Equity Valuation
Vonovia SE

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Dissertation submitted in partial fulfilment of requirements for the MSc in Finance, at the Universidade Católica Portuguesa, 10th of March, 2025

Abstract

This dissertation addresses the equity valuation of Vonovia SE., a leading German residential real estate firm with a portfolio exceeding 710,000 units. The primary objective the study is to establish a target share price for Vonovia as of December 31, 2025, while also providing an investment recommendation based on valuation methodologies applied.

Following an analysis of the most advanced equity valuation techniques, it was concluded that the Discounted Cash Flow (DCF) approach, specifically using the Free Cash Flow to Firm (FCFF) with a perpetuity model, is the most appropriate approach for valuing Vonovia. Alongside this method and its sensitivity analysis, the relative valuation was chosen to test the assumptions and compare them to the market values. The dissertation culminates in a presentation of forecasting assumptions, followed by a comparison of the findings with Morgan Stanley's valuation as of September 30, 2024.

Through a thorough application of these valuation frameworks and an extensive analysis of the sector, the company, and its historical financial performance, the study arrives at a target share price of €26.14 for Vonovia as of December 31, 2024. This projection suggests a potential depreciation of 10.85% compared to the share price at the date of €29.32. Based on these findings, a **Sold** recommendation is advised for investors in Vonovia.

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Title: Equity Valuation – Vonovia SE

Keywords: Vonovia, Vonovia SE., real estate, portfolio, units, company valuation, target share price, evolution, discounted cash flow, relative valuation

Resumo

Esta dissertação investiga a avaliação patrimonial da Vonovia S.E., uma empresa de imobiliário na área residencial, com sede na Alemanha e umportfólio superior a 710.000 unidades. O principal objetivo do estudo é estabelecer o justo valor por ação da Vonovia a 31 de dezembro de 2024, de forma a emitir uma recomendação de investimento com base nas metodologias de avaliação utilizadas.

Após a análise das técnicas mais avançadas de avaliação, concluiu-se que o método do Fluxo de Caixa Descontado (DCF), utilizando o Fluxo de Caixa Livre para a Empresa (FCFE) com um modelo de perpetuidade, é a abordagem mais apropriada para avaliar a Empresa. Para além deste método e da correspondente análise de sensibilidade, foi realizada a avaliação relativa, de forma a testar os pressupostos e compará-los com os valores de mercado. A dissertação culmina na apresentação das projeções, seguida de uma comparação dos resultados com a avaliação da Morgan Stanley à data de 30 de setembro de 2024.

Através de uma aplicação rigorosa destas metodologias e posteriormente a uma análise detalhada do setor, da empresa e do seu desempenho financeiro histórico, o estudo chega a um preço final por ação de €26,14 a 31 de dezembro de 2024. Esta projeção indica um potencial de desvalorização de 10.85% em relação ao preço à data das ações de €29.32. Com base nessas conclusões, é aconselhada uma recomendação de **Venda** para os investidores na Vonovia.

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Acknowledgement

This thesis marks a significant milestone in my academic, professional and personal journey, and I am deeply grateful for the learning and support that have shaped this experience.

Firstly, I would like to extend my heartfelt gratitude to my advisor, professor José Carlos Tudela Martins. His guidance and insightful feedback were invaluable in navigating the complexities of this research.

To my parents and my sister, I owe more than words can express. Their support, encouragement, and sacrifices have provided the foundation upon which this work rests. Beyond the thesis, I am deeply grateful for their steadfast guidance and belief in me throughout my entire academic and professional journey. They have taught me resilience and perseverance, qualities that sustained me through challenging moments. Their faith in my capabilities, even when I doubted them myself, has been a constant source of strength and motivation, helping me reach this milestone and so many others.

Lastly, I am incredibly grateful to my closest friends who have been my pillars of support during all the masters program. Their companionship, encouragement, and understanding allowed me to stay balanced and motivated while working and studying at the same time. They were always there to celebrate small victories and provide perspective during setbacks, reminding me of the value of friendship and laughter along the way. A special word to Rodrigo for his unwavering friendship and immeasurable support.

This thesis is a product of collective support and encouragement, and I am deeply appreciative of everyone who contributed to making this achievement possible. Thank you for sharing this journey with me.

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Abbreviation

- 3FF: Fama-French Three-Factor Model (3FF).
- ΔNWC: Changes in working capital
- Ɛ: Risk
- β: Factor's coefficient (sensitivity)
- CAPEX: capital expenditures
- CAGR: Compounded Average Growth Rate
- CO2: Carbon Dioxide
- D: Market Value of Debt
- D&A: depreciation and amortization
- DCF: Discounted Cash Flow
- DDM: Dividend Discount Model
- DPS: Dividend Per Share
- E: Market Value of Equity
- EBIT: Earnings Before Interest and Taxes
- EBITDA: Earnings Before Interest and Taxes
- ECB: European Central Bank
- ESG: Environmental, Social, and Governance)
- EU: European Union
- EV: Enterprise Value
- FCF: Free Cash Flow
- FCFF: Free Cash Flow to the Firm
- FCFE: Free Cash Flow to Equity
- FY: Final Year
- g: Growth Ratef
- GGM: Gordon Growth Model
- HML: Book-to-Market factors
- IoT: Internet of Things
- K_e: Cost of equity
- K_d: Cost of Debt
- Market Cap: Market Capitalization
- MRP= Market Risk Premium
- P&L: Profit and Loss Statement
- Q1: First Quarter
- Q2: Second Quarter
- Q3: Third Quarter
- Q4: Fourth Quarter
- r_f: Risk free rate
- r_m: Expected return of the market
- SMB: Size Factor
- T: Marginal Tax Rate
- TSP: Target Share Price
- TV: Terminal Value
- VS: Versus
- YOY:
- YTM: yield to maturity
- WACC: Weighted Average Cost of Capital

1. Introduction

Founded in 2015 and headquartered in Germany, Vonovia SE. (in this dissertation, also referred to as Vonovia or the Company) is a residential real estate company with a portfolio of over 710,000 units, primarily in its own country but also in Sweden and Austria. In a challenging macroeconomic environment influenced by economic, political, and regulatory factors, Vonovia is facing significant obstacles in Germany due to high construction costs, lack of skilled labour and regulatory constraints. Despite these challenges, Vonovia positions itself as a market leader, operating in a vertically integrated market and establishing a clear strategy, which major concerns related to technological innovation and Environmental, Social, and Governance (ESG) commitment.

The purpose of this dissertation is to estimate, as of December 31st, 2024, Vonovia's target share price and compare it with its market price in that date.

The dissertation begins with the state of the art of valuation methods in the Literature Review. Afterwards, an overview of the global economic status and the industry is presented, followed by an in-depth analysis of the company, portfolio, and financial performance since 2019. After this breakdown, the assumptions and financial forecasts are presented, along with the calculation of the target share price through the discounting of Free Cash Flow to Firm with Terminal Value and the respective sensitivity analysis. This method will then be supported by relative valuation. Finally, both models will be confronted with the Morgan Stanley valuation.

2. Literature Review

Equity valuation involves various methods to determine a company's intrinsic value, essential for corporate decisions, investment analysis, mergers and acquisitions, and financial planning.

This literature review explores valuation methods, including theoretical foundations and applications. It covers cash flow valuation methods, key models' inputs, and market multiples. The literature review offers a deep understanding of these methodologies exploring valuation methods and common valuation challenges.

2.1. Discounted Cash Flow

The Discounted Cash Flow (DCF) method is a key technique in finance for estimating companies' and project's intrinsic value. According Damodaran (2012), it calculates the present value of expected future cash flows. This method relies on the time value of money, discounting future cash flows back to present value using a rate that reflects risk and opportunity cost (Luehrman, 1997). DCF includes a short-term forecast and a terminal value (TV) for long-term cash flow, calculated after the stabilization of growth and cash flows (section 2.2.5.7) (Damodaran, 2012):

***Equation 1**: Net Present Value of Future Cash Flows (DCF)*

$$NPV = \sum_{t=1}^{t=n} \frac{CF_t}{(1+r)^t} + \frac{TV_n}{(1+r)^n}$$

DCF is effective for firms with consistent cash flows and clear risk proxies for discount rates (Damodaran, 2012). It is a robust valuation tool due to its detailed financial forecasts and risk adjustment. The valuation process depends on future cash flows and discount rates, requiring assumptions that impact results. Differences in DCF variants arise from discount rates, cash flow components, and tax implications. Section 2.2 examines key DCF models: Dividend Discount Model (DDM), Free Cash Flow to the Firm (FCFF), and Free Cash Flow to Equity (FCFE).

2.1.1. Dividend Discount Model (DDM)

The Dividend Discount Model is a foundational approach to investment valuation, described by Damodaran (2006) as one of "the oldest discounted cash flow models". This model posits that the future cash flows from an investment are equivalent to the expected dividends. The discount rate applied corresponds to the Cost of Equity.

***Equation 2**: DDM Formula*

$$Value\ per\ Share = \sum_{t=1}^{t=n} \frac{E(DPS_t)}{(1 + K_e)}$$

According to Damodaran (2002) the difficulty lies within the uncertainty of predicting future dividends. Therefore, different versions of the DDM have been created to forecast it, as it not possible to estimate dividends for an infinitive period of time (Damodaran, 2012), with the Gordon Growth Model (GGM) being the most well-known. The GGM values a company's share price by assuming constant growth in dividends, making it suited for stable companies with defined payout policies. According to Damodaran (2002) GGM is used when meeting these conditions: i) firm growing rate ≤ nominal growth rate of the economy; ii) the firm needs a well-defined payout policy making dividends constant and stable.

***Equation 3:** Value per Share - Gordon Growth Model*

$$Value\ per\ Share = \frac{D_0 \times (1 + g)}{(K_e - g)}$$

A significant drawback of the DDM is its dependence on the assumption of constant growth, which may not reflect the realities of firms in cyclical or competitive industries. This limitation has spurred the development of alternative models, such as the Modified Dividend Discount Model, which accommodates varying growth rates and different cash flow scenarios.

Proponents of the DDM argue that it is a straightforward and effective method for assessing a company's value, providing insights into its fundamental attributes and associated risks. However, it is essential to apply the model alongside other valuation strategies, considering the unique characteristics of the firm and its market context. Additionally, the DDM is relevant primarily for companies that distribute dividends.

2.1.2. Free Cash Flow to Equity (FCFE)

"Free cash flow to equity is the cash flow available to the company's holders of common equity after all operating expenses, interest, and principal payments have been paid and necessary investments in working and fixed capital have been made.", Pinto et al. (2015).

To determine FCFE, different components must be considered. Net capital expenditures, defined as the difference between capital expenditures and depreciation, reflect investments in long-term assets. Additionally, changes in non-cash working capital indicate how much a company invests in short-term assets such as accounts receivable, inventory, and accounts payable. Therefore, total reinvestment is the sum of net capital expenditures and changes in non-cash working capital. The cash flow implications arising from debt fluctuations can be assessed by offsetting existing debt repayments against new debt issuances.

Considering the mentioned factors, to calculate FCFE, capital expenditures and acquisitions are subtracted from net income, as these represent cash outflows. In contrast, depreciation and amortization, classified as accounting expenses rather than cash expenditures, are added back into the calculation (Damodaran, 2012).

***Equation 4**: Free Cash Flow to the Equity*

$$FCFE = Net\ income\ -\ (Capital\ expenditures\ -\ Depreciation)$$
$$-\ (Change\ in\ noncash\ working\ capital)$$
$$+\ (New\ debt\ issued\ -\ Debt\ repayments)$$

By calculating each expected FCFE using the previously mentioned formula, the equity value can be estimated. The discounting of these cash flows is performed using the Cost of Equity (k_e), detailed in Section 2.1.5.2.

***Equation 5**: Equity Value Calculation (FCFE model)*

$$Equity\ Value = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1+k_e)^t} + \frac{TV_n}{(1+k_e)^n}$$

2.1.3. Free Cash Flow to The Firm (FCFF)

Pinto et al. (2015) define "Free cash flow to the firm as the cash flow accessible to the company's capital providers after settling all operational expenses and making necessary investments in working capital and fixed assets."

In the context of DCF analysis, Earnings Before Interest and Taxes (EBIT) often serves as the starting point for calculating Free Cash Flow (FCF). Transitioning from EBIT to FCF involves considering several factors, including the marginal tax rate, depreciation and amortization (D&A), capital expenditures (CAPEX), and changes in working capital (Rosenbaum & Pearl, 2013). Interest expenses and tax incentives are excluded from the FCFF calculation by multiplying EBIT by (1-T).

***Equation 6**: Free Cash Flow to the Firm*

$$FCFF = EBIT \times (1 - T) + D\&A - CAPEX - \Delta NWC$$

To determine the company's value, the FCFF is discounted using the Weighted Average Cost of Capital – detailed in 2.1.5.1. Consequently, the enterprise value (EV) can be calculated using Equation 7, assuming the firm achieves sustainable growth.

***Equation 7**: EV calculation (FCFF model)*

$$EV = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1 + WACC)^t} + \frac{TV_n}{(1 + WACC)^n}$$

After obtaining the enterprise value, the value of equity is calculated using Equation 8. The value per share is then determined by dividing the equity value by the number of shares outstanding, as shown in Equation 9.

***Equation 8**: Equity Value (FCFF model)*

$$Equity\ value = EV - Market\ value\ of\ debt$$

***Equation 9:** Value Per Share (FCFF model)*

$$Value\ Per\ Share = \frac{Equity\ Value}{\#\ Shares\ Outstanding}$$

2.1.4. FCFF VS FCFE

Empirical studies have explored the relationship between Free Cash Flow (FCF) models and company valuation, consistently showing a positive correlation.

Both methods for assessing equity value are valid and equivalent, depending on the underlying model assumptions. While FCFE model appears more straightforward as it directly reflects cash available to shareholders, it may face challenges in companies with high debt levels, potentially

resulting in negative FCFE despite robust FCFF. Conversely, when using FCFF model, attention to the company's debt dynamics is essential. The WACC plays a crucial role, enabling stress testing and scenario analysis.

The relationship between FCFF and FCFE is represented below (Damodaran, 2012):

***Equation 10**: FCFF to FCFE*

$$FCFF = FCFE + Interest \times (1 - tax\ rate) + \text{Principal repayments} - \text{New debt issues} + \text{Prefered dividends}$$

2.1.5. Inputs for DCF models

2.1.5.1. Weighted Average Cost of Capital (WACC)

The WACC, often referred to as Cost of Capital, represents the average cost of capital for a firm. According to Rosenbaum and Peal (2013), it "is a broadly accepted standard for use as the discount rate to calculate the present value of a company's projected FCF and terminal value. It reflects the weighted average of the required return on invested capital, typically comprising debt and equity." This discount rate must adequately capture the intrinsic risk associated with the company's projected future cash flows.

WACC is calculated by weighting the cost of debt and the cost of equity according to the firm's capital structure (Fernandez, 2013):

***Equation 11**: Weighted Average Cost of Capital*

$$WACC = \frac{E}{D+E} * K_e + \frac{D}{D+E} * K_d * (1 - T)$$

WACC may fluctuate over time due to changes in the company's capital structure. Therefore, researchers often use target weights rather than current market value weights (Pinto et al., 2015).

2.1.5.2. Cost of Equity (K_e)

According to Rosenbaum and Pearl (2013), the "Cost of equity is the required annual rate of return that the company's equity investors expect to receive (including dividends)." In a racional capital market, investors expect a return exceeding the risk-free rate (r_f)—discussed in section 2.1.5.4. This additional return is referred to as the Market Risk Premium (MRP), covered in 2.1.5.5. Thus, in a free market, the cost of capital is determined using Equation 12.

***Equation 12**: Cost of Equity in a free capital Market*

$$K_e = r_f + MRP$$

To estimate K_e, various models have been developed to account for distinct types of investment risk. This literature review highlights two prominent methods:

CAPM Model

Developed in the early 1960s, the Capital Asset Pricing Model (CAPM) is the most established model for assessing expected returns. As stated by Rosenbaum and Pearl (2013), "CAPM is based on the premise that equity investors need to be compensated for their assumption of systematic risk in the form of a risk premium.". CAPM assumes a relationship between expected returns and investment risk, quantifiable through comparison with the market portfolio. The asset's sensitivity to market variation is measured by beta, which "measures the sensitivity of the asset's return to variations in the market" (Damodaran, 2016). Under CAPM, K_e is calculated as follows:

***Equation 13**: Cost of Equity (CAPM)*

$$K_e = r_f + \beta_L \times MRP$$

Fama and French 3 factor model

Though CAPM is praised for its "simplicity and intuitive appeal" (Damodaran, 2016), empirical tests have exposed its limitations. The Fama-French model offers a multifactor approach, enhancing CAPM by incorporating additional factors. Fama and French introduced size and book-to-market value as factors alongside market risk.

In the 1990s, Fama and French revised the previously established regression by integrating Size (SMB) and Book-to-Market (HML) factors, resulting in the Fama-French Three-Factor Model (3FF).

***Equation 14**: Cost of Equity (3FF model)*

$$K_e = r_f + \beta_1 \times MRP + \beta_2 \times (SMB) + \beta_3 \times (HML) + \varepsilon$$

Many enhancements have been developed beyond this model, one of which is widely recognized as the Fama-French Five-Factor Model (5FF), which includes factors like profitability and investment in its regression analysis.

2.1.5.3. Cost of Debt (K_d)

The cost of debt is a critical component of the WACC and reflects the current expense that a firm incurs when borrowing funds to finance operations and projects. According to Damodaran (2012), "the cost of debt measures the current cost to the firm of borrowing funds.". Factors affecting the cost of debt include the risk-free rate, default risk, and the tax benefits associated with debt financing (Damodaran, 2002).

For investment-grade firms, the cost of debt can be determined using the yield to maturity (YTM) of the company's actively traded, option-free long-term bonds. However, relying on market prices is inadvisable for firms with only short-term or infrequently traded bonds. In such cases, YTM should be estimated based on the company's credit ratings (Koller et al., 2020).

If a company lacks a credit rating, two methods can estimate the cost of debt. The first involves determining a synthetic rating based on the firm's interest coverage ratio, allowing for the assignment of a synthetic rating and corresponding default spread. The second method utilizes the firm's recent borrowing history (Damodaran, 2012).

When determining the cost of debt, tt's essential to consider taxes, since interest payments provide tax savings due to their deductibility. Therefore, to calculate the after-tax cost of debt, the pre-tax cost is multiplied by one minus the marginal tax rate (Koller et al., 2020; Pinto et al., 2015).:

Equation 15*:After Taxes Cost of Debt*

$$After\ tax\ Cost\ of\ Debt = K_d\ (pretax) \times (1 - T)$$

being:

Equation 16*: Pretax Cost of Debt*

$$K_d\ (pretax) = r_f + Default\ Spread$$

2.1.5.4. Risk-free Rate (r_f)

The risk-free rate is a fundamental concept in finance, representing the return on an investment with no risk of default. For an asset to be classified as risk-free, two conditions must be met: i) there must be no default risk, and ii) there should be no reinvestment risk (Damodaran, 2012).

The r_f serves as a benchmark for assessing investment opportunities and is generally derived from the yields of government securities, such as U.S. Treasury bonds, deemed default-free (Damodaran, 2002). Typically, rates from 10 or 30-year government bonds are used, under the assumption that governments do not default (Damodaran, 2012).

2.1.5.5. Market Risk Premium

The market risk premium (MRP) represents the additional return that investors demand from equity investments compared to the risk-free rate. This premium compensates investors for the higher risks associated with stocks relative to risk-free securities (Damodaran, 2002).

As previously discussed, MRP is essential for calculating the expected return on equity and is utilized in both the CAPM and 3FF models. It is determined by subtracting the risk-free rate from the expected return of the market.

Typically, the MRP estimate is derived from the excess return of specific stock indices, such as the S&P 500 or MSCI indices, reflecting the geographical operations of the firm. Alternatively, official databases, like those provided by Damodaran, can be used for suitable estimates.

Equation 17: *Market Risk Premium*

$$MRP = (r_m - r_f)$$

2.1.5.6. Beta

Beta measures a stock's volatility relative to the overall market, quantifying a security's sensitivity to market movements, which helps investors assess risk (Damodaran, 2002). A Beta of one indicates that the stock moves in tandem with the market, while for example, a Beta of 1.4 implies that a 1% increase in the market will lead to a 1.4% increase in the stock price.

According to Damodaran (2012), three methods estimate Beta: i) regression of historical market prices; ii) leveraging the fundamental characteristics of the investment; and iii) analyzing

variations in profitability rather than stock price data. The most common approach is to use historical data through linear regression of stock returns against a market index (e.g., S&P 500). After computing the regression, the beta is represented by the slope of the equation 18, which is equal to the covariance of asset's returns with the market portfolio's returns divided by the variance of returns in the market portfolio

***Equation 18**: Beta Levered*

$$\beta_L = \frac{Cov\,(r_i, r_m)}{Var(r_m)}$$

Only traded assets can be estimated using this historical method (Damodaran, 2012). In order to adjust the beta to the company's structure, the Unlevered beta and Relevered beta must be calculated, with the details provided in Appendix 1.

2.1.5.7. Terminal Value

The terminal value represents the value of a business at the end of a forecast period, extending into perpetuity. It is derived from the FCF of the final year within the projection period and can comprise a substantial portion of a company's total value in a DCF analysis. Thus, it is crucial that the terminal year reflects stability, avoiding cyclical peaks or troughs (Rosenbaum & Pearl, 2013).

According to Rosenbaum and Pearl (2013), there are two primary methods for calculating terminal value:

Perpetuity growth model

This model estimates the value based on expected cash flows that grow at a stable rate indefinitely:

***Equation 19:** Terminal Value (Perpetuity Growth Model)*

$$Terminal\ Value = \frac{CF_n \times (1+g)}{(r-g)}$$

where (g) is the perpetual growth rate and (r) is the discount rate. "The perpetuity growth rate is typically chosen on the basis of the company's expected long term industry growth rate, which generally tends to be within a range of 2% to 4%" (Rosenbaum & Pearl, 2013).

Exit multiple method:

This method applies a multiple—often based on EBITDA or EBIT—to the expected financial performance in the final forecast year. The multiple is derived from trading multiples of comparable companies over the last twelve months. It is essential to use normalized multiples to account for potential sector or economic cycle impacts (Rosenbaum & Pearl, 2013).

***Equation 20**: Terminal Value (Exit Multiple Model)*

$$\text{Terminal Value} = EBITDA_n \times \text{Exit Multiple}$$

2.2. Relative Valuation

Damodaran (2012) emphasizes the importance of relative valuation as a complement to other valuation methods. Unlike intrinsic valuation, relative valuation determines a company's value in relation to comparable firms, using standardized metrics or multiples.

To conduct an accurate relative valuation analysis, three steps should be followed:

1. Often referred to as the "peer group," this step involves identifying similar companies to compute average multiples (Koller et al., 2020). The selected firms should be of comparable size, operate in the same industry, and share similar business and financial profiles.
2. The second step, as noted by Damodaran (2006), involves "scaling the market prices to a common variable to generate standardized prices that are comparable" using valuation multiples, which can be categorized into two primary types: Enterprise Multiples and Equity Multiples.

The most used equity multiples are:

***Equation 21**: P/E Ratio*

$$Price\ to\ Earning\ Ratio\ (P/E) = \frac{Share\ Price}{Earnings\ per\ Share}$$

***Equation 22**: P/S Ratio*

$$Price\ to\ Sales\ (P/S) = \frac{Share\ Price}{Sales\ per\ Share}$$

***Equation 23**: P/BV Ratio*

$$Price\ to\ Book\ Value\ (P/BV) = \frac{Share\ Price}{Book\ Value\ per\ share}$$

The typical Enterprise Value Multiples, which are employed based on unlevered financial metrics, reflecting the interests of both equity and debt holders, are:

***Equation 24**: EV/EBITDA*

$$EV/EBITDA = \frac{Equity\ Value - Net\ Debt}{Earnings\ before\ interests, taxes, depreciations\ and\ amortizations}$$

***Equation 25**: EV/EBIT*

$$EV/EBIT = \frac{Equity\ Value - Net\ Debt}{Earnings\ before\ interests\ and\ taxes}$$

***Equation 26**: EV/Sales*

$$EV/Sales = \frac{Equity\ Value - Net\ Debt}{Sales}$$

3. After evaluating standardized values, adjustments must be made to account for differences between companies. For example, firms with higher growth rates within the same industry should exhibit higher trading multiples than their lower-growth counterparts. Adjustments can be executed through subjective modifications, adjusted multiples, or statistical techniques, including market and sector regressions (Damodaran, 2006).

   While the use of multiples offers benefits such as efficiency and quick decision-making in dynamic markets, its success relies on the careful selection of comparable companies and the context of the multiples assessed. External factors and market conditions can significantly impact evaluation results. Therefore, it is essential to combine multiple analyses with intrinsic valuation methods for a more accurate estimation.

2.3. Conclusions

In conclusion, this literature review examined various methods of equity valuation relevant to Vonovia. The Discounted Cash Flow (DCF) method remains a fundamental approach, emphasizing the time value of money. The Free Cash Flow to Equity (FCFE) method offers a clear perspective on cash available to shareholders, while the Free Cash Flow to the Firm (FCFF) method accounts for all capital providers. The Dividend Discount Model (DDM) is significant but limited by its assumption of constant growth. Relative valuation complements these methods by enabling comparisons with peer firms through standardized metrics.

3. Industry Overview

3.1. Global Macroeconomic Situation

The current global macroeconomic environment is marked by challenges due to demographic changes, technological advancements, and geopolitical dynamics. The International Monetary Fund projects global growth to stabilize at 3.1%, while the World Bank forecasts 2.6% for 2024. Advanced economies are expected to see modest growth, rising from 1.6% in 2023 to 1.8% in 2025. In contrast, emerging markets may experience a slight slowdown from 4.3% in 2023 to 4.2% in 2024 and 2025. Global disinflation is evident, and central banks aim for a "soft landing". In Appendix 2, a detailed analysis of the macroeconomic situation is presented.

3.2. Industry analysis

3.2.1. Global and Europe

The global housing market is currently grappling with a significant supply-demand imbalance, intensified by various economic, political, and regulatory factors. Rising construction costs, labour shortages, and increased interest rates have impeded new housing developments, thereby limiting availability. In regions such as the United States, the United Kingdom, and parts of Europe, this constrained supply, combined with decreased affordability, has resulted in housing prices remaining above pre-pandemic levels, even though inflation and high interest rates have dampened demand.

3.2.2. European

The European residential real estate market, where Vonovia operates, is undergoing significant changes driven by both economic and structural factors.

The interest rates, which have more than doubled since 2022, have elevated financing costs for new developments and reduced housing construction across Europe, resulting in supply and affordability challenges. Since 2022, the European Central Bank (ECB) has implemented rate hikes to combat persistent inflation, significantly affecting Euribor rates and access to credit. In July 2022, the ECB raised its main refinancing rate from 0% to 0.50%, marking its first

increase in 11 years. This upward cycle continued, reaching 4.50% in September 2023, the highest level in 22 years. In December 2024, the ECB began implementing rate cuts, reducing rates to 3% to improve financing conditions, although rates remain elevated compared to pre-2022 levels.

Figure 1 illustrates the evolution of financing rates last 2 years, set by the ECB as part of monetary policy and applied directly to commercial bank transactions.

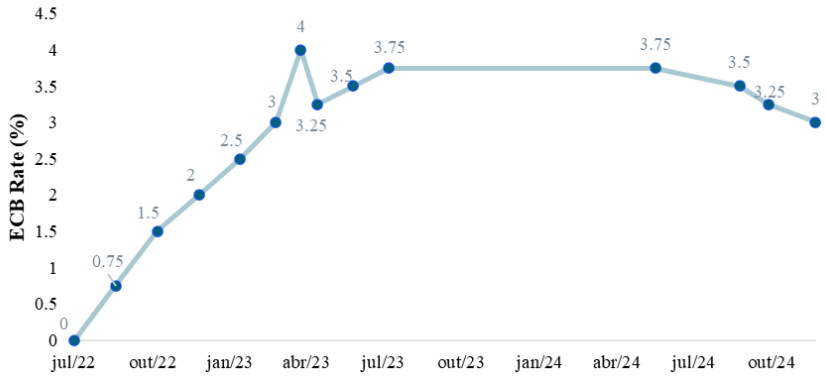

***Figure 1**: ECB Rates 2022-2024. Source: ECB*

Despite these financial challenges, demand for rental housing remains strong, particularly in urban areas, driven by demographic trends such as urbanization, an aging population, and increasing international migration. These factors continue to push rents up across Europe.

According to Eurostat, in 2023, 13 out of 16 EU countries experienced a decrease in the number of transacted residences compared to 2022. However, in Q3/2024, house prices in the euro area rose by 2.6% and by 3.8% in the EU year-on-year (Figure 2).

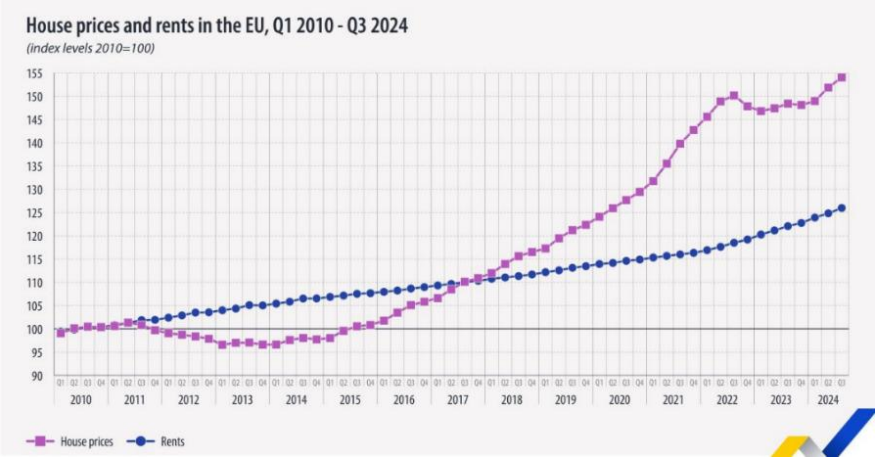

***Figure 2**: House Prices and Rents in the EU, Q1 2010-Q3 2024. Source: Eurostat, Jan2025*

HousingAnywhere's International Rent Index for Q2/2024 indicated year-over-year (YoY) rent increases of 4.2% for apartments across 28 European cities. Furthermore, Abrdn's European real estate outlook reported a 4.3% rise in rental values across all sectors in the 12 months leading to Q1/2024. While Dutch and German cities have the highest rents, notable increases are also occurring in Italy and Spain.

European residential real estate exhibits resilience, with low vacancy rates of around 3% in prime urban areas and strong investor interest stemming from stability compared to struggling asset classes like office spaces. This tightening market has resulted in double-digit rental growth in certain cities, with an overall average increase of 6.3% leading up to Q1/2024. Investors are particularly attracted to high-quality assets that align with environmental, social, and governance (ESG) standards.

3.2.3. Germany

Germany's housing market, where Vonovia is a key player, is facing significant challenges due to a critical housing shortage. This shortage, driven by high construction costs, lack of skilled labour, and regulatory constraints, has led to limited new housing supply, particularly in cities like Berlin and Munich.

The 2023 fiscal year was characterized by challenging overall conditions in the residential real estate sector. While the ongoing housing shortage pushed rents up, closing the macroeconomic supply gap proved impossible due to restricted new construction activity.

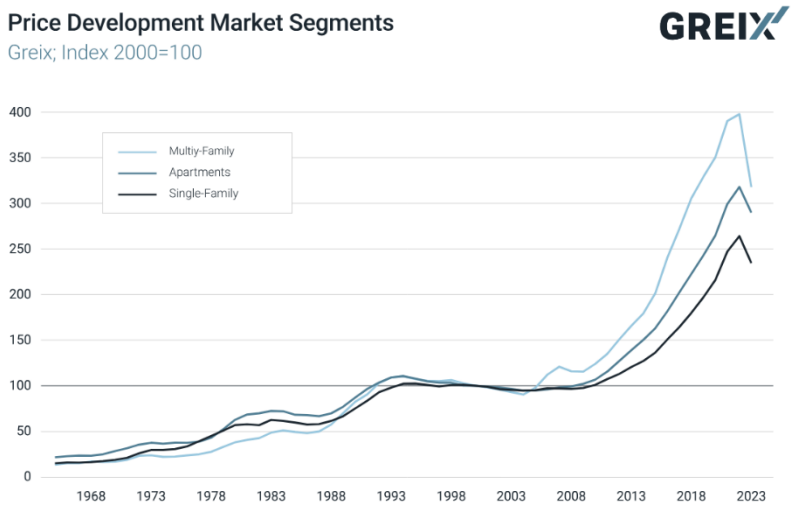

Figure 3: *Germany House Price Evolution 1968-2023.* *Source: Greix, 2024*

According to data from Greix, housing prices in Germany experienced the steepest drop in 2023 since 1964. The downward trend spans all sub-segments of the market, with a particular emphasis on multifamily housing (Figure 3).

According to a Savills report (January/2024), the significant price drop coincided with decreased transaction volumes. Apartment sales fell by 27% compared to 2022, exceeding declines in multifamily housing (19%) and single-family homes (16%). Since peaking in 2021, real estate transactions have steadily declined, with apartment sales down 49%, outpacing single-family home 42% and multifamily housing 39%.

Despite these challenges, strong demand has spurred consistent rental growth. According to HousingAnywhere's International Rent Index for 2023, German cities rank among Europe's most expensive rental markets, with apartment rents in major cities increasing by 5-10% over 2023 due to sustained demand and limited supply. This contrast between falling sale prices and rising rents highlights the supply-demand imbalance in Germany's housing market.

Regarding inflation, there has been significant fluctuation over the past 10 years, with a sharp increase that peaked at 8.8% in 2022. Since the beginning of 2023, it has been consistently declining, ending 2023 at 2.6% (Figure 4).

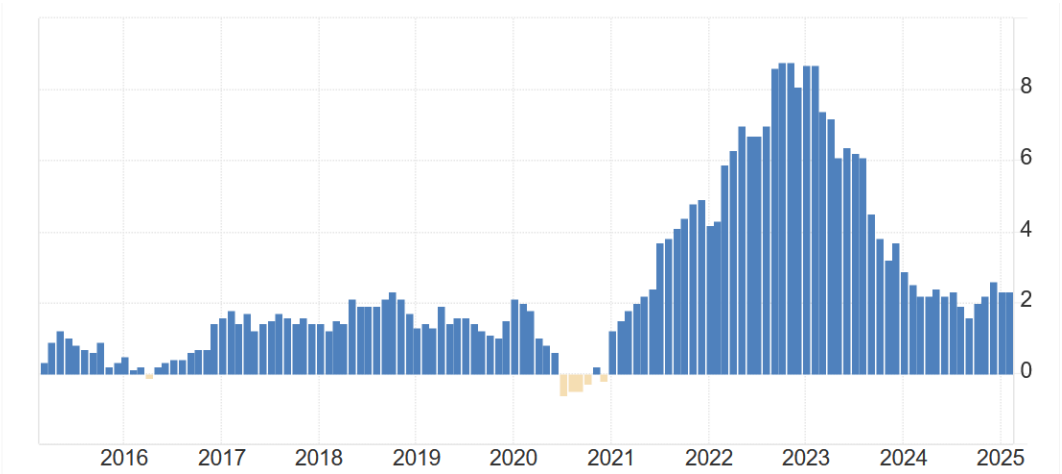

***Figure 4**: Germany Inflation Rate. Source: Trading Economics, Dec2024*

The Bundesbank's forecast for Germany is positive. According to the same source, the inflation rate, as measured by the Harmonised Index of Consumer Prices, is expected to decrease only slightly in 2025, from an annual average of 2.5% to 2.4%. However, according to Joachim

Nagel, President of the Deutsche Bundesbank, starting from 2026, the inflation rate in Germany is projected to gradually return to 2%, primarily due to two factors: the previous tightening of monetary policy and decreasing price pressures from labour costs.

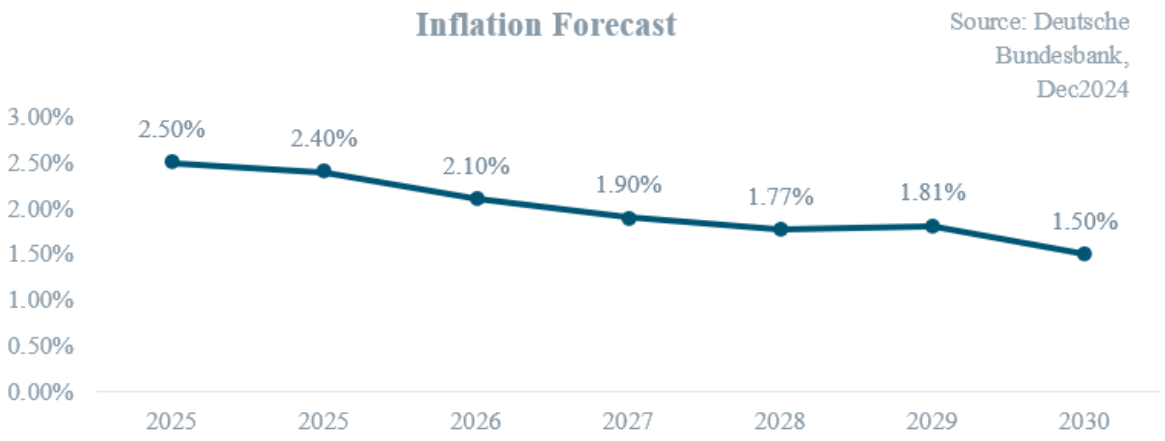

Figure 5: *Germany Inflation Rate Forecast*

4. Company Analysis

This section 4 provides an overview of Vonovia. All figures, tables, and charts presented are based on the Company's financial reports.

4.1. Vonovia's Overview

Founded in 2015 and headquartered in Bochum, Germany, Vonovia SE. is an Europe's leading residential real estate company. Despite its relatively recent establishment, Vonovia integrates over a century of industry history through its predecessor companies - *GAGFAH, Eisenbahnerwohngesellschaften,* and *Vereinigte Stahlwerke AG* - whose merger resulted in Vonovia. These companies constitute the foundation of Vonovia's extensive portfolio, which at the end of the third quarter of 2024 (Q3/2024), includes more than 713 thousand units.

The company operates a vertically integrated model, overseeing property acquisition, development, leasing, and maintenance, which allows it to maximize operational efficiency and tenant satisfaction. Vonovia's strategic focus extends beyond property management. It invests substantially in property modernization and sustainability initiatives. By upgrading its assets with energy-efficient technologies and renewable energy sources, not only increases property value but also aligns with the European Union's sustainability targets, enhancing its ESG commitment.

4.2. Business Model

As explained, Vonovia's core business involves acquiring, developing, and managing residential properties, primarily in Germany, with expanded operations in Austria and Sweden. The company's revenue streams are derived from rental income, property sales, and development projects. An in-house multidisciplinary team, a residential neighbourhood network, and a caretaker organization, along with comprehensive back-office functions, support the management and ongoing development of Vonovia's housing portfolio.

Vonovia's business model is to maintain a competitive edge by enhancing operational efficiency, expanding services, and aligning with sustainability and digitalization trends, considering the following strategies:

a) Market Consolidation

As part of its growth strategy, Vonovia emphasizes consolidation within the fragmented German residential market and beyond. Its partial acquisition of Deutsche Wohnen in 2021, significantly increased Vonovia's market share, particularly in urban areas like Berlin, enhancing economies of scale and supporting its leadership position in the German residential market.

b) Housing-Related Services

Vonovia rounds out its business model by offering various housing-related services, such as cable TV, energy supply (electricity and heating), and automated meter reading. This value-added approach enhances tenant loyalty and broadens the company's revenue streams by offering integrated services that go beyond traditional property management.

c) Platforms and Digitalization

Vonovia's business model relies on two digital platforms: one for management and another for development. These platforms streamline the real estate value chain—from acquisition to tenant services— and serve as valuable intangible assets. Digital tools facilitate efficient tenant communication, maintenance tracking, payment processing, and the use of smart home technologies for improvements in convenience and security.

d) Service Diversification, Development and New Construction

Vonovia expanded into energy management and elderly care, broadening its market and enhancing tenant loyalty. This strategy generates additional revenue while addressing demographic needs.

Through its BUWOG brand, Vonovia maintains a strong property development pipeline in Germany and Austria, using build-to-hold and build-to-sell strategies. BUWOG's integrated platform ensures control over all development stages, optimizing efficiency and cost management.

e) Sustainability and Corporate and Social Responsibility

Sustainability is central to Vonovia's approach, shown by investments in energy-efficient upgrades, sustainable materials, and renewable energy. These initiatives align with EU environmental goals, reducing carbon emissions and ensuring regulatory compliance. The company promotes equal opportunities and supports workforce growth, emphasizing ethical

corporate governance in its stakeholder and community engagement. Below is the framework of ESG principles to which Vonovia is committed.

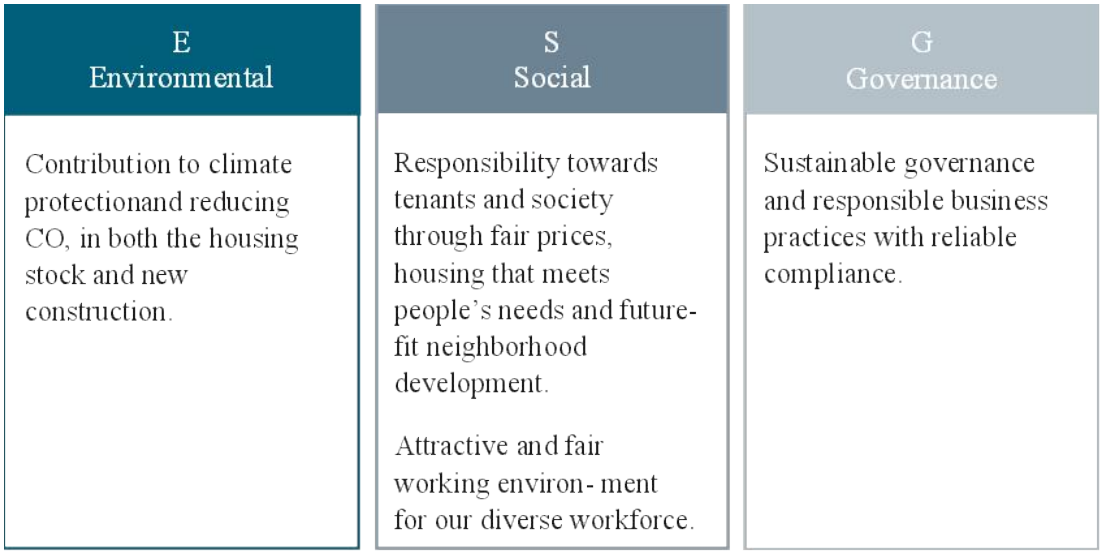

***Figure 6**: Aspects of Sustainability at Vonovia.*

f) Neighbourhood Concept

Approximately 75% of Vonovia's properties are in connected urban areas, each with over 150 apartments. These areas are crucial for sustainability projects aimed at creating inclusive, multi-generational communities that meet housing needs and climate goals while considering local dynamics, cultural heritage, and sustainable growth.

4.3. Corporate Structure

Vonovia SE., as the holding entity of the Vonovia Group, operates as a European dualistic company (SE). Its governance structure includes a Management Board responsible for strategic direction and daily operations, alongside a Supervisory Board that monitors and evaluates business opportunities and risks.

By the end of 2023 (last data available), the Vonovia Group included 631 legal entities, with 426 in Germany. Vonovia SE. serves as the central management holding, directing overall strategy and overseeing functions such as property management, financial planning, and sustainability initiatives.

The corporate structure of Vonovia is designed for effective portfolio management and digitalization. Key tasks are consolidated in shared service centres, reducing redundancies and

enhancing service quality. This model balances centralized services with regional caretakers and technical teams to efficiently address tenant needs.

Vonovia organizes its operations into four core segments: Rental, Value-add (housing-related services), Recurring Sales, and Development. This segmentation supports a customer-oriented service model and emphasizes Vonovia's commitment to sustainable investments.

4.4. Growth Strategy

Vonovia's growth has been driven by a strategy based on four key pillars. However, evolving market dynamics require an updated approach that considers not only the shareholder, but also the tenants, employees, financial partners, and society. Vonovia's approach is now structured around six key strategic value drivers (Figure 7):

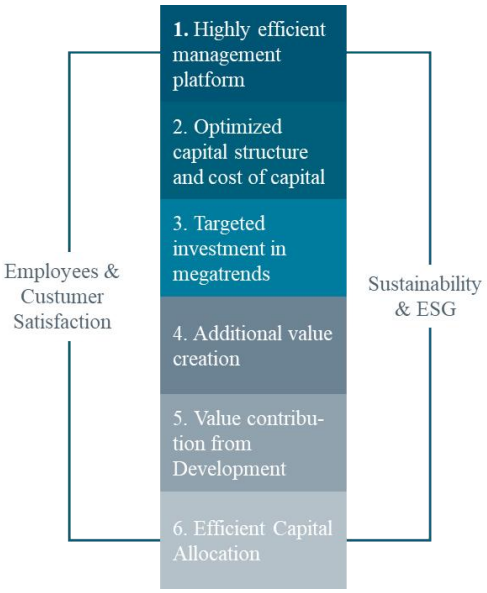

***Figure** 7: Value Drivers of Vonovia's Strategy.*

a) **Highly Efficient Management Platform**: Vonovia's digital platform oversees over 500,000 residential units, reducing fixed costs and enhancing customer service. Using a "digital twin" model and advanced tools, it provides valuable data insights for predictive maintenance and streamlined management.

b) **Optimized Capital Structure and Cost of Capital**: A competitive cost of capital enables Vonovia to fund large-scale investments. The strategy aims to maintain a good investment-grade rating through a balanced mix of debt and equity financing, adjusted to market conditions.

c) **Targeted Investment in megatrends**: Vonovia prioritizes strategic investments to meet housing demand, modernize properties, and support climate initiatives. Key focuses include new constructions, senior-accessible upgrades, and projects aimed at reducing CO_2 emissions.

d) **Additional Value Cration**: Vonovia's technical services and infrastructure management ensure high-quality service across its portfolio. The Value-Add business promotes

community integration through utility services, energy solutions, IoT maintenance, and sustainability innovations.

e) **Value Contribution from Development**: Vonovia's Development division addresses housing shortages by expanding its portfolio and generating sales revenue. Operating in seven European locations, it aligns with sustainability goals by managing projects from land acquisition to construction.

f) **Efficient Capital Allocation**: In response to rising capital costs, Vonovia emphasizes equity growth and internal financing for sustainable, profit-driven investments. Asset sales and joint ventures ensure a dynamic portfolio and ongoing internal funding.

Additionally, Vonovia's capital allocation has shifted from growth through acquisitions to optimizing its portfolio in response to inflation and market conditions. This transition emphasizes each business unit's ability to deliver returns and positive cash flow, while portfolio management adapts to enhance efficiency.

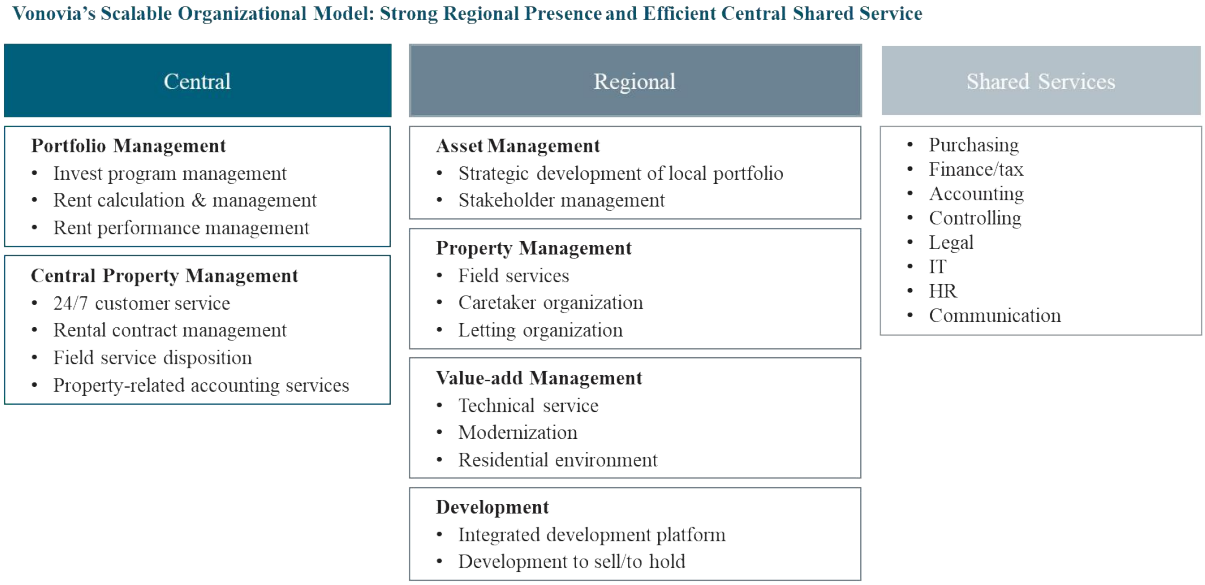

Figure 8: *Vonovia's Organizational Model.*

4.5. Main Competitors

In the competitive European residential real estate landscape, Vonovia faces notable rivals, particularly in Germany, each with distinctive strategies that shape their market positions. The main competitors are:

a) Deutsche Wohnen AG (DWNI)

Managing approximately 140,000 units (Q3/2024) in Germany major urban areas, it focuses on providing affordable housing, emphasizing sustainability and energy-efficient renovations. This strategy enables the company to address the growing housing demand while effectively managing operational costs within Germany's rental market.

b) LEG Immobilien SE (LEG)

Managing over 165,000 units (Q3/1024) primarily in North Rhine-Westphalia, LEG focuses on affordable housing for middle-income tenants, emphasizing cost-efficient management and energy-efficient renovations. Unlike Vonovia's broader tenant base and international operations, LEG's strong regional presence helps lowering operational costs and navigate Germany's rental regulations effectively.

c) TAG Immobilien AG (TEGG)

Overseeing around 83,000 units (Fy2024), primarily in smaller and mid-sized German cities, TAG focuses on affordable housing outside major urban areas to avoid stringent regulations faced in larger cities. Expanding into Poland aims to diversify beyond the German market.

d) **Aroundtown SA (AT1)**

One of Europe's largest commercial real estate investors, Aroundtown manages a diverse portfolio across Germany, Netherlands, UK, and Belgium. With a mix of residential and commercial properties, including offices, hotels, and logistics centres, Aroundtown differentiates itself from Vonovia by focusing heavily on commercial assets. Its strategic partnerships, including a significant stake in Grand City Properties.

d) Fastighets AB Balder (28F0)

A Swedish real estate company managing properties across Sweden, Denmark, Norway, Finland, and Germany, Balder focuses on both residential and commercial real estate. The company's growth strategy emphasizes long-term ownership, active property development, and

expansion into key Nordic and German markets. While Vonovia remains more Germany-centric, Balder's diversification across multiple European markets offers a different risk profile and investment strategy.

In addition to these competitors, Vonovia faces competition from other major players in the European residential real estate market, including Citycon Oyj, PSP Swiss Property AG, Sedlmayr Grund und Immobilien, Dinkelacker, STINAG Stuttgart Invest AG and Fabege AB. These companies, based in Europe's leading economic hubs, contribute to the sector's competitive dynamics by leveraging regional specialization or focusing on specific market segments, contrasting with Vonovia's diversified and international approach.

4.6. Risks and Risk management

Vonovia operates in a dynamic market characterized by changing economic conditions and regulations. To adapt, the company regularly adjusts its strategies and ESG objectives to meet stakeholder expectations.

The company is exposed do diverse risks, namely related to the economic situation, which leads to changes in demand and rental income, regulations, customer relationship, portfolio maintenance and exposure to debt. Its risk management system identifies, evaluates, and mitigates risks to support sustainable growth. Appendix 4 presents the identified risks along with the risk management framework.

4.7. Portfolio Structure

This subchapter provides a comprehensive analysis of Vonovia's real estate portfolio as of the end of the third quarter of 2024 (Q3/3034), the most recent available data.

As Q3/2024, Vonovia manages a portfolio with a fair value of €82.6 billion, encompassing 541,619 owned residential units (75.95%), 163,045 garages and parking spaces (22.86%), and 8,431 (1.18%) commercial units. Additionally, Vonovia manages 73,358 residential units on behalf of third-party clients at the same date. The geographical distribution of the portfolio spans more than 600 cities, towns, and municipalities across Germany, Sweden, and Austria (Figure 9).

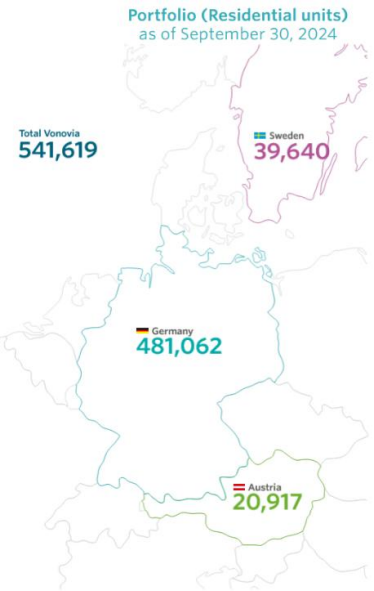

Figure 9: *Residential units owned in Q3/2024.*

As illustrated in Table 1, Germany leads in both total fair value and value per square meter, comprising approximately 88.54% of the portfolio with a value of €2,278 per square meter. The Swedish segment accounts for about 8.02% of the fair value, while the Austrian portfolio represents roughly 3.48%.

The portfolio presents an average vacancy rate of 2.10%. Germany exhibits the best performance, with only 1.80%, while the other two countries report rates exceed 4.50%.

Regarding rental income, the portfolio has an average rent of €7.94 per square meter; Sweden shows a significantly stronger performance at €10.59 per square meter, followed by Germany at €7.81/m^2, and Austria at €5.69/m^2.

***Table 1**: Fair Value and Portfolio by country*

	Fair value			Portfolio			
	€ million	% strategic Locations	€/m²	Residential Units	% strategic Locations	Vacancy %	In-place rent (€/m²)
Vonovia Germany	69 662	88.54%	2 278	481 062	88.82%	1.80%	7.81
Vonovia Sweden	6 311	8.02%	2 059	39 640	7.32%	4.50%	10.59
Vonovia Austria	2 704	3.44%	1 594	20 917	3.86%	4.60%	5.69
Vonovia total	**78 677**	**100%**	**2 226**	**541 619**	**100%**	**2.10%**	**7.94**

Most of Vonovia's German portfolio comprises large urban neighbourhoods classified as urban quarters, which represent a substantial portion of the company's strategic investments. As indicated in Table 2, strategic locations account for 85.21% of the total residential portfolio value of €59.362 million. Within this, urban quarters play a pivotal role, offering a cohesive framework for managing residential units across entire neighbourhoods. In addition to urban quarters, the portfolio includes urban clusters, consisting of smaller building groups and individual properties. While urban clusters do not pertain to complete neighbourhoods, they are managed similarly to urban quarters by Vonovia.

***Table 2**: Fair Value and Portfolio by Strategy (Germany)*

	Fair value			Portfolio			
	€ million	% strategic Locations	€/m²	Residential Units	% strategic Locations	Vacancy %	In-place rent (€/m²)
Strategic	59 362	85.21%	2 257	421 453	87.61%	1.70%	7.75
Urban Quarters	48 494	69.61%	2 308	340 592		1.60%	7.74
Urban Clusters	10 867	15.60%	2 055	80 861		2.20%	7.82
Recurring Sales	4 151	5.96%	2 297	25 796		2.90%	7.67
MFH Sales	4 673	6.71%	3 190	22 231	4.62%	1.40%	9.45
Non Core	1 477	2.12%	1 474	11 582	2.41%	5.50%	6.92
Vonovia Germany	**69 662**	**100%**	**2 278**	**481 062**	**95%**	**1.80%**	**7.81**

As highlighted in Table 3, Berlin accounts for a significant portion of the portfolio, contributing 33.97% to the total fair value of €69,216 million across all strategic locations in Germany. The average value per square meter in Berlin stands at €2,669, reflecting its high demand and premium rental market. Furthermore, Berlin boasts a remarkably low vacancy rate of 0.80%, the lowest among all regions. However, the in-place rent is slightly below the average, standing at €7.77 per square meter.

In the Rhine-Main Area, the second most important location in Germany in terms of fair value, contributes 9.38% to the overall fair value. Its average value per square meter is above the average, at €2,758. Similarly, the in-place rent is one of the highest among all regions at €9.63 per square meter, although the occupancy rate is below average. The Southern Ruhr Area represents 7.37% of the total portfolio. While it comprises a substantial share of the overall fair value, its performance in terms of €/m2 of fair value and occupancy rates is below average.

Regions such as Munich and Stuttgart provide additional context for the portfolio's performance. Munich is recognized for its high fair value per square meter and rental prices, boasting the highest values among the regions analyzed. Stuttgart also demonstrates a considerable rental value at €9.04 per square meter. While Berlin maintains a low vacancy rate, regions like Kiel and Stuttgart report higher vacancy rates, at 4.5% and above. These insights suggest that while some regions excel in rental income and occupancy rates, others may require strategic management to enhance their performance.

***Table 3**: Fair Value and Portfolio by Regional Market (Germany)*

	Fair value*			Portfolio			
	€ million	% strategic Locations	€/m²	Residential Units	% strategic Locations	Vacancy %	In-place rent (€/m²)
Regional market (Sept 30, 2024)							
Berlin	23 515	33.97%	2 669	143 007	29.87%	0.80%	7.77
Rhine Main Area	6 492	9.38%	2 758	36 364	7.60%	2.40%	9.63
Southern Ruhr Area	5 102	7.37%	1 894	42 928	8.97%	2.50%	7.24
Rhineland	5 017	7.25%	2 349	31 409	6.56%	1.90%	8.34
Dresden	4 915	7.10%	1 843	43 588	9.11%	2.20%	6.95
Hamburg	3 206	4.63%	2 478	20 089	4.20%	1.50%	8.33
Hanover	2 773	4.01%	1 940	22 058	4.61%	2.40%	7.61
Kiel	2 751	3.97%	1 856	25 077	5.24%	1.70%	7.60
Munich	2 695	3.89%	3 873	10 380	2.17%	1.20%	9.74
Stuttgart	2 239	3.23%	2 628	13 140	2.74%	1.90%	9.04
Northern Ruhr Area	2 023	2.92%	1 339	24 270	5.07%	2.80%	6.63
Leipzig	1 910	2.76%	1 901	14 370	3.00%	2.90%	6.83
Bremen	1 406	2.03%	1 932	11 667	2.44%	2.30%	6.92
Westphalia	1 099	1.59%	1 774	9 408	1.97%	2.50%	7.35
Freiburg	725	1.05%	2 644	3 849	0.80%	1.00%	8.73
Other strategic locations	3 347	4.84%	1 889	27 087	5.66%	3.30%	7.69
Total strategic locations Germany	**69 216**	**100%**	**2 283**	**478 691**	**100%**	**1.80%**	**7.81**

4.7.1. Portfolio Evolution

The analysis of Vonovia's real estate portfolio from 2019 to Q3/2024 shows significant growth, highlighting the company's robust asset management and strategic positioning in the market.

The fair value of the real estate portfolio has consistently increased, rising from €53,316 million in 2019 to €82,637 million by Q3/2024 (Figure 10). This increase was primarily driven by a significant leap between 2020 and 2021, with the portfolio's fair value increasing by 66.09% in just one year. In the following years, despite a slight decline, the fair value has remained at elevated levels.

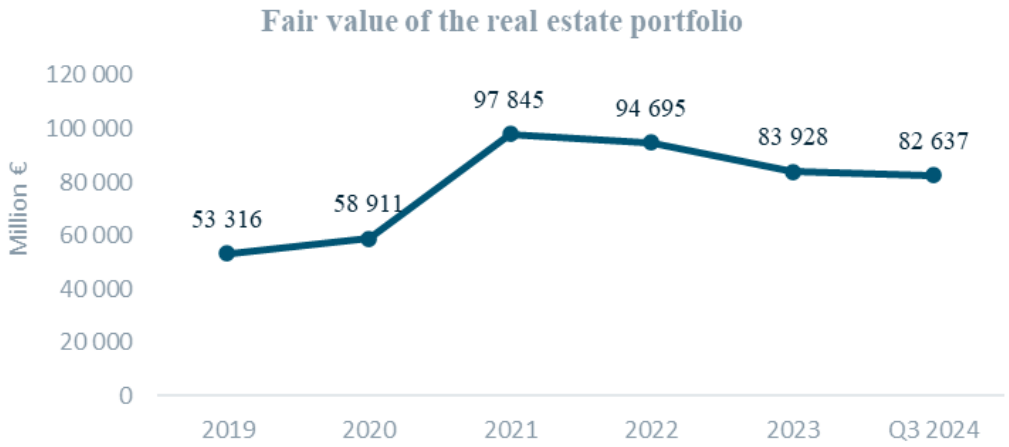

Figure 10: *Fair Value of Real Estate Portfolio, 2019-Q3/2024*

Following the same path, the number of units managed has expanded from 494,927 in 2019 to 614,977 in Q3/2024, with a significant number of acquisitions in 2021 (155,145 units) and a slight decline in the number of units under management in the following years. Within this portfolio, the number of apartments owned by Vonovia has also grown, increasing from 416,236 in 2019 to 541,619 in Q3/2024. Conversely, the number of apartments owned by others has declined, although slightly, reflecting a more focused management approach. The number of apartments sold has remained relatively stable over the years, with a notable peak in 2022 when 19,760 apartments were sold.

Overall, the metrics related to Vonovia's portfolio reflect positive trends in both asset value and management capacity, with a significant peak occurring in 2021, and a slight decrease in managed units since then, with more units sold than purchased per year.

Table 4: *Portfolio Key Figures, 2019-Q3/2024.*

	2019	2020	2021	2022	2023	Q3 2024
Number of units managed	494 927	489 709	636 507	621 303	617 343	614 977
thereof own apartments	416 236	415 688	565 334	548 524	545 919	541 619
thereof apartments owned by others	78 691	74 021	71 173	72 779	71 424	73 358
Number of units bought	23 987	1 711	155 145	969	63	-
Number of apartments sold	4 784	3 677	6 965	19 760	3 838	5 429
thereof Recurring Sales	2 607	2 442	2 803	2 710	1 590	1 516
thereof Non Core/other	2 177	1 235	4 162	17 050	2 248	3 913
Number of new apartments completed	2 092	2 088	2 200	3 749	2 425	2 409
thereof own apartments	1 301	1 442	1 373	2 071	1 309	875
thereof apartments for sale	791	646	827	1 678	1 116	1 534

4.8. Last 5 years Financials

This section provides a comprehensive overview of Vonovia's financial performance as reflected in its income statement, balance sheet, and cash flow statement from 2019 to Q3/2024, the latest available data. All values were computed using the Final Reports between 2019 and 2023 and the Q3/2024 interim report.

Over the past six years, Vonovia has demonstrated significant growth and resilience in its core operations, primarily driven by robust revenues from property management, which consistently accounted for over 70% of total operational income.

Notably, 2021 was a landmark year for Vonovia, marked by significant asset acquisitions and a corresponding rise in debt, which had a considerable impact on its financials thereafter. Since then, the company has been slowing down its growth.

With an evolving equity position and strategic efforts in leveraging and deleveraging, Vonovia is signalling a focus on establishing a solid foundation for future growth and financial stability.

4.8.1. Income Statement

a) Revenues

The financial performance of Vonovia over the last five years reflects a complex evolution of its four revenue streams. During this period, the company primarily relied on property management (including Other Revenue from Property Management), averaging more than 70% of total operational revenues, reflecting the demand within the real estate market.

In 2019, operational revenues reached €3,671 million, marking the start of a significant upward trend. This amount increased 9.81% in 2020 and 30.63% in 2021. The year 2022 marked a

substantial jump in revenues, with an increase of 65.70% to €8,725 million. This rise was driven not only by a 35.06% growth in property management revenues but also by a remarkable 188.93% increase in income from property disposals compared to the previous year. However, in 2023, total revenues decreased by 30.13%, primarily related to the income from property disposals, which had shown atypical results in the previous year; nonetheless, revenues from core operations decreased by less than 1%.

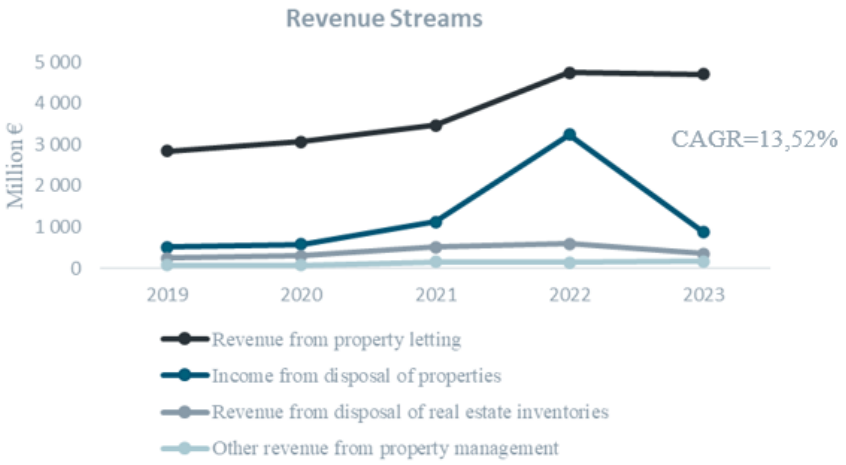

***Figure 11**: Revenue Streams, 2019–2023*

Although a comprehensive analysis of 2024 is not yet feasible, a comparison between Q3/2023 and Q3/2024 reveals modest growth. Operational revenue increased by 4.42%, largely driven by a remarkable 125.87% surge in income from property disposals. In contrast, revenues from property management experienced a slight decline of 4.41%.

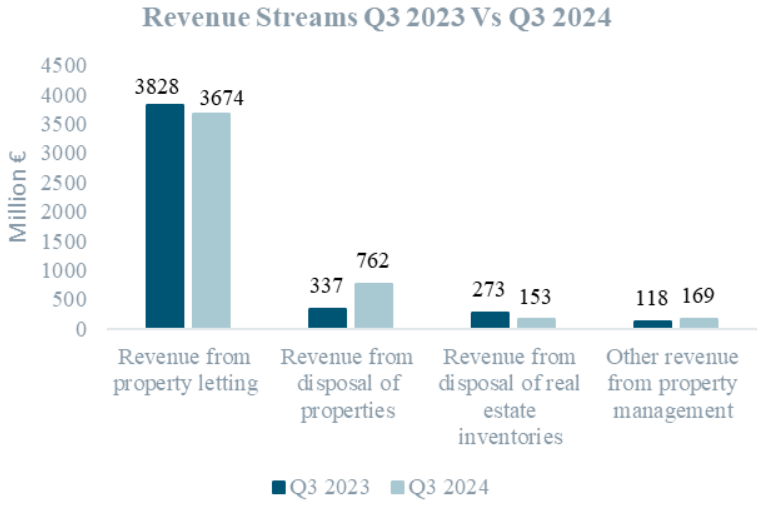

Figure 12: Revenue Streams, Q3/2023 Vs Q3/2024

b) Cost of Material

The cost of materials is the main operational expense for Vonovia, representing approximately 35% of operational revenues presented in a). This category experienced consistent growth from 2019 until 2022, increasing 67.18% over three years. However, there was a significant decline in 2023 to €2,100 million (14.12%). In addition to maintenance and modernization costs, which account for around 35% of the cost of materials, ancillary expenses are the main item, and it is mainly related with development area.

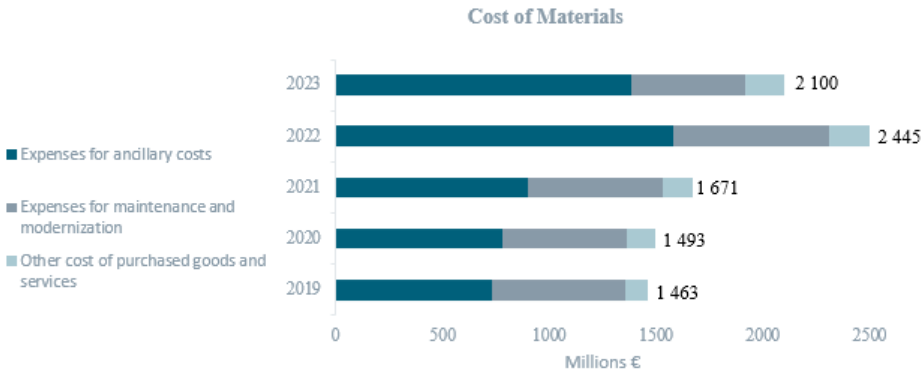

***Figure 13**: Cost of Materials, 2019–2023*

c) Personal Costs

The personnel expenses reflect the company's growth and investment in human capital, with an increase of nearly 43% over five years. The number of employees followed a similar trend, rising from 10,345 in 2019 to 11,977 by the end of 2023. As of Q3/2024, the total reached 12,010 workers.

Consequently, the average cost per employee has also risen in recent years. In 2023, the average cost per employee was €63,981, representing a 23.55% increase over five years.

Over the six years, personnel costs represented between 13% and 15% of total revenues, except for the year 2022, which only accounted for 8.18%.

***Table 5**: Staff Figures 2019–Q3/2024*

	2019	2020	2021	2022	2023	Q3 2024
Personneal Expenses (Million €)	536	595	682	714	766	701
% of Revenues	*15%*	*15%*	*13%*	*8%*	*13%*	*15%*
# Employees (December 31)	10 345	10 622	15 871	12 117	11 977	12 010
Average Cost Per Employee	51 783	56 006	42 990	58 901	63 981	58 385

d) EBITDA

Vonovia's financial performance is underscored by its EBITDA, reflecting a substantial increase of 52.81% over the five-year period. In 2019, total EBITDA was €1,562 million, increasing 15.64% in 2020. This upward trend persisted with EBITDA rising 15.42% in 2021 and €16.74% in 2022. By 2023, EBITDA reached €2,638 million, indicating a slight decline of 1.93%.

Regarding the EBITDA margin, it has experienced some fluctuations. In 2019, the margin was 42.55%, rising slightly by more than 2% in 2020. From 2020 to 2022, the trend was quite downward, falling to 27.89% in 2022. In 2023, it returned to values close to those of 2019, with an EBITDA margin of 39.15%.

The total EBITDA for Q3 2024, when compared to Q3 2023, showed a decrease of 8.66%, to €1.607 million, with a 33.79% of EBITDA margin.

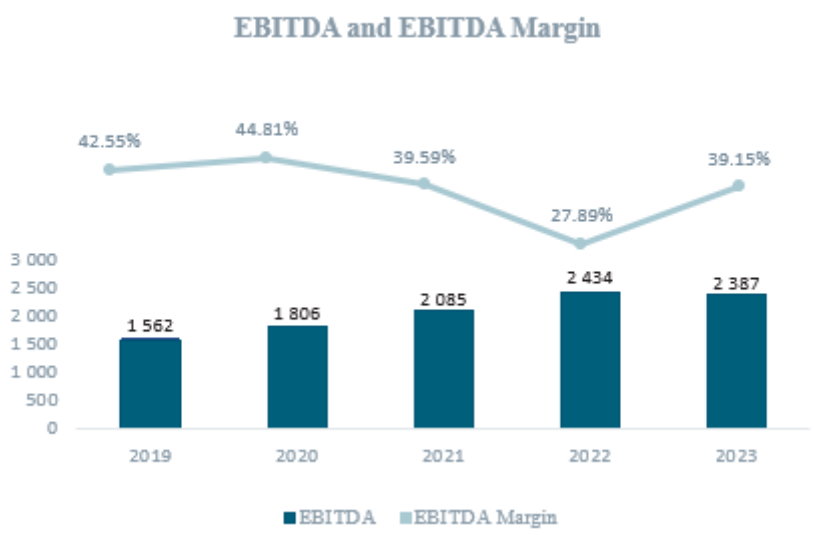

Figure 14: *EBITDA, 2019–2023*

e) Capitalized Expenses

Vonovia's capitalized expenses primarily relate to the costs of the Group's craftsmen's organization included in the capitalized modernization costs and the management costs for significant modernization projects.

From 2019 to 2022, this item exhibited relatively stable progression, with minor fluctuations. In 2023, expenses decreased significantly to €470 million (-30.11%).

***Table 6**: Capitalized Expenses, 2019-2023*

Million €	2019	2020	2021	2022	2023
Capitalized internal expenses	687	659	663	673	470

f) Depreciation and Amortization (D&A)

The data illustrates significant fluctuations in Vonovia's depreciation and amortization expenses over the five-year period. Starting at €2,176 million in 2019, expenses decreased to €92 million in 2020.

However, in 2021, there was a substantial increase to €3,978 million, which had a huge negative impact on the profit for that year. In the following years, D&A expenses dropped considerably, reaching €411 million in 2024.

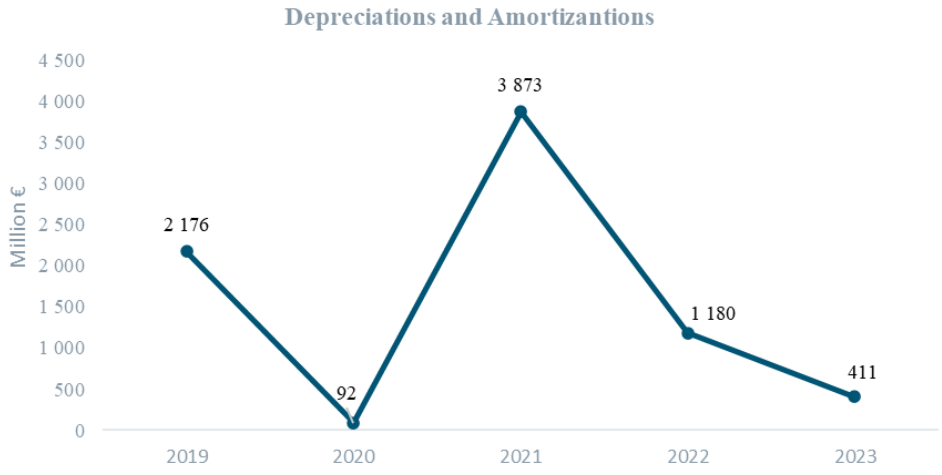

***Figure 15:** Amortizations and depreciations, 2019-2023*

Vonovia includes impairments, currency translation adjustments, and transfers in its depreciation and amortization, with the presented fluctuation primarily attributed to changes in goodwill impairments. Vonovia's goodwill is not amortized; rather, it undergoes annual impairment testing and is assessed for impairment whenever events indicating a potential impairment arise, resulting in significant fluctuations.

In Appendix 9, the details on amortization and depreciation are presented.

g) Interest Income and Expenses

Regarding interest income, the data reveals a very positive trend. In 2019, the amount was only €9 million, growing consistently to €22 million in 2021. The year 2022 marked a significant leap with an increase of almost 4.4 times, continuing to grow by 97.23% in 2023, reaching €228 million.

On the other hand, interest expenses exhibited a stable trend between 2019 and 2022, with a significant increase to €810 million in 2023. The interest expenses mainly consist of interest on non-derivative financial liabilities, which increased in 2022 in line with the rise in debt from 2021. However, this line item includes other variables, such as effects from the valuation of non-derivative financial instruments, effects from the valuation of swaps, and capitalization of interest on borrowed capital for development. Historically, these values do not have a significant impact on the item, but in 2022, the sum of the three resulted in a reduction of €256 million in interest expenses. In 2023, the effect was the opposite, increasing interest expenses by €39 million. This explains why the interest only increased in 2023 and the difference is so large.

Overall, the data shows, as expected, that interest income was considerably lower than expenses. However, over the five years, this gap has been narrowing, with exponential growth in income compared to the relatively stable behaviour of expenses.

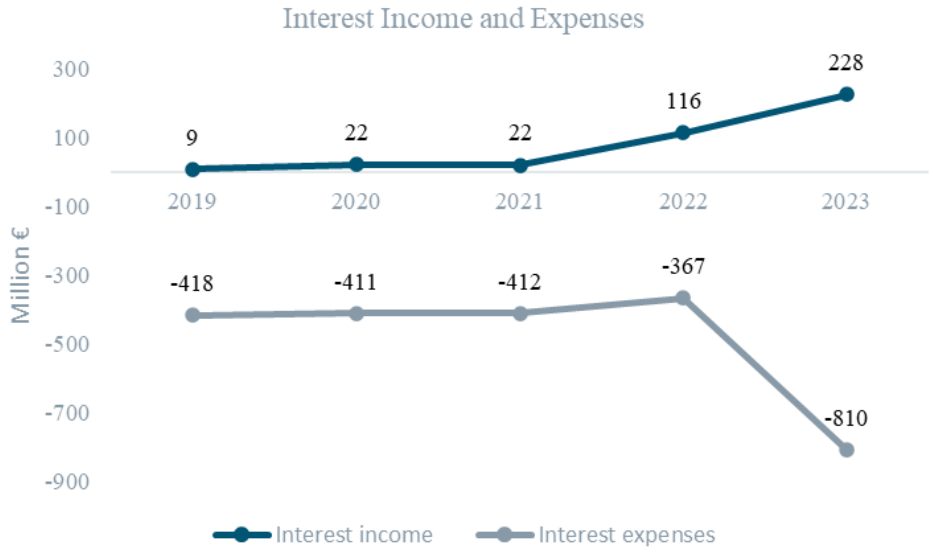

Figure 16: *Interest Income and Expenses 2019-2023*

h) Net Income from fair value of investment properties

In addition to the revenue sources described in a), it is essential to analyse net income from fair value adjustments. These values result from the annual valuations conducted on the portfolio's properties, generally measured by the in-house valuation department according to the fair value model.

Initially, this item exhibited a strong upward trend, peaking in 2021 at €7,394 million. However, the figure sharply declined, turning negative in 2022, with a loss of €1,178 million. This trend continued into 2023, resulting in a loss of €10,651 million, which had a substantial negative impact on the results for that year.

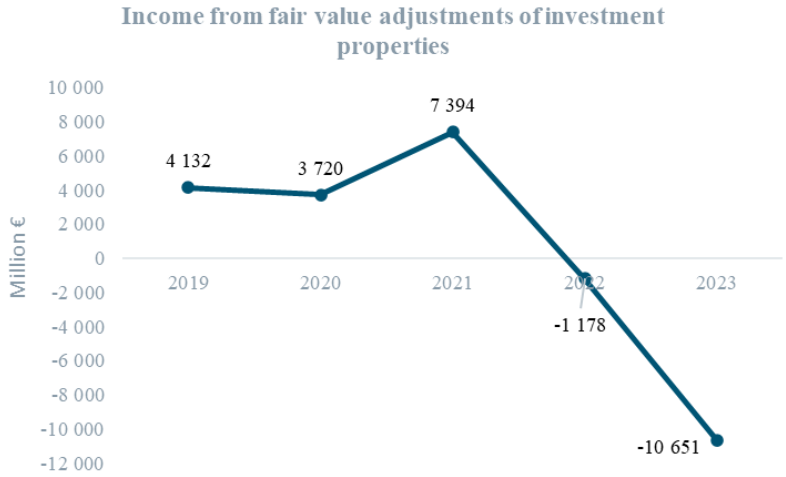

Figure 17: *Income from fair value adjustments of investment properties, 2019–2023*

I) Profit for the Period

After analysing the key items of the P&L, the profit for the period from 2019 to 2023 shows fluctuations, with a negative trend starting in 2020 (Figure 18).

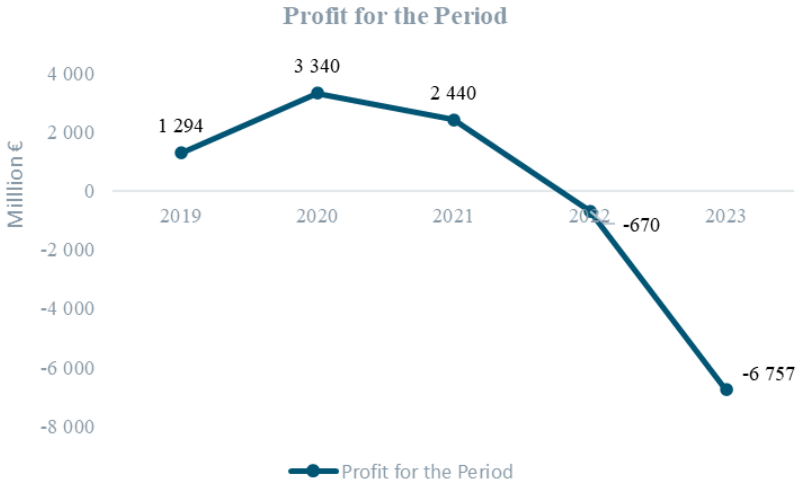

Figure 18*: Profit for the Period 2019-2023*

In 2019, the profit was €1,294 million, which surged to €3,340 million in 2020, marking a considerable increase. However, in 2021, profit dropped to €2,441 million, primarily influenced by high depreciation and amortization costs for that year.

In 2022, the company reported a loss of €660 million, driven by negative fair value adjustments. This downward trend continued into the following year, resulting in a total negative profit of €6,756 million, primarily explained by an anomalously high amount of income from fair value adjustments of investment properties.

Comparing September 2024 with the same month of the previous year, the figures indicate a more positive situation, with a profit of -€789 million compared to -€4,799 million in 2023.

4.8.2. Balance Sheet

a) Assets

The analysis of Vonovia's total assets from 2019 to Q3/2024 illustrates a significant growth trajectory in both non-current and current assets, with an overall increase of 61.18% during this period.

In 2019, non-current assets totalled €55,045 million, reaching €82,328 million by Q3/2024, indicating a strong focus on expanding its long-term assets. This primarily consists of investment properties (discussed in further detail later), which account for more than 95% of total non-current assets. Consequently, total non-current assets peaked in 2021 due to a high volume of acquisitions, declining in the following years while remaining significantly above pre-peak levels. Intangible assets represent the second larger portion of this category and are mainly composed by goodwill.

***Table** 7: Non-current Assets 2019-Q3/2024*

in € million	2019	2020	2021	2022	2023	Q3 2024
Intangible assets	1 504	1 612	2 723	1 660	1 424	1 424
Property, plant and equipment	359	388	654	673	655	661
Investment properties	52 737	58 072	94 100	92 300	81 120	78 472
Financial assets	0	383	1 017	745	1 456	1 354
Other assets	55	129	200	380	222	128
Deferred tax assets	59	16	20	40	86	86
Total non-current assets	**55 045**	**60 632**	**99 139**	**96 038**	**85 121**	**82 338**
Δ %		10.15%	63.51%	-3.13%	-11.37%	-3.27%

Current assets have also shown a notable upward trend, rising from €1,431 million in 2019 to €8,692 million in Q3/2024, representing an increase of more than 5 times. This growth is primarily driven by three components: i) Cash and cash equivalents grew by 320.33% from 2019 to Q3/2024, suggesting enhanced liquidity essential for meeting short-term obligations; ii) Financial assets, which were valued at €1 million in 2019, reached €1,060 million by Q3/2024; and iii) Real estate inventories, which experienced nearly 5 times increase during this period.

***Table 8**: Current Assets 2019-Q3/2024*

in € million		2019	2020	2021	2022	2023	Q3 2024
Inventories		9	9	16	32	20	19
Trade receivables		206	269	450	161	593	207
Financial assets		1	0	1 063	768	1 008	1 060
Other assets		138	119	221	621	660	731
Income tax receivables		85	40	202	240	178	144
Cash and cash equivalents		501	613	1 433	1 302	1 374	2 105
Real estate inventories		358	570	671	2 156	1 958	2 128
Assets held for sale		134	165	2 719	71	313	1 605
Assets from discontinued operations					-	-	770	693
Total current assets		**1 431**	**1 785**	**6 776**	**5 352**	**6 875**	**8 692**
	Δ %	n/a	24.77%	279.51%	-21.02%	28.45%	26.44%

Investment Properties

Investment Properties stands out due to its significant contribution to the company's total assets. Over the past five years, this category has consistently represented an average of approximately 90% of Vonovia's total assets.

Starting at €52,737 million in 2019, investment properties saw an increase of 10.12% in 2020. As expected, with the evolution of the portfolio, 2021 experienced a substantial jump with an increase of 62.04% to €94,100 million. This growth plateaued in subsequent years, reached €78,472 million by the third quarter of 2024.

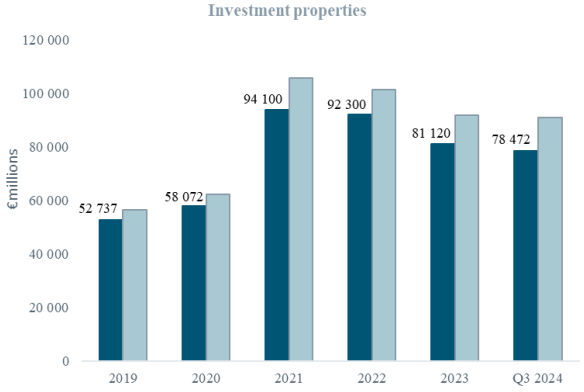

***Figure 19:** Investment Properties 2019-Q3/2024*

b) Equity

Equity attributable to Vonovia shareholders grew from €19,308 million to €24,445 million by Q3/2024, indicating a robust strengthening of the equity base. However, a peak occurred in 2021, primarily driven by increases in capital reserves and retained earnings, both of which have declined since then. Given the positive performance that the company has been demonstrating, naturally the retained earnings are positive and have been growing, except for 2023 and Q3 of 2024 due to the negative profit recorded since 2022.

Additionally, non-controlling interests grew more than 4 times, reflecting increased interest from minority investors and contributing to overall shareholder equity.

Overall, total equity increased substantially, which signifies a significant strengthening of Vonovia's equity position, establishing a solid foundation for future financial stability and strategic investments.

***Table 9**: Equity 2019-Q3/2024*

in € million	2019	2020	2021	2022	2023	Q3 2024
Subscribed capital	542	566	777	796	815	823
Capital reserves	8 240	9 038	15 458	5 152	2 681	2 897
Retained earnings	10 534	13 368	16 536	25 605	22 505	21 094
Other reserves	–8,1	172	126	-221	-318	-368
Total equity attributable to Vonovia shareh	**19 308**	**23 144**	**32 897**	**31 332**	**25 683**	**24 445**
Equity attributable to hybrid capital	1 002	1 002			-	
Non-controlling interests	814	686	3 242	3 107	4 262	4 160
Total equity	**21 124**	**24 832**	**36 139**	**34 439**	**29 945**	**28 606**

c) Liabilities

The financial data on Vonovia's total liabilities from 2019 to Q3/2024 reveals significant growth in both non-current and current liabilities.

Non-current liabilities increased from €31,762 million in 2019 to €55,768 million by Q3/2024, an increase of 75.58%. The major components of this category are non-derivative financial liabilities (discussed in further detail later) and deferred tax liabilities, which together represents approximately 97% of this category, accounting for the substantial growth during this period.

***Table 10**: Non-Current Liabilities 2019-Q3/2024*

Non-Current Liabilities in € million	2019	2020	2021	2022	2023	Q3 2024
Provisions	662	711	866	656	607	658
Trade payables	5	5	5	5	7	7
Non-derivative financial liabilities	21 198	22 375	40 172	41 270	39 637	38 729
Derivatives	74	77	66	-	59	67
Lease liabilities	443	467	635	641	629	630
Liabilities to non-controlling interests	21	27	225	220	168	169
Financial liabilities from tenant financing	44	45	45	43	42	44
Other liabilities	26	3	5	28	51	86
Deferred tax liabilities	9 288	10 960	18 694	18 612	15 713	15 377
Total non-current liabilities	**31 762**	**34 670**	**60 713**	**61 475**	**56 912**	**55 768**
Δ %		9.15%	75.12%	1.25%	-7.42%	-2.01%

Current liabilities have also risen markedly, from €3,590 million in 2019 to €6,656 million in Q3/2024, an increase of 85.40%. Non-derivative financial liabilities also comprise the largest portion of this category. Other significant components include trade payables, reflecting short-term obligations to suppliers, and provisions, illustrating anticipated short-term commitments. While trade payables more than doubled during this period, provisions decreased to nearly half.

***Table 11**: Current Liabilities, 2019-Q3/2024*

Current Liabilities in € million	2019	2020	2021	2022	2023	Q3 2024
Provisions	530.20	389.00	727.20	238.00	202.90	297.60
Trade payables	219.10	229.50	444.40	563.30	486.40	463.70
Non-derivative financial liabilities	2 376.90	1 709.60	6 857.10	3 790.00	3 260.60	4 332.70
Derivatives	41.00	222.20	266.00	1.30	0.10	-
Put options		-	-	270.90	316.20	324.80
Lease liabilities	28.30	27.80	44.20	41.50	43.90	45.30
Liabilities to non-controlling interests	12.90	16.30	16.00	15.90	30.70	25.40
Financial liabilities from tenant financing	117.80	118.10	112.60	112.10	112.50	110.10
Current income taxes	-	-	-	241.30	260.00	214.70
Other liabilities	264.00	203.30	228.80	201.60	283.60	560.60
Liabilities associated with assets held for sale	-	-	365.70	-	-	194.60
Liabilities from discontinued operations	-		-	-	142.00	86.90
Total current liabilities	**3 590**	**2 916**	**9 062**	**5 476**	**5 139**	**6 656**
Δ %		-18.78%	210.79%	-39.57%	-6.15%	29.53%

Non derivative financial liabilities

Non-derivative financial liabilities emerge as a dominant component of the company's total liabilities, representing an average 67.26% since 2019. This substantial proportion underscores their critical importance in financing operations and strategic initiatives.

The values of non-derivative financial liabilities reflect an 82.66% rise during the period. Starting at €23,575 million in 2019, it experienced a steady increase in 2020. In 2021, it reached €47,029 million, marking a significant shift in Vonovia's liabilities structure. This increase

coincided with the expansion of Vonovia's portfolio. Following this peak, the figures remained high, with a slight decrease in the subsequent years, underscoring a sustained commitment to employing financial resources for growth.

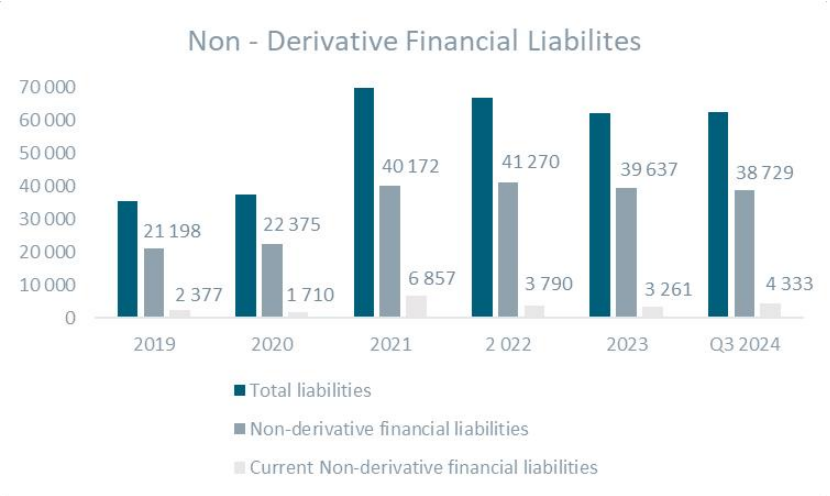

Figure 20: *Non-derivative financial liabilities 2019-Q3/2024*

4.8.3. Cash Flow Statement

The cash flow data from 2019 to 2023 for Vonovia, reflects the dynamics of its operations, investments, and financing activities.

From operating activities, Vonovia consistently generated positive cash flows throughout the period which indicates strong and reliable income from its core real estate operations, despite market fluctuations.

Starting at €1,556 million in 2019, cash flows slightly decreased in 2020, followed by a strong recovery in 2021, peaking at €2,084 million in 2022. In 2023, cash flows decreased by 8.78%, remaining positive and above the levels recorded in 2021.

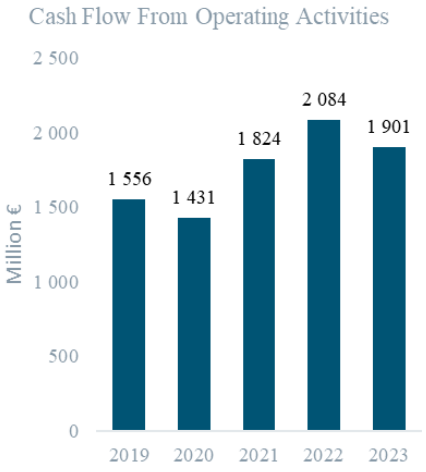

Figure 21*: Operational CFs 2019-2023*

In investing activities, the company recorded, as expected, negative cash flows from 2019 to 2021, with -€2,506 million and -€1,730 million in the first two years. As anticipated, there was a significant increase to €19,116 million in 2021, driven by the strong portfolio expansion previously detailed. In 2022, investing cash flow turned positive, which was also expected, as more units were sold than acquired. In 2023, investment activity returned, albeit with modest figures.

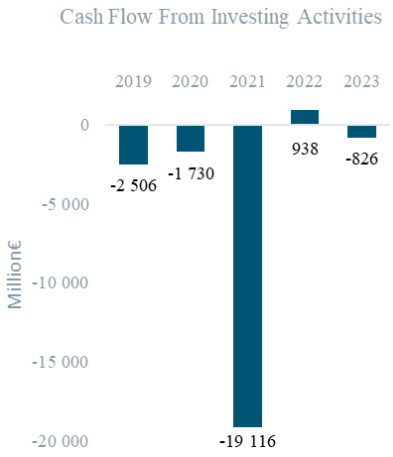

Figure 22: *Investment CFs 2019-2023*

Regarding financing activities, the trajectory aligns with the pattern presented by liabilities. Vonovia recorded modest figures in the first two years, followed by a significant rise to €18,125 million in 2021, corresponding to financing secured for the acquisitions. As noted, the company subsequently reduced its debt, with cash flows from financing activities turning negative in the following two years, reflecting a deleveraging process.

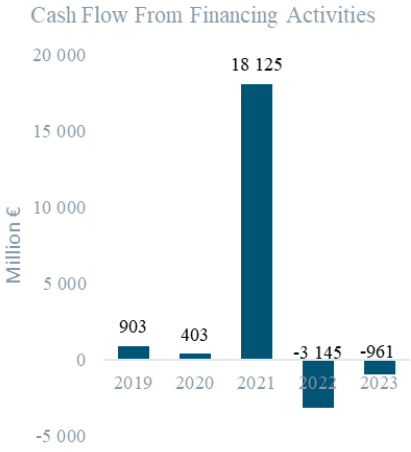

Figure 23*: Finance CFs 2019-2023*

Overall, Vonovia's cash flow patterns highlight a strategy of expansion followed by consolidation. The stable operational cash flows underscore the resilience of its rental income base, while the fluctuations in investing and financing activities point to strategic growth initiatives and subsequent adjustments to manage debt and market exposure.

4.8.4. Financial Ratios

Following the financial analysis, the financial ratios are important to understand the company's evolution.

The Net Debt-to-EBITDA ratio assesses the extent to which the company's debt is supported by operating results. This ratio increased between 2019 and 2021. After peaking in 2021, it has

declined but remains above pre-2021 levels. Vonovia's average ratio means that net financial debt is 17.4 times greater than EBITDA.

Table 12: *Debt-to-EBITDA Ratio*

(Million €)	2019	2020	2021	2022	2023	
EBITDA	1 561.60	1 805.93	2 084.48	2 433.52	2 386.56	**Average 2019-2023**
Cash	500.70	613.30	1 432.80	1 302.40	1 374.40	
Financial Debt	23 574.90	24 084.70	47 029.00	45 059.70	42 897.10	
Net Debt-to-EBITDA	14.78X	13.00X	21.87X	17.98X	17.40X	17.01X
Debt To EBITDA - Real Estate sector (General/Diversified) for Europe (Aswath Da						23.48X

The Debt-to-Equity Ratio measures the proportion of a company's financing that comes from debt compared to shareholders' equity. It has been increasing over the past years, again reflecting the rising financial debt relative to the company's results. The average value in recent years is lower the average reported by Aswath Damodaran (Table 13).

Table 13: *Market Debt-to-Equity Ratio*

(Million €)	2019	2020	2021	2022	2023	
No. of shares as of Dec. 31 (in million)	552.6	603.6	776.6	795.8	816.6	
Market cap as of Dec. 31 (€ billion)	26.0	33.8	37.7	17.5	23.2	
Equity (market value)	14 368	20 402	29 278	13 927	18 945	**Average**
Financial Debt	23 575	24 085	47 029	45 060	42 897	**2019-2023**
Debt-To-Equity Ratio	164.08%	118.05%	160.63%	323.55%	226.43%	**198.55%**
Market D/E - Real Estate sector (General/Diversified) for Europe (Aswath Damodaran jan2024)						**174.58%**

Investment Properties to Net Debt indicates how well a company is positioned to cover its debt with its investment assets. This value has been increasing in recent years, suggesting that the company has a superior value of assets relative to its net debt. As of September 2024, the company shows a ratio in line with its competitors (Table 14).

Table 14*:Investment Properties to Net Debt Ratio*

(Million €)	2019	2020	2021	2022	2023
Investment Properties	52 737	58 072	94 100	92 300	81 120
Net Debt	23 074	23 471	45 596	43 757	42 897
Ratio	43.75%	40.42%	48.45%	47.41%	52.88%
Competitors	**Investment Properties to Net Debt (Q3/2024)**				
LEG Immobilien SE	**49.47%**				
TAG Immobilien AG	52.28%				
Aroundtown SA	46.64%				
Fastighets AB Balder	49.60%				

4.9. Vonovia's Shares Performance

In 2022, high inflation and rising interest rates resulted in negative performance across most sectors: DAX 40 (-12.3%), EURO STOXX 50 (-11.5%), and EPRA Europe (-38.9%). The real estate sector was particularly affected due to its capital-intensive nature and rising bond yields, making its shares less appealing. German residential real estate stocks also experienced pressure after years of appreciation, leading to significant underperformance.

The Figure 24 illustrates the evolution of Vonovia's share prices compared to the growth of DAX shares (Dax comprises the 40 top-performing publicly traded companies in Germany) over the past six years. In a market influenced by macroeconomic conditions, Vonovia's stock prices remained relatively stable, with 2022 standing out as the most significant year in this period. Vonovia shares dropped by 54.6% in 2022, closing at €22.02, mainly due to their strong negative correlation with government bond yields. Since then, the stock price has been recovering, reaching €29.32 by the end of 2024.

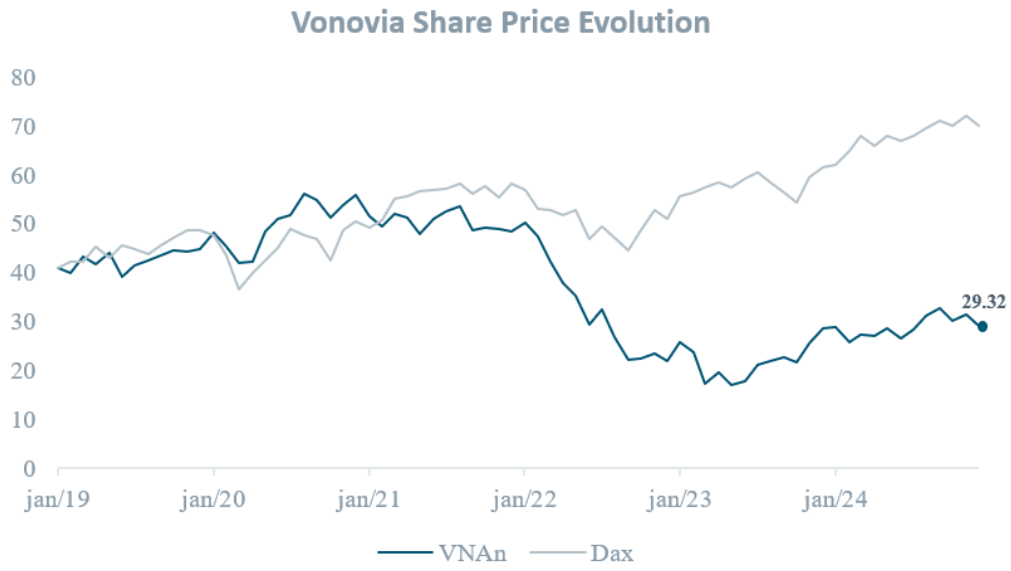

Figure 24: *VNAn Share Prices, compared with Dax evolution.* *Source: Investing.com*

Market capitalization (Market Cap) represents the total market value of a publicly traded company's outstanding shares. In line with stock price, 2022 was a year in which this value declined sharply, although it has been recovering since then. As of March 3, 2025, Vonovia has a market Cap of €23.7B.

***Figure 25**:Vonovia's history Market Cap. Source: Companies Market Cap.*

In Table 15, a comparison of the company's market capitalization with its competitors is presented.

***Table 15:** Vonovia and Competitors' Market Cap.*

Vonovia and Competitors' Market Cap | Source: Investing.com

Company	Country	Market Cap (march 3rd, 2025)
Vonovia	**DE**	**€23.77B**
Deutsche Wohnen AG	DE	€9.31B
Fastighets AB Balder (publ)	DE & Int.	€8.08B
PSP Swiss Property AG	CH	€6.50B
LEG Immobilien AG	DE	€5.84B
Aroundtown Property Holdings	DE	€2.93B
TAG Immobilien AG	DE	€2.36B
Sedlmayr Grund und Immobilien	DE	€851.8M
Citycon Oyj	Nordic and Baltics	€582.2M
Dinkelacker	DE	€326.1M
STINAG Stuttgart Invest AG	DE	€190.5M

5. Company Valuation

To compute Vonovia's target share price (TSP), it was conducted a DCF valuation, specifically using the Free Cash Flow to Firm (FCFF) with a perpetuity model. Forecast period extends from 2025 to 2029, being 2030 the base for Terminal value. A relative analysis was also conducted after computing the peer group. Finally, the results were compared with the Morgan Stanley Valuation.

5.1. Forecast

For the preparation of the forecast, all items from the income statement and balance sheet were projected. Those not addressed in the main body of the dissertation will be detailed in the appendices.

The inflation values considered are presented in Table 16.

Table 16: *Dissertation Inputs - Inflation*

	2025	2025	2026	2027	2028	2029	2030
Inflation Forecast (Germany)	2.50%	2.40%	2.10%	1.90%	1.77%	1.81%	1.50%

Revenues

As previously outlined, Vonovia generates revenue from four primary sources, with the most significant being revenue from property letting. To determine this revenue stream, the six-year average yield was calculated, amounting to 5.05% of the investment properties. This enables projections of future revenues by multiplying it by the value of the investment properties.

Using the same method, the revenue from property management was determined by multiplying the average yield for this item over the last six years (0.18%) by the value of the investment properties to establish this revenue component.

For revenue from property disposals and the disposal of real estate inventories, the sale price for each subsequent year was projected, along with the number of sold apartments. Revenue

from property disposal of properties is generated through the projection of non-core units sold, while revenue from the disposal of real estate inventories comes from the recurring sales units.

***Table 17**: Revenue Projections*

Revenues (Million €)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029
Revenue - property letting	2 841	3 069	3 465	4 747	4 707	4 899	4 244	4 264	4 276	4 280	4 285
Yield (%)	*5.39%*	*5.29%*	*3.68%*	*5.14%*	*5.80%*	*5.00%*	*5.05%*	*5.05%*	*5.05%*	*5.05%*	*5.05%*
Other revenue from property management	70	78	159	147	168	225	152	153	154	154	154
Yield (%)	*0.13%*	*0.13%*	*0.17%*	*0.16%*	*0.21%*	*0.29%*	*0.18%*	*0.18%*	*0.18%*	*0.18%*	*0.18%*
Revenue - disposal of properties	511	586	1 122	3 242	868	1 016	1 899	1 939	1 976	2 010	2 047
Revenue - disposal of real estate inventories	250	298	520	588	354	204	490	500	509	518	528
Total Revenue	**3 671**	**4 031**	**5 266**	**8 725**	**6 096**	**6 344**	**6 784**	**6 856**	**6 914**	**6 963**	**7 014**

Portfolio Evolution

To calculate revenues, it was essential to project the evolution of the portfolio. Since the company has not provided forecasts regarding the following years and considering what seems to be Vonovia's strategy of slowing portfolio growth, the calculations were based on the last three years, using data from 2022, 2023, and projecting 2024 using data from the third quarter of the year. Given that it is not a seasonal business, it was assumed that the fourth quarter would follow the same trend as the rest of the year.

Thus, for both purchases and sales, as well as completions, the averages of these three years were taken, and a constant value was assumed for the forecast period (Table 18).

***Table 18:** Portfolio Projections*

	2019	2020	2021	2022	2023	Q3 2024	E2025	E2026	E2027	E2028	E2029
Number of units managed	**494 927**	**489 709**	**636 507**	**621 303**	**617 343**	**614 977**	**606 558**	**598 138**	**589 719**	**581 300**	**572 880**
Thereof own apartments	416 236	415 688	565 334	548 524	545 919	541 619	533 200	524 780	516 361	507 942	499 522
Valuation per unit	0.13	0.14	0.17	0.17	0.15	0.14	0.16	0.16	0.16	0.17	0.17
Apartments owned by others	78 691	74 021	71 173	72 779	71 424	73 358	73 358	73 358	73 358	73 358	73 358
Number of units bought	**23 987**	**1 711**	**155 145**	**969**	**63**	**-**	**344**	**344**	**344**	**344**	**344**
Number of apartments sold	**4 784**	**3 677**	**6 965**	**19 760**	**3 838**	**5 429**	**10 279**	**10 279**	**10 279**	**10 279**	**10 279**
Price per unit	0.16	0.24	0.24	0.19	0.32	0.17	0.23	0.24	0.24	0.25	0.25
Recurring Sales	2 607	2 442	2 803	2 710	1 590	1 516	2 107	2 107	2 107	2 107	2 107
Non Core/other	2 177	1 235	4 162	17 050	2 248	3 913	8 172	8 172	8 172	8 172	8 172
# new apartments completed	**2 092**	**2 088**	**2 200**	**3 749**	**2 425**	**2 409**	**3 129**	**3 129**	**3 129**	**3 129**	**3 129**
Own apartments	1 301	1 442	1 373	2 071	1 309	875	1 516	1 516	1 516	1 516	1 516
Apartments for sale	791	646	827	1 678	1 116	1 534	1 613	1 613	1 613	1 613	1 613

Concerning the valuation of investment properties, the unit value was determined by dividing the total value of investment properties by the number of managed units for each of the three years. By applying the inflation rate for 2025 to the average over the past three years, a portfolio

valuation of €157,610 per unit was projected, with inflation adjustments factored in for subsequent years.

For the sale price, the same method was followed. The total funds from portfolio sales were computed by summing the revenues from the disposal of properties and the disposal of real estate inventories and dividing this by the number of units sold, both for recurring sales and non-core properties. This resulted in a projected sale price for 2025 of €232,360, with inflation applied in the following years.

Costs

Table 19 presents the cost structure projected.

***Table 19**: Costs Projections*

Costs (Million €)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029
Cost of sold real estate inventories	-197	-236	-382	-461	-305	-182	-396	-404	-412	-419	-427
Cost of materials	-1 463	-1 493	-1 671	-2 446	-2 101	-2 303	-2 213	-2 221	-2 224	-2 223	-2 222
Capitalized internal expenses	687	659	663	673	470	507	595	598	599	600	601
Personnel expenses	-536	-595	-682	-714	-766	-935	-945	-955	-963	-969	-977
Total Costs	**-2 196**	**-2 324**	**-2 735**	**-3 620**	**-3 171**	**-3 420**	**-3 554**	**-3 580**	**-3 598**	**-3 611**	**-3 625**

Regarding the projections of cost of goods sold for real estate inventories, it was computed the average percentage of the item relative to the revenue from the disposal of real estate inventories (80.90%) and it was applied to the following years.

As for the cost of materials, there are three sources that need to be projected, considering that the company does not provide detailed values for 2024. Therefore, calculations only considered values up to 2023, with the averages calculated based on the years 2021, 2022, and 2023, as a change in weighting was observed starting in 2021.

- Expenses for ancillary costs are mainly related to costs for the development, and for that reason, they were calculated as a percentage of each year sum of i) real estate inventories, ii) assets held for sale, iii) revenue from disposal of properties, and iv) revenue from disposal of real estate inventories.
- Expenses for maintenance and modernization were projected based on its percentage concerning investment properties and property, plant & equipment, which is in average 0.70%.

- Lastly, since there is no detailed information about the other costs of purchased goods and services, the average value of this item was calculated and adjusted for inflation.

Table 20: *Cost of Materials Projections*

Cost Of Materials (Million €)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029
Expenses for ancillary costs	729	781	898	1 580	1 386		1 440	1 440	1 438	1 433	1 428
	58.21%	*48.20%*	*17.85%*	*26.07%*	*39.67%*		*27.86%*	*27.86%*	*27.86%*	*27.86%*	*27.86%*
Expenses - maintenance and modernization	629	586	636	729	533		595	598	599	600	601
	1.18%	*1.00%*	*0.67%*	*0.78%*	*0.65%*		*0.70%*	*0.70%*	*0.70%*	*0.70%*	*0.70%*
Other cost of purchase goods and services	105	127	137	193	182		179	183	186	189	193
Total	**1 463**	**1 493**	**1 671**	**2 502**	**2 101**	**2 303**	**2 213**	**2 221**	**2 224**	**2 223**	**2 222**

For the projection of capitalized internal expenses, it was assumed that all spending on maintenance and modernization would be capitalized as investment, representing 100% of this item.

Regarding personnel costs, they accounted for an average of 13.92% of revenues, excluding 2022, which was deemed an outlier (as explained in section 4.8). Therefore, this rate was applied to the projected total revenue for the next five years. The company provides information without detail about the personnel structure, therefore it was considered redundant to calculate its evolution.

Other Components of EBITDA

To calculate EBITDA, other variables need to be projected, despite having a less significant impact on the overall figure:

- The carrying amount of property sold was calculated as a percentage relative to revenues from disposal properties and disposal of real estate.
- Impairment losses on financial assets were calculated as a percentage of short-term and long-term financial assets.
- Revaluation of assets held for sale was projected by calculating a percentage of the assets held for sale.
- For other operating income and expenses, since there is no detail on each line item, the averages of previous years was computed and inflation was applied.

Depreciation

As the last items affecting EBIT, depreciation and amortization were projected.

Based on the final detailed values of property, plant, and equipment for 2023 and the overall ones for 2024, the depreciation for the following years was projected. It was assumed that the reinvestment values would be equal to each year's depreciation, reason why its amount would remain constant, as well as the values of property, plant, and equipment. A rate of 2% was assumed for owner-occupied properties, 13% for technical equipment, plant and machinery, and 8% for equipment, furniture and office equipment, as stated in the notes of the report, resulting in an annual depreciation of €100million.

A similar approach was taken for amortizations. A rate of 10% was considered for existing intangible assets. According to Vonovia's policies, goodwill is not subject to amortization, instead, it undergoes annual impairment testing. However, due to the difficulty of forecasting through this method, a 10-year amortization period was considered until it is fully amortized. Regarding the other intangible assets, it was assumed that its amortization would be reinvested every year. In this context, a total amortization of €949 million is projected for 2025, €454 million for 2026 and from 2027 onwards a constant depreciation of €20 million is expected.

Table 21: *D&A projections*

D&A (Million €)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029
Depreciation and Amortization	-2 176	-92	-3 873	-1 180	-411	-122	-1 049	-554	-120	-120	-120

Other Variables of FCF

In order to forecast the FCF and computing the DCF valuation, the Free Cash Flow is the result of the sum of following variables.

Table 22*: Free Cash Flow Projections*

Free Cash Flow (Million €)	E2025	E2026	E2027	E2028	E2029
(EBIT) x (1-t)	746	1 098	1 403	1 403	1 402
Non-Cash events of IS	-259	370	-122	-553	-550
Δ Net Working Capital (-)	303	9	10	9	3
CAPEX (-)	-173	-176	-177	-178	-179
Free cash-flow (Million €)	**617**	**1 302**	**1 115**	**682**	**677**

After discussing all the components that comprise **EBIT**, it is necessary to apply the factor of **(1-T)** to obtain the amount that the company retains after paying taxes. The tax rate used is 30%, as it is the German corporate tax rate.

To obtain the free cash flow, items from the income statement that are **non-cash events** must be deducted, namely capitalized internal expenses, impairment losses on financial assets, revaluation of assets held for sale and depreciation and amortization.

For the **variation of net working capital (Table 23)**, the current assets and current liabilities that impact the company's liquidity were considered:

- Inventories, calculated as a percentage of the cost of materials.
- Trade receivables, calculated as a percentage of the four streams of revenues.
- Other assets. Since there is no disclosure, it was assumed to remain constant at the 2024 value, adjusted for inflation.
- Real estate inventories, calculated based on the previous year's value, adding the new constructions and subtracting the sold units, both evaluated at the unit value of the respective year.
- Trade payables, calculated as a percentage of the cost of sold real estate inventories and the cost of materials.
- Other liabilities. It is primarily composed of advanced payments received and accruals, reason why it was calculated as a percentage of revenue from the disposal of properties and revenue from the disposal of real estate inventories.
- Current income taxes were accounted for in both liabilities and assets. Due to the lack of disclosure and their minimal impact since they largely offset each other, the value was kept constant at the 2024 figure, adjusted for inflation.

***Table 23**: NWC Projections*

Net Working Capital (Million €)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029
Inventories	9	9	16	32	20	21	20	20	20	20	20
Trade receivables	206	269	450	161	593	389	416	420	423	426	430
Other assets	138	119	221	621	660	731	749	765	779	793	807
Income tax receivables	85	40	202	240	178	144	167	194	226	263	308
Real estate inventories	358	570	671	2 156	1 958	2 128	2 101	2 066	2 024	1 978	1 929
Current Assets	**796**	**1 007**	**1 560**	**3 210**	**3 409**	**3 413**	**3 453**	**3 465**	**3 473**	**3 480**	**3 494**
Trade payables	219	230	444	563	486	466	490	493	495	496	497
Income taxes Liabilities	0	0	0	241	260	220	224	229	233	237	241
Other liabilities	264	203	229	202	284	328	642	656	668	680	693
Current Liabilities	**483**	**433**	**673**	**1 006**	**1 030**	**1 014**	**1 357**	**1 377**	**1 396**	**1 413**	**1 430**
Net working Capital	**312**	**574**	**887**	**2 204**	**2 379**	**2 399**	**2 096**	**2 087**	**2 077**	**2 067**	**2 064**
Δ Net Working Capital	**n.a.**	**262**	**313**	**1 317**	**175**	**20**	**-303**	**-9**	**-10**	**-9**	**-3**

Finally, **CAPEX** was calculated. This amount consists of i) the investment properties purchased, in line with the portfolio projections, and ii) the reinvestments in Property, Plant and Equipment, as well as in intangible assets, as explained in the depreciation section. In 2030, the base year for calculating the terminal value, CAPEX is around 1.5 times the depreciations, which might suggest that the company is not in a steady state. However, it is essential to consider the company's operations, particularly that a significant portion of the CAPEX relates to investment properties that are not subject to depreciation.

Table 24: *CAPEX Projections*

CAPEX (million €)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029	E2030
IA & Property, plant and equipment		229	5 250	136	157	97	118	120	120	120	120	120
Investment properties		239	25 824	163	9	0	54	55	56	57	58	59
CAPEX		468	36 325	435	323	97	173	176	177	178	179	180

Number of Shares & Dividends

Although it does not directly factor into the calculation of FCFF, a projection of the company's equity is presented, mainly to understand how the number of shares evolve. Vonovia offers shareholders the option to choose between receiving their dividends in cash or being granted new shares. The average scrip dividend from recent years was calculated, leading to the conclusion that, on average, 45.68% of dividends have been paid in new shares (2019-2023). It was assumed that the DPS would remain constant at €1.35 starting from 2025, for the sake of conservatism and due to the lack of disclosure in the company's reports regarding its evolution. With these values, it was possible to forecast the dividends per year and, by multiplying it by the average scrip, the number of shares issued each is projected.

Table 25*: Equity Projections*

Million (€)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029
Dividend per share	1.44	1.57	1.69	1.66	0.85	0.9	1.35	1.35	1.35	1.35	1.35
Scrip %	45.80%	40.70%	49.18%	47.85%	44.87%	45.68%	45.68%	45.68%	45.68%	45.68%	45.68%
Shares outstanding	542	566	777	796	815	833	845	863	881	899	917
Dividend (M€)	746	851	956	1289	676	750	1142	1166	1190	1215	1240
Dividend-Cash	404	505	486	672	373	407	620	633	647	660	674
Dividend-Equity	342	347	470	617	304	343	522	533	544	555	566
Shares issued	8	7	9	19	19	12	18	18	18	19	19
Shares notional v.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

5.2. WACC

To discount the FCFF, a WACC was estimated. As explained in Literature Review the WACC depends on the respective weight of the market values of equity and debt, as well as the cost of equity and the cost of debt. The table below consolidates the different parameters that were required to be estimated. The calculations of each parameter are individual explained in the next sections.

Table 26: *WACC inputs*

Weighted Average Cost of Capital (WACC)	
Risk-free Germany	2.49%
Beta	0.73
Investor's Equity Risk Premium	4.33%
CAPM = ke	**5.65%**
Interest rate	3.54%
Cost of Debt = kd	**2.48%**
Equity Ratio (2024)	**38.2%**
WACC	**3.69%**

Cost Of Equity

The CAPM was used to estimate the cost of equity. For this purpose, it was necessary to obtain the values for the risk-free rate, levered beta, and market risk premium (MRP).

The **risk-free rate** used is the 10-year Germany treasury bond since it is a long-term forecast for a company mostly focused and headquartered in Germany. The value used is 2,49%, which was retrieved Bloomberg on February 18th, 2025.

The **Beta** as a measure of company specific risk, has been derived from conducting a linear regression (Figure 26) of Vonovia´s month returns against the returns of a market portfolio using monthly intervals between January of 2019 and December of 2024. Given the company's primary activities in Germany, the DAX index was selected as a proxy for the market portfolio.

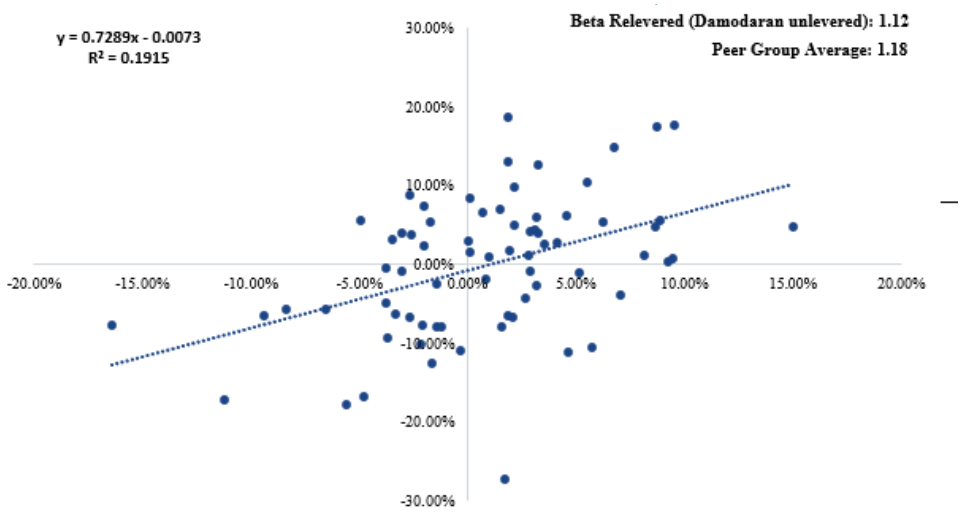

***Figure 26**: Beta Regression*

The resulting beta of 0.73 was compared to industry betas of the company's peers, as represented by the presented competitors. Another method was also used as a form of comparison, utilizing the unlevered beta of the industry sourced from the Damodaran database and calculating the releveled beta based on the company's structure (Appendix 12).

The divergence between Vonovia's beta from the two methods is substantial, as illustrated in Figure 26, and seems to be primarily explained by the company's size and sector leadership. Since it was calculated using Vonovia's data for an appropriate period and there appears to be justification for this discrepancy, the regression beta was chosen.

Finally, to predict **Market Risk Premium**, Damodaran's database to Germany was considered, with values updated a 01st January 2025. According to the data base, MRP is predicted to be 4.33%.

As a result, it was obtained a **cost of equity** of 5.65%.

Cost of Debt

As referred in the literature review, the cost of debt reflects the current expense a firm incurs when borrowing funds to finance operations and projects. The company's reports indicate that the contractual rate is at 1.75%, which is either fixed or hedged for the remainder. However, this value does not seem sustainable in the current environment, and it is lower than the risk-free rate.

The literature review also explained that for investment-grade firms, the interest rate can be determined based on the company's credit ratings. Given that the company has a BBB+ rating, the yield to maturity (YTM) of a European bond with the same rating (iShares € Corp Bond) was considered, with a yield of 3.54% as of March 6, 2025.

To eliminate the tax shield effect, that is, to reflect the tax deduction of interest, the interest rate was multiplied by (1 - T), resulting in a final cost of debt of 2.48%%.

Discount Factor

Considering the explanation provided in the literature review and the values presented, the equation 11 was applied, resulting in a WACC of 3.69%.

The discount factor for each year was calculated using the Equation 27, resulting in the values shown in Table 24.

***Equation 27**:Discount Factor*

$$Discount\ Factor = \frac{1}{(1 + Wacc)^t}$$

***Table 27:** Discount Factors*

	Y1	Y2	Y3	Y4	Y5
	E2025	**E2026**	**E2027**	**E2028**	**E2029**
Discount Factor	0.964	0.930	0.897	0.865	0.834

5.3. Terminal Value

For the terminal value, the year 2030 was projected using the same assumptions as the previous years. To compute the terminal value, the Equation 28 was applied.

***Equation 28:** Dissertation Terminal Value*

$$TV = \frac{FCF_{2030}}{(WACC - g) \times DiscountFactor_{2029}}$$

For the perpetual growth rate (g), which is a key assumption in a DCF valuation, several approaches were analysed. It was considered that the average global GDP growth forecast from 2024 to 2029 is 3.1%, making it inappropriate for g to exceed this figure. Additionally,

according to the Literature Review, a reasonable growth rate typically ranges between 2% and 4%.

The Damodaran (2025, Jan) database was analysed initially, revealing a growth rate of 4.30% for the Real Estate industry (General/Diversified). However, this figure appeared inappropriate primarily because it reflects global sector trends, while the German market is growing at a slower pace.

Subsequently, the growth rate of the construction sector in Germany was investigated as a proxy, which is expected to grow by 4.28% (Mordor Intelligence). While this is a good indicator for sector growth, more precise proxies were pursued.

Finally, the annual growth rate of the real estate sector in Germany was examined. According to Statista, this rate is projected to be 2.7% between 2025 and 2029. Given that this reference directly reflects the company's operations and is specific to its location, a 2.7% perpetual growth rate was assumed.

5.4.DCF Valuation

By summing the discounted free cash flows between 2025 and 2029, with the terminal value calculated in 2030, it was obtained an enterprise value of €60.682 million. After discounting the net debt as of December 31, 2024, amounting to €38.899 million, the projected equity value is €21.784 million, which represents a valuation of €26.14 per share.

***Table 28**: DCF Valuation*

Valuation (Dec.31, 2024)	
Enterprise Value (millions €)	60 682
Forecast	3 961
Terminal Value	56 722
Debt (millions €)	-43 729
Cash (millions €)	916
Net Financial Debt (millions €)	-38 899
Equity Value (millions €)	**21 784**
#Shares (nmillions)	833
Share Value (€)	**€26.14**

5.4. Sensitive Analysis

The share value derived from the DCF model was calculated based on several assumptions, making it important to understand how the value varies with changes in these variables, according to optimistic and pessimistic scenarios. The stressed variables, WACC and Perpetual Growth rate (g), were subject to variations of 0.25%. The results of the sensitivity analysis are shown in the table 29. It is important to note that when the values for WACC and g are equal, the resulting calculation should not be considered, as it becomes irrelevant.

***Table 29**: Sensitive Analysis*

		Perpetual Growth Rate (g)				
		2.20%	2.45%	2.70%	2.95%	3.20%
WACC	3.19%	€27.83	€51.38	€98.94	€245.61	n.a.
	3.44%	€13.08	€26.96	€50.22	€97.22	€242.12
	3.69%	€3.28	€12.39	€26.14	€49.08	€95.52
	3.94%	€0.00	€2.70	€11.71	€25.26	€47.96
	4.19%	€0.00	€0.00	€2.14	**€11.03**	€24.42

As can be seen from the results obtained, by keeping the same WACC (3.69%) but changing g, the TSP ranges from €3.28 to €95.52. Additionally, by keeping the same g (2.70%) but changing the WACC, the TSP ranges from €2.14 to €98.94. Overall, the share value ranges between 0 and €245.61.

5.6. Relative Valuation

In relative valuation, defining the peer group is a crucial step. Given that Vonovia operates exclusively within Europe, primarily in Germany, the peer group was based on data collected about companies operating in the Real Estate sector in the region, specifically focusing on large firms that are identified as competitors through financial databases.

The initial peer group consisted of 12 companies, all operating in Europe, with operations in Germany (albeit minority), and specific criteria were outlined concerning the sector and company size. Two companies (marked in red in table 30) were excluded since they did not meet the necessary criteria - Grand City, is a subsidiary of Aroundtown SA., while Fabage AB operates exclusively in the commercial real estate market. The remaining companies fit within the same sector.

In order to select comparable companies in terms of size and growth, two key factors were established, i) revenues should exceed €1.000millions, and ii) CAGR should exceed 5%, which resulted in the removal of the companies marked in yellow. Tag Immobilien was also excluded due to its financial ratios being significantly different from those of the companies under analysis.

***Table 30**: Peer Group*

Company	Country	Sectors	EV (M€)	VN (M€)	CAGR VN (19-25)	EBITDA (M€)	EBIT (M€)	EV/ Sales	EV/ EBITDA	EV/ EBIT	P/E Ratio
Vonovia			**60 682**	**6 344**	**13.52%**	**2 143**	**2 021**	**9.6X**	**28.3X**	**30.0X**	
Deutsche Wohnen AG	DE	Resid.	17 501	3 051	7.92%	474	314	5.7X	36.9X	55.8X	-7.4X
LEG Immobilien AG	DE	Resid.	14 965	1 407	8.45%	565	588	10.6X	26.5X	25.5X	-10.2X
Fastighets AB Balder (publ)	DE & Int.	Com. & Resid.	18 301	1 299	10.37%	929	920	14.1X	19.7X	19.9X	27.5X
Aroundtown Property Holdings	DE	Resid.	15 029	1 476	5.44%	897	795	10.2X	16.8X	18.9X	-2.8X
TAG Immobilien AG	DE	Resid.	351	1 378	28.95%	311	293	0.3X	1.1X	1.2X	-25.5
Citycon Oyj	Baltics	Com., Resid & Hosp	2 344	321	4.63%	186	183	7.3X	12.6X	12.8X	-15.1x
PSP Swiss Property AG	CH	Resid.	9 817	398	5.39%	338	337	24.6X	29.1X	29.1X	16.3x
Sedlmayr Grund und Immobilien	DE	Com. & Resid.	1 741	136	3.65%	64	47	12.8X	27.2X	37.3X	64.0x
Dinkelacker	DE	Com. & Resid.	375	25	4.90%	17	13	15.0X	22.3X	28.6X	31.0x
STINAG Stuttgart Invest AG	DE	Com., Resid & Hosp	NI	28	10.03%	18	NI	-	-	-	-
Fabege AB (publ)	SE	Com.									
Grand City Properties S.A	DE	Com. & Resid.									

*ForDeutsche Wohnen AG, the data from 2022 is used, as 2023 was an atypical year.

Equity multiples are greatly influenced by leverage and specific accounting practices, reason why, the relative valuation model emphasizes EV multiples exclusively, including EV/Revenue, EV/EBITDA, and EV/EBIT.

It may seem that EV/Sales would not be appropriate for the real estate sector; however, it is considered suitable since its main source of revenue is rental income, which is always included in "Sales" regardless of accounting methods. Additionally, in the real estate sector, where companies have different capital structures, EV/Sales allows for a fairer comparison between companies of varying sizes and debt levels, being this metric less susceptible to variations in accounting records. Although asset sales, another source of income, may not always be reflected in revenues, this is offset by the average with the other two multiples.

Given its relevance in valuations, the P/E ratio was also evaluated, however the discrepancies in values among the companies were too significant to reach a reliable conclusion.

A comprehensive overview of these multiples can be found in Table 31.

***Table 31**: Relative Valuation*

	EV/ Sales	EV/ EBITDA	EV/ EBIT
Deutsche Wohnen AG	5.7X	36.9X	55.8X
LEG Immobilien AG	10.6X	26.5X	25.5X
Fastighets AB Balder (publ)	14.1X	19.7X	19.9X
Aroundtown Property Holdings PLC	10.2X	16.8X	18.9X
Average	**10.2X**	**25.0X**	**30.0X**
EV	64 457	53 534	60 633
Net Debt	-38 899	-38 899	-38 899
Equity Value	25 558	14 636	21 734
# Shares	833	833	833
Price per share	€30.67	€17.56	€26.08
Average Price		**€24.77**	

Depending on the multiple chosen, the calculated share price varied. The share prices ranged from €17.56 to €30.67, with an average of €24.77. This value is quite comparable to the valuation derived from the DCF method, which enhances confidence in the assessment.

6. Investment Banking Valuation | Comparison

This chapter aims to compare the results achieved with those produced by an investment bank. The valuation from Morgan Stanley, dated September 2024, was used for comparison, with a target price of €30.00, higher than both DCF and Relative valuation. It is important to note that the investment bank's analysis projects financials only until 2026, while this dissertation forecasts data up to 2029.

***Table 32**: TSP Dissertation Vs Morgan Stanley*

	Dissertation	Morgan Stanley
Valuation Date	Dec/24	set/24
Estimation Period	2025-2029	2024-2026
Valuation method	DCF	DCF
Share Price	€29.32	€31.30
TSP	€26.14	€ 30.00
Target price potencial	-10.85%	-4.15%
Recommendation	Sell	Moderate Sell

As shown in Table 32, the operational results differed significantly, primarily due to differences in accounting treatments and assumptions made.

Regarding revenues, Morgan Stanley accounted only for rental income, while all other earnings were incorporated directly into EBITDA, making the EBITDA margin less relevant for comparison.

In terms of depreciation and amortization, there are significant differences between the approaches taken by Morgan Stanley and this dissertation. The investment bank assumes that depreciation values will remain constant at the 2023 levels. Additionally, Morgan Stanley only recognizes goodwill as an intangible asset, maintaining its value at the 2023 figure, resulting in zero amortization throughout the forecast period, which has a considerable impact on valuation.

When looking at EBIT, the most significant distinction is that Morgan Stanley includes revaluations as part of its EBIT calculation. In contrast, this dissertation treats revaluations differently, since in Vonovia's reports, this item is indicated as already being net.

Finally, regarding balance sheet items, the dissertation projects growth in total assets over the three years, aligned with an increase in equity. In contrast, Morgan Stanley anticipates a similar rise in equity from 2024 to 2025 but expects a reduction in debt. For the period from 2025 to 2026, the last evaluation year, Morgan Stanley does not forecast any changes for these items.

Table 33: *Forecasts Dissertation Vs Morgan Stanley*

	Dissertation			Morgan Stanley		
Million €	**E2024**	**E2025**	**E2026**	**E2024**	**E2025**	**E2026**
Revenue	6 344	6 784	6 856	3 253	3 295	3 324
Growth		*6.94%*	*1.06%*		*1.29%*	*0.87%*
EBITDA	2 143	2 115	2 123	2 555	2 564	2 595
Growth		*-1.31%*	*0.35%*		*0.33%*	*1.23%*
D&A	122	1 049	554	110	110	110
Growth		*757.52%*	*-47.16%*		*0.00%*	*0.00%*
EBIT	2 021	1 066	1 568	-183*	1912**	1973
Growth		*-47.25%*	*47.10%*		*n/a*	*3.19%*
Net Profit	-790	854	1 188	413	1740	1770
Growth		*-208.08%*	*39.15%*		*321.59%*	*1.73%*
Total Assets	89 993	91 872	92 613	88045	87304	87304
Growth		*2.09%*	*0.81%*		*-0.84%*	*0.00%*
Total Equity	27 076	26 899	27 028	25333	26351	26351
Growth		*-0.65%*	*0.48%*		*4.02%*	*0.00%*
Total Liabilitues	62 917	65 939	65 584	62712	60952	60952
Growth		*4.80%*	*-0.54%*		*-2.81%*	*0.00%*

* Morgan Stanley revenues only consider rents

**Morgan Stanley EBIT includes asset revaluation

7. Conclusion

In this dissertation, a thorough analysis of the industry and the company was conducted. It was concluded that Vonovia operates in a highly competitive industry affected by macroeconomic constraints. However, it strives to solidify its market leadership position by enhanced services and focusing on technological progression and sustainability.

A financial analysis of the past six years was also performed, revealing that the company experienced significant growth in 2021, which has since stabilized, indicating a robust financial condition, but a slowdown in growth.

Following this analysis, along with a careful examination of the valuation methods, the valuation of Vonovia was carried out through DCF analysis, and a sensitivity analysis was conducted. Furthermore, the target share price was calculated using relative valuation, and the results were compared with the valuation from Morgan Stanley.

***Table 34**: Vonovia TSP (comparation all methods)*

Vonovia's target share price	
DCF	€26.14
Sensitive w/ WACC Constant	€3.28 - €95.52
Sensitive w/ g Constant	€2.14 €98.94
Relative Valuation	€24.77
JP Morgan	€30.00
Share Price (December 31, 2024)	€29.32

In conclusion, although Morgan Stanley's valuation presents a significantly higher value, and trusting the assumptions applied in the dissertation's evaluation, the final recommendation is to **sell.**

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9. Appendixes

Appendix 1: Beta (Additional information)

Nevertheless, the historical beta is only partially appropriate for forward-looking company valuations. This is why it is important to adjust the raw beta. The Blume adjustment (Blume, 1975) is the most used method for this purpose. This adjustment accounts for the time variability and the tendency of the beta factor to regress toward 1 through the following equation:

***Equation**: Adjusted Beta*

$$Adjusted\ Beta = \frac{1}{3} + \frac{2}{3} \times raw\ beta$$

Beta can also be approximated by analysing the Betas of publicly traded peer companies, adjusting for differences in financial leverage (Pinto et al., 2015). This involves calculating the unlevered Beta for each firm to minimize capital structure effects:

***Equation**: Unlevered Beta*

$$\beta_i(U) = \frac{\beta_i(L)}{1 + (1 - T) * \frac{D}{E}}$$

After calculating the unlevered beta for each firm, should be computed the average unlevered beta for the entire peer group. Following this, the firm's target capital structure and marginal tax rate are utilized to relever this average unlevered beta (Rosenbaum & Pearl, 2013)

***Equation**: Relevered Beta*

$$\beta_L = \beta_{U \times (1+} \frac{D}{E} \times (1 - T))$$

Appendix 2: **Global Macroeconomic Situation**

The current global macroeconomic environment reflects a complex intersection of challenges and opportunities shaped by demographic shifts, technological advancements, climate change, and evolving geopolitical dynamics. While some regions show resilience and growth, significant structural and systemic challenges persist, threatening to undermine progress.

According to the International Monetary Fund ("World Economic Outlook",2024), Global economic growth is projected to remain stable at 3.1% over the next five years—below the pre-pandemic trend and the lowest level in decades. The World Bank, in its "Global Economic Prospects" report published in June 2024, projected that global growth will remain stable at 2.6% in 2024, rising slightly to an average of 2.7% in 2025–2026.

Advanced economies are expected to experience a slight acceleration, with growth increasing from 1.6% in 2023 to 1.7% in 2024 and 1.8% in 2025, while emerging market and developing economies are projected to experience a modest slowdown, from 4.3% in 2023 to 4.2% in both 2024 and 2025. Emerging markets present a mixed outlook, with strong growth in Asia countered by slower recoveries in regions like sub-Saharan Africa and the Middle East, where conflicts, extreme weather events, and resource constraints persist.

Global disinflation is in progress, especially in developed markets, where inflation is approaching central bank targets. However, achieving full stabilization is expected to require below-average growth through 2025. Emerging markets face additional challenges due to the volatility of food and energy prices. Central banks worldwide are striving for a "soft landing," but their efforts are constrained by the dual risks of reigniting inflation or triggering economic stagnation. This has led to a cautious approach to monetary easing, with interest rates projected to decline gradually over the next two years.

Economic performance varies significantly across regions:

- United States: Growth is forecasted to slow to 1.9% in 2024 and 1.4% in 2025, with consumer spending cooling and higher debt servicing costs.
- Europe: The Eurozone faces weak growth, particularly in Germany, but inflation-adjusted income improvements and resilient job markets could support recovery by 2025.

- Asia: Emerging Asia, led by India and China, benefits from robust demand for semiconductors and AI-driven investments, although China's growth faces challenges from subdued post-pandemic recovery.

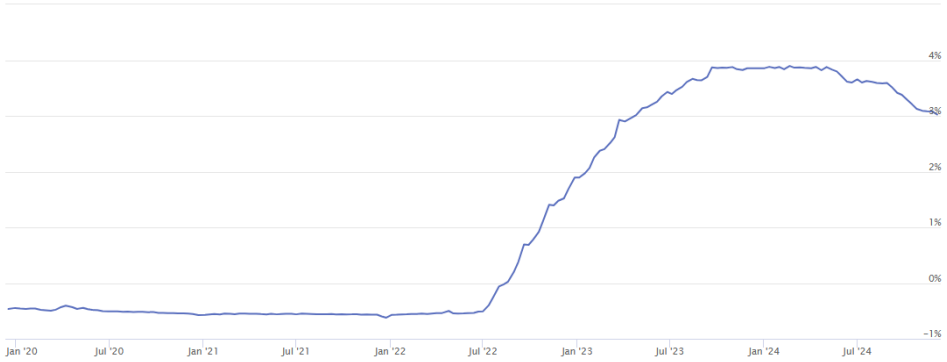
- Latin America and Africa: Regions like Latin America and sub-Saharan Africa face slower growth due to external shocks, conflicts, and climate impacts, offset by specific recoveries in countries such as Chile and Poland.

Globally, low productivity, inefficient public spending, and rising inequality hinder sustainable economic growth. Climate change exacerbates vulnerabilities, with damages already weighing on growth trajectories. Developing countries must tackle structural inefficiencies such as inadequate domestic resource mobilization, low international competitiveness, and fiscal systems misaligned with sustainability goals.

While some economies, such as those in Asia, are poised for robust growth fuelled by technological advancements, the global economy is unlikely to regain pre-pandemic growth rates in the near term. Central banks and policymakers must carefully balance short-term pressures with the need for long-term resilience and inclusivity. This requires innovative approaches to address systemic risks, foster sustainability, and promote equitable growth in an increasingly interconnected yet fragmented world.

Appendix 3: 6M Euribor rates over the last 5 years

Below is representing 6M Euribor rates over the last 5 years - average interest rates at which major European banks lend to each other in the interbank market.



Euribor6M historical taxes 2019-2024. Source: euribor-rates.eu

Appendix 4 - Risks and Risk management (Additional Information)

Vonovia operates in a dynamic market with shifting economic conditions and regulations. To adapt, the company regularly adjusts its strategies and ESG objectives to meet stakeholder expectations, creating new opportunities.

Its risk management system identifies, evaluates, and mitigates risks to support sustainable growth and resilience. Below are the key risk categories addressed by Vonovia:

a. **Market and Economic Risks:**

   These risks arise from changes in demand and rental income due to macroeconomic factors like interest rates, inflation, and regulations such as rent control policies. Vonovia is especially vulnerable to changes in housing regulations, including rent freezes or restrictions on modernizations, which can affect revenue.

b. **Operational Risks:**

   Managing a large property portfolio involves risks related to maintenance, tenant satisfaction, and technology adoption. Inefficiencies in property upkeep could hinder tenant attraction and rental income.

c. Financial Risks:

The real estate sector's reliance on debt exposes Vonovia to risks such as rising interest rates, liquidity issues, and refinancing challenges.

d. ESG and Regulatory Risks:

Increasing regulations on sustainability and tenant rights pose ESG-related risks. Vonovia must comply with energy efficiency standards and meet stakeholder expectations regarding ESG practices. Non-compliance may result in fines, reputational damage, or operational restrictions.

e. Strategic Risks:

Expansion into new markets or acquisitions carries risks, such as misjudging market potential, cultural differences, or unexpected costs. These factors can negatively impact financial performance if strategies fail to deliver anticipated results.

To address potential risks, Vonovia has implemented a comprehensive risk management framework built on an integrated five-pillar approach, presented below. This system focuses on continuous risk monitoring, scenario analysis, and proactive adjustments, enabling the company to effectively manage risks and ensure stability in a dynamic market environment.

5 Pillars of Risk Management at Vonovia. Vonovia SE's Final Report 2023

Vonovia's risk management framework identifies, assesses, and mitigates operational, social, and environmental risks, defined as events that could harm financial performance, strategic goals, or ESG objectives.

Risk assessments are primarily quantitative, focusing on worst-case scenarios for thorough evaluation. When quantitative methods are impractical, a qualitative approach is used with a classification matrix, which classifies the expected amount of loss one of five categories.

Category	Class	Description	Impact on profit and loss*	Impact on statement of financial position*
Very high	5	Threatens the company's existence	Possible loss of > € 750 million in Group FFO	Possible balance sheet loss of >€12,000 million
High	4	Dangerous impact on business development, previous business situation cannot be restored in the	Possible loss of € 375 million to €750 million in Group FFO	Possible balance sheet loss of € 6,000 million to € 12,000 million
Considerable	3	Temporarily impairs business development	Possible loss of € 150 million to €375 million in Group FFO	Possible balance sheet loss of € 6,000 million to € 12,000 million
Noticeable	2	Low impact, possibly leaving a mark on business development in one or more years	Possible loss of € 40 million to €150 million in Group FFO	Possible balance sheet loss of € 600 million to € 2,400 million
Low	1	Minor impact on business development	Possible loss of € 5 million to €40 million in Group FFO	Possible balance sheet loss of € 80 million to € 600 million

* Understood as the possible financial loss over five years in accordance with the medium-term planning horizon.

Vonovia's Risk Categories. Source: Vonovia SE's Final Report 2023

To facilitate this process, Vonovia employs a five-category risk matrix and a net heatmap to effectively classify and prioritize risks. These tools provide a structured method to visualize risk severity and likelihood, enabling the company to make informed decisions and allocate resources effectively.

Category	Class	Definition	Probability
Very high	5	It is to be assumed that the risk will materialize during the observation period.	>95%
High	4	The risk is likely to materialize during the observation period.	60-95%
Considerable	3	The risk could materialize during the observation period.	40-59%
Noticeable	2	The risk is unlikely to materialize during the observation period.	5-39%
Low	1	It is to be assumed that the risk will not materialize during the observation	<5%

Five-category risk matrix. Source: Vonovia SE's Final Report 2023

Vonovia's Risk Net Heatmap. Source: Vonovia SE's Final Report 2023

By the end of 2023 (last information available), Vonovia identified 118 individual risks, up from 107 in 2022. However, no risks threaten the company's stability or continuity, as confirmed by the Management Board.

A risk-bearing capacity analysis reaffirmed Vonovia's sustainability outlook for the next five years, consistent with the 2022 assessment. Among the evaluated risks:

- 10 were classified as amber (a slight decrease from 11 in 2022).
- 108 were categorized as green (an increase from 96 in 2022).

Risk	Strategy	Operating business	Regulatory environ-ment	Financing	Total
					0 (0)
		3 (4)	2(2)	5 (5)	10 (11)
	10 (9)	56 (51)	31 (27)	11 (9)	108 (96)
Total	**10 (9)**	**59 (55)**	**33 (29)**	**16 (14)**	**118 (107)**

Risk Assessment 2023. 2022 values are in breakets. Source: Vonovia SE's Final Report 2023

Appendix 5 – IRC Ratio

The Interest Coverage Ratio (ICR) measures the extent to which interest expenses are covered by operating results. As shown in Table 13, EBIT was negative in 2019 and 2021, meaning operational results did not cover interest expenses. In contrast, the other years saw significantly higher ratios. On average, Vonovia's ICR is below the European industry average of 1.40 (Aswath Damodaran jan2024).

IRC Ratio

(Million €)	2019	2020	2021	2022	2023	
EBIT	-614	1 714	-1 788	1 254	1 976	**Average 2019-2023**
EBIT * (1-T)	-430	1 200	-1 251	878	1 383	
Interest Expense	418	411	412	367	810	
ICR	-1.03	2.92	-3.04	2.39	1.71	**0.59**

ICR - Real Estate sector (General/Diversified) for Europe (Aswath Damodaran jan2024)	**1.40**

Appendix 6 – Dividends 2023

Below is presented the table detailing transactions over the past years, highlighting the evolution of dividends per share and dividend yield, which have remained consistently stable.

Vonovia in Capital Market.

	2019	2020	2021	2022	2023
Annual closing price (€)	**45.00***	**56.02***	**49**	**22**	**29**
High (€)*	46	58.33	57	51	29
Low (€)*	37	36.19	46	19	16
No. of shares as of Dec. 31 (in million)	578.5*	603.6*	777	796	815
Market cap as of Dec. 31 (€ billion)	26	33.8	38	18	23
Average transaction volume p/day (VWAP in € million)*	**66**	**85.7**	**84**	**84**	**81**
Dividend per share (€)	**1.47***	**1.58***	**2**	**1**	**0.90****
Dividend yield (%)	3	2.8	3	4	3

Appendix 7 – Income Statement Forecast

Revenues (Million €)	2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029	E2030 (TY)
Revenue - property letting	2 841	3 069	3 465	4 747	4 707	4 899	4 244	4 264	4 276	4 280	4 285	4 276
Other revenue from property management	70	78	159	147	168	225	152	153	154	154	154	154
Revenue - disposal of properties	511	586	1 122	3 242	868	1 016	1 899	1 939	1 976	2 010	2 047	2 078
Revenue - disposal of real estate inventories	250	298	520	588	354	204	490	500	509	518	528	536
Total Revenue	**3 671**	**4 031**	**5 266**	**8 725**	**6 096**	**6 344**	**6 784**	**6 856**	**6 914**	**6 963**	**7 014**	**7 043**
Cost of sold real estate inventories	-197	-236	-382	-461	-305	-182	-396	-404	-412	-419	-427	-433
Cost of materials	-1 463	-1 493	-1 671	-2 446	-2 101	-2 303	-2 213	-2 221	-2 224	-2 223	-2 222	-2 213
Capitalized internal expenses	687	659	663	673	470	507	595	598	599	600	601	600
Personnel expenses	-536	-595	-682	-714	-766	-935	-945	-955	-963	-969	-977	-981
Total Costs	**-2 196**	**-2 324**	**-2 735**	**-3 620**	**-3 171**	**-3 420**	**-3 554**	**-3 580**	**-3 598**	**-3 611**	**-3 625**	**-3 627**
Carrying amount of properties sold	-442	-482	-1 045	-3 172	-808	-950	-1 633	-1 668	-1 699	-1 729	-1 761	-1 787
Impairment losses on financial assets	-29	-40	-39	-50	-28	-267	-60	-62	-63	-64	-65	-66
Revaluation of assets held for sale	60	78	87	68	18	53	141	139	136	133	130	126
Other operating income	106	163	277	190	243	227	206	210	214	218	222	225
Other operating expenses	-295	-279	-389	-381	-434	-351	-363	-371	-378	-385	-392	-397
EBITDA	**1 562**	**1 806**	**2 085**	**2 434**	**2 387**	**2 143**	**2 115**	**2 123**	**2 125**	**2 124**	**2 124**	**2 116**
EBITDA Margin	*42.55%*	*44.81%*	*39.59%*	*27.89%*	*39.15%*	*33.79%*	*31.18%*	*30.96%*	*30.74%*	*30.51%*	*30.28%*	*30.04%*
Depreciation and amortization**	-2 176	-92	-3 873	-1 180	-411	-122	-1 049	-554	-120	-120	-120	-120
EBIT	**-614**	**1 714**	**-1 788**	**1 254**	**1 976**	**2 021**	**1 066**	**1 568**	**2 005**	**2 004**	**2 003**	**1 996**
Interest income	9	22	22	116	228	81	118	120	122	124	127	129
Interest expenses	-418	-411	-412	-367	-810	-920	-1 626	-1 591	-1 546	-1 505	-1 445	-1 385
Other financial result	24	-33	-137	10	150	84	17	17	17	18	18	18
EBT	**-998**	**1 292**	**-2 315**	**1 013**	**1 543**	**1 266**	**-425**	**115**	**599**	**642**	**704**	**758**
Income taxes	-1 845	-1 674	-2 652	30	2 577	-86	-647	-608	-703	-682	-711	-646
Profit for the period from discontinued operations	0	0	0	-95	-148	-35	0	0	0	0	0	0
Net income from fair value adjustments of investment properties	4 132	3 720	7 394	-1 178	-10 651	-1 902	2 017	1 773	1 609	1 497	1 537	1 270
Net income derecognition of financial assets measured at amortized cost	5	0	-3	-3	-2	4	0	0	0	0	0	0
Net income from investments accounted for using the equity method	1	3	16	-437	-76	-38	-91	-93	-94	-96	-98	-99
Profit for the period	**1 294**	**3 340**	**2 441**	**-669**	**-6 756**	**-790**	**854**	**1 188**	**1 410**	**1 362**	**1 432**	**1 283**

Appendix 8 - Balance Sheet Forecast

(Million €)	2019	2020	2021	2022	2023	Q3 2024	E2024	E2025	E2026	E2027	E2028	E2029	E2030
BALANCE SHEET													
Intangible assets	1 504	1 612	2 723	1 660	1 424	1 424	1 413	482	48	48	48	48	48
Property, plant and equipment	359	388	654	673	655	661	641	641	641	641	641	641	641
Investment properties	52 737	58 072	94 100	92 300	81 120	78 472	78 472	84 038	84 448	84 672	84 763	84 867	84 688
Financial assets	0	383	1 017	745	1 456	1 354	1 354	1 386	1 415	1 442	1 467	1 494	1 516
Investments accounted for equity method	332	33	425	240	158	213	213	218	223	227	231	235	239
Other assets	55	129	200	380	222	128	128	128	128	128	128	128	128
Deferred tax assets	59	16	20	40	86	86	86	86	86	86	86	86	86
Total non-current assets	**55 045**	**60 632**	**99 139**	**96 038**	**85 121**	**82 338**	**82 307**	**86 979**	**86 989**	**87 244**	**87 364**	**87 499**	**87 347**
Inventories	9	9	16	32	20	19	21	20	20	20	20	20	20
Trade receivables	206	269	450	161	593	207	389	416	420	423	426	430	431
Financial assets	1	0	1 063	768	1 008	1 060	1 060	1 085	1 108	1 129	1 149	1 170	1 187
Other assets	138	119	221	621	660	731	731	749	765	779	793	807	819
Income tax receivables	85	40	202	240	178	144	144	167	194	226	263	308	361
Cash and cash equivalents	501	613	1 433	1 302	1 374	2 105	916	644	386	-228	-737	-1 733	-2 714
Real estate inventories	358	570	671	2 156	1 958	2 128	2 128	2 101	2 066	2 024	1 978	1 929	1 873
Assets held for sale	134	165	2 719	71	313	1 605	1 605	677	665	652	637	621	603
Assets from discontinued operations	0	0	0	0	770	693	693	0	0	0	0	0	0
Total current assets	**1 431**	**1 785**	**6 776**	**5 352**	**6 875**	**8 692**	**7 686**	**5 859**	**5 624**	**5 025**	**4 529**	**3 552**	**2 582**
Total Assets	**56 476**	**62 417**	**105 914**	**101 390**	**91 996**	**91 030**	**89 993**	**92 838**	**92 613**	**92 269**	**91 893**	**91 052**	**89 928**
Subscribed capital	542	566	777	796	815	823	833	845	863	881	899	917	937
Capital reserves	8 240	9 038	15 458	5 152	2 681	2 897	2 555	2 033	1 500	957	402	-165	-743
Retained earnings	10 534	13 368	16 536	25 605	22 505	21 094	19 896	20 129	20 684	21 448	22 150	22 908	23 504
Other reserves	-8	172	126	-221	-318	-368	-368	-368	-368	-368	-368	-368	-368
Total equity attributable to shareholders	**19 308**	**23 144**	**32 897**	**31 332**	**25 683**	**24 445**	**22 916**	**22 639**	**22 679**	**22 917**	**23 082**	**23 293**	**23 329**
Equity attributable to hybrid capital investors	1 002	1 002	-	-	-	-	-	-	-	-	-	-	-
Non-controlling interests	814	686	3 242	3 107	4 262	4 160	4 160	4 260	4 350	4 432	4 511	4 592	4 661
Total equity	**21 124**	**24 832**	**36 139**	**34 439**	**29 945**	**28 606**	**27 076**	**26 899**	**27 028**	**27 349**	**27 593**	**27 885**	**27 990**
Provisions	662	711	866	656	607	658	658	674	688	701	713	726	737
Trade payables	5	5	5	5	7	7	6	6	6	6	6	6	6
Non-derivative financial liabilities	21 198	22 375	40 172	41 270	39 637	38 729	38 899	41 933	39 918	38 998	35 719	34 022	32 639
Derivatives	74	77	66	0	59	67	67	69	70	72	73	74	75
Lease liabilities	443	467	635	641	629	630	630	645	658	671	683	695	705
Liabilities to non-controlling interests	21	27	225	220	168	169	165	251	256	262	267	273	278
Financial liabilities from tenant financing	44	45	45	43	42	44	61	52	52	52	52	52	52
Other liabilities	26	3	5	28	51	86	86	86	86	86	86	86	86
Deferred tax liabilities	9 288	10 960	18 694	18 612	15 713	15 377	15 377	16 025	16 598	17 122	17 611	18 111	18 530
Total non-current liabilities	**31 762**	**34 670**	**60 713**	**61 475**	**56 912**	**55 768**	**55 948**	**59 740**	**58 333**	**57 969**	**55 211**	**54 046**	**53 109**
Provisions	530	389	727	238	203	298	298	305	311	317	323	328	333
Trade payables	219	230	444	563	486	464	466	490	493	495	496	497	497
Non-derivative financial liabilities	2 377	1 710	6 857	3 790	3 261	4 333	4 831	3 997	5 012	4 679	6 788	6 788	6 475
Derivatives	41	222	266	1	0	0	0	0	0	0	0	0	0
Put options	0	0	0	271	316	325	325	333	340	346	352	359	364
Lease liabilities	28	28	44	42	44	45	45	46	47	48	49	50	51
Liabilities to non-controlling interests	13	16	16	16	31	25	18	28	28	29	29	30	31
Financial liabilities from tenant financing	118	118	113	112	113	110	157	135	135	136	136	136	136
Income taxes Liabilities	0	0	0	241	260	215	220	224	229	233	237	241	241
Other liabilities	264	203	229	202	284	561	328	642	656	668	680	693	703
Liabilities - assets classified as held for sale	0	0	366	0	0	195	195	0	0	0	0	0	0
Liabilities from discontinued operations	0	0	0	0	142	87	87	0	0	0	0	0	0
Total current liabilities	**3 590**	**2 916**	**9 062**	**5 476**	**5 139**	**6 656**	**6 969**	**6 199**	**7 251**	**6 951**	**9 090**	**9 121**	**8 829**
Total liabilities	**35 352**	**37 586**	**69 775**	**66 951**	**62 051**	**62 424**	**62 917**	**65 939**	**65 584**	**64 920**	**64 300**	**63 167**	**61 938**
Total equity and liabilities	**56 476**	**62 417**	**105 914**	**101 390**	**91 996**	**91 030**	**89 993**	**92 838**	**92 613**	**92 269**	**91 893**	**91 052**	**89 928**

Appendix 9 - D&A

	Depreciation %	Carryng value 2023	Accumulated Depreciation FY 2023	Gross Value FY 2023	Dep. Q32024	Value Q32024	Dep. E2024	Gross Value E2024	Carrying Value E2024	Dep. E2025-30
Owner-occupied properties	2%	238	36	274	4	233	6	339	297	7
Technical equipment, plant and machinery	13%	125	82	206	21	104	28	206	97	28
Equipment, fixtures, and office equipment	8%	293	283	576	35	258	46	824	247	66
Total		655	401	1 056	59	596	79	1 369	641	100.19
					Additions	65				

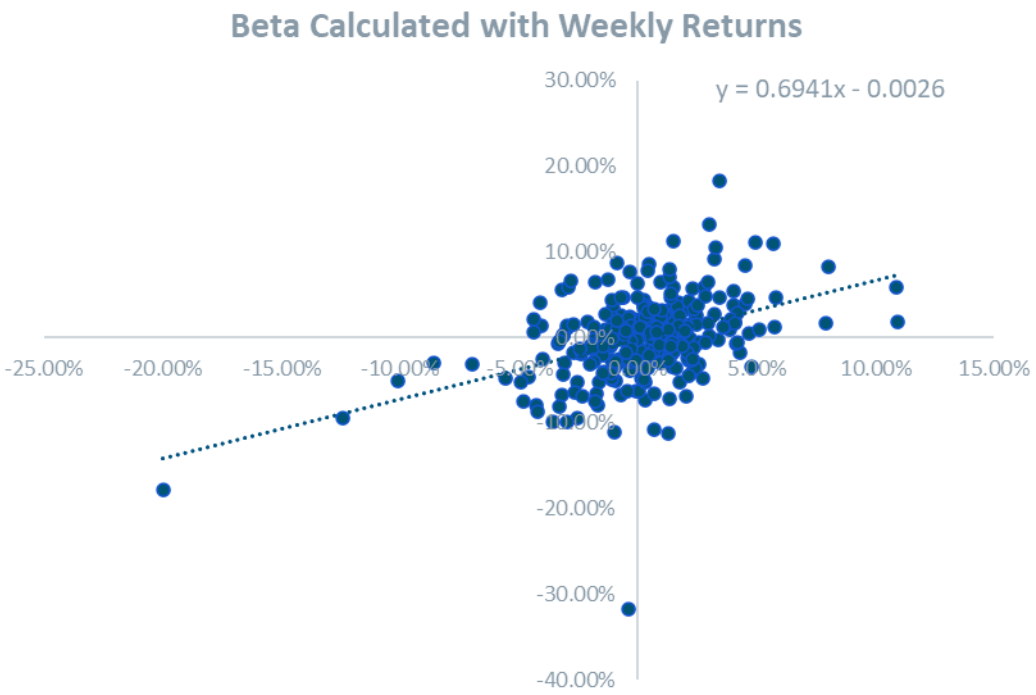
	Amortization %	Carryng value 2023	Accumulated Amortization FY 2023	Gross Value FY 2023	Amort. Q32024	Value Q32024	Amort. E2024	Gross Value E2024	Carrying Value E2024	Amort. E20205	Carrying Value E2025	Amort. E20206	Amort. E20207-30
Concessions/industrial property rights and	10%	31.7	119	151	11	20	16	183	48	18	48	20	20
Self-developed software													
Goodwill	10%	1 391.7	7 916	9 308	20	1 372	27	9 308	1 365	931	434.2	434	0
Customer relationships …	50%	0.3	11	11	0.3	0	0	0		0	0.0	0	0
Trademark rights	50%	0.0	67	67	0	0	0	0		0	0.0	0	0
Total		1 424	8 113	9 536	32	1 392	43	9 490	1 413	949	482	454	20
					Additions	32				Additions	18		

Appendix 10 - Debt repayment Plan

	2022		2023	
Million €	Non-current	Current	Non-current	Current
Non-derivative financial liabilities	**41 269.70**	**3 790.00**	**39 636.50**	**3 260.60**
Liabilities to banks	17 086.40	1 021.40	14 283.20	632.40
Liabilities to other creditors	24 183.30	2 558.40	25 353.30	2 397.70
Deferred interest from non-derivative financial liabilities	0.00	210.20	0.00	230.50

					Existing Debt Repayment Plan (Million €)										
	Nominal oblig. Dec 31, 2023 Million €	**Maturity**	**Interest rate**	**%**	**2024**	**2025**	**2026**	**2027**	**2028**	**from 2029**	2029	2030	2031	2032	2033
Bond (SEK)	121	2026	5.29%	0.28%	49			73							
Bond (EMTN)	18 642	2030	1.05%	43.46%	1814	2594	1800	2000	1725	8530	2843	2843	2843		
Bond (EMTN Green Bond)	2 137	2031	2.80%	4.98%						2137	534	534	534	534	
Bond (EMTN Social Bond)	2 076	2027	2.77%	4.84%			611	750	715						
Bond (Deutsche Wohnen)	1 761	2030	1.12%	4.10%		590				1171	390	390	390		
Registered bond	600	2031	1.68%	1.40%			100	70	50	380	95	95	95	95	
Bearer bond	1 260	2032	1.77%	2.94%				34	10	1217	243	243	243	243	243
Promissory note loan	1 045	2029	2.57%	2.44%			50	309	60	626	313	313			
Commercial paper	500	2024	4.16%	1.17%	500										
Mortgages	14 755	2030	2.24%	34.40%	671	1647	1436	1777	2119	7106	2369	2369	2369		
	42 897		**1.75%**		**3034**	**4831**	**3997**	**5012**	**4679**	**21167**	**6788**	**6788**	**6475**	**873**	**243**

Appendix 11 - Beta Regression with weekly returns



Appendix 12 - Beta Regression with weekly returns

Beta		E2024
BL (Levered Beta)	Real Estate (General/Diversified)	0.98x
Bu (Unlevered Beta)	Real Estate (General/Diversified)	0.43x
E/(D+A)		0.38x
D/(D+A)		0.62x
D/E		1.60x
B relevered		1.12x

Appendix 13- DCF Valuation

Vonovia's Equity Valuation | Catarina Esteves
Valuation

Weighted Average Cost of Capital (WACC)	
Risk-free Germany	2%
Beta	0.7289
Investor's Equity Risk Premium	4.33%
CAPM = ke	**5.65%**
Interest rate	3.54%
Cost of Debt = kd	**2.48%**
Equity Ratio (2024)	**38.2%**
WACC	**3.6895%**
Perpetual Growth Rate (g)	**2.70%**

		2019	2020	2021	2022	2023	E2024	E2025	E2026	E2027	E2028	E2029	E2030 (TY)
Discount Factor													
Discount Factor		1.000	1.000	1.000	1.000	1.000	1.000	0.964	0.930	0.897	0.865	0.834	0.805
Tax Rate	30.0%												
Equity Ratio													
Total Equity		€21 124	€24 832	€36 139	€34 439	€29 945	€27 076	€26 899	€27 028	€27 349	€27 593	€27 885	€27 990
Total Financial Debt		€23 575	€24 085	€47 029	€45 060	€42 897	€43 729	€45 929	€44 930	€43 677	€42 507	€40 810	€39 113
Equity Ratio (implied value)		47.3%	50.8%	43.5%	43.3%	41.1%	38.2%	36.9%	37.6%	38.5%	39.4%	40.6%	41.7%
Free Cash Flow													
(EBIT) x (1-t)		(€614)	€1 200	(€1 788)	€878	€1 383	1 415	746	1 098	1 403	1 403	1 402	€1 397
Non-Cash events of IS		€2 145	€54	€3 824	€1 162	€420	-256	-259	370	-122	-553	-550	(€544)
Δ Net Working Capital (-)		n.a	(€262)	(€313)	(€1 317)	(€175)	-20	303	9	10	9	3	(€1)
CAPEX (-)		n.a.	(€468)	(€36 325)	(€435)	(€323)	-97	-173	-176	-177	-178	-179	(€180)
Free cash-flow (Million €)				(€34 601)	€287	€1 306	1 042	617	1 302	1 115	682	677	€673
Discounted Free cash-flow				(€34 601)	€287	€1 306	€1 042	€595	€1 211	€1 000	€590	€565	

Valuation	5Y
Enterprise Value (millions €)	60 682
Forecast	3 961
Terminal Value	56 722
Debt (millions €)	-43 729
Cash (millions €)	916
Net Financial Debt (millions	-38 899
Equity Value (millions €)	**21 784**
#Shares (nmillions)	833
Share Value (€)	**€26.14**