1533	0.1262	0.3801	0.7054	No
2021/2022	Monthly	12	-0.2022	-0.4996	0.2974	0.2230	0.8276	No
2022/2023	Weekly	52	0.0140	0.1658	-0.1518	-0.6213	0.5372	No
2022/2023	Monthly	12	-0.0185	0.7608	-0.7793	-0.9904	0.3433	No
2023/2024	Weekly	53	0.3139	0.1447	0.1692	0.6134	0.5423	No
2023/2024	Monthly	12	1.2737	0.4760	0.7978	0.5754	0.5766	No
2024/2025	Weekly	52	0.3386	0.1358	0.2028	0.9305	0.3565	No
2024/2025	Monthly	12	1.4027	0.4575	0.9452	1.2906	0.2233	No

Note: Each portfolio year runs from July 1 to June 30 of the following year. Significance assessed at the 5% level.

The results confirm that no individual portfolio year yields a statistically significant size premium at either weekly or monthly frequency. All fourteen year-frequency combinations produce p-values well above 0.05, ranging from a low of 0.2233 in the 2024/2025 monthly analysis to a high of 0.8276 in the 2021/2022 monthly analysis. The direction of the premium is not consistent across years: the SML differential is negative in 2018/2019, 2019/2020, and 2022/2023, and positive in 2020/2021, 2021/2022, 2023/2024, and 2024/2025. This alternation of sign across years is inconsistent with a systematic size premium, instead reflecting the absence of any reliable directional relationship between price-based size classification and subsequent portfolio returns.

Several year-specific observations merit discussion. The 2019/2020 portfolio year — which encompasses the COVID-19 market crash of early 2020 (Ahelegbey & Giudici, 2020) — records the most negative SML premium in the sample at both weekly (-0.349 percent) and monthly (-1.443 percent) frequencies, though neither is statistically significant. This directional finding is consistent with flight-to-quality behavior during crisis periods, whereby investors disproportionately sell less liquid and lower-priced equities (Sedeek & Elgiziry, 2020; Vayanos, 2004). The 2020/2021 year, covering the post-crash recovery, shows the most positive SML premium in the sample (0.306 percent weekly, 1.464 percent monthly), potentially reflecting a partial rebound of lower-priced stocks as market conditions normalized. The 2022/2023 year — corresponding to the peak BSP tightening period — records a negative SML premium, consistent with the theoretical expectation that rising discount rates disproportionately compress the valuations of smaller, more rate-sensitive firms (Atento, 2025; Fujita, 2016), though this effect did not reach statistical significance.

4.4 Size Premium: Sub-Period Analysis

Table 4 presents the sub-period size premium results across three structurally distinct episodes.

Table 4: Sub-Period Size Premium Analysis

Sub-Period	Freq.	N	Mean Small (%)	Mean Large (%)	SML Prem (%)	t-stat	p-value	Sig.
Pre-COVID (2018-2019)	Weekly	79	-0.2101	0.0408	-0.2509	-1.1181	0.2669	No

Pre-COVID (2018-2019)	Monthly	18	-0.9236	0.0831	-1.0067	-1.1344	0.2724	No
COVID-Recovery (2020-2021)	Weekly	104	0.2249	0.0200	0.2049	0.7189	0.4738	No
COVID-Recovery (2020-2021)	Monthly	24	1.0079	0.0196	0.9882	0.8387	0.4103	No
Post-COVID Tightening (2022-2024)	Weekly	157	0.0684	0.0621	0.0064	0.0432	0.9656	No
Post-COVID Tightening (2022-2024)	Monthly	36	0.2408	0.3181	-0.0773	-0.1342	0.8940	No

Note: Sub-periods defined as: Pre-COVID (July 2018-December 2019), COVID-Recovery (January 2020-December 2021), Post-COVID Tightening (January 2022-June 2025). Significance assessed at the 5% level.

Across all three sub-periods and both return frequencies, the size premium remains statistically insignificant. In the pre-COVID sub-period, the SML premium is negative at both frequencies (-0.2509% weekly, -1.0067% monthly), with p-values of approximately 0.27. During the COVID-Recovery sub-period, the premium turns positive (0.2049% weekly, 0.9882% monthly), with p-values of approximately 0.47 and 0.41. In the post-COVID tightening sub-period, the premium is near zero at both frequencies (0.0064% weekly, -0.0773% monthly), with p-values of 0.97 and 0.89 — the least significant results across all sub-periods.

The sub-period analysis reinforces three conclusions. First, the absence of a size premium persists across structurally heterogeneous market environments including a period of relative market tranquility, a period of acute crisis and recovery, and a period of monetary tightening. Second, the directional shift between the pre-COVID (negative SML) and COVID recovery (positive SML) sub-periods is consistent with crisis-period flight-to-quality and its subsequent reversal, but neither episode generates a premium large enough or reliable enough to be statistically meaningful. Third, the post-COVID tightening period, despite representing a substantial change in the discount rate environment, produced essentially no size premium — further undermining the case for a systematic size effect in the Philippine equity market.

4.5 Volatility Clustering: GARCH Results

Table 5 presents the results of the ARCH Lagrange Multiplier tests and GARCH(1,1) estimations for each size portfolio at weekly and monthly return frequencies.

Table 5: GARCH(1,1) Volatility Clustering Results

Portfolio	Freq.	N	ARCH LM p	ARCH Det.	omega	alpha	alpha p	beta	beta p	alpha+beta
Small	Weekly	366	0.0000	Yes	0.8193	0.1599	0.0340	0.7415	0.0000	0.9014
Medium	Weekly	366	0.0000	Yes	0.5233	0.1428	0.1475	0.7931	0.0000	0.9359
Large	Weekly	366	0.0000	Yes	0.9910	0.1453	0.0472	0.7181	0.0000	0.8634
Small	Monthly	84	0.9493	No	—	—	—	—	—	—
Medium	Monthly	84	0.8366	No	—	—	—	—	—	—
Large	Monthly	84	0.6706	No	—	—	—	—	—	—

Note: ARCH LM test uses 5 lags. GARCH(1,1) estimated only where ARCH effects are detected at the 5% level. alpha captures the effect of past squared innovations on conditional variance; beta captures volatility persistence. alpha + beta measures total persistence; values near unity indicate slow mean reversion. Dashes indicate GARCH not estimated due to absence of ARCH effects.

The results reveal a sharp and theoretically consistent contrast between the two frequencies: strong and statistically significant volatility clustering is detected in all three portfolios at weekly frequency, while no evidence of clustering is found at monthly frequency for any portfolio.

At the weekly frequency, the ARCH LM test rejects the null hypothesis of no conditional heteroskedasticity for all three portfolios at the one percent level, with p-values of 0.0000 across Small, Medium, and Large. This uniform rejection confirms the presence of time-varying conditional variance in PSE portfolio returns at weekly

frequency, consistent with the extensive international evidence on ARCH effects in equity return series and specifically with the earlier PSE findings of Bautista (2003) and Perez (2018).

The GARCH(1,1) parameters provide further detail on the nature and persistence of this clustering. For the Small portfolio, alpha is estimated at 0.1599 ($p = 0.034$) and beta at 0.7415 ($p = 0.000$), yielding a persistence measure of 0.9014 — indicating that volatility shocks decay slowly and that elevated variance conditions are highly persistent. For the Large portfolio, alpha is 0.1453 ($p = 0.047$) and beta is 0.7181 ($p = 0.000$), producing a persistence of 0.8634 — somewhat lower than the Small portfolio, suggesting marginally faster mean reversion of volatility in the highest-priced stocks. The Medium portfolio records the highest persistence of 0.9359, with beta of 0.7931 ($p = 0.000$) highly significant, though alpha of 0.1428 is not individually significant at the five percent level ($p = 0.148$). In all three cases, the dominance of the beta parameter relative to alpha confirms that volatility persistence in PSE weekly portfolio returns is driven primarily by lagged conditional variance rather than by immediate shock response.

At the monthly frequency, the ARCH LM test fails to reject the null hypothesis for any portfolio, with p -values of 0.9493 for Small, 0.8366 for Medium, and 0.6706 for Large. These values are far from rejection at any conventional significance level, and no GARCH(1,1) models are estimated for the monthly series. The absence of detectable clustering at monthly frequency, in sharp contrast to its strong presence at weekly frequency, is precisely consistent with the temporal aggregation theory formalized by Taylor (1986) and Diebold (1988): as the return measurement interval lengthens, the GARCH process governing the underlying high-frequency returns converges toward a constant-variance process, making conditional heteroskedasticity undetectable at lower frequencies. The present findings replicate this pattern in the PSE portfolio context and directly extend the Perez (2018) finding of weaker monthly clustering evidence into a longer and more turbulent sample period, confirming that frequency-dependent volatility clustering is a robust and stable property of Philippine equity portfolio returns.

Comparing across portfolios at weekly frequency, the Small portfolio exhibits the second-highest persistence at 0.9014 while the Large portfolio shows the lowest at 0.8634, broadly consistent with the expectation that lower-priced, less liquid stocks are subject to more episodic and persistent volatility clustering. However, the differences in persistence across portfolios are modest, and the more substantive conclusion is that volatility clustering is a general property of PSE portfolio returns at weekly frequency regardless of size classification.

5. Discussion of Findings and Implications

5.1 The Absence of a Size Premium: Interpretation and Market Context

The consistent failure to detect a statistically significant size premium in the Philippine Stock Exchange across the full sample, across all individual portfolio years, and across three structurally distinct sub-periods constitutes the central empirical finding of this study. This result is not a marginal or borderline outcome: p -values for the full-sample SML premium are 0.79 at weekly frequency and 0.76 at monthly frequency, leaving no reasonable basis for inferring the presence of a genuine size-related return differential in PSE-listed equities over the 2018 to 2025 period. The finding directly replicates and extends the null result of Perez (2018), establishing that the absence of a size premium in the Philippine equity market is a stable and durable feature of the market rather than an artifact of the particular sample window examined in the original study.

Several structural features of the PSE help explain why the size premium fails to manifest in this market. First, the price-level sorting methodology used in this study — adopted as a consequence of the unavailability of historical market capitalization data through publicly accessible sources — classifies stocks into size portfolios on the basis of share price rather than total market value. While price per share is a defensible proxy in the PSE context, where low-priced stocks tend systematically to be smaller and less liquid firms, it is an imperfect instrument. In particular, the PSE-listed universe includes large conglomerate holding companies whose share prices may not accurately reflect their aggregate market capitalization relative to smaller but higher-priced firms (Atento, 2025). This measurement imprecision may attenuate any genuine size-related return differential that might otherwise be detectable with true market capitalization data.

Second, the PSE-listed universe over the study period is characterized by significant ownership concentration and limited free float for many stocks, particularly among the lower-priced equities that populate the Small portfolio (OECD, 2024). In such a market structure, the arbitrage mechanisms that theory suggests should sustain or eliminate the size premium — specifically, the ability of sophisticated investors to accumulate positions in undervalued small-cap stocks — are constrained by thin trading, wide bid-ask spreads, and the practical difficulty of executing meaningful trades in illiquid names (Cohen et al., 2007; Lam et al., 2019). This limits-to-arbitrage environment may simultaneously prevent genuine size-related mispricings from being systematically exploited and make measured return differentials noisy and unreliable.

Third, the study period encompasses the COVID-19 pandemic and the BSP tightening cycle — episodes that produced substantial market disruption but did not generate a detectable size premium even during the sub-periods most theoretically favorable to its emergence. The COVID recovery period, during which small-cap stocks in other markets benefited from stimulus-driven risk appetite (Buszko et al., 2021; Caporale et al., 2024), produced only a statistically insignificant positive SML premium in the PSE. The BSP tightening period, during which theory predicts differential discount rate effects across the size spectrum (Ippolito et al., 2018), produced a near-zero premium. These null sub-period results suggest that neither crisis dynamics nor monetary policy shifts are sufficient to activate a size premium in the Philippine market under the current market structure.

5.2 Implications for Asset Pricing and Market Efficiency

The null finding on the size premium carries meaningful implications for the applicability of multi-factor asset pricing frameworks in the Philippine context. The Fama-French three-factor model, which assigns systematic explanatory power to the SMB factor, implicitly assumes that the size premium is a reliable and pervasive feature of equity markets (Kabir et al., 2023; Sudhakar, 2018). The present results, combined with those of Perez (2018), suggest that this assumption does not hold in the PSE, and that a single-factor model incorporating only the market premium may be no less adequate than the three-factor model for characterizing cross-sectional return variation in Philippine equities. This has direct practical implications for cost-of-equity estimation, portfolio performance attribution, and benchmark construction in the Philippine market.

The absence of the size premium is also consistent with a weak-form efficiency interpretation of the Philippine equity market, in the specific sense that price-based size classification does not generate exploitable return differentials on average. However, this interpretation must be qualified carefully. A finding of no anomaly does not confirm full efficiency; it may instead reflect insufficient statistical power arising from the limited size of the PSE-listed universe, the measurement constraints imposed by the price-level proxy, or the possibility that any genuine size effect is masked by the noise introduced by thin trading and stale prices in the lower-priced portfolios. The null result is therefore better characterized as consistent with the absence of a detectable and exploitable size premium under the current market and data conditions, rather than as definitive evidence of market efficiency in a theoretical sense.

5.3 Volatility Clustering: Implications for Risk Modeling and Investor Behavior

The GARCH findings carry a distinct set of implications that are in some respects more practically actionable than the anomaly tests. The strong and uniform detection of volatility clustering at weekly frequency across all three size portfolios — with persistence measures ranging from 0.86 to 0.94 — establishes that the risk of holding PSE portfolios is materially time-varying rather than constant. This has direct consequences for risk management, portfolio construction, and the interpretation of return-based performance measures in the Philippine equity market.

For investors and portfolio managers active in Philippine equities, the high persistence of weekly volatility clustering — particularly the persistence of 0.9359 observed in the Medium portfolio — implies that periods of elevated market stress tend to be prolonged rather than transient. An investor who enters a PSE portfolio position following a period of high volatility should expect that elevated variance conditions are likely to persist for a substantial number of subsequent weeks before reverting to the mean. Standard deviation-based risk measures that assume constant variance — including many value-at-risk models applied in practice — will systematically underestimate risk during high-volatility episodes and overestimate it during calm periods (Muller & Righi, 2022), and should be replaced or supplemented with GARCH-based conditional variance estimates for PSE portfolio risk assessment.

The sharp contrast between weekly and monthly volatility clustering results has a further practical implication for the time horizon of risk assessment. Investors and analysts who evaluate PSE portfolio risk using monthly return data — a common practice in performance reporting and asset allocation — will observe return distributions that appear broadly consistent with constant variance, potentially leading to underestimation of the clustering risks that manifest at shorter horizons. The present results suggest that weekly return data should be the preferred frequency for volatility modeling and risk assessment in the PSE context.

5.4 Contribution to the Regional Asset Pricing Literature

Taken together, the size premium and volatility findings of this study contribute to the growing body of evidence on the conditional and market-specific nature of asset pricing anomalies in Asian and emerging equity markets. The replication and extension of the Perez (2018) null result across a materially extended and structurally more turbulent sample period strengthens the case that the absence of a size premium in the Philippine market is not a temporary or data-specific phenomenon but a persistent structural feature. This result adds the Philippines

to the set of markets — alongside several other smaller and less liquid Asian exchanges — where the Fama-French size factor does not appear to generate reliable return premia, in contrast to the stronger evidence found in larger and more liquid markets such as China, Japan, and Korea.

The frequency-dependent volatility clustering finding complements and extends the Perez (2018) volatility evidence by demonstrating that this pattern survives through the extraordinary volatility episode of the 2020 pandemic period. The fact that the GARCH results at weekly frequency are highly consistent across all three size portfolios — regardless of whether the portfolio comprises low-priced, mid-priced, or high-priced stocks — suggests that volatility clustering in the PSE is driven primarily by market-wide dynamics rather than by portfolio-specific characteristics.

5.5 Boundaries of the Analysis

Several important boundaries on the conclusions of this study must be acknowledged. The exclusion of the value premium from the empirical analysis — necessitated by the unavailability of historical book value data through publicly accessible sources for PSE-listed firms — limits the scope of the anomaly investigation to size alone. Future research that can access structured fundamental data, whether through institutional data providers or through systematic manual collection from PSE Edge, would be positioned to provide a more complete assessment of multi-factor pricing in the Philippine equity market. The use of price per share as the size proxy, while methodologically defensible as an acknowledged limitation, introduces measurement imprecision that may attenuate genuine size-related effects. The relatively modest number of stocks in the analytical sample — ranging from 25 to 26 per annual portfolio cycle — constrains statistical power and means that the null findings on the size premium should be interpreted in the context of this power limitation rather than as definitive rejections of the anomaly's existence. Finally, the study period of 2018 to 2025, while representing a meaningful extension of the prior literature, encompasses only seven annual portfolio cycles, which limits the reliability of year-by-year and sub-period inferences relative to studies conducted in markets with longer and more complete data histories.

6. Conclusions and Recommendations

6.1 Summary of Findings

This study provides an updated and extended empirical assessment of the size premium and volatility clustering in the Philippine Stock Exchange, covering the period from July 2018 to June 2025 and encompassing the COVID-19 market disruption, the post-pandemic recovery, and the BSP monetary tightening cycle of 2022 to 2023. The analysis constructs annual tercile portfolios sorted by price per share as a proxy for firm size, computes equal-weighted portfolio returns at weekly and monthly frequencies, tests for systematic return differentials between small-priced and large-priced portfolios, and applies GARCH(1,1) models to portfolio return series to assess volatility clustering across return frequencies.

Four findings emerge clearly from the empirical analysis. First, no statistically significant size premium is detected in the full sample at either weekly (SML = 0.0302%, $p = 0.79$) or monthly (SML = 0.1449%, $p = 0.76$) frequency. Second, this null result is consistent across all seven individual portfolio years examined, with no single year producing a statistically significant size premium and the direction of the premium alternating across years without a discernible pattern. Third, sub-period analysis across pre-COVID, COVID-recovery, and post-COVID tightening episodes confirms that the absence of a size premium is not specific to any single market environment but persists across structurally heterogeneous conditions. Fourth, volatility clustering is strongly and uniformly detected at weekly frequency across all three size portfolios — with ARCH LM p -values of 0.0000 and GARCH(1,1) persistence measures ranging from 0.86 to 0.94 — but is entirely absent at monthly frequency, with ARCH LM p -values ranging from 0.67 to 0.95. This frequency-dependent pattern is precisely consistent with the temporal aggregation theory of volatility and directly replicates and extends the findings of Perez (2018).

6.2 Comparison with the Prior Literature

The present findings are directly comparable to and consistent with those of Perez (2018), the only prior published study examining size and value effects in the PSE using firm-level return data. That study found no evidence of a size premium over its earlier sample period and documented volatility clustering at weekly but not monthly frequency. The present study confirms both findings across a significantly extended sample that includes some of the most significant market events in recent Philippine financial history — the COVID-19 crash, the sharpest BSP tightening cycle in decades, and the introduction of new asset classes including REITs to the PSE-listed universe. The stability of these results across two studies separated by seven years and covering distinct market episodes strengthens confidence that the null size premium and the frequency-dependent volatility clustering are genuine and durable features of the Philippine equity market rather than sample-specific artifacts.

The null size premium finding also aligns with the documented attenuation of the size effect in developed markets since the mid-1980s (Ahn et al., 2019; Asness et al., 2015) and with the mixed evidence from comparable smaller Asian and emerging equity markets (Jiao, 2017; Quach et al., 2018). It diverges from the stronger size premium evidence reported in larger and more liquid markets such as China (Liu et al., 2019) and Japan (Tsuji, 2023), reinforcing the conclusion that the size premium is a conditional rather than universal phenomenon whose manifestation depends critically on market structure, liquidity conditions, and the availability of arbitrage capital.

6.3 Recommendations for Research

Several directions for future research follow directly from the findings and limitations of this study. Most importantly, future work on Philippine equity market anomalies should prioritize access to structured historical fundamental data — specifically book value of equity and shares outstanding — either through institutional data providers such as Bloomberg or Refinitiv, or through systematic collection from PSE Edge annual financial statement filings. Such data would enable a complete replication of the Fama-French framework including the value premium, which the present study was unable to examine due to data constraints, and would replace the price-level size proxy with the theoretically preferred market capitalization measure. A complete three-factor analysis of the PSE — covering the market, size, and value dimensions simultaneously — would constitute a significant contribution to the regional asset pricing literature.

Future studies should also consider expanding the stock universe beyond the PSEi blue-chip component stocks and their immediate peers to include the full listed universe of the PSE, including smaller and less actively traded firms in the Second Board and SME Board. Additionally, future research could examine the value premium using alternative proxies beyond book-to-market — including price-to-earnings, price-to-cash-flow, and dividend yield ratios — which may be more readily constructable from publicly available PSE disclosure data.

The volatility findings suggest that future research should examine whether the clustering properties detected at weekly frequency in PSE portfolios exhibit structural breaks coinciding with major market events — including the COVID-19 shock, the BSP tightening announcements, and significant geopolitical disruptions — using GARCH models with regime-switching or time-varying parameter specifications. Such analyses would provide a more granular characterization of how volatility dynamics in the Philippine equity market respond to macro-financial shocks.

6.4 Recommendations for Policy and Practice

For portfolio managers and institutional investors active in Philippine equities, the findings caution against the mechanical application of size-tilted investment strategies in the PSE context. The consistent absence of a detectable size premium across the full sample and all sub-periods, combined with the limited statistical power of PSE-based anomaly tests, suggests that size-factor-based strategies calibrated to developed-market evidence are unlikely to generate reliable alpha in this market. Investment decisions in Philippine equities are better grounded in stock-specific fundamental analysis, liquidity assessment, and macroeconomic positioning than in systematic factor exposures.

The strong GARCH evidence at weekly frequency has direct implications for risk management practice. Philippine equity portfolio managers and risk officers should employ conditional variance models — rather than unconditional standard deviation estimates — for value-at-risk calculations, stress testing, and dynamic asset allocation decisions. The high persistence of volatility clustering in PSE portfolios, with persistence measures above 0.86 across all size groups, means that risk models that ignore time-varying variance will systematically misstate portfolio risk during both elevated and subdued volatility regimes.

For market regulators and the PSE as an institution, the data availability constraints encountered in this study highlight a structural gap in the Philippine equity market's information infrastructure. The absence of a freely accessible, machine-readable repository of historical fundamental data for PSE-listed companies — comparable to the structured databases available for major developed and several emerging equity markets — imposes a material cost on academic research and limits the depth of analytical work that can be conducted on Philippine equities using open-source methods (Atento, 2025). Regulatory initiatives to improve the accessibility, standardization, and machine-readability of PSE Edge disclosure data would directly benefit the quality and volume of academic research on Philippine capital markets, and ultimately support more informed investment and policy decision-making.

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