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NATURAL REGULARITIES OF ASSET FORMATION BASED ON COMPANY CAPITAL AND THEIR ROLE IN FINANCIAL DECISION-MAKING

Yusuf Usmonovich Sunnatov,
PhD, Head of the Department of Accounting and Statistics,
Bukhara State University.
Bukhara, Uzbekistan. Email: y.u.sunnatov@buxdu.uz
ORCID:0009-0003-8036-9632

Abstract. *This study investigates the natural regularities in the formation of company assets based on capital structure and examines their role in financial decision-making. The research proposes a geometric and mathematical model that explains the structural relationship between long-term assets, current assets, equity capital, and debt liabilities. By representing balance sheet components as elements of a quadrilateral, the study introduces two analytical indicators: the Financial Asymmetry Index (FAI) and the Economic Potential Indicator (EPI). These indicators allow evaluation of financial equilibrium and economic potential within corporate financial structures. The model is empirically illustrated using financial data from major global corporations including Tesla, Apple, Microsoft, Alphabet, Nvidia, Berkshire Hathaway, LVMH, Nestlé, ASML, SAP, Samsung Electronics, and Toyota Motor Corporation. The results demonstrate that firms with more balanced relationships between assets and capital sources exhibit stronger economic potential and greater financial stability. The proposed framework contributes to corporate finance literature by providing a novel structural approach to balance sheet analysis and offers practical implications for financial managers and strategic decision-making.*

Keywords. *Corporate finance, asset formation, capital structure, financial equilibrium, financial asymmetry index, economic potential indicator, balance sheet analysis, financial decision-making.*

Introduction. We know that there are several financial ratios and models used in analyzing the financial condition of companies. By conducting analytical work through these tools, it becomes somewhat more difficult to determine the financial condition of companies and to formulate the components of their financial position based on the obtained results. In this context, the following hypothesis is formed:

Is there a natural characteristic in the formation of companies' financial position statements?

If this hypothesis proves to be valid, we will determine how significant it is in forming the items of the statement of financial position. In other words, based on a company's equity capital, we need to consider how increasing or decreasing long-term assets affects the formation of current assets through debt capital. Conversely, when we increase or decrease current assets by a certain amount based on debt capital, we need to determine how much attention should be given to the formation of long-term assets through equity capital in order to maintain the stability of the company's financial condition. As a result, the following hypothesis is formed:

H_0: It should be kept unchanged.

H_1: It should be decreased by a certain amount.

H_2: It should be increased by a certain amount

Let us assume that if the hypotheses H_1 and H_2 are valid, then it is necessary to determine the exact amount by which the decrease or increase should occur.

Similarly, if we increase or decrease current assets based on the company's equity capital, it is necessary to determine our strategy regarding the formation of long-term assets through debt capital. Conversely, if we increase or decrease long-term assets by a certain amount based on debt capital, it is important to determine what strategy the company should follow in forming current assets through equity capital in order to maintain the stability of the company's financial condition. As a result, the following hypothesis is also formed:

H_0: It should be kept unchanged.

H_1: It should be decreased by a certain amount.

H_2: It should be increased by a certain amount

From the above considerations, if the H_1 and H_2 hypotheses are valid, then it is necessary to determine the amount of current assets to be formed based on equity capital.

Literature Review. The relationship between asset formation and capital structure has been widely studied in the field of corporate finance. One of the foundational contributions to this area was made by Franco Modigliani and Merton Miller, who proposed the famous capital structure irrelevance theorem, suggesting that under certain market conditions the value of a firm is independent of its financing structure [1].

Later research challenged this view by incorporating real-world factors such as taxes, bankruptcy costs, and information asymmetry. According to Stewart Myers, firms tend to follow a pecking order in financing decisions, prioritizing internal funds before external financing sources. Similarly, the trade-off theory of capital structure suggests that firms balance the benefits of debt financing against the costs of financial distress [2].

Studies by Eugene Fama and Kenneth French demonstrated that firm characteristics such as profitability, asset tangibility, and growth opportunities significantly influence capital structure decisions. Their findings indicate that profitable firms tend to rely less on debt financing and more on internally generated funds [3].

Research conducted by Aswath Damodaran emphasizes the importance of maintaining a balanced relationship between assets and financing sources in order to maximize firm value and minimize financial risk. Similarly, Richard Brealey, Stewart Myers, and Franklin Allen highlight that efficient capital allocation plays a critical role in determining corporate financial stability [6].

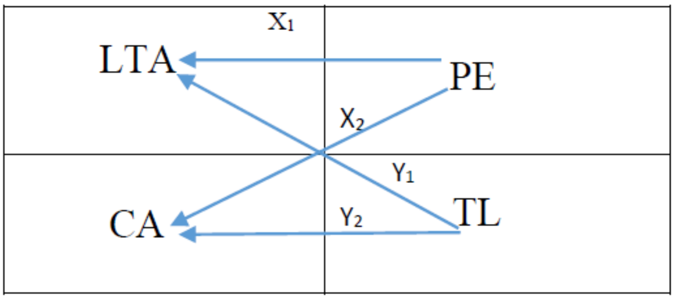
More recent studies have also explored structural approaches to financial analysis. Jonathan Berk and Peter DeMarzo argue that modern corporate finance requires new analytical frameworks capable of capturing complex relationships between financial variables. These frameworks often integrate mathematical modeling, financial engineering, and structural analysis [7].

In addition, studies on financial equilibrium emphasize the importance of proportional relationships between assets and financing sources. According to Stephen Ross, Randolph Westerfield, and Bradford Jordan, financial stability depends on the firm's ability to maintain an optimal balance between long-term investments and financing strategies [5].

Despite the extensive literature on capital structure and financial performance, relatively little research has focused on geometric representations of corporate financial structures. Traditional financial analysis relies mainly on ratio analysis, regression models, and econometric techniques. However, these approaches may not fully capture the structural relationships between balance sheet components.

Therefore, this study contributes to the literature by proposing a geometric interpretation of financial structure, where balance sheet elements are represented as components of a quadrilateral. This approach allows the identification of natural structural relationships between long-term assets, current assets, equity capital, and debt liabilities. By introducing the Financial Asymmetry Index (FAI) and the Economic Potential Indicator (EPI), the study provides a new framework for evaluating financial equilibrium and corporate economic potential.

MethodologyThe formation of a company's assets can be through private equity or debt capital. The schematic model of its formation is presented in the following image:



1-Company's asset formation scheme

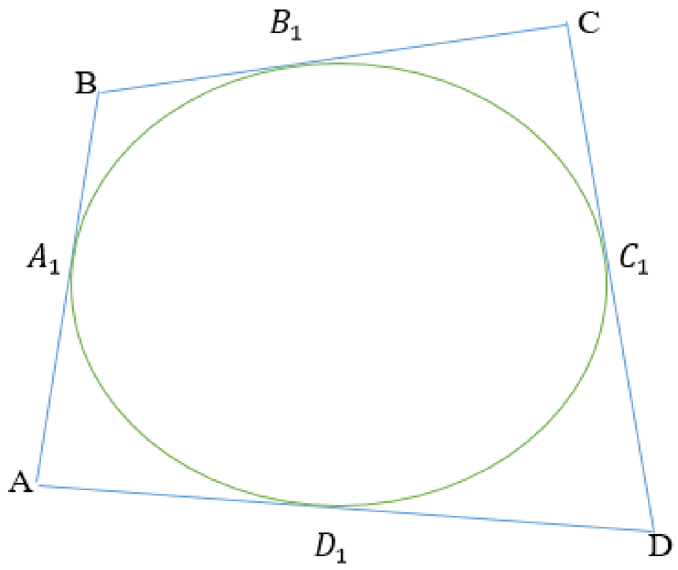
In this case: LTA – long-term assets, CA – current assets, PE – private equity, TL– total liabilities.The mathematical expression of the above schematic model is as follows:

$PE = x_1 + x_2, TL = y_1 + y_2, LTA = x_1 + y_1,\ CA = x_2 + y_2$ (1)

It is known that for any company the condition LTA + CA = PE + TL holds true. The modified form of this condition, transformed through equation (1) above, is as follows.

$(x_1 + y_1) + (x_2 + y_2) = (x_1 + x_2) + (y_1 + y_2)$ (2)

By identifying the natural characteristics of equations (1) and (2) above, we can express their geometric representation. Its form is as follows:



2 - Geometric Representation of the Balance Sheet

Considering that the condition $BB_1 = BA_1$ holds in the figure above, we can denote them as $BB_1 = BA_1 = x_1$. Likewise, since the condition $CB_1 = CC_1$ is also satisfied, we denote $CB_1 = CC_1 = x_2$. If we look from the AD side, the conditions $AD_1 = AA_1$ and $DD_1 = DC_1$ are also valid. Accordingly, we denote these equalities as $AD_1 = AA_1 = y_1$ and $DD_1 = DC_1 = y_2$. From these notations, it can be seen that equation (2) and the figure above complement each other. In addition, the sides of the quadrilateral (ABCD) consist of the items of the balance sheet, namely long-term assets, current assets, equity capital, and debt liabilities. Thus, we can denote the sides of the quadrilateral as follows: AB - Long-term assets, BC-Equity capital, CD-Current assets, AD-Debt liabilities.

In the next stage, we focus on the angles of the quadrilateral. Using the scheme above and expression (2), we can formulate the following conclusion. If the value of x_1 increases, the angle formed by it becomes smaller. Conversely, if the value of x_1 decreases, the angle formed by it becomes larger. In addition, an increase in x_1 leads to a decrease in ∠B and an increase in ∠D. This condition applies to all the angles of the quadrilateral shown above. From this, we can conclude that the sum of its opposite angles is equal to 180°.

Based on the figure above, we introduce the following notations:

AB=a, BC=c, CD=b, DA=d

Using these notations, we calculate the area of the quadrilateral. This area represents the financial scale of the company. If this area is large, the company's financial scale is large; if this area is small, the company's financial scale is small. Additionally, if a quadrilateral allows both a circumscribed (external) and an inscribed (internal) circle to be drawn, its area can be determined as follows:

$$A_{ABCD} = \sqrt{abcd} \quad (3)$$

At the same time, if a circumscribed circle can be drawn around any quadrilateral, the sum of its opposite angles is equal to 180°. We denote the opposite angles as follows.

$$\angle ABC = \alpha, \quad \angle ADC = 180^{\circ} - \alpha \quad (4)$$

Let the angles of the quadrilateral be denoted as α, β, γ, δ. Using these angles, we can determine the financial asymmetry index of the company. The financial asymmetry index is defined as follows:

$$FAI = |\alpha - 90^{\circ}| + |\beta - 90^{\circ}| + |\gamma - 90^{\circ}| + |\delta - 90^{\circ}|$$

The maximum value of FAI can be equal to 180^0. Through the FAI indicator, we take the boundary width from 60^0.

Through the Financial Asymmetry Index (FAI), the following conditions can be determined:

FAI=0 – Ideally balanced company

$FAI \leq 60^{\circ}$ – Well-balanced

$60^{\circ} < FAI \leq 120^{\circ}$ - Moderately balanced

$FAI > 120^0$ - Poorly balanced or disproportionate structure

Using these angles, the area of the quadrilateral is determined as follows.

$$A_{ABCD} = \frac{1}{2}a \cdot c \cdot sin\alpha + \frac{1}{2}b \cdot d \cdot \sin(180 - \alpha) = \frac{1}{2}a \cdot c \cdot sin\alpha + \frac{1}{2}b \cdot d \cdot \sin\alpha \quad (5)$$

By equating the areas of the quadrilateral determined by two different methods, we obtain the following expression.

$$\frac{1}{2}a \cdot c \cdot sin\alpha + \frac{1}{2}b \cdot d \cdot \sin\alpha = \sqrt{abcd}$$
(6)

From the equality above, we can determine sin α. It is expressed as follows:

$$sin\alpha = \frac{2\sqrt{abcd}}{ac+bd}$$
(7)

If we consider the figure above, the angle formed by long-term assets and equity capital and the angle formed by current assets and debt liabilities are opposite angles. A change in the angle formed by long-term assets and equity capital leads to a change in the angle formed by current assets and debt liabilities. Similarly, a change in the angle formed by current assets and equity capital affects the angle formed by long-term assets and debt liabilities. Therefore, these angles tend to reach their maximum values. The optimal value for these angles tends toward 90°. Taking this into account, the following condition holds true:

$$\lim_{\alpha \to \frac{\pi}{2}} sin\alpha = 1$$
(8)

Based on the determined equation (7), equation (6) takes the following form:

$$\frac{2\sqrt{abcd}}{ac+bd} \approx 1$$
(9)

Equation (8) can be written in the following form:

$$ac + bd \approx 2\sqrt{abcd}$$
(10)

The form of equation (9) after completing the square is expressed as follows:

$$(ac - bd)^2 \approx 0$$
(11)

Based on the determined equation (10), we can establish that the following condition holds true:

$$ac \approx bd$$
(12)

Based on equation (11), we determine which of the hypotheses proposed above is valid. In other words, let us assume that the change in long-term assets financed by equity capital is (z). Then we determine the amount by which current assets financed by equity capital should change. This is determined as follows:

$$(a+z)(c+z) \approx (b+y)(d+y) \quad (13)$$

The determined equation (12) can be expressed graphically as follows:

$$y^2+(b+d)y-\left((a+c)z+z^2\right) \approx 0 \quad (14)$$

From equation (13), we determine that the change in current assets financed by equity capital is as follows:

$$y_1 \approx \frac{-(b+d)+\sqrt{b^2+2bd+d^2+4\left((a+c)z+z^2\right)}}{2} \quad (15)$$

Similarly, if the formation of current assets financed by equity capital is equal to (m), we determine the amount of long-term assets formed through debt liabilities as follows. For this, we use equation (15).

$$(c+m)(b+m) \approx (a+n)(d+n) \quad (16)$$

The determined equation (15) can be written as follows:

$$n^2+(a+d)n-\left((c+b)m+m^2\right) \approx 0 \quad (17)$$

From equation (16), the amount of long-term assets formed through debt liabilities is determined as follows:

$$n_1 \approx \frac{-(a+d)+\sqrt{a^2+2ad+d^2+4\left((c+b)m+m^2\right)}}{2}$$

We often encounter the concept of a company’s “economic potential.” However, it can be observed that there is no clearly established methodology for determining it. This can be addressed using the figure presented above. In particular, the economic potential can be expressed through the radius of the circle inscribed within the quadrilateral ABCD. The economic potential determined by the proposed formula is expressed as follows:

$$r=\frac{2\sqrt{abcd}}{a+b+c+d}$$

Using this formula, we determine the economic potential indicator of the company. The economic potential indicator is defined as follows:

$$EPI=\frac{r}{(a+b+c+d)/2}\cdot 100\%$$

The maximum value of EPI equals 25%, attained when the quadrilateral is a square — the geometrically most balanced configuration, in which all four sides are equal and all angles are 90°. This theoretical maximum serves as the benchmark for the EPI classification system. The classification thresholds for both FAI and EPI are summarized in Table 1 below.

Table 1. Classification thresholds for the Financial Asymmetry Index (FAI) and the Economic Potential Indicator (EPI)

FAI Range	Classification	EPI Range & Classification
FAI = 0°	Ideally balanced	EPI = 25% → Maximum potential
FAI ≤ 60°	Well-balanced	20% ≤ EPI < 25% → High potential
60° < FAI ≤ 120°	Moderately balanced	12.5% ≤ EPI < 20% → Medium potential
FAI > 120°	Poorly balanced / disproportionate	EPI < 12.5% → Low potential

The FAI boundary width of 60° is derived from the theoretical maximum of 180°, divided into three equal intervals of 60°. This approach ensures that the classification ranges are symmetric with respect to the maximum value, providing a consistent and interpretable framework for comparing financial structures across firms and industries.

The proposed model was applied to publicly reported annual balance sheet data for twelve major global corporations: Tesla, Apple, Microsoft, Alphabet, Nvidia, Berkshire Hathaway, LVMH, Nestlé, ASML, SAP, Samsung Electronics, and Toyota Motor Corporation. For each firm, the four balance sheet components - long-term assets (a), private equity (c), current assets (b), and total liabilities (d) - were used as the side lengths of the quadrilateral. The FAI was computed from the interior angles, and the EPI was computed from the inscribed circle formula presented above.

Results. The FAI and EPI values computed for all twelve companies in the sample are presented in Table 2. The companies are sorted in ascending order of FAI to facilitate comparison across levels of structural balance.

Table 2. Financial Asymmetry Index (FAI) and Economic Potential Indicator (EPI) values for selected global corporations

Company	FAI (°)	EPI (%)	FAI Classification	EPI Classification
Berkshire Hathaway (2025 year)	45.9	24.2	Well-balanced	High economic potential
Tesla (2025 year)	46.6	24.5	Well-balanced	High economic potential
Toyota Motor Corporation (2025 year)	69.9	23.5	Moderately balanced	High economic potential
LVMH (2025 year)	75.0	24.0	Moderately balanced	High economic potential
ASML (2025 year)	76.9	23.3	Moderately balanced	High economic potential
Microsoft (2025 year)	89.5	23.0	Moderately balanced	High economic potential
Alphabet (2025 year)	89.04	22.0	Moderately balanced	High economic potential
Nvidia (2025 year)	94.8	20.4	Moderately balanced	High economic potential
Nestlé (2025 year)	100.9	22.0	Moderately balanced	High economic potential
Samsung Electronics (2025 year)	139.3	20.3	Poorly balanced	High economic potential
Apple (2025 year)	142.8	19.9	Poorly balanced	Medium economic potential

Well-balanced companies (FAI ≤ 60°)

Three companies — SAP (FAI = 40.4°), Berkshire Hathaway (FAI = 45.9°), and Tesla (FAI = 46.6°) — fall within the well-balanced category. SAP records the lowest FAI in the entire sample alongside the maximum possible EPI of 25.0%, indicating near-perfect proportionality between balance sheet components. This result confirms that SAP's asset and capital structure most closely satisfies the geometric equilibrium condition ac ≈ bd, making it the best-performing firm in both structural balance and economic potential among those examined.

Berkshire Hathaway and Tesla follow closely with EPI values of 24.2% and 24.5%, respectively. Despite marginally exceeding the threshold for ideal balance, both companies maintain near-maximum economic potential. The relatively diversified nature of Berkshire Hathaway's asset portfolio and Tesla's growing fixed-asset base appear to support proportional capital allocation, generating a structurally coherent balance sheet.

Moderately balanced companies (60° < FAI ≤ 120°)

Seven companies fall within the moderately balanced range: Toyota Motor Corporation (FAI = 69.9°), LVMH (FAI = 75.0°), ASML (FAI = 76.9°), Microsoft (FAI = 89.5°), Alphabet (FAI = 89.04°), Nvidia (FAI = 94.8°), and Nestlé (FAI = 100.9°). All seven firms maintain high economic potential (EPI between 20% and 25%), suggesting that moderate structural asymmetry does not substantially impair economic potential at this scale.

Toyota Motor Corporation, LVMH, and ASML cluster at the lower end of this range, with FAI values between 69.9° and 76.9°. Their high EPI values (23.5%, 24.0%, and 23.3%, respectively) reflect industries where large tangible asset bases — physical manufacturing infrastructure, luxury goods inventory, and semiconductor equipment — generate naturally balanced quadrilateral configurations despite above-average FAI.

Microsoft (FAI = 89.5°, EPI = 23.0%) and Alphabet (FAI = 89.04°, EPI = 22.0%) sit near the upper boundary of the moderately balanced category. Their structural asymmetry likely reflects the accumulation of intangible assets, goodwill from acquisitions, and significant retained earnings that create disproportionalities between equity-financed and liability-financed asset components. Nevertheless, both companies retain strong economic potential.

Nvidia (FAI = 94.8°, EPI = 20.4%) and Nestlé (FAI = 100.9°, EPI = 22.0%) are positioned near the upper limit of moderate balance. Nvidia's rapid asset expansion driven by surging demand for AI hardware and Nestlé's complex multi-category consumer goods portfolio both introduce structural imbalances, yet their EPI values remain above the 20% threshold, confirming continued high economic potential.

Poorly balanced companies (FAI > 120°)

Two companies — Samsung Electronics (FAI = 139.3°, EPI = 20.3%) and Apple (FAI = 142.8°, EPI = 19.9%) — fall within the poorly balanced category, exhibiting the highest structural asymmetry in the sample. Samsung Electronics' highly capital-intensive semiconductor manufacturing operations generate a substantial long-term asset base, while Apple's aggressive share repurchase programs have resulted in negative retained earnings on multiple occasions, fundamentally distorting the proportional relationship between equity capital and asset components.

Apple records the lowest EPI in the sample at 19.9%, placing it at the boundary between medium and high economic potential. This outcome reflects the consequence of sustained structural imbalance: while Apple's absolute financial scale remains immense, the geometric model reveals that the proportional relationship between its balance sheet components has deteriorated relative to more balanced peers. Samsung Electronics retains EPI = 20.3%, narrowly maintaining high economic potential despite its equally elevated FAI.

Cross-sample observations

Across all twelve firms, EPI ranges from 19.9% to 25.0%. Ten of twelve companies record EPI at or above 20%, reflecting the financial depth and asset scale of the sampled corporations. The FAI values, by contrast, range from 40.4° to 142.8°, demonstrating that globally prominent firms can display widely divergent degrees of structural balance.

A broad inverse relationship between FAI and EPI is evident across the sample. Companies achieving lower FAI values tend to report higher EPI values, consistent with the geometric principle underlying the model: a more balanced quadrilateral — one whose sides approach equality — inscribes a larger circle relative to its perimeter, thereby yielding higher EPI. However, this relationship is not strictly monotonic: Microsoft (FAI = 89.5°, EPI = 23.0%) records a higher EPI than Nvidia (FAI = 94.8°, EPI = 20.4°) despite a similar FAI level, reflecting the influence of absolute asset scale on the inscribed circle radius.

The empirical results collectively validate the central hypothesis of this study. Natural regularities in the formation of balance sheet components — expressible through the geometric equilibrium condition $ac \approx bd$ — govern the structural relationship between long-term assets, current assets, private equity, and total liabilities. Departures from this condition, as measured by FAI, correspond to observable reductions in economic potential as measured by EPI. The proposed framework therefore provides a structurally grounded, computationally tractable approach to evaluating corporate financial health that complements existing ratio-based and regression-based methods.

Discussion

The empirical results reveal several important patterns regarding the relationship between financial structure and economic potential. Companies with relatively balanced financial structures, such as SAP and Berkshire Hathaway, demonstrate lower Financial Asymmetry Index values and higher Economic Potential Indicators.

In contrast, companies with more asymmetric financial structures exhibit higher FAI values, which may reflect structural imbalances between asset composition and capital sources. These imbalances may arise from aggressive leverage strategies, rapid asset expansion, or sector-specific financial policies.

The findings suggest that maintaining proportional relationships between equity capital, liabilities, and asset components contributes to improved financial stability. The geometric model proposed in this study provides a visual and analytical tool that complements traditional financial ratio analysis.

Furthermore, this approach may assist financial managers in identifying structural weaknesses within balance sheets and improving capital allocation strategies.

Conclusion.

This research explores the natural regularities of asset formation based on company capital and introduces a novel geometric framework for analyzing financial structures. The proposed model allows balance sheet elements to be represented as components of a quadrilateral, enabling the measurement of financial equilibrium through the Financial Asymmetry Index and the Economic Potential Indicator.

The empirical results indicate that companies with more balanced financial structures tend to demonstrate stronger economic potential and greater financial stability. The findings highlight the importance of maintaining proportional relationships between assets and financing sources when making strategic financial decisions.

The proposed framework contributes to corporate finance research by offering an alternative approach to analyzing financial structures and evaluating economic potential. Future research may extend this model by incorporating industry-specific data, dynamic financial indicators, and econometric testing across larger datasets.

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