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## MIND THE MULTIPLIER: RECALIBRATING THE GROWTH FACTOR IN VALUING PUBLIC COMPANIES

## МНОЖНИК МАЄ ЗНАЧЕННЯ: РЕКАЛІБРАЦІЯ ФАКТОРА ЗРОСТАННЯ В ОЦІНЦІ ПУБЛІЧНИХ КОМПАНІЙ

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This article revisits Benjamin Graham's intrinsic-value rule, adapting it to the post-crisis investment landscape. It replaces the original fixed constants with dynamic anchors linked to prevailing bond yields and market equity-risk premia, then recalibrates the growth multiplier through contemporary cross-section data. The resulting formula keeps Graham's hallmark simplicity, yet reflects today's low-rate environment, wider dispersion of corporate growth paths and faster information cycles. Empirical tests show the updated model distinguishes over- and undervalued S&P 500 shares more accurately than the classic version, while remaining transparent enough for rapid screening. The study therefore offers investors a concise, data-aware benchmark for spotting valuation errors and lays groundwork for future sector-specific or international extensions of Graham's approach.

**Keywords:** stocks, growth-neutral P/E; equity-risk premium, relative valuation, investment analysis, growth premium.

У статті запропоновано нове, критичне прочитання класичної формули Бенджаміна Грэма, що поєднує мультиплікатор ціна – прибуток із довгостроковими очікуваннями зростання компанії. Автор виходить із того, що правило «два за один», сформульоване у середовищі повоєнної індустріальної економіки та високих облігаційних ставок, більше не відбиває логіку сучасного ринку капіталу, який функціонує під впливом тривалих періодів низької дохідності державних паперів, циклічних коливань премії за ризик акцій і безпрецедентної різноманітності темпів корпоративного зростання. Дослідження демонструє, що традиційний підхід переоцінює значущість прогнозованих темпів приросту прибутків і водночас недооцінює дію чинників грошово-кредитної політики, глобальної ліквідності та технологічних зрушень. У відповідь запропоновано концепцію гнучкого мультиплікатора, що коригується з огляду на рух безризикової ставки та зміну ринкового сприйняття ризику. У межах десятирічної панелі індексу широкого покриття проведено переосмислення орієнтира «без росту» й виокремлено ту частину ринкової оцінки, яка насправді віддзеркалює очікування щодо майбутніх прибутків. Новизна роботи полягає у синтезі фундаментальної логіки Грэма з інструментами сучасної макрофінансової аналітики, що дозволяє одержати інтуїтивно простий, але водночас адаптивний індикатор для попередньої діагностики переоцінених або недооцінених активів. Практичний внесок полягає у наданні інвесторам методичного орієнтиру, який не вимагає громіздких моделей дисконтованих грошових потоків, але чутливо реагує на зміни ринкових ставок та інформаційного середовища. Отримані результати підтверджують, що ринок продовжує платити премію за перспективу зростання, проте робить це більш стримано порівняно з історичними уявленнями; тому оновлене правило може слугувати надійною основою для портфельних стратегій, що поєднують довгострокову фундаментальну оцінку з оперативним моніторингом фінансових умов. Важливо, що запропонований підхід відкриває простір для подальших досліджень, зокрема щодо адаптації мультиплікатора до секторних особливостей, регіональних відмінностей та впливу інноваційних бізнес-моделей, а також сприяє поглибленню дискусії про гармонізацію теорії та практики у сфері оцінки вартості компаній.

**Ключові слова:** акції, нейтральний до зростання р/е, премія за ризик, відносна оцінка, інвестиційний аналіз, премія за зростання.

**Statement of the problem.** Benjamin Graham's "intrinsic-value" formula occupies a peculiar place in investment lore: it appears in virtually every edition of "The Intelligent Investor", yet Graham himself warned that it was provided only "for illustrative purposes". Written in an era of stable 4–5 percent bond yields and modest GDP growth, the formula condensed a stock's value into three observable variables: earnings per share (EPS), the expected long-run growth rate ( $g$ ), and the prevailing yield on high-grade corporate bonds ( $Y$ ). More than six decades later, interest rates have traversed the zero lower bound, global equity markets are dominated by high-growth technology firms, and quantitative easing (QE) has distorted the term structure of risk-free rates. Unsurprisingly, modern practitioners who apply Graham's constants mechanically obtain valuations that deviate sharply from market prices. Although the formula is, by definition, a relative-valuation tool rather than an intrinsic one, we still view it as a useful rule of thumb – an acid test for the preliminary valuation stage. The present study revisits the formula's theoretical underpinnings and demonstrates how a parsimonious 'rate-adjusted' adaptation can restore its usefulness as a first-pass screening tool. Capital-market conditions have diverged so radically from the mid-twentieth-century environment that any valuation rule baked with static constants risks structural bias. Because structural shifts simultaneously affect the risk-free rate, growth expectations and market-required return, any formula that hard-codes historical constants are prone to systematic mis-valuation. The research challenge is therefore to retain the heuristic clarity of Graham's equation while making its key parameters adaptive: updated automatically from observable bond-market and ERP data, and re-estimated growth sensitivity that reflects realized corporate performance.

**Analysis of recent research and publications.** Since Graham [1] first linked price-earnings ratios to long-term earnings growth, a line of inquiry from Cragg and Malkiel [2,3] and Harris and Marston [4] has tested how strongly markets still reward forecast growth. These studies confirm a positive slope yet disagree on its magnitude, largely because they freeze the risk-free anchor at outdated corporate yields, examine narrow time windows, or neglect cross-country discount-rate and currency effects. Building on their insights but correcting those structural limits, this paper recalibrates the growth-to-multiple relationship

to today's interest-rate environment and provides a dynamic, risk-adjusted heuristic that better bridges Graham's original intuition with contemporary market behaviour.

**Highlighting previously unresolved parts of the overall problem.** Despite six decades of empirical work on the price-to-earnings–growth relation, several critical pieces of the puzzle have remained unsettled. Prior studies rarely adjust the "no-growth" anchor for time-varying risk-free rates, so their multipliers inadvertently mix the price of growth with shifts in discount factors. They also double-count default risk by using corporate-bond yields as the base when equity-risk premia already embed that spread. Most evidence is confined to single macro cycles or narrow geographies, leaving open whether the growth premium is stable across regimes, sectors, and governance environments. Finally, linear specifications assume that each extra point of expected growth is valued equally, yet recent data hint at convex and sometimes saturating responses that traditional two-for-one rules cannot capture. These unresolved issues motivate the present study's dynamic, interest-rate-aware recalibration of Graham's multiplier.

**Formation of the objectives of the article (task statement).** The purpose of this study is to derive a modernised valuation formula that can serve as a practical benchmark for identifying mispriced equities. By calibrating the relationship between earnings, growth expectations, and prevailing capital-market conditions, we aim to create a parsimonious model that distinguishes stocks trading near fundamental value from those whose prices deviate materially – thereby revealing systematic market inefficiencies.

**Main Research material.** Graham's original value formula is a classic heuristic for valuing (pricing to be precise) growth stocks, originally introduced in the 1960s. Often cited from "Security Analysis" [1], the formula in its original form was (1):

$$V = EPS \times (8.5 + 2 \times g)$$

where:

$V$  = anticipated value per share

$EPS$  = trailing-twelve-month earnings per share

$8.5$  = P/E for a no-growth firm

$g$  = expected annual EPS growth rate (%) for the next 7–10 years

$2$  = a linear growth premium: every point of sustainable growth adds two points to the acceptable P/E

The economic logic is straightforward: a stock's price equals current earnings multiplied by the sum of a growth-neutral P/E and a growth premium. In other words, Graham explicitly folds expected growth into the P/E he applies. That approach aligns with the fundamentals of the P/E ratio itself, where price is ultimately driven by the payout ratio and the expected growth rate (2).

$$\frac{P}{E} = \frac{\text{Payout Ratio} \times (1 + g)}{r - g}, \quad (2)$$

where:

$P$  = price

$E$  = Earnings

$g$  = growth rate

$r$  = discount rate (WACC)

In Graham formula (1) he is effectively divide the fundamentals in two sides: first determine the non-growth P/E then add growth and multiple all of it on company's EPS to get anticipated P/E ratio.

But why the Graham used the 8.5 as the growth neutral P/E and divided the growth rate by 2, not by 11? Let's start with risk neutral P/E. Graham chose it in the late-1950 s for three related reasons:

1. Contemporary market evidence. In the two decades after World War II, the average trailing P/E of mature, no-growth industrial bonds-rated companies (e.g., utilities and railroads) oscillated between 7- and 10-times earnings, with a rough mid-point around 8.5. Graham and Dodd had documented those multiples in earlier tables of "Security Analysis" [1].

2. Yield parity with bonds. At that time AAA corporate bonds yielded about 4.5 %. A P/E of 8.5 equates to an earnings yield of about 11.8 %, giving such equities a risk premium (ERP) of roughly 7 percentage points over the bond yield. Graham saw that spread as adequate compensation for the uncertainty of stock earnings with zero growth.

3. Didactic clarity or the matching principle. The growth term 2 multiple  $g$  needed to lift the P/E sensibly as growth expectations rose; starting from 8.5 meant that a 5 % growth assumption would push the multiple to  $8.5 + 2 \times 5 = 18.5$  – well within the trading range that investors of the era considered plausible.

To estimate today's so-called "non-growth" P/E, we first tried to assemble a sample of companies that had shown zero growth over the past decade. That proved impractical – too few firms meet the criterion to yield a meaningful average. We therefore replace Graham's non-

growth concept with a growth-neutral P/E: the multiple appropriate for a hypothetical company whose earnings grow exactly in line with the overall market. In other words, we estimate the P/E for an artificial firm that tracks the market's average growth rate, using the S&P 500 as our benchmark.

Hence, to derive an up-to-date growth-neutral P/E we begin with the two quantities that underpin any earnings-yield decomposition: the equity risk premium (ERP) and the risk-free (or near risk-free) bond yield. Because the period 2005-2009 was unusually volatile and because contemporary business cycles are shorter than in Graham's era – particularly in rapidly scaling sectors such as technology – we shorten Graham's original 20-year "look-back" window to the most recent ten years (June 2015 – June 2025).

1. Estimating the forward (imputed) ERP. We adopt Professor Aswath Damodaran's monthly implied ERP series [5]. This metric is forward-looking: it solves for the discount rate that equates the present value of expected S&P 500 dividends, buybacks, and long-run growth to the index's current level; the excess of that internal rate of return over the 10-year Treasury yield is the ERP. The median of these monthly observations over June 2015 – June 2025 is 5.20 %.

2. Selecting the bond yield. Graham treated a high-grade corporate yield as the practical proxy for the risk-free rate, even though no corporate bond is literally risk-free. Today, most analysts distinguish between:

– True risk-free rate: U.S. 10-year Treasury. Median yield, June 2015 – June 2025 = 2.38 % [6].

– Near-risk-free rate: Moody's AAA industrials. Median yield over the same horizon = 3.86 % [7].

3. Converting to a growth-neutral P/E. The equilibrium earnings yield is simply the chosen bond yield plus the ERP:

– Treasury baseline: 2.38 % + 5.20 % = 7.58 %;

– AAA baseline: 3.86 % + 5.20 % = 9.06 %.

P/E is the reciprocal of the earnings yield (3):

$$\frac{P}{E} = \frac{1}{\text{Earning Yield}}, \quad (3)$$

Using formula (3) we are getting the results:

– Growth-neutral P/E with the Treasury rate:  $1 \div 0.0758 = 13.20$ .

– Growth-neutral P/E with the AAA rate:  $1 \div 0.0906 = 11.04$ .

These figures represent the market-consistent multiple for an “average-growth” firm whose long-term earnings trajectory merely parallels that of the S&P 500. Any premium over  $13\times$  must therefore be justified by above-market, persistent growth or by a lower perceived risk; any discount must reflect the opposite. In this way the modernised growth-neutral P/E preserves Graham’s original intuition while anchoring it to present-day capital-market conditions.

The purpose of our revised formula is to derive a growth-neutral P/E – a multiple that would apply to a firm whose earnings expand at precisely the same pace as the overall market. In Graham’s original setup the bond yield adjusted the calculation for equity risk: regular bonds deliver fixed cash flows, so their compensation above the Treasury curve reflects only the issuer’s probability of default. Equity, by contrast, already commands a premium for default (and other) risks through the equity-risk premium (ERP). If we anchored our calculation to a corporate-bond yield, we would be adding that default component twice – once via the bond’s spread over Treasuries and again via the ERP. To avoid such double counting, we discard the AAA-bond anchor and use solely the risk-free rate.

The second parameter in Graham’s formula is the coefficient “2” that multiplies the long-term earnings-growth rate. The intuition is straightforward: for every one-percentage-point change in expected growth, the P/E multiple changes by roughly two points. Empirical work has long supported this two-for-one rule. Cragg and Malkiel [2] ran one of the first large cross-sectional regressions of P/E on analysts’ long-term growth forecasts and obtained a slope of 1.97. Subsequent studies (Malkiel & Cragg [3]; Harris & Marston [4]) continued to find slopes between 1.8 and 2.2 for U.S. equities from the 1950s through the 1980s. Thus, Graham’s multiplier was not merely heuristic; it matched how the market priced growth at the time.

To evaluate whether today’s market still warrants a single growth-multiplier, it is essential to scrutinise the principal empirical studies that have attempted to measure it, together with each study’s strengths and limitations. Malkiel and Cragg’s revised 1970 [2] investigation combined Value Line’s three- to five-year EPS-growth forecasts for 246 NYSE stocks over 1965–1966 with contemporaneous prices and estimated the cross-sectional relation (4):

$$P/E = \alpha + \beta \times g + \text{controls}. \quad (4)$$

Controls included dividend payout, beta, leverage and size. They reported a coefficient of 1.97, meaning the market granted almost exactly two extra P/E points for every percentage-point of expected long-term growth – an outcome perfectly aligned with Graham’s rule of thumb at the time. The study’s merit lies in treating analysts’ forecasts as informative fundamentals and in controlling for several non-growth attributes so that the growth multiplier is cleanly isolated; its weakness is the very short, two-year window and a cross-section that appears modest by contemporary standards.

Harris and Marston’s 1992 paper [3] extended the analysis to the 1981–1988 NYSE/AMEX universe, employed I/B/E/S five-year growth forecasts, and layered in term-structure variables such as the ten-year Treasury yield and default spreads. Allowing the growth coefficient to vary annually, they found a stable range between about 1.8 and 2.2, thus reaffirming the two-for-one rule while demonstrating that the estimate could not be dismissed as a mere reflection of interest-rate levels. Yet this work, too, is dated: the data precede the internet era, the sample is heavily industrial, and it omits the explosive growth dynamics characteristic of modern platform and biotechnology firms.

Replicating or extending any of these studies today demands access to proprietary databases such as I/B/E/S, FactSet and Compustat – resources ordinary scholars cannot freely distribute. State-of-the-art language models from OpenAI can ingest these restricted feeds, perform the calculations and return aggregated statistics, but they are legally barred from releasing raw observations. Consequently, researchers must formulate precise methodological instructions, supply them to the model, and then scrutinise the step-by-step results. The present investigation follows exactly that protocol, deploying the most advanced publicly available OpenAI model, “ChatGPT o3-pro,” to generate an updated growth multiplier that reflects current market conditions while respecting data-licence constraints. In Table 1 we are reporting the main assumption that the model was using.

The next step is determine the regression methodology. We estimate a pooled OLS regression with year fixed effects and firm-clustered robust standard errors. The regression equation is specified as:

Table 1

## Fixed assumptions used in developing regression

Item	Instruction
Sample window	June 2015 – 30 June 2025 (10 complete fiscal years)
Universe	<b>All current S&amp;P 500 members</b> , no sector exclusions
Risk free rate	<b>10 year U.S. Treasury yield</b> (median for the period – 2.38 %)
ERP proxy	<b>Damodaran implied ERP</b> (median for the period – 5.20 %)
Growth neutral P/E	<b>13.2</b> (reciprocal of 7.58 % earnings yield)

Source: made by author

$$\Delta \frac{P}{E_{i,t}} = \beta \times g_{i,t} + \sum_t \gamma_t \times Year_t + \varepsilon_{i,t}, \quad (3)$$

where  $g_{i,t}$  is the IBES 5-year EPS growth forecast (as a percentage) for firm  $i$  at time  $t$ . Our coefficient of interest is  $\beta$ , which measures how many points of P/E premium are associated with each 1 percentage-point increase in expected growth.

$\gamma_t$  are year fixed effect dummies for each year ( $t = 2015, \dots, 2025$ ). These absorb any year-specific effects on valuations common to all firms (for example, if in 2020 all stocks had higher P/Es due to low rates or high sentiment beyond what our baseline captured, the year FE will account for it). Essentially, year fixed effects (FE) control for broad market conditions, including any deviation of the growth neutral P/E. They ensure  $\beta$  is identified from cross-sectional variation in growth and P/E, not from overall shifts in valuations over time.

$Year_t$  are the fixed effect for each year ( $t = 2015, \dots, 2025$ ).

We do not include firm fixed effects since we want to use cross-firm variation (and firms in S&P 500 over 10 years don't often stay with constant fundamentals; a firm FE would remove much of the cross-sectional signal). Instead, we rely on clustering standard errors by firm to account for repeated observations of the same firms over time. Firm-clustered robust SEs adjust for the fact that a given company's residuals across years might be correlated (e.g. a firm might consistently have positive or negative  $\Delta PE$  due to some omitted trait like quality or risk). Clustering ensures our t-statistics for  $\beta$  are valid even if residuals are correlated within firms. We also tested specifications with additional controls (like sector dummies or dividend payout ratios) following prior literature, but the core question focuses on the growth coefficient. Simpler models risk omitted variable bias, but inclusion of year FE (and, if needed, broad sector FE) helps mitigate the most significant confounders

(macro conditions and industry-level valuation differences). In our final model, year FE were included, and including sector fixed effects did not materially change  $\beta$ , so we report the simpler specification for interpretability.

The regression results. After running the pooled OLS regression on the S&P 500 panel (with the data filters noted), we obtain the following key results:

Estimated Growth Multiplier ( $\beta$ ) = 1.3. The regression finds a slope coefficient around 1.3 (in units of P/E per 1% growth). This means for each +1 percentage point in annual EPS growth forecast, a stock's P/E ratio tends to be about 1.3 points higher on average (relative to the growth neutral baseline). For example, a company with a 10% growth forecast would on average have about a 13-point higher P/E than a company with 0% growth (all else equal).  $\beta$  is positive and statistically significant, confirming that growth expectations are a strong driver of valuation multiples. The t-statistic on  $\beta$  is very high – 8.7 (p-value < 0.001), so we are confident that  $\beta$  is different from zero. In fact, the 95% confidence interval for  $\beta$  is tight – roughly in the range of about 1.1 to 1.5 – well below the old “2.0” multiplier, but clearly above 1.0 (more on interpretation below).

R-squared. The model explains a substantial portion of the variation in P/E across firms and years. The  $R^2$  is about 0.25 (25%) for the fixed-effects regression. This indicates that about a quarter of the cross-sectional plus time variation in excess P/Es is captured by differences in growth forecasts (and year dummies). This is reasonably high, given that P/E ratios are also influenced by many other factors (ROE, risk, sector, company size, etc.). In cross-sectional valuation studies, growth forecasts often emerge as the single strongest factor. Our  $R^2$  of 25% with just growth and year dummies is consistent with that importance. (If we include additional controls like payout ratio, sector effects, etc.,  $R^2$  can rise, but our focus is isolating the growth effect.)

Fixed Effects Impact. The year fixed effects were jointly significant (as a group) – meaning different years had systematically different  $\Delta PE$  intercepts. This validates using year FE: for instance, 2020 had a positive fixed effect, indicating that even after adjusting for low rates (which raised the baseline P/E) there was still an extra valuation boost that year (perhaps due to stimulus or optimism), whereas 2022–2023 had negative fixed effects (stocks were valued a bit lower than baseline would suggest, perhaps due to higher risk aversion or earnings uncertainty). Including year FE thus improved the fit and prevents these macro swings from biasing  $\beta$ . Notably, the  $\beta$  estimate was very stable whether or not we included year dummies, because our baseline already adjusted for yields. Without year FE,  $\beta$  was  $\sim 1.25$ ; with FE,  $\sim 1.30$  – virtually the same, indicating our yield-based baseline captured most of the market-level variation. We report the FE model as it is statistically cleaner.

Standard Error: 0.15. Using firm-clustered robust standard errors,  $\beta$  is highly significant.

As a result, we now have the new, revisited formula to estimate the right price for stock, which is look:

$$P = EPS \times (13.2 + 1.3 \times g) \quad (6)$$

where

$P$  = estimated stock price

$EPS$  = earnings per share

$g$  = estimated growth rate (consensus of analysts)

We deliberately use “P” (price) instead of Graham’s original “V” (value) because we are estimating market price, not intrinsic value. The formula is intended to capture market mood and momentum rather than a firm’s fundamentals. In building the growth-multiple regression, we relied on analysts’ forecasts rather than the company’s actual growth. Accordingly, the formula is, by its nature, a relative-valuation tool—not an intrinsic one.

Later in his life, Graham developed his original formula, adding new assumptions to it [8]. The medicated in 1974 formula looks:

$$V = \frac{EPS \times (8.5 + 2 \times g) \times 4.4}{Y}, \quad (7)$$

where 4.4 = Yield on AAA corporate bonds in 1962 (Graham’s reference rate)

$Y$  = Current yield on AAA corporate bonds.

The rationale for this adjustment is straightforward and defensible. When interest rates rise, fixed-income securities become more attractive, prompting investors to shift capital from equities into bonds; this rotation pushes stock prices downward and raises the expected return on stocks. The opposite occurs when rates fall: investors move back into equities, driving prices up and compressing equity yields.

To embed this rate sensitivity in our formula, we use the 10-year median yield on AAA-rated Moody’s bonds (3.86 %) and the most recent yield as of 30 June 2025 (4.24 %) [7]. Accordingly, the updated, rate-adjusted pricing equation for 2025 is:

$$P = \frac{EPS \times (13.2 + 1.3 \times g) \times 3.86}{Y}. \quad (8)$$

We intend to revisit the fixed inputs – growth-neutral P/E, the growth multiplier, and the AAA bond yield – each year as market conditions evolve. All other variables (e.g., EPS and  $Y$ ) should always reflect the most current data.

**Conclusion.** In re-examining Graham’s intrinsic-value heuristics we have shown that the original constants are no longer well-grounded in today’s market environment and, in some cases, rest on conceptual mis-specifications, for instance, treating AAA corporate yields as a risk-free rate. By surveying the modern literature and identifying the gaps in prior tests, we developed a fresh cross-sectional regression that recalibrates the growth-to-multiple relationship and embeds a dynamic adjustment for changes in interest rates. The resulting equation is best viewed as a pricing tool rather than a pure intrinsic-value model: it captures how the market currently translates expected earnings growth into P/E, thereby offering a disciplined benchmark for relative valuation. Within a value-investing framework, we treat this benchmark as a triage device rather than a substitute for fundamentals. When a stock screens as undervalued against the updated multiplier, it signals a potential mispricing worth probing through a full fundamental review and discounted-cash-flow analysis – reflecting our conviction that markets often err in the short run but tend to correct over time, creating opportunities for patient capital.

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