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EQUITY RESEARCH NOS SGPS, S.A.: CAPITAL STRUCTURE OPTIMIZATION

ANDRIANA CHORNENKA

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ANDRIANA CHORNENKA

SUPERVISOR:
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Abstract

The present document consists of an Equity Research report on NOS SGPS, S.A. (NOS.LS), an established telecommunications company in Portugal. The company offers Fixed Pay TV, Fixed Voice, Fixed Broadband, Mobile, IoT and Data Management services and has an Audiovisuals and Cinema segment.

The report issues a BUY recommendation based on a price target of €4.15/share for 2024YE. The valuation implies a 27% upside potential from January 12th, 2024, closing price of €3.27/sh with a medium-low risk. For the valuation, a Sum-of-the-Parts approach was applied to each segment. To support this analysis, other valuation methods were used, and a sensitivity analysis was carried out.

Following the original research, and additional analysis was carried out to provide insights into the company's capital structure. That chapter's intention is to provide a company specific capital structure recommendation and to value the company with the recommendation calculated. Moreover, it will give us insights into NOS' current capital structure and whether it is optimal. The analysis is conducted by applying the principles in the paper *Capital structure optimization: a model of optimal capital structure from the aspect of capital cost and corporate value* (Eleonora Kontuš, Kristina Šorić & Nataša Šarlija 2023). The results indicated that the company is better off with its current risky financing strategy than the optimal conservative financing strategy, which focuses on long-term financing instead of short-term.

Resumo

O presente documento consiste num relatório de Equity Research sobre a NOS SGPS, S.A. (NOS.LS), uma empresa de telecomunicações prominente estabelecida em Portugal. A empresa oferece serviços fixos e móveis de televisão, internet, voz e dados, IoT e gerenciamento de dados, além de possuir um segmento de distribuição e exibição cinematográfica.

O relatório emite uma recomendação de compra com base em um preço-alvo de €4.15/ação para o final de 2024. A avaliação implica um potencial de valorização de 27% em relação ao preço de fecho de €3.27/ação a 12 de Janeiro de 2024, com um risco médio-baixo. Para a avaliação, foi utilizada uma abordagem de soma de partes a cada segmento. Para apoiar esta análise, foram utilizados outros métodos de avaliação e foi utilizada uma análise de sensibilidade.

Após a pesquisa original, foi realizada uma análise adicional para fornecer informação sobre a estrutura de capital de empresas. A intenção desse capítulo é fornecer uma recomendação específica da estrutura de capital para a empresa e avaliar a empresa com base na recomendação calculada. Além disso, fornecerá informação sobre a estrutura de capital atual da NOS e se esta é otimizada. A análise é conduzida aplicando os princípios do artigo *Capital structure optimization: a model of optimal capital structure from the aspect of capital cost and corporate value* (Eleonora Kontuš, Kristina Šorić & Nataša Šarlija 2023). Os resultados indicaram que a empresa está melhor com a sua atual estratégia de financiamento arriscada do que com a estratégia conservadora otimizada, que se concentra no financiamento de longo prazo em vez de curto prazo.

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And finally, *"I want to thank me for believing in me. I want to thank me for doing all this hard work. I want to thank me for having no days off. I want to thank me for never quitting. I want to thank me for always being a giver and trying to give more than I receive. I want to thank me for trying to do more right than wrong. I want to thank me for being me at all times."* – Calvin Broadus Jr.

Disclosures

Disclosure 1:

A significant portion of the Appendices were submitted by a group of students from ISEG, including the candidate, for the 2024 CFA Institute Research Challenge Portuguese Local Final. The main work can be read independently of these Appendices, although they provide a better understanding of the analysis.

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This report was prepared by a Master's student in Finance at ISEG – Lisbon School of Economics and Management, exclusively for the Master's Final Work. The opinions expressed and estimates contained herein reflect the personal views of the author about the subject company, for which he/she is solely responsible. Neither ISEG, nor its faculty accepts responsibility whatsoever for the content of this report or any consequences of its use. The valuation methodologies and the financial model contained in this report was revised by the supervisor.

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Recommendation System

Level of Risk	SELL	REDUCE	HOLD/NEUTRAL	BUY	STRONG BUY
High Risk	0%≤	>0% & ≤10%	>10% & ≤20%	>20% & ≤45%	>45%
Medium Risk	-5%≤	>-5% & ≤5%	>5% & ≤15%	>15% & ≤30%	>30%
Low Risk	-10%≤	>-10% & ≤0%	>0% & ≤10%	>10% & ≤20%	>20%

AI Disclaimer

I disclose that AI tools were employed during the development of this thesis as follows:

- AI-based research tools were used to assist in literature review and data collection.
- AI-powered software was utilized for data analysis and visualization.
- Generative AI tools were consulted for brainstorming and outlining purposes. However, all final writing, synthesis, and critical analysis are my own work. Instances where AI contributions were significant are clearly cited and acknowledged.

Nonetheless, I have ensured that the use of AI tools did not compromise the originality and integrity of my work. All sources of information, whether traditional or AI-assisted, have been appropriately cited in accordance with academic standards. The ethical use of AI in research and writing has been a guiding principle throughout the preparation of this thesis.

I understand the importance of maintaining academic integrity and take full responsibility for the content and originality of this work.

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Capital Structure Optimization

Introduction

A company's overall success highly depends on its financial decisions, making capital structure optimization a crucial and complex topic in corporate finance management. Thus, the purpose of this research is to calculate NOS's optimal capital structure and the new corporate value, and to compare the results with NOS's current values to determine whether the company is already optimizing its capital structure, or if it can be enhanced.

There are various models regarding capital structure, but these are aimed at balancing two factors, tax shields and bankruptcy costs, in order to optimize the company's capital structure. Nevertheless, these models fail to produce a firm-specific recommendation for the optimal capital structure.

To address this gap, we will follow the framework for determining the optimal capital structure described in the paper *Capital structure optimization: a model of optimal capital structure from the aspect of capital cost and corporate value,* (Eleonora Kontuš, Kristina Šorić & Nataša Šarlija 2023). In this study, a model-based approach was developed by applying corporate finance and mathematical modeling principles, and optimization theory. The model calculates the optimal capital structure by estimating the effective cost of capital and by determining the equity and long-term debt capital that minimizes the overall cost of capital while maximizing the company's value. Therefore, by following this framework, we will obtain the company's optimal capital structure considering capital cost and corporate value. Although previous studies also take these aspects into consideration, they do not provide a capital structure recommendation based on them. Overall, the model gives managers information about how much equity and long-term a company should use and how its capital structure affects its value.

NOS currently employs a risky financing strategy, heavily relying on short-term debt to benefit from attractive yields. This strategy is possible due to the company's stability and easy access to capital markets. However, the paper provides a framework for optimal long-term debt and equity. Thus, our aim is to analyze whether NOS is truly maximizing its value by following this risky financing strategy or if it could benefit more from adopting a more conservative approach. We will also determine the optimal capital structure in case the company decides to shift away from the strategy currently employed.

This chapter will begin with a literature review on capital structure and the theoretical grounds of the research. It will then describe the methodology used, including its theoretical basis and the models employed. At last, we will present the analysis and interpretation of the results.

Literature Review

There have already been developed four different principles on capital structure: the trade-off theory (Klaus & Litzenberger, 1973), the pecking order theory (Myers & Majluf, 1984), the signaling theory (Ross, 1977), and the market timing theory (Baker & Wurgler, 2002).

The trade-off theory asserts that the optimal capital structure can be obtained by balancing the benefits and the costs of the different financing sources, for instance, by balancing interest tax shields and the bankruptcy costs. The optimal capital structure will then vary between companies depending on factors such as industry, risks and taxes. Many aspects align with the model, however according to the model, borrowing would increase with a company's profitability, which is not the case.

The pecking order theory states that managers prefer to minimize dependence on outside financing, prioritizing internal sources of financing such as retained profits. Thus, there is a hierarchy in the use of funds. Internal funding is utilized first. If these funds are insufficient, managers will use debt, prioritizing safer options such as senior debt. When it is not advisable to take on more debt, the company then considers equity financing.

The signaling theory arises from asymmetric information between the company's managers and shareholders. If management believes that the company's stock is undervalued, they will finance their investments using debt first to showcase the company's strength, and issue equity as a final option. On the contrary, if management believes that the stock is overvalued, they will prioritize equity financing first.

The market timing theory asserts that companies strategically choose when and which type of financing to use depending on market conditions to optimize the company's value. Specifically, companies will issue equity when their share prices are high and opt for debt financing when their share prices are low.

The traditional approach states that financial leverage can reduce a company's weighted average cost of capital (WACC), thereby increasing its value. Debt financing is generally obtained at lower cost of capital compared to equity financing, which is more expensive and raises the company's overall cost of capital. This increase in cost of capital raises the discount rate applied to the firm's cash flows, lowering its value (Chamber & Lacey, 2014). Thus, according to this approach, a company's value is influenced by its capital structure, and it is possible to determine the optimal capital mix (Shapiro & Balbirer, 2000). Moreover, under the traditionalists' approach, managers should identify the level of debt and equity financing that minimizes the overall cost of capital while maximizing the company's value.

The agency cost approach suggests that the optimal capital structure is one that minimizes the combined agency costs associated with financing sources, equity and debt. Increasing leverage initially decreases agency costs up to a certain level of debt, beyond which further increases in debt result in higher agency costs. Thus, the capital structure that minimizes the total agency costs would be the optimal.

Extensive literature regarding optimal capital structure includes notable contribution, such as:

- Leland & Toft (1996) developed a model that suggests that optimal leverage depends on debt maturity, which is lower when short-term is used.
- Vilauso and Minkler (2001) created a dynamic model suggesting that the optimal capital structure is composed of both, equity and debt, and minimizes agency costs.
- Mao (2003) created a model that addressed risk-shifting and under-investment.
- Ju et al. (2005) developed a dynamic model, highlighting strategic reduction of initial leverage to avoid bankruptcy.
- DeMarzo and Fishman (2007) states that the optimal capital structure is composed of equity, long-term debt and a line of credit.
- Bessler et al. (2011) suggest that the optimal capital structure is obtained by balancing debt and equity costs of debt.
- Binsbergen et al. (2011) provides formulas for the approximation of cost of debt, leading to the optimal amount of debt.
- Craven and Islam (2013) state that debt-equity ratio affects company value, highlighting the importance of finding optimal debt.
- Park (2015) finds that firms with volatile earnings prefer issuing shorter debt to balance bankruptcy costs and tax benefits.
- Mu et al. (2017) investigated capital structure with moral hazard, relating higher debt issuance and earlier defaults with moral hazard.
- Palmowski et al. (2020) extended the Leland-Toft optimal capital structure model and obtained an optimal bankruptcy strategy and the respective equity/debt/firm values.
- Adeoye et al. (2021) states that the optimal capital structure that minimizes agency costs is the one with higher debt and lower cost of equity, developing a model which integrates capital structure, corporate governance and agency problems

Despite all these contributions, these models lacked the ability to produce a firm specific capital structure recommendation and evaluate financing alternatives effectively. Thus, these paper aims to delete that gap and to propose an innovative model for the capital structure optimization.

Methodology

For the solving of scientific problems in this paper, mathematical modeling and mathematical optimization theory was applied.

Mathematical models represent real-world problems in equations, allowing the analysis of the problem within a formal structure (Cook & Russel, 1989). The authors of this study evaluated long-term financing options presented to companies by identifying the variables impacting the effective cost of long-term financing and defined a relationship. The determination of the effective cost of capital also used mathematical models.

Mathematical optimization, defined as finding the best solutions to mathematical problems (Snyman, 2005) is used to determine the optimal capital structure. The linear programming model is comprised of an objective function, four constraints and nonnegativity conditions. The objective function is a mathematical expression that measures the effectiveness of a solution for the optimal capital structure problem. The constraints are mathematical statements which specify such elements of the problem as the limitations of available long-term sources. The bounds of the constraints are defined according to vertical rule of financing, conservative vertical rule of financing and the findings from empirical analysis of capital structure.

Due to lack of principles and assumptions, the authors also looked at the data of Croatian, Slovenian and Czech joint-stock companies, which are listed on the capital markets, to analyze how the shares of long-term debt and short-term debt are related.

1.   Effective cost of sources financing

This section includes equation models in order to calculate the effective cost of equity and long-term debt. By determining these variables, we can ascertain the cost of capital, which is the key factor in decision-making regarding raising new capital.

   1.1. The effective cost of equity

When raising common equity, a company can decide to issue new shares of common stock or reinvest its earning.

The effective cost of new common stock can be obtained by:

$$k_e = \frac{\sum costs\ of\ financing\ by\ stocks}{net\ proceeds}$$

Now, expressing in terms of independent variables:

$$k_e = \frac{[P_r \times (1 - k) - D_{ps} + AC_e]}{(s \times P_0 - FC)}$$

where the independent variables impacting the effective cost of new common stock are net profit (P_r), rate of retained earnings (k), dividend for the existing preferred stock (D_{ps}), agency costs of equity (AC_e), number of stocks (s), value of common stock (P_0), and floating costs (FC).

The sales-to-asset ratio measures the company's management effectiveness in utilizing its assets. The equity agency costs can be directly determined from the sales-to-asset ratio since the two are inversely related.

So, the sales to assets ratio is expressed as follows:

$$Sales\ to\ Asset\ Ratio = \frac{Annual\ Sales}{Total\ Assets}$$

And equity agency costs can be determined as follows:

$$Equity\ Agency\ Costs = \frac{1}{Sales\ to\ Asset\ Ratio} = \frac{1}{\frac{Annual\ Sales}{Total\ Sales}} = \frac{Total\ Assets}{Annual\ Sales}$$

That is, equity agency costs can be obtained as follows:

$$Equity\ Agency\ Costs = \frac{Total\ Assets\ (TA)}{Annual\ Sales\ (AS)}$$

1.2. The effective cost of long-term debt

For this paper, the authors analyzed simple interest bank loan, simple interest discounted loan, bank loan with compound interest, discounted bank loan with compound interest, and long-term debt obtained by issuing coupon bonds and annuity bonds.

The effective interest rate after tax for any long-term loan available to companies can be expressed as follows:

$$Effective\ interest\ rate\ after\ tax$$
$$= \frac{Nominal\ interest\ on\ face\ of\ long-term\ loan}{Net\ proceeds\ of\ long-term\ loan} \times (100 - profit\ tax\ rate)$$

Now, the formulas for the determination of the effective after-tax cost of long-term debt of each source will be showcased.

1.2.1. Simple interest bank loan

$$k_d = \frac{\sum_{j=1}^{n} \frac{\left(N_j \times \frac{i_1}{100} - C_{od} \times \frac{i_2}{100}\right)}{\left(1 + \frac{d}{100}\right)^j}}{\sum_{j=1}^{n} \frac{(N_j - CB - C_{od})}{\left(1 + \frac{d}{100}\right)^j}} \times (100 - t)$$

where k_d is the effective interest rate after tax, i_1 is the interest rate on debt expressed as percentage, i_2 is the interest rate on deposit, N_j is the nominal amount of debt in period j, CB is the amount of compensating balances, C_{od} is the amount of deposit, d is the discount rate and t is the profit tax rate.

1.2.2. Simple interest discounted loan

$$k_d = \frac{\sum_{j=0}^{n-1} \frac{\left(N_j \times \frac{i_1}{100} - C_{od} \times \frac{i_2}{100}\right)}{\left(1 + \frac{d}{100}\right)^j}}{\sum_{j=0}^{n-1} \frac{\left(N_j - N_j \times \frac{i_1}{100} - CB - C_{od}\right)}{\left(1 + \frac{d}{100}\right)^j}} \times (100 - t)$$

where k_d is the effective interest rate after tax, i_1 is the interest rate on debt expressed as percentage, i_2 is the interest rate on deposit, N_j is the nominal amount of debt in period j, CB is the amount of compensating balances, C_{od} is the amount of deposit, d is the discount rate and t is the profit tax rate expressed as percentage.

1.2.3. Bank loan with compound interest

$$k_d = \frac{\sum_{j=1}^{n} \left\{ \dfrac{\left[N_0 \times \frac{r^n(r-1)}{r^n-1} - (N_{j-1}-N_j) \right] - \left[C_{od} \times \left(1+\frac{i_2}{100}\right)^j - C_{od} \times \left(1+\frac{i_2}{100}\right)^{j-1} \right]}{\left(1+\frac{d}{100}\right)^j} \right\}}{\sum_{j=0}^{n-1} \dfrac{(N_j - CB - C_{od})}{\left(1+\frac{d}{100}\right)^j}} \times (100-t)$$

where $r = 1 + \frac{i_2}{100}$, N_0 is the principal, n is the number of annuities, N_j is the nominal amount of debt in period j, i_1 is the interest rate on debt expressed as percentage, i_2 is the interest rate on deposit, CB is the amount of compensating balances, C_{od} is the amount of deposit, d is the discount rate and t is the profit tax rate.

1.2.4. Discounted bank loan with compound interest

$$k_d$$

$$= \frac{\left(\frac{N_0 \times i_1}{100} - \frac{C_{od} \times i_2}{100}\right) + \sum_{j=1}^{n-1} \left\{ \dfrac{\left[N_0 \times \frac{\rho^{n-1}(\rho-1)}{\rho^n-1} - (N_{j-1}-N_j) \right] - \left[C_{od} \times \left(1+\frac{100}{100-i_2}\right)^j - C_{od} \times \left(1+\frac{100}{100-i_2}\right)^{j-1} \right]}{\left(1+\frac{d}{100}\right)^j} \right\}}{\sum_{j=0}^{n-1} \dfrac{(N_j - I_j - CB - C_{od})}{\left(1+\frac{d}{100}\right)^j}}$$

$$\times (100-t)$$

Where $I_j = N_0 \times \frac{\rho^{n-1}(\rho-1)}{\rho^n-1} - (N_{j-1}-N_j)\rho = \frac{100}{(100-i_1)}$, N_0 is the principal, n is the number of annuities, N_j is the nominal amount of debt in period j, i_1 is the interest rate on debt expressed as percentage, i_2 is the interest rate on deposit, CB is the amount of compensating balances, C_{od} is the amount of deposit, I_j is the interest for period j, d is the discount rate and t is the profit tax rate expressed as percentage.

1.2.5. Coupon bonds

$$k_b = \frac{\sum_{j=1}^{n} \dfrac{\frac{i}{100}}{\left(1+\frac{d}{100}\right)^j}}{\sum_{j=1}^{n} \dfrac{\left(1 - \frac{d_0}{100} + \frac{p}{100} - \frac{fc_b}{100}\right)}{\left(1+\frac{d}{100}\right)^j}} \times (100-t)$$

where i is the interest rate on debt, d_0 is the bond discount, p is the bond premium, fc_b are flotation costs, d is the discount rate and t is the profit tax rate.

1.2.6. Annuity bonds

$$k_b = \frac{\sum_{j=1}^{n} \dfrac{\left[N_0 \times \frac{r^n(r-1)}{r^n-1} - (N_{j-1}-N_j) \right]}{\left(1+\frac{d}{100}\right)^j}}{\sum_{j=1}^{n} \dfrac{\left(N_j - N_0 \times \frac{d_0}{100} + N_0 \times \frac{p}{100} - N_0 \times \frac{fc_b}{100} \right)}{\left(1+\frac{d}{100}\right)^j}} \times (100-t)$$

where $r = 1 + \frac{i}{100}$, i is the interest rate on debt, N_0 is the face value of a bond, N_j is the nominal amount of debt in period j, d_0 is the bond discount, p is the bond premium, fc_b are flotation costs, d is the discount rate and t is the profit tax rate.

The real rate of interest, which represents the actual cost of long-term debt financing is calculated using the previous equations. When deciding which financing source to utilize, managers should consider all available options, and choose the one with the lowest effective cost. This cost will represent the true financing expense for the firm.

2.   The model

To construct the model, the authors took into consideration both capital cost and corporate value to determine the optimal capital structure. The model aims to identify the capital structure that minimizes the capital cost while maximizing the corporate value. It achieves this by calculating the effective costs of capital structure components and the overall cost of capital, considering taxes, bankruptcy costs, agency problems and information asymmetries, ultimately selecting the best capital structure. The model involves equations for calculating the required capital, determining the effective cost of equity and long-term debt, a linear programming model to maximize the overall cost of capital, and an equation model for corporate value.

Capital structure comprises the combination of equity and long-term debt a company uses to fund its assets and future growth, while current liabilities finance current assets. According to the matching principle, long-term financing should be used for long-term and permanent assets, while short-term debt should finance short-term assets.

Thus, the total capital needed is expressed as follows:

$$Equity + long\ term\ debt = long\ term\ assets + permanent\ current\ assets$$

$$Short\ term\ liabilities = temporary\ current\ assets$$

The cost minimization problem will determine the optimal mix of long-term financing, considering market imperfections. The linear programming model will then determine the proportions of new equity capital and long-term debt that minimize the overall cost of capital, which is used as the discount rate in the mathematical model for determining the corporate value.

2.1. The linear programming model

To obtain the optimal capital structure, the maximization approach is utilized. The defined linear programming model that minimizes total costs of capital is comprised of an objective function and a set of constraints.

The objective function defines the overall cost of capital in terms of the share of new equity capital in total capital, the share of new debt capital in total capital and constants u1, u2 and u3 representing the share of the existing equity capital, the share of the existing preferred capital, and the share of the existing long-term debt capital in total capital.

The first constraint forces the sum of the constants, the share of new equity capital and the share of new debt capital in total capital to equal 1.

The second constraint, referring to the total equity capital, indicates that the sum of the share of the existing equity capital in total capital (u_1), the share of new equity capital in total capital (w_{e1}) and the share of the existing preferred capital in total capital (u_2) is no less than 0.56 and no more than 0.71.

The third constraint reflecting the total debt capital indicates that the sum of the share of the existing long-term debt capital in total capital (u_3) and the share of new long-term debt capital in total capital (w_{d2}) is no less than 0.29 and no more than 0.44.

The bounds in the second and third constraints are defined by the vertical financing rules and the determined ratio of long-term to short-term debt in the financial structure, which is 2:3. The vertical rule of financing sets a debt-to-equity ratio of 2:1, meaning total debt should not exceed 66.67% of total capital, and equity should be at least 33.33%. This defines equity as more than 56% and long-term debt as less than 44% of total capital. The upper limint of total equity capital and the lower limit of total long-term debt are defined using the conservative vertical rule of financing. The conservative vertical rule of financing sets a debt-to-equity ratio of 1:1, meaning total debt should not exceed 50% of total capital, and equity should also be at least 50%. This defines equity as less than 71% and long-term debt as more than 29% of total capital.

The fourth constraint, which reflects the share of new equity capital in total capital, mandates that it must be at least 5 percent of the share of new long-term debt in total capital. This ensures that the optimal capital strucuture includes both long-term debt and equity financing, thus minimizing the sum of agency costs.

Thus, the following linear programming model solves the optimal capital structure problem:

$$z(w_{e1}, w_{d2}) = min(k_{e1} \times u_1 + k_{e2} \times w_{e1} + k_p \times u_2 + k_{d1} \times u_3 + k_{d2} \times u_{d2})$$

Subject to the constraints

$$\sum_{i=1}^{3} u_i + w_{e1} + w_{d2} = 1$$

$$0.56 \leq u_i + w_{e1} + u_2 \leq 0.71 \Leftrightarrow 0.56 - u_i - u_2 \leq w_{e1} \leq 0.71 - u_i - u_2$$

$$0.29 \leq u_3 + w_{d2} \leq 0.44 \Leftrightarrow 0.29 - u_3 \leq w_{d2} \leq 0.44 - u_3$$

$$w_{e1} \geq 0.05 w_{d2}$$

nonnegativity constraints

$$w_{e1} > 0$$

$$w_{d2} \geq 0$$

where k_{e1} is the effective cost of existing equity capital, k_{e2} is the effective cost of new equity capital, k_p is the effective cost of preferred capital, k_{d1} is the effective cost of the existing long-term debt capital, k_{d2} is the effective cost of new long-term debt capital, w_{e1} is the share of new equity capital in total capital, w_{d2} is the share of new long-term debt, u_i are the constants – the shares of the existing equity capital and preferred capital, and the share of the existing long-term debt in total capital.

The solution of the linear programming model will provide the values of the decision variables, the share of new equity capital in total capital (w_{e1}) and the share of new long-term debt capital (w_{d2}), which minimize the overall cost of capital.

The minimized overall cost of capital (OCC_real) is obtained as follows

$$OCC_{real} = k_{e1} x u_1 + k_{e2} x w_{e1} + k_p x u_2 + k_{d1} x u_3 + k_{d2} x u_{d2}$$

where k_{e1} is the effective cost of existing equity capital, k_{e2} is the effective cost of new equity capital, k_p is the effective cost of preferred capital, k_{d1} is the effective cost of the existing long-term debt, k_{d2} is the effective cost of new long-term debt, w_{e1} is the share of new equity capital, w_{d2} is the share of new long-term debt in total capital, u_i are the constants.

2.2. Corporate value

Corporate value can be determined from the expected cash flows discounted at the overall cost of capital, which is minimized.

$$V = -I + \frac{FCF_1}{(1+OCC_{real})^1} + \frac{FCF_2}{(1+OCC_{real})^2} + \frac{FCF_3}{(1+OCC_{real})^3} + \frac{FCF_4}{(1+OCC_{real})^4} + \frac{FCF_5}{(1+OCC_{real})^5} + \frac{Terminal\ Value_{after\ five\ years}}{(1+OCC_{real})^5}$$

where I is the investment, FCF_n is the cash flow in year n, TV is the terminal value and OCC_{real} is the overall cost of capital. This equation implies that the value obtained is the maximized value.

Results

In this section, the results will be presented.

Table 1 – Description of variables

			Assumption
Pr	net profit	148000	in thousands, 2023YE
k	rate of retained earnings	-0.05	team estimates
Dps	dividend for existing preffered stocks	0	
ACe	agency costs of equity	2.389	
s	number of common stock	515161	in thousands, NOS' data
P0	value of common stock	3.27	as of January 12th
FC	flotation costs	125	in thousands, NOS' data
	interest coverage	3.3	team estimates
rf		2.14%	normalized 10Y german government bond yield
	default spread	2.21%	according to Damodaran
t	tax rate	22.50%	

Source: Student's estimates

By applying the formula for the determination of the cost of equity, using the data estimated by our team in the previous chapter, we arrive at a cost of equity equal to 9.23%. This value is higher than the existing cost of equity of 8.40%, indicating an increase in the company's overall cost of capital.

Due to lack of specific data for the calculation of the costs of debt of the different long-term financing sources – simple interest bank loan, simple interest discounted loan, bank loan with compounded interest, discounted bank loan with compound interest, coupon bonds, and annuity bonds we approximated it using Damodaran's synthetic rating approach. With an interest coverage ratio of 3.3 in 2023E and considering NOS as a non-financial service company with small market capitalization (<$5billion), we estimated a typical default spread of 2.21%. Combining with a risk-free rate of 2.14% and a tax rate of 22.5% we obtain an after-tax cost of debt equal to 3.37%, slightly higher than the original cost of debt of 3.21%.

With both the cost of capital and cost of debt obtained, we were able to apply the linear programming model aimed at minimizing the overall cost of capital while maximining the company's value. The

constraints were maintained, considering the common practice in Portuguese companies do follow the vertical financing rule, aiming to keep an debt to equity ratio lower than of 2:1. Using Excel's function "Solver" we were able the determine the optimal values for the decision variables, w_{e1} and w_{d2}, reaching the values of 33.40% and 4.94%, respectively.This would lead to an optimal capital structure composed of 44% long-term debt and 56% equity.

The linear programming model was constructed as follows:

Table 2 – Linear Programming model

min	0.0923	0.0337	0.0325				
s.t.	1	1	0.3834	=	0.3834		
c1	1	0	0.3340	>=	0.3340	<=	0.4840
c2	0	1	0.0494	>=	-0.1006	<=	0.0494
c3	1	-0.05	0.3316	>=	0		
c4	1	0	0.3340	>=	0		
c5	0	1	0.0494	>=	0		
	0.3340	0.0494					

Source: Student's estimates

These decision variables resulted in an overall cost of capital of 6.40%, which is higher than the previous 6.04%. Discounting the cash flows projected in the previous section at the new cost of capital, we obtain a significantly lower Enterprise Value of €1,750,084 compared to the original estimate of €4,258,570.

Table 3 – Enterprise Value calculation

Year		2024F	2025F	2026F	2027F	2028F	2029F	2030F	TV
FCFF Telco		260889	267019	278652	283776	280048	271682	263872	192802
FCFF A&C		19582	20250	21432	22215	22391	22204	22054	16114
FCFF		280471	287269	300084	305991	302439	293886	285926	208916
		263600	253749	249125	238748	221782	202547	185208	135325
Enterprise Value	1750084								

Source: Student's estimates

However, the significant decrease in enterprise value when adopting the conservative approach can be attributed to the weighted average cost of capital (WACC) calculation. Initially, WACC was derived by averaging segment-specific WACCs—5.90% for Telco and 8.03% for A&C. By recalculating WACC under the new optimal capital structure, larger cash flows from Telco were discounted at a higher WACC, thereby influencing the lower enterprise value obtained.

In conclusion, capital structure analysis is pivotal as it profoundly impacts a company's overall success. This research was aimed to evaluate NOS's current capital structure and assess whether it can be optimized. While existing literature on corporate structure provides comprehensive insights, it lacks the ability to provide a firm-specific optimal capital structure optimization.

To address this gap, the study followed the model outlined in *Capital structure optimization: a model of optimal capital structure from the aspect of capital cost and corporate value* (Eleonora Kontuš, Kristina Šorić & Nataša Šarlija 2023). This model aims to calculate the optimal capital structure by balancing cost of capital and enterprise value.

However, several limitations were encountered in the study. First, the lack of detailed data made it challenging to accurately determine the firm-specific optimal capital structure, particularly in calculating the costs associated with different sources of debt. Additionally, accounting for how changes in the long-term capital structure would impact the short-term capital structure—and consequently the overall enterprise value—proved difficult. These challenges limited the precision of the model's outcomes. To address this challenges, approximations were used, which may have affected the precision of the model's outcomes.

Nevertheless, the analysis reveals that NOS benefits from the risky financing strategy currently employed, since NOS' original enterprise value is significantly higher than the one obtained by following the model. The company's reputation and ease in accessing capital markets, allow for a lower cost of capital and thus, higher enterprise value. However, applying a more conservative approach, focused on long-term debt, would involve financing capital needs leading to an optimal capital structure composed of 44% long-term debt and 56% equity, compared to the current capital structure comprised of c.63% long-term debt and c.37% equity. This adjustment would reduce enterprise value substantially, underscoring the impact of capital structure decisions on corporate performance.

In essence, NOS benefits from its current financing choices and adopting a more conservative capital structure, focused on long-term debt instead of short-term, would reduce the company's enterprise value. With this study, we highlight the importance of capital structure analysis and how its change can highly impact the company's value.

Appendix A: NOS' Equity Research

Table 4 - NOS.LS Overview

| Company Name	NOS SGPS, S.A.
Price Target (2024YE)	**€4.15**
Upside	27%
Closing Price (Jan 12, 2024)	€3.27
Stock Exchange	Euronext Lisbon
Industry	Telecommunication
Ticker (Refinitiv)	NOS.LS
52w Price Range (€)	3.13 – 4.46
Average Volume (Th)	466,178
Shares Outstanding	511M
Market Cap (Jan 12th, 2024)	1.69B
Free Float	36%
Dividend Yield	8.5%

* As of January 12th
Source: Team Estimates, NOS' data, Refinitiv
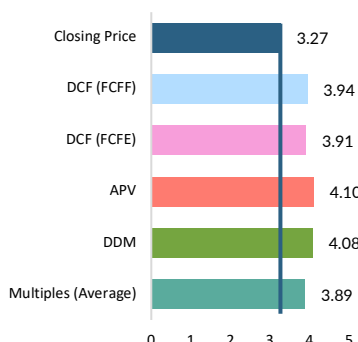
Figure 1 - CAPEX/EBITDA
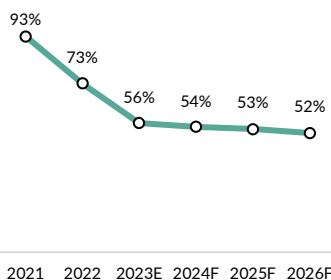
Source: Team Estimates

Figure 2 – EV/EBITDA
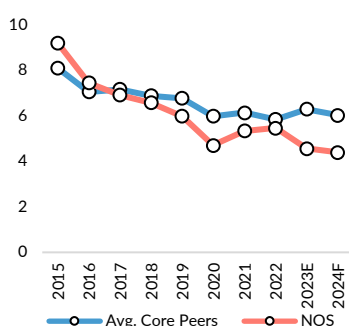
Source: Refinitiv

Figure 3 – Valuation Summary

Source: Team Estimates

NOS: Disconnected From Its Value

NOS is a prominent and well-established entity in the Portuguese Telecommunications Market, dedicated on enhancing connectivity through advanced technology. With a steadfast commitment to innovation, NOS is poised for future growth, anticipating an upward trajectory in its share price.

Investment Summary

We initiate our report on NOS SGPS, S.A., a prominent player in the Portuguese telecommunications sector, with a BUY recommendation, based on a price target of €4.15/share for 2024YE derived from a DCF model. This forecast suggests a potential upside of 27% from the closing price of €3.27/sh on January 12th, 2024 (Table 4) with a medium-low risk. Our recommendation is supported by three fundamental pillars.

PILLAR 1 | Free Cash Flow to pick up as Capex Normalizes

Following an intensive investment phase focused on expanding Fiber and 5G networks, NOS has completed a substantial **Capex cycle from 2019 to 2022**, totaling €1.74bn, averaging **€495M per year** (excluding the exceptional year of 2020). With the majority of this expansion concluded, we anticipate gradual normalization of Capex towards a **long-term plateau of €350M**. Strong cash flow enables the ongoing shareholder distributions without compromising financial stability. Since 2019, shareholders have received a steady dividend (0.27€/sh). As Capex normalizes, **we anticipate a rise in NOS' payout by +0.055€/share (**potential dividend yield boost of 150 bps**)**. Projections based on Capex/EBITDA support this outlook (Figure 1).

PILLAR 2 | Room to Entry but Bundles Make the Market!

It has been acknowledged for some time that Digi Communications from Romania is entering the Portuguese telecom scene. From our viewpoint, the market is overestimating the potential threat posed by Digi's entry. The **oligopolistic characteristics** of the **Portuguese market** (3 dominant players), with service **penetration rates of >90%** and a strong consumer **preferences** for **bundled services** create **significant barriers for new entrants**. These barriers include the challenge of meeting the diverse demands of convergent customers. Digi's primary strategy targets consumers specifically interested in internet connectivity alone, while for NOS this represents a niche and constitutes a a small fraction of the business. ANACOM, the regulatory body, aims to foster competition in the market. Yet, its is important to consider that Portuguese consumers generally favor an established Portuguese company over a new foreign player from Eastern Europe. An example is NOWO, a Spanish company within the Másmóvil group. Despite offering bundled services priced 20%-30% lower than incumbents like NOS, NOWO has only achieved a market share of 3%. While there is room for market liberalization, we anticipate that the market share of the big 3 players will remain largely intact.

PILLAR 3 | Attractive Valuation vs. Peers

Using a DCF model based on the FCFF with a Sum-of-Parts (SoP) approach, we reached a price target of €4.15/sh, indicating a potential 27% upside. This upside aligns with an average cost of equity capital of 8.4%, promising value creation for investors. Moreover, NOS currently trades at a significant discount compared to its peers, approximately **19% below** (Figure 2) pre-COVID-19 levels when it typically traded at, or slightly above, the **average multiples** of its **peers**. Despite concerns regarding the A&C segment, which accounts for c.7% of the overall revenue, the company has already surpassed its pre-pandemic Revenue, EBITDA, and FCF values, suggesting potential for adjustment in its multiples. Our EV/EBITDA valuation for 2024F points to a €4.59/share price target, while averaging four different multiples suggest **€3.89/sh**. Alternative valuation methods were also employed to support a buy recommendation, indicating further upside potential (Figure 3).

OUTLOOK | Market and NOS Forecasts

The telecom sector's growth hinges mainly on inflation-linked pricing due to high market penetration (Figure 12), with new technologies also driving growth. To avoid obsolesce, telecom companies must continue investing in Capex. NOS, peaked in Capex in recent years, expects a slowdown, but anticipates a rebound long term.

Bundle services remain fundamental, with consumers increasingly preferring comprehensive bundles over lower-cost limited features options. We expect a continuation of this trend, with the number of **4/5P bundles** consistently rising over the coming years. Currently, these constitute around **55%** of **total market bundles**, expected to **grow by 550bps** by the **end of the decade**. NOS is strategically positioned to benefit from this trend, focusing on expanding its convergent customer base, which has boosted **EBITDA margin** by 300bps from 2018 value to **42.8%** 2023E, expected to stabilize around 43.3% in period 2024F-2030F. In contrast, **competitors**' average lower **EBITDA margin** of **37.4%**. The market is shifting towards complete bundles, with NOS leading the change.

RISKS TO ACHIEVE PRICE TARGET

NOS is expected to maintain strong cash flows and a solid market position. Risks include easier entry for new players, and potential regulatory and market dynamic changes in the tech-related market. Competition from Vodafone and Altice could threaten market share and margins, though volatility has been minimal. Governance risks related to ZOPT's stake have not affected NOS directly (Table 9). Potential geopolitical events and the rise of cyber-attacks constitute additional concerns. Despite these factors, stress tests suggest NOS remains a buy-rated stock (Appendix 21).
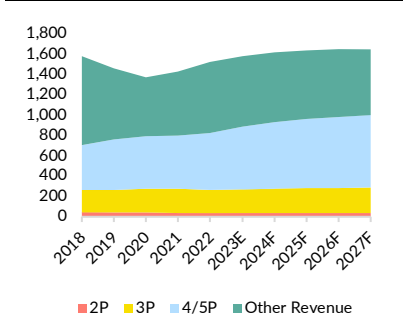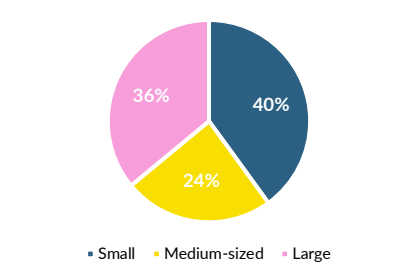
Figure 4 – Stock Evolution

Source: Refinitiv, Team Analysis

Figure 5 –Revenue Breakdown (Bundles and Other Revenue)
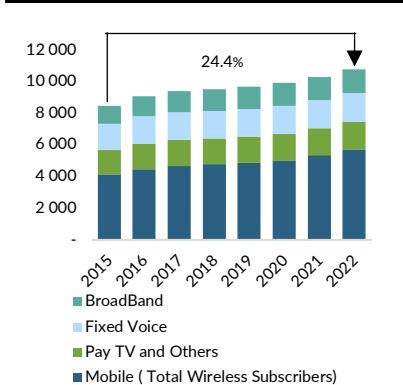

Source: NOS' data, Team Estimates

Figure 6 – B2B Revenue Sources

Source: NOS' data

Figure 7 - NOS' RGUs (number of units)

Source: NOS' data

Business Description

NOS, S.G.P.S., S.A. (NOS.LS) is a prominent Lisbon-based telecom company offering a range of services. Its Telco segment, which includes Fixed Pay TV, Fixed Voice, Fixed Broadband, Mobile, IoT and Data Management services generates about 92.3% of 2023E revenue. The remaining 7.7% comes from A&C, Audiovisuals and Cinema.

Established in 2013 through the merger of ZON Multimedia and Optimus, NOS aimed to capitalize on the rising trend of convergent offers in the industry. ZON, founded in 1999 after a compulsory spinoff mandated by the antitrust authority and primarily owned by Angolan businesswoman Isabel dos Santos, specialized on cable TV, internet, and landline services. On the contrary, Optimus, founded in 1998 and part of the Sonae group, was a leading mobile telecommunications operator in Portugal but faced growth challenges and lacked a TV presence. The merger combined ZON's dominance in Fixed Pay TV (over 40% market share) with Optimus's significant Mobile presence (c.18% market share), creating a comprehensive portfolio of services. NOS successfully launched ZON4i, an integrated package. Within three months of its launching, 89% of customers came from the existing Fixed Pay TV base, boosting NOS's mobile market share from 18% in to 28.9% as of 3Q2023.

Recently, NOS has focused on implementing the 5G technology. In 2020, NOS sold its tower management business, NOS Towering, to Cellnex for €375M upfront and an additional €175M over six years (€163M received in 2022). By leveraging its strong financial position, NOS invested €165M to secure the most 5G spectrum in ANACOM's auction, enhancing its capacity and data speeds to improve service quality and efficiency, aiming to boost customer retention. Additionally, NOS is exploring new revenue streams, especially in digital B2B, acting as an intermediary for cloud computing services like AWS, Azure, and Google CP.

Segments Breakdown

Telco | Since its creation in 2013, NOS has seen a revenue CAGR of 6% CAGR, and EBITDA margin increase from 35.7% to 41.2% (+550 bps). The company segments its Telco customers into Consumer, Business, and Wholesale. Fixed services include Fixed TV, Fixed Voice, and Fixed Broadband, which provide TV channels and streaming content, home phone lines, and fast and reliable internet, respectively. Mobile services include 4G and 5G access, roaming and hotspot solutions. Revenue is split between bundles (breakdown and forecast will be detailed later) and other revenue (Figure 5).

NOS has thrived with bundled services, where convergent customers (those using both fixed and mobile services) represent 69.0% of subscribers, growing from 384.6K subscribers (29% of total) in 2014 to of 1126K today (+192.77%, +12.7% CAGR). Consequently, total Telco RGUs (Revenue Generating Units) increased from 7.611M to 10.980M (+44.26%, +4.2% CAGR). Mobile RGU's have grown 95.5% since 2014, now accounting for over 50% of total RGUs, largely due to the rise in convergent customers. Fixed Broadband and Fixed Voice's RGUs increased by 69.8% and 41.8%, respectively. Conversely, Fixed Pay TV saw minimal growth (4%), due to already high market penetration at the time (Figure 7).

NOS' Business segment, which includes traditional telecom services and IoT and Data Management Solutions, accounts for 21.5% of Telco revenues, growing 17.2% since 2018. Despite this growth, most Portuguese firms SMEs show little interest in IoT and Data Management solutions, posing challenges for expansion in these services. As of November 2023, NOS' business customers consisted of 40% small businesses, 24% mid-size companies, and 36% large corporations with volatile revenue profiles and a focus on large project (Figure 6).

The wholesale segment, making up 6.5% of Telco, provides telecommunication services to other operators, roaming revenues from other operators' customers using NOS' networks, and value-added call revenues, including cloud-computing, data centers, IT services and other IoT services.

A&C | Audiovisuals and Cinema's unit oversees production, distribution, and exhibition of content on TV and cinemas. The unit had its strongest quarter ever in 3Q2023, with €32.2 million in revenue, €15.4 million in EBITDA and a 57.4%YoY increase in ticket sales, attributed to blockbusters like Barbie, Oppenheimer, Mission: Impossible, and Elemental. Despite its lower overall importance, NOS values this segment for its differentiation factor and plans to retain it. The strong recovery from the COVID-19 period, which severally impacted the segment, demonstrates continued demand for cinema despite the rise of streaming platforms (Figure 8).

Company Strategies

Lead in 5G | Despite regulatory hurdles, NOS is committed to leading in 5G technology aiming to enhance service-quality and minimize customer turnover, a common challenge in telecom. Following the 2021 5G auction, NOS secured leadership in 5G spectrum frequencies, critical for data-intensive applications in the current digital era. The 5G network already covers over 90% of their customer base.

Lead in Customer Experience | Digitalization is pivotal for transforming customer experience, and NOS aspires to lead this evolution by seizing growing digital opportunity. NOS, strong on innovation, is advancing its B2B strategy to become a primary partner for Portuguese companies looking to embrace digital transformation.

Deepen Customer Relationships | With a strong presence in the Portuguese telecommunications and potential new competitors, retaining customers is a challenge to NOS. To address this, NOS plans to deepen customer relationships by introducing new consumer services like alarms and expanding its enterprise side through digital transformations partnerships.

Key drivers of profitability

Convergent customers | The merger that created NOS aimed to shift towards convergent offers, where customers subscribe to a bundle including Fixed Pay TV, Fixed Broadband, and Mobile services. These customers play a crucial role in boosting NOS's revenue and profitability, and have grown, as a share of total subscribers, from 29.2% in 2014 to 69.0% as of 3Q2023 (Figure 9), driven by the successful upselling strategy.

Figure 8 – Cinema tickets sold
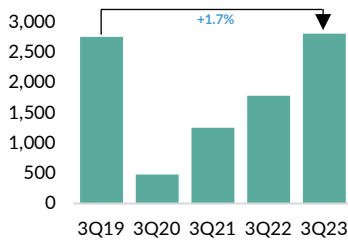
Source: NOS

Figure 9 –Convergent Customer Growth
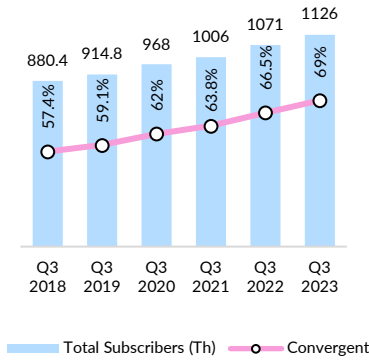
Note: Convergent customers – bundled consumers with fixed and mobile services.
Source: NOS' data

Figure 10 – Market Share Evolution
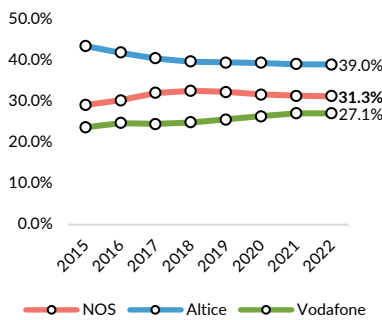
Source: ANACOM

Figure 11 – FTTH penetration in Europe in 2023
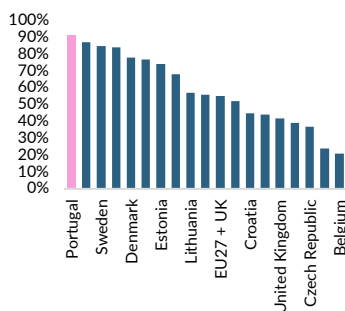
Source: FttH Council Europe Market Intelligence Committee and Moody's Investors Service

Figure 12 – 3Q23 Service Penetration
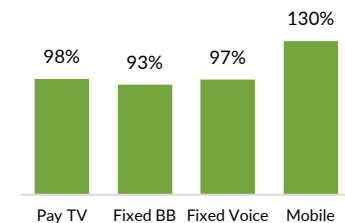
Source: ANACOM data

Ability to maintain above-market EBTIDA margins | NOS has consistently outperformed peers in EBITDA performance, supported by the adoption of Artificial Intelligence for Robotic Processes of Automation (RPA) to enhance efficiency and financial performance in a mature and saturated market. This is evident in the EBITDA margin spike from 35.7% in 2013 to 44.28% in 2023E exceeding peers' average of 37.4% (Table 12), crucial for sustained profit growth and financial robustness.

Infrastructure sharing partnerships | NOS and Vodafone agreed to share network infrastructure, targeting 2.6M households evenly. The collaboration aimed to boost cost efficiency by avoiding redundant investments in network coverage and allowed both companies to expand their network reach to over 30% of households nationwide, without additional capital expenditure, offering a strategic advantage to both entities.

Industry Overview and Competitive Positioning

Economic Outlook

In 2022, Europe faced an armed conflict triggering an energy crisis and exacerbating inflation to 7.8% in 2022. The ECB's increased interest rates aimed at curbing inflation raised borrowing costs, impacting the heavily leveraged telecom sector. Additionally, telecom prices in the EU rose by 0.9% YoY (on average, from September 2022), while Portuguese prices increased by 2.9%, exceeding the EU average by 200bps. Despite these challenges, Portuguese real GDP grew 6.7%, surpassing the EU average of 3.61%, with the unemployment rate rising to 6.1% in Q3 2023 (+30bp YoY).

Telco Sector

The European Telco sector operates under liberal market policies aimed at promoting competition. Despite EU's digital development goals, telecom companies face profitability pressures, demand and pricing uncertainties, and value erosion of existing technologies which compels high investments. To face these issues, there is a trend of vertical separation of the value chain (decoupling), expected to continue over the next decade. While this strategy can enhance market capitalization and efficiency, it also invites non-EU players.

In Portugal, telecom expansion includes 92.5% FttH coverage and the robust 5G deployment, one of the highest values in the EU, exemplified by NOS covering over 90% of its customer base. Households demand increasingly favors bundled services, with penetration at 92.8% by 1H2023, up from around 2.5M subscribers in 2013 to around 4.7M today.

In the domestic mobile services market, penetration rates have reached 180% (130% considering only effective usage, excluding M2M). Fixed services also show high penetration rates: Fixed Voice at 97%, Fixed Broadband at 93% and Fixed Pay TV at 98%.

Market Overview

The Portuguese Telecommunications industry, dominated by Altice (38.8%), NOS (31.6%), and Vodafone (27.2%), is mature, with steady growth evidenced by a 3.64% YoY revenue increase, following a 2.34% growth in 2021 (Figure 10). NOS targeted mobile services expansion within its fixed customer base, raising its mobile market share from 23.1% in 2016 to 29.5% by 3Q23, thought this shift favored Vodafone in other segments.

The market is characterized by price sensitive consumers and notable churn rates. Smaller competitors, such as NOWO and LYCAMOBILE, conquered a small market share using Mobile virtual network operator (MVNO) agreements. They benefited from cost leadership strategies (20% to 30% below market prices) but have struggled to gain significant market share. Since 2017, NOWO's market share decrease by 90bps, and LYCAMOBILE share remains marginal. This highlights the high barriers to entry and the advantage held by well-established players. Recently, Vodafone announced plans to acquire NOWO, a move still under investigation by ANACOM without disclosed pricing.

The expected entry of Digi, focused on internet offers, prompted NOS to launch WOO service package (internet standalone), to which Vodafone responded with "amigo" (internet standalone). Digi's successful entry in Spain contrasts with the Portugal's more developed and well-served market with higher FttH coverage (90% vs Spain's, at the time, below 30%). Digi's budget-friendly approach could impact market pricing and dynamics.

Additionally, satellite providers such as Starlink and SpaceMobile aim to overcome telecom limitations by offering internet via satellite links by 2025, potentially disrupting the industry. Regulatory delays might affect their availability in Portugal, however they could become significant global competitors.

Supply drivers

Regulatory incentives | ANACOM, the regulatory authority, promotes fair competition in the telecom sector by setting regulations to encourage innovation, improved services, and competitive pricing, and imposing strategic goals on companies to expand offerings, improve network infrastructure, and invest in technology. In 2022, it approved the BEREC draft to flatten Altice's cost of capital rise by over 150bps to ensure investment incentives, prevent anti-competitive practices, and protect consumers from excessive pricing.

Operational efficiency improvement | Telecom companies are optimizing operations and reducing costs in key areas, namely network infrastructure, equipment procurement, and energy use. They are adopting technologies like cloud computing and artificial intelligence to streamline processes and improve profitability.

Technology | The integration of advanced technologies is essential for expanding supply. Investments in new tech, including 5G, IoT, AI-driven services, and cloud platforms significantly enhance supply capabilities. Besides optimizing costs, these technologies enable innovative services, extend connectivity, and improved operational efficiency, boosting overall supply potential.

Figure 13 – TTM Bundle Revenue per Player
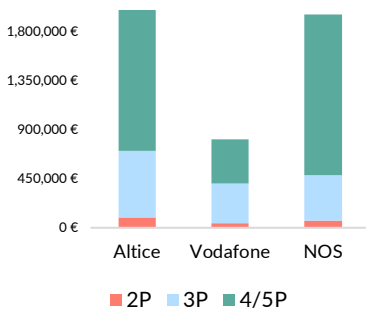
Source: ANACOM data

Figure 14 – Cyberattacks recorded in Portugal
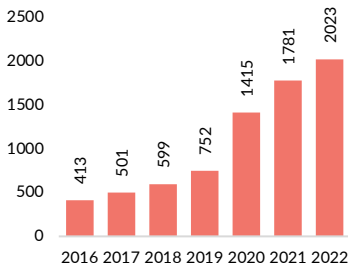
Source: CNCS

Figure 15 – PESTEL Analysis
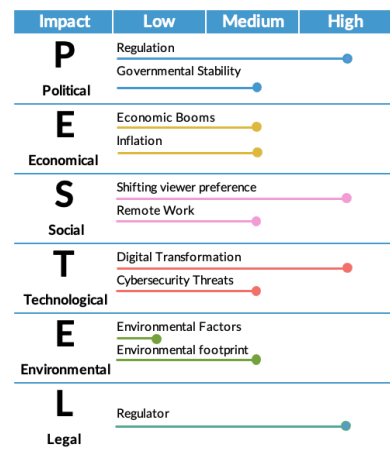
Source: Team Analysis

Figure 16 – Porter's 5 Forces
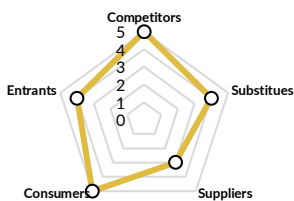
Source: Team Analysis

Table 6 – SWOT Analysis

Strengths	Weaknesses
Established Infrastructure	Rural Connectivity
Market Reputation	Saturated Market
Diversified Offerings	Economic Conditions
High Penetration	Regulations
Opportunities	**Threats**
More Efficient Networks	New Entrants
Emerging Technologies	New Substitutes
Improved Customer Experience	Cybersecurity
Strategic Partnerships	Changing Consumer Preferences

Source: Team Analysis

Demand drivers

Changing consumer preferences – Changing consumer preferences, driven by mobile data reliance (+5.34% YoY 2023-2027, Economist Intelligence Unit), and the rise in remote work culture, intensifies the need for better internet and data services. Demand also rises for larger bundles including extra services, such as streaming platforms. By 2030, 4/5P bundles are expected to reach 61% of market share, up from 55%. Telecom firms meeting the need for reliable, high-speed data solutions will see increased demand.

Technological advancements and increased connectivity – The telecom industry thrives on innovation to meet consumer demand for improved network speeds, wider coverage, and pioneering services. According to ETNO, total European Mobile 5G coverage grew from 13% in 2019 to over 70% in 2022, reflecting consumer preferences for high-speed internet, expansive coverage, and steadfast connectivity. Providers excelling in these areas capitalize on this demand and are preferred choices for robust connectivity solutions.

Privacy and Security – In Portugal, cyber-attacks surged by 30.3% CAGR from 2016 to 2022 (Figure 14), driven by increasing data value and complex cyber threats. This has boosted demand for stronger privacy, security, and resilience in the telecom sector. Effective management of these challenges is crucial for operators to safeguard trust, lead the industry's evolution and protect their brand reputation.

PESTEL Analysis

Political | ANACOM ensures fair competition and regulatory compliance, fostering innovation and competitive pricing in telecom. Moreover, stable government policies encourage substantial investments in infrastructure and innovation.

Economical | Economic upswings drive higher spending on communication services due to higher disposable income, but inflation and borrowing costs can hinder growth due to the sector's high infrastructure investment needs.

Social | Shifting viewer preferences from TV towards on-demand streaming and the increased mobile data usage indicate a demand for flexible and personalized content. Moreover, Remote work intensifies the need for reliable broadband services.

Technological | Digital transformation in telecom enables innovation, but it necessitates enhanced cybersecurity measures to protect consumer data and infrastructure.

Environmental | Environmental factors, such as weather events, can affect service reliability and consumer experience. Moreover, companies aim to minimize their environmental footprint by adopting eco-friendly practices during infrastructure upgrades.

Legal | ANACOM oversees telecom regulations, protects consumer rights with data laws, ensures pricing transparency, fair contract management, and regulates mergers and acquisitions to prevent anti-competitive behavior.

Competitive Positioning

Rivalry Among Competitors - HIGH | The Portuguese Telecom market, dominated by ALTICE, NOS, and VODAFONE, sees limited price competition due to its oligopolistic nature. These entities focus on expanding market share through intensive advertising and strategic partnerships. Mergers and acquisitions among competitors, for instance VODAFONE's pending acquisition of NOWO, are also relative.

Threat of Substitute Products – MODERATE | Traditional telecom services face limited direct substitutes, but alternatives like Over-the-Top (OTT), Voice over Internet Protocol (VoIP), and social media platforms compete in specific areas. In remote or underserved regions, Fiber to the Home (FttH) competes with Wireless Internet Service Providers (WISPs) and satellite service providers, such as Amazon (Project Kuiper) and Starlink. Regulatory scrutiny will be crucial in determining the impact and market integration of these advancements.

Bargaining Power of Suppliers – MODERATE | In 2022, NOS spent approximately €1,575M across 6,250 suppliers, with 86% sourced locally, boosting the national economy. Annual evaluations since 2019 focus on proactivity, contract adherence, quality, ethics, and ESG considerations, reflecting commitment to beneficial supplier relationships. Despite a significant market presence and diversified offerings, NOS has moderate leverage over suppliers due to reliance on specialized suppliers, resulting on a balanced power dynamic.

Bargaining Power of Customers – HIGH | Portuguese consumers exhibit high price sensitivity, facilitated by low switching costs. With mandatory no-penalty options replacing 24-month contracts, competition to retain customers is intense. This compels providers to innovate and offer enhanced services at competitive prices, giving consumers significant power.

Threat of New Entrants – MODERATE | Telecom market liberalization enables new entrants, contingent upon meeting ANACOM's standards for consumer protection and competition. MVNO agreements help new players reduce costs. However, established Telecom giants create barriers by developing lower-cost solutions (WOO for NOS) to counter emerging competitors like DIGI, hindering their market share and scale advantages. Hence, despite ANACOM's efforts, new entrants struggle against dominant companies.

SWOT Analysis

Portuguese Telecom companies face challenges with rural coverage, market saturation and regulatory limitations, among others. Established companies leverage their infrastructure and brand reputation. Opportunities lie in efficient networks, new technologies, enhanced customer service and partnerships. However, threats include new entrants and cybersecurity risks.

Table 7 – ESG scores

| Pillar	Source	NOS
ESG	Refinitiv	B (64/100)
ESG	Bloomberg	4.73/10 - "Leading"
ESG risk	Sustainalytics	14.3 - low
ESG risk resiliece	MSCI	AA (6.1)
E	Refinitiv	A
E	Bloomberg	3.75/10 - "Above Median"
S	Refinitiv	B+
S	Bloomberg	5.35/10
S	Moody's	70
G	Refinitiv	C - "Below Average"

Note: E – Environment; S – Social; G – Governance

Figure 17 – Emissions from own operations (tCO$_2$ e)
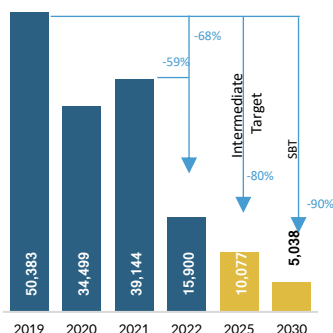
Note: SBT – Science Based Target
Source: Team Analysis

Figure 18 – Collection and recovery of customer equipment in the fixed service (in 00's)
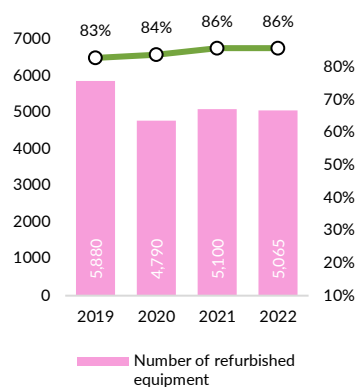
Source: Team Analysis

Table 8 – NOS' Management Team

Women	33%
Men	67%

Source: Team Analysis

Table 9 – Shareholders

Sonae Com, SGPS, S.A.	26%
ZOPT, SGPS, S.A.	26%
Sonae, SGPS, S.A.	11%
Mubadala Investment Company PJSC	5%
Free Float	32%

Source: NOS' data

Environment, Social and Governance

NOS's 2021-2025 strategic sustainability plan is based on 4 pillars: "On behalf of the planet", "For a digital future", "More for our people", and "Ethical and responsible management", contributing to 11/17 United Nations Sustainable Development Goals (SDGS) 14. NOS has strong ESG scores (Table 7) and has set Sustainability Requirements for Suppliers and Partners to ensure that all partners, suppliers, and their subcontracted parties adhere to their sustainability principles.

Environment

NOS's strong commitment to environmental sustainability (Table 7), earned it a spot in the CDP Climate 2022 Program's A List. As the only Portuguese telecom company assessed by CDP, NOS consistently outperforms the international sector average and has maintained a Leadership level evaluation for three years. Additionally, NOS is a member of the Global e-Sustainability Initiative (GeSi) and a signatory to the Manifesto Towards COP 27, aligning with the Paris Agreement and 2030 Sustainable Development goals.

Carbon Efficiency | NOS substantially reduced its operational GHG emissions by 59% YoY and by 68% compared with the base year 2019. Their goal is to further reduce own operation emissions by 90% and value chain emissions by 30% by 2030, relative to 2019 levels (Figure 17). As a founding member of the European Green Digital Coalition, NOS aims to achieve carbon neutrality by 2040.

Energy Efficiency | NOS aims to fully electrify its fleet and offset emissions through reforestation in Portugal by 2030. The company is replacing impactful gases and improving energy efficiency but faces increased emissions from the production and purchasing of capital goods due to network expansion. In 2022, electricity consumption rose by 39% YoY. By deploying intelligent network management features to process higher data volumes faster, they saved 5-10% of energy costs during low-traffic period. Overall, energy consumption rose by 27% YoY due to by growing energy needs and activity recovery.

Supply Chain | To ensure a greener supply chain, NOS participates in the Eco Rating project, providing consumers data on mobile phones' environmental impact. Since its 2021 launch, the average Eco Rating score has risen by 2pp. NOS plans to extend this to all main suppliers and include emissions data from network equipment. This initiative promotes informed, sustainable choices, incentivizes supplier improvements, and fosters sector-wide transparency and environmental impact reduction.

Circular Economy | NOS aims to boost business circularity from 2022 to 2025. In 2022, they recycled 98% of total waste (+1 p.p. YoY). With 5G technology, NOS enhanced recovery and reuse processes, refurbishing and reintegrating equipment, while selling legacy items to cut energy and material use (Figure 18). It also digitized billing and contracts, improving efficiency, and reducing printing and transportation energy use (Appendix 7).

Sustainability-Linked Bonds | NOS's Sustainability-Linked Financing Framework helps reduce its environmental footprint and aligns with long-term emission reduction targets. In January 2023, NOS secured 350 million euros in loans, distributed among bond loans and commercial paper programs, maturing in 2028 and linked to sustainable objectives. According to S&P Global Ratings, the company meets all Sustainability Performance Targets. This financing form offers lower interest rates, reducing debt costs. With 70% of its debt tied to sustainability KPIs, NOS benefits from 'greenium' interest rate advantages.

Social

NOS has a robust workforce, achieving an 84.11% score on Bloomberg's 2023 Gender-Equality Index, surpassing sector and national averages. Women make up 41% of the workforce and hold 33% of management roles (Table 8), highlighting the company's strong commitment to gender diversity. NOS has also implemented a certified Occupational Health and Safety (OHS) management system, focusing on proactive health and safety measures. By collaborating with ENSICO, NOS launched "Projeto ZER01" to introduce computer science education nationwide, demonstrating their dedication to digital literacy and inclusion. However, NOS has seen a 4% increase in employee turnover from 2018 (10% turnover) to 2022.

Governance & Management

Shareholder structure | NOS has 4 major shareholders (Table 9), with 36% of shares in free float. While share transfer and ownership are unrestricted, competitors can only hold up to 10% of the capital without General Meeting approval. In 2022, the General Meeting authorized an 18-month buyback and sale of shares. Some financing contracts permit changes of control (including takeovers), possibly requiring early repayment. NOS has no defense against public takeover bids or measures to protect assets if the BoD changes or control shifts.

Controversies | In 2020, following the Luanda Leaks scandal, Isabela dos Santos' associates, Jorge Brito Pereira, Mário Leite da Silva, and Paula Oliveira, resigned from the NOS board. The Angolan businesswoman faced allegations of diverting over 100 million euros from Sonangol to a Dubai-based company, leading to a UK court freezing her assets, including her NOS stake. In June 2023, she was convicted by a Dutch court for embezzlement and document forgery, involving €52.6 million from Sonangol. Ana Rita Cernadas, Cristina Maria de Jesus Marques, and José Carvalho de Freitas replaced the board members for the 2019-2021 mandate, with two of them linked to Isabela dos Santos via Santoro Finance, a company linked to the scandal.

In 2022, ANACOM fined the Portuguese Telecom companies, including NOS for inadequate communication on price increases. In April 2023, NOS was fined €50K fine for violating Electronic Communications Law rules by signing service contracts via phone call.

Board of Directors | NOS has a one-tier board with a Board of Directors handling daily management, and an independent audit board supervising the management. The Board consists of 7 executive and 8 non-executive directors, being 67% of them male and 33% female, with an average of 15 years of telecom experience.

Table 10 – Valuation

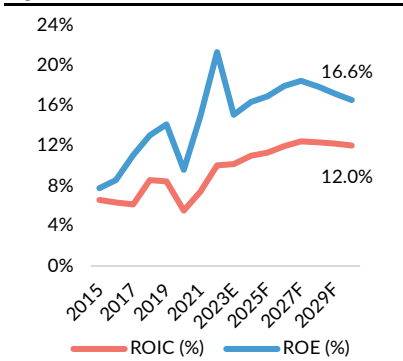|	Model	g	%EV	M €
Telco	FCFF	1.0%	92.3%	3,920,562
A&C	FCFF	1.0%	7.7%	251,119
NOS				4,171,682
Adjustments for Net Debt				-1,690,895
Other Adjustments				-359,773
Equity Value				**2,121,013**
# Shares ('Th)				511,382
Price Target (€/sh)				**4.15 €**

Source: Team Estimates
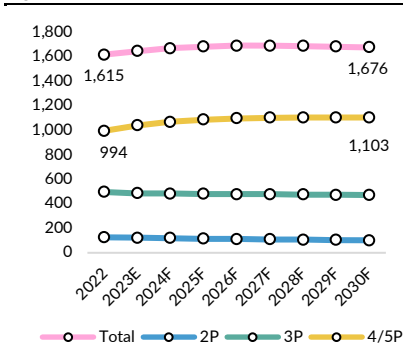
Figure 19 – Margin evolution
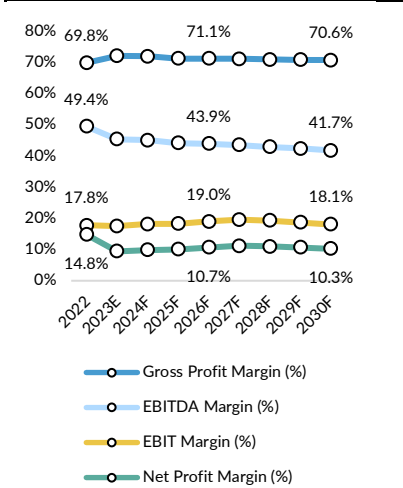
Source: Team Estimates

Figure 20 – Ratios evolution

Source: Team Estimates

Figure 21 –NOS' Number of Bundles

Source: Team Estimates

Table 11 – WACC

	2024F	TV
Debt ratio	50.8%	46.2%
Cost of debt	3.2%	3.2%
Cost of equity		
Telco	8.1%	8.9%
A&C	12.3%	11.6%
WACC		
Telco	5.7%	6.5%
A&C	7.7%	7.9%

Source: Team Estimates

Management Team | Miguel Almeida, President of the executive committee (2022-2024) leads a team that provides strategic recommendations to the BoD. As the sector's longest-serving CEO, his primary goal is long-term shared value creation, evident in efforts to lead in 5G deployment, strengthening NOS's industry position.

Remuneration Policy |. The remuneration policy includes a fixed component, with executive directors, whose pay has grown the most, receiving an additional capped variable component. The variable pay, tied to profit sharing and/or share allocations, is based on 30% individual and 70% company performance (NOS's KPIs).

Valuation

Free Cash Flow to the Firm: A Sum-of-the-Parts Approach (SoP)

We issue a **BUY** recommendation with a 12-month price target of €4.15, indicating a 27% upside from January 12th closing price of €3.27/share. This target is derived from a Discounted Cash Flow (DCF) model using a SoP valuing each segment separately. Different WACCs were calculated to reflect the various risks of each segment's peer group (Appendix 13). Additional valuation methods were employed to support the initial valuation. Our financial statements were forecasted using a hybrid top-down approach, influenced by Portuguese macroeconomic projections.

Revenue Breakdown

NOS' revenue forecast is divided into the Telco and A&C segments, each with three categories. The primary category, **Services Rendered**, accounts for c.90% of total revenues. For Telco's services rendered, we used ANACOM data, other sources and our estimates to calculate average bundle prices (from 2P to 5P), considering market trends, convergent customers, and inflation-linked price adjustments by the three major operators. We also forecasted the number of bundles in the market and NOS's and competitors' market shares (Figure 21).

Market analysis show that while NOS attracts customers preferring 4/5P bundles, its growth rate lags the market, leading to a gradual loss of market share to Vodafone. However, NOS is increasing its number of customers and RGU's. These services rendered also include VOD (Video-On-Demand) and other additional services, projected based on their declining proportion compared to bundles. The A&C segment, focused on cinema, was also independently calculated. Its services rendered include box office, film distribution, advertising, and audiovisual production, with revenues projections adjusted for inflation.

The second and third revenue categories are **sales and other operating revenue**, making up 10-11% of total revenues from 2023E-2030F. These were estimated based on the evolution of services rendered and inflation-adjustments.

Capex and D&A

NOS has surpassed the peak of its Capex spending for FttH and 5G network deployment. We forecast a -1.9% CAGR decline in Capex until 2030, reducing from c.€400M in 2023 to a terminal value of €350M. Since 2015 D&A have consistently been around 110% of Capex, a trend we expect to continue, with depreciations exceeding Capex in the near future. However, future technological advancements will require adjustments to net Capex over the long term.

Weighted Average Cost of Capital

The different segments within the NOS Group have unique risks. To evaluate these, we calculated two separate WACC rates for discounting the FCFF of each segment. The **cost of equity** was obtained using the standard CAPM method with leveraged adjusted Betas from peer groups. NOS' **cost of debt** includes the normalized 10-Year German Government Bond Yield (2.14%), as a proxy for the Risk-Free Rate, NOS' additional spread (2.0%), corresponding to the BBB Fitch rating, and an after-tax cost of debt of c.3.2% for 2024. During the forecast period, we expect the cost of equity to vary with NOS' annual capital structure changes, while the cost of debt remains constant.

Terminal Period | Value from the Long-Run

For the terminal period forecast, we incorporated additional long-term uncertainties facing the market and NOS. The Telco sector is constantly innovating technologically, with expectations already emerging for advancements from 5G to 6G technology in the next decade. This necessitates ongoing reinvesting to maintain relevance and profitability. Concurrently, regulatory efforts are promoting a more competitive market environment, intensifying existing competition. Specifically for NOS, uncertainties include governance complications stemming from Isabel dos Santos' heavy frozen stake in the company, which adds to uncertainty regarding the future ownership of these shares.

To address these factors in our models, we made specific adjustments. Firstly, we increased Telco's unlevered beta to 0.55 to better reflect the business risks that NOS faces amidst the industry's ongoing uncertainties, including the risk of technological obsolescence (Appendix 13). Additionally, we set a conservative 1% terminal growth rate. This approach aims to capture the previously mentioned challenges ahead for NOS, while allowing for potential future cash flows growth, as outlined in our projections.

FCFF and APV

In the DCF model, we discounted NOS' FCFF, as a sum of part of the Telco and A&C segments using the consolidated yearly WACC, resulting in a price target of €4.15/sh after adjustments from the company's enterprise value to equity value (Appendix 16). The APV model, also using the SoP FCFF method, yielded a target price of €4.10/sh.

FCFE

Following NOS's annual changing capital structure, we developed a valuation method extending directly to the terminal value. We discounted the resulting cash flows by the company's cost of equity (Appendix 13), adjusted for non-controlling interests, arriving at a price target of €3.9/sh.

Table 12 – Peers and industry comparison (%)

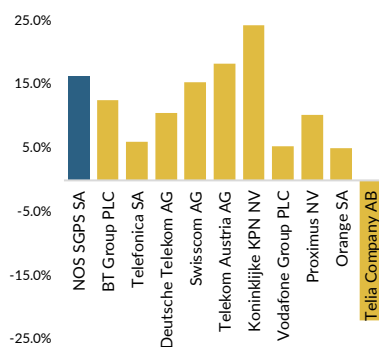|	NOS	Industry Average	PT sector's average
ROE	14.9	9.3	-
ROCE	0.1	-	-0.62
EBITDA	42.5	37,4	30.19
Current Ratio	56.9	-	64.97

Note: Most updated data used
Source: Team Estimates, Orbis
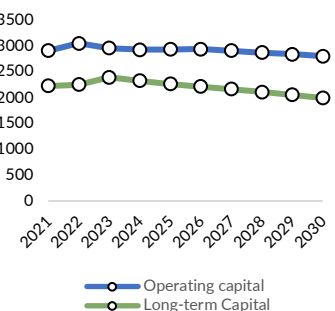
Figure 22 – EBITDA Margin
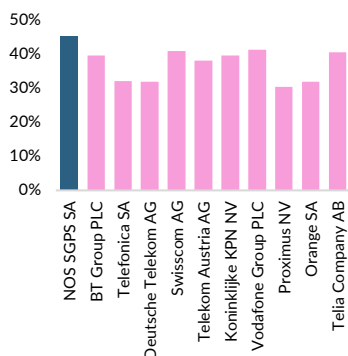
Source: Refinitiv
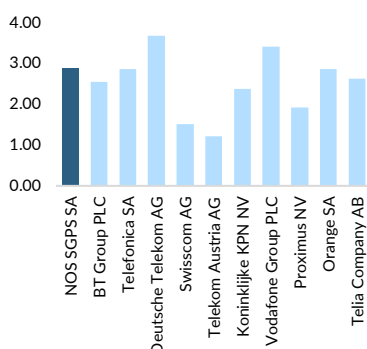
Figure 23 – Peers ROE

Source: Refinitiv

Figure 24 – Financing Strategy (in 000's)

Note: The spread between Operating Assets and Equity and Long Term-Debt corresponds to the Short-Term Debt
Source: Team Estimates

Figure 25 – Net Debt / EBITDA

Source: Refinitiv

Relative Valuation

In our multiple's valuation, we applied a sum-of-parts approach, creating distinct peer groups for NOS's Telco and A&C segments. For the Telco segment, peers were selected using the Sum of Absolute Rank Differences (SARD) method, focusing on companies closely aligned with NOS' core business areas (Appendix: Peers), excluding Altice USA and capex-expanding firms for a more representative sample. In the A&C segment, we chose cinema theatre operators with similarities pre- and post-COVID-19.

Using EV/EBITDA for 2024 forecasts, we calculated a weighted average of multiples from NOS's Telco and A&C peers, resulting in a price target of €4.59/sh, indicating a 40% upside. An equal-weighted average of the price targets from four multiples assessments yielded a €3.89/sh price target, reflecting a 19% upside (see Appendix: Multiples Valuation). Historical multiples analysis further supports our evaluation, showing that NOS has consistently traded below its peers following the COVID-19 correction.

DDM

We conducted a DDM analysis based on the NOS's consistent dividend payouts of 27c/share since 2019. Anticipating a future with reduced Capex and improved margins, we projected an increase of €0.055 in the dividend to 0.325€/sh. This adjustment resulted in a price target of €4.04/share, indicating a potential 24% upside.

Sensitivity Analysis

A sensitivity analysis was conducted to evaluate the impact of the key inputs on our valuation. We found that reducing NOS' terminal growth rate to 0.2% an increasing the WACC to 7.18% could potentially alter our recommendation. However, this scenario is unlikely since the company is transitioning from a period of high capital expenditure and benefits from contracts linked to inflation, suggesting a sustainable long-term inflation rate of 1.5-2%.

Considering a 0.6% terminal growth rate, while it could influence our recommendation, NOS's ongoing efforts to innovate in mature industry make a growth rate below 1% improbable. It is important to note that reducing this variable would result in a downgrade of our recommendation in only 30% of scenarios (Appendix 21).

Financial Analysis

Profitability | Bottom Line Stability

NOS has shown consistent growth in EBITDA and EBIT, achieving a +3.1% and +7.0% CAGR 2015-2023YE, respectively. The industry average stands at 37.4%, with NOS surpassing this figure 26). Following this period of growth, the company I expected to stabilize its margins. The entry of new competitors, led by Digi, potential shifts in market demand, and further regulatory liberalization by ANACOM may reduce EBITDA margins by up to 460 bps, though minimal impact on the bottom line. We anticipate the net profit margin to stabilize around 11%, despite slower growth due to market saturation.

Overall profitability has been on an upward trajectory, with ROA growing at +5.5% CAGR 2015-2023YE. We project a continuation of this positive trend at a +1.9% CAGR 2024-2030YE, supported by reduced capital requirements and stable margins. Additionally, NOS's asset turnover of 0.45 exceeds and aligns with the industry's average of 0.43. Most profitability ratios indicate initial growth in the early forecasted years, followed by modest stabilization, resulting in a consistent and stable overall trend.

Regarding ROCE, NOS has maintained relative stability alongside VODAFONE, outperforming other competitors like Altice, which has experienced a significant downturn with a -102.45% ROCE in 2019. Both NOS and VODAFONE have seen improvements in ROE, whereas Altice's ratio has been consistently volatile and underperforming. NOS has consistently exceeded the industry's average ROE of 9.3% by more than 300 bps (Figure 23).

Liquidity | Taking Risks as They Have a Bargain

The company's financing strategy appears to be risky (Figure 24) This strategy relies on securing short-term financing with attractive yields to meet investment and payout targets. However, there is a consistent negative net liquid balance and working capital deficit, meaning current assets are insufficient to cover short-term obligations, thus stable funding does not meet operating assets. Despite this imbalance in the short term, our treasury forecast does not indicate significant risks, aligning with the risky financing strategy adopted by NOS.

Operating assets are partly financed by short-term financing, facilitated by NOS's ability to access the market for such funding at attractive yields. While this approach minimizes interest payments, it increases risk due to the need for constant renewal of short-term financing. Nevertheless, NOS appears comfortable with this strategy, leveraging its status as a major corporation with ready access to capital in financial markets. These characteristics contribute to consistently low liquidity ratios, in line with other Portuguese industry players.

Additionally, NOS has set a conservative target of 2.0x target for Net financial debt to EBITDA AL, contrasting with the industry average of 2.55x among competitors. The company's ability to cover interest payments has been strong, averaging 7.0x from 2015-2023YE and expected to stabilize at 6.0x during 2024-2030YE.

Efficiency | Stability

NOS maintains stable efficiency ratios. This stability contributes to a forecasted negative operating cash cycle at -567 days 2024YE. As a well-established company with a strong reputation, NOS can confidently extend payment terms to suppliers without jeopardizing its creditworthiness., a practice common to its business model.

Dividends | Room for improvement/growth

Despite lacking a formal payout policy, NOS has consistently showed commitment to rewarding shareholders. In some instances, those remunerations have exceeded the company's earnings (2018-2020). Following a period of significant capital expenditure, NOS announced an extraordinary dividend of €0.152/sh (already distributed in 2023), in addition to the regular dividend of €0.278/sh maintained since 2019. This

Figure 26 – ROIC spread to WACC and ROE spread to Cost of Equity
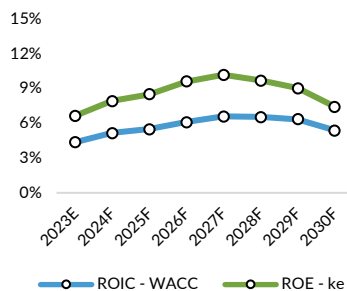
Source: Team Estimates

Figure 27 – Risk Matrix
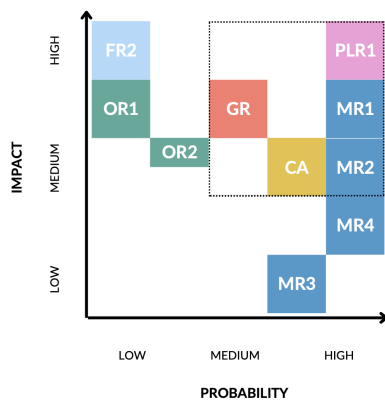
Source: Team estimates

Figure 28 – Monte Carlo Simulation
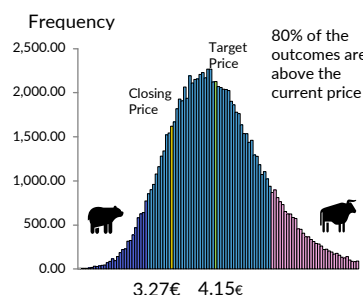
Source: Team calculations

Figure 29 – Sensitivity analysis
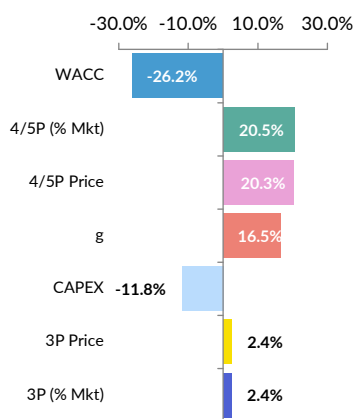
Source: Team calculations

extraordinary dividend was supported by additional cash from the towers' transaction and capital gains. Moreover, with anticipated margin improvements and reduced investment, we expect NOS' dividend practice to increase to €0.325/sh. This aligns with the company's historical profits' sharing practice and underscores its dedication to rewarding shareholders.

Financial Risk | Under Control

NOS received credit ratings of BBB- by Standard and Poor's and BBB by Fitch Ratings. Despite the risky financing strategy, heavily reliant on short-term financing, the company maintains a conservative capital structure, targeting a Net Debt/EBITDA after leases target of 2.0x. NOS has also ventured into sustainability-linked bonds, which have offered a premium over comparable issuances, known as 'greenium'.

Value Creation | Delivering

NOS consistently achieves profitability with its ROIC exceeding WACC by over 400 bps. ROE also maintains a spread of 245 bps above the cost of equity, benefiting shareholders. These positive metrics (Figure 26) indicate that NOS is well-positioned to continue delivering sustained value and maintaining its robust dividend payout, supported by an estimated c.8.1% Telco's cost of equity and an implied 2024YE dividend yield of 8.5%.

Investment Risks

These are the main risks, although in Appendix 19 is presented additional investment risks.

Market Risk | Existing Competition (MR1)

NOS operates in a compact and saturated market of 5.6 million households within a population of 10.3 million. It competes directly with Vodafone and Altice, offering similar services and products, with the three leading companies striving to maintain and grow their market shares. **Mitigation:** NOS focuses on expanding its telecom services by enhancing customer experience, product quality, and offering extra services like alarm systems to attract new convergent customers and reduce churn. NOS also aims to innovate in the B2B segment, offering competitive IT and IoT services to SMEs to diversify its revenue.

Market Risk | Entry of New Players (MR2)

New entrants like Digi Communications, offering budget-friendly Fixed Broadband and Mobile services, could attract a new customer segment focused on lower prices. This price competition significantly challenges established players, impacting their ability to grow and maintain market share without compromising margins. **Mitigation:** NOS has highlighted the high market penetration in Portugal, making it difficult to gain market share. To counter new low-cost competitors in the growing mobile sector, NOS launched the "WOO" offering in 2020. The low-cost package provides Fixed Broadband and Mobile services for customer seeking only internet connectivity. Although NOS is not aggressively promoting this option, it is prepared for shifts in market preferences or competitor-driven changes in customer behavior.

Political, Regulatory and Legal Risk | Recent changes in Regulations (PRL1)

NOS faces significant political, regulatory, and legal risks in the Portuguese telecommunications sector due. to ANACOM's actions. Regulatory decisions often bring unforeseen changes, disrupting market stability and facilitating new competitors' entry. For instance, the 5G auction rules in February 2020 eased entry barriers for new players, requiring them to cover only 25% of the population within three years and 50% within six, using existing towers from larger operators. In contrast, NOS had to cover over 90% of the population within four years without network access when it entered the market. This disparity led to tensions and legal actions from NOS, claiming unlawful discrimination. Recently, ANACOM also mandated Altice to grant access to its FttH network in 402 areas, where it held a monopoly, indicating potential for abrupt regulatory shifts.

Governance Risk | NOS' Shareholders (GR)

Sonaecom, holding a 37.37% stake in NOS, is a conglomerate with investments in various industries, potentially prioritizing its interests over NOS' minority shareholders. Another significant shareholder, ZOPT, owned by Isabel dos Santos, with a 26.08% stake, faces legal risks in Angola, including allegations of mismanagement and document forgery. UK authorities, recently, froze ZOPT's NOS shares at Angola's state-owned Unitel request, raising uncertainty about its position and potential impacts on NOS. Mitigation: Despite pressure from influential shareholders in the past to alter its strategies and financial structure, NOS has remained steadfast in its conservative approach to debt. The company has constantly prioritized its focus and long-term plans. However, given ZOPT's previous ownership by Isabel dos Santos, NOS is now subject to court decisions that could affect its operations (Table 9).

Cybersecurity Attacks | (CA)

Portugal has seen a rise in cyberattacks across sectors (according to Portuguese National Cybersecurity Centre (CNCS)), heightening concerns about cybersecurity risks nationwide. Such incidents, while more common, can vary in impact based on factors such as severity, duration and whether they compromise customer data privacy. In February 2022, Vodafone Portugal faced a significant cyberattack that disrupted services for all customers in the country for at least one day, though no customer private information was compromised. Interestingly, this incident did not seem to to impact Vodafone's market share in telecommunication. Mitigation: Besides to providing B2B cybersecurity solutions and partnering with Fidelity on integrated security solutions in 2022, NOS is enhancing operational security by upgrading its technical infrastructure to align with technological advancements and providing extensive training for its cybersecurity team in key areas such as cyberstrategy, intelligence, architecture, and defense. NOS has also appointed a new Chief Information Security Officer (CISO) to oversee and enhance all aspects of cybersecurity efforts.

Scenario and Sensitivity analysis

A Monte Carlo Simulation with 100k iterations was conducted on the DCF model to evaluate its reliability. Figure 28 and Figure 29 provide an overview of the simulation results. Additional details and outcomes of this analysis can be found in (Appendix 20).

Appendix B: NOS' Equity Research Supplementary Materials

Appendix 1: Income Statement

(in € millions)	2023E	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Operating revenues	1 579	1 616	1 637	1 645	1 645	1 641	1 640	1 639
Services Rendered	1 435	1 466	1 484	1 489	1 487	1 480	1 476	1 472
Telco	1341	1368	1383	1387	1383	1374	1368	1361
A&C	94	98	101	102	104	106	108	111
Sales	114	117	120	122	124	126	129	131
Telco	101	104	106	108	110	112	114	116
A&C	13	13	14	14	14	14	15	15
Other Operating Revenue	31	32	33	34	34	34	35	36
Telco	30	31	32	33	33	33	34	35
A&C	1	1	1	1	1	1	1	1
Operating costs	864	888	915	923	931	937	946	955
Wages and salaries	91	93	95	97	99	100	102	104
Direct Costs	341	351	366	367	367	366	365	365
Cost of Products Sold	101	104	106	108	110	112	114	117
Marketing and advertising	38	39	40	40	41	42	43	44
Support services	93	95	97	97	97	97	97	97
Supplies and external services	164	168	172	175	178	181	185	188
Other operating losses / (gains)	1	1	1	1	1	1	1	1
Taxes	35	36	37	38	38	38	39	39
EBITDA	716	728	722	722	715	704	694	684
Depreciation and Amortization	440	434	423	409	393	388	388	388
EBIT	276	294	299	313	322	316	306	296
Net Financial costs	(85)	(88)	(87)	(85)	(84)	(82)	(80)	(79)
Income before tax	192	206	212	227	238	234	226	218
Income Tax	43	46	48	51	54	53	51	49
Net Income from continuing operations	148	160	164	176	184	181	175	169
Net Income	148	160	164	176	184	181	175	169

Appendix 2: Statement of Financial Position

	2023E	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Assets	3 482	3 457	3 431	3 408	3 380	3 345	3 306	3 262
Non-current assets	2 886	2 846	2 808	2 771	2 735	2 700	2 664	2 629
Tangible assets & Investment Property	1 092	1 075	1 060	1 044	1 029	1 015	1000	986
Intangible assets	1 185	1 161	1 137	1 115	1 093	1 071	1 049	1 028
Contract costs	162	163	164	165	166	167	168	170
Rights of use	298	297	297	297	297	297	296	296
Investments in jointly controlled and associated companies	39	39	39	39	39	39	39	39
Other accounts receivables & non-current financial assets	10	10	10	10	10	10	10	10
Deferred income tax assets	90	90	90	90	90	90	90	90
Derivative financial instruments	11	11	11	11	11	11	11	11
Current assets	596	611	623	638	645	645	642	633
Inventories	70	71	72	73	73	73	72	72
Accounts receivable and other current assets	370	380	385	386	386	384	383	382
Contract assets	63	64	65	65	65	65	65	64
Tax receivable & other accounts receivable	25	25	26	26	26	26	26	26
Prepaid expenses	52	53	55	55	56	55	55	55
Cash and cash equivalents	15	16	19	33	40	43	41	33
Shareholders' Equity	983	975	972	981	997	1 011	1 019	1 020
Share capital	855	855	855	855	855	855	855	855
Capital issued premium	4	4	4	4	4	4	4	4
Own shares	(14)	(14)	(14)	(14)	(14)	(14)	(14)	(14)
Legal and other reserves & accumulated earnings	(17)	(36)	(44)	(47)	(39)	(22)	(8)	0
Net Income	148	160	164	176	184	181	175	169
Equity before NCI	977	969	966	974	991	1 005	1 013	1 014
Noncontrolling interests	6	6	6	6	6	6	6	6

Liabilities			2 499	2 482	2 459	2 428	2 382	2 334	2 288	2 241
Non-Current Liabilities			1 600	1 542	1 482	1 422	1 355	1 288	1 224	1 162
Borrowings			1 424	1 365	1 306	1 246	1 179	1 112	1 048	986
Provisions			81	81	81	81	81	81	81	81
Accounts payable - other			42	42	42	42	42	42	42	42
Deferred income & tax liabilities			53	53	53	53	53	53	53	53
Current Liabilities			899	940	977	1 005	1 027	1 046	1 063	1 079
Borrowings			313	341	368	393	414	432	449	464
Accounts payable - trade			258	264	267	268	268	266	266	265
Accounts payable - other			54	54	54	54	54	54	54	54
Tax payable			39	39	39	39	39	39	39	39
Accrued expenses			198	204	210	212	213	215	217	219
Deferred income			37	38	39	39	39	39	39	39
Total Liabilities & Equity			3 482	3 457	3 431	3 408	3 380	3 345	3 306	3 262

Appendix 3: Cash Flow Statement

(in € millions)	2023E	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Operating Activities (CFO)	**608**	**675**	**672**	**672**	**663**	**655**	**647**	**638**
EBIT	276	294	299	313	322	316	306	296
Depreciation, Amortization, and Impairment losses	440	434	423	409	393	388	388	388
Taxes	43	46	48	51	54	53	51	49
Change in NWC	65	7	2	(1)	(2)	(4)	(3)	(3)
Investment Activities (CFI)	**(400)**	**(394)**	**(385)**	**(372)**	**(357)**	**(353)**	**(353)**	**(352)**
CAPEX (Tangible Assets)	(122)	(120)	(117)	(113)	(109)	(108)	(108)	(108)
CAPEX (Intangible Assets)	(91)	(90)	(88)	(85)	(82)	(81)	(81)	(80)
CAPEX (Contract costs)	(81)	(80)	(78)	(75)	(72)	(72)	(72)	(71)
CAPEX (Rights of Use)	(105)	(104)	(101)	(98)	(94)	(93)	(93)	(93)
Financing Activities (CFF)	**(201)**	**(280)**	**(284)**	**(287)**	**(299)**	**(299)**	**(296)**	**(294)**
Net Borrowings	99	(30)	(33)	(35)	(47)	(49)	(47)	(47)
Interest and related expenses	(85)	(88)	(87)	(85)	(84)	(82)	(80)	(79)
Dividends	(220)	(167)	(167)	(167)	(167)	(167)	(167)	(167)
Accounts payable Trade	5	6	3	1	(0)	(1)	(1)	(1)
Change in Cash	**7**	**1**	**4**	**14**	**7**	**3**	**(2)**	**(8)**
Beginning	8	15	16	19	33	40	43	41
End	**15**	**16**	**19**	**33**	**40**	**43**	**41**	**33**

Appendix 4: Financial Ratios

Key Financial Ratios	2021	2022	2023E	2024F	2025F	2026F	2027F	2028F	2029F	2030F	CAGR (2015-2023)	CAGR (2024-2030)
Liquidity Ratios												
Current Ratio (%)	56.9%	52.5%	66.3%	64.9%	63.8%	63.4%	62.8%	61.7%	60.4%	58.6%	1.0%	-1.7%
Quick Ratio (%)	39.7%	34.3%	44.3%	43.4%	42.6%	42.9%	42.6%	42.0%	42.0%	39.5%	-1.1%	-1.5%
Efficiency Ratios												
Total Assets Turnover (x)	0,44 x	0,44 x	0,45 x	0,47 x	0,48 x	0,48 x	0,49 x	0,49 x	0,50 x	0,50 x	-0.8%	1,2%
DSO (days) - core	82	76	83	83	83	83	82	82	82	82	-0.6%	-0.2%
DIO (days)	162	214	252	250	248	245	241	236	231	227	2.4%	-1.6%
DPO (days)	1 013,4	662,0	895,7	899,5	895,7	887,9	874,4	857,5	837,2	818,3	-2.7%	-1.6%
Operating Cash Cycle (days)	(769,8)	(372,2)	(561,1)	(566,2)	(565,0)	(560,5)	(551,2)	(539,0)	(523,6)	(509,7)	-2.7%	-1.7%
Profitability Ratios												
Gross Profit Margin (%)	69.4%	69.8%	72.0%	71.8%	71.1%	71.1%	71.0%	70.9%	70.7%	70.6%	1.1%	-0.3%
EBITDA Margin (%)	42.5%	49.4%	45.3%	45.0%	44.1%	43.9%	43.4%	42.9%	42.3%	41.7%	2.6%	-1.3%
EBIT Margin (%)	13.9%	11.2%	17.5%	18.2%	18.3%	19.0%	19.6%	19.2%	18.7%	18.1%	5.3%	-0.1%
Net Profit Margin (%)	10.1%	14.8%	9.4%	9.9%	10.0%	10.7%	11.2%	11.0%	10.7%	10.3%	6.4%	0.7%
ROA (%)	4.4%	6.5%	4.3%	4.6%	4.8%	5.2%	5.5%	5.4%	5.3%	5.2%	5.5%	1.9%
ROIC (%)	7.4%	10.0%	10.2%	11.0%	11.3%	11.9%	12.4%	12.4%	12.2%	12.0%	5.5%	1.5%
ROE (%)	14.9%	21.3%	15.1%	16.4%	16.9%	18.0%	18.5%	17.9%	17.2%	16.6%	8.7%	0.2%
EPS	0.28	0.44	0.29	0.31	0.32	0.34	0.36	0.35	0.34	0.33	7.6%	0.9%
DPS	0.28	0.28	0.43	0.33	0.33	0.33	0.33	0.33	0.33	0.33	15.0%	0.0%
Payout Ratio (%)	98.8%	63.4%	148.2%	104.9%	101.9%	95.1%	90.8%	92.5%	95.6%	99.1%	6.8%	-0.9%
Solvency Ratios												
Total interest-bearing Debt Ratio (%)	62.08%	60.88%	64.61%	65.00%	65.26%	65.23%	65.01%	64.87%	64.90%	65.11%	2.6%	-1.3%
Interest Coverage Ratio (x)	5.5	8.6	3.3	3.3	3.4	3.7	3.8	3,8	3.8	3.8	-7.5%	2.1%

Appendix 5: Income Statement Assumptions

Income Statement Assumptions	Unit	2023E	2024F	2025F	2026F	2027F	2028F	2029F	2030F	Notes for assumptions
Portuguese inflation	YoY	5.4%	2.8%	2.3%	1.8%	1.7%	1.7%	2.0%	2.0%	Data from EIU forecasts
Operating Revenues										
Telco										
Services rendered	M€	1,341	1,368	1,383	1,387	1,383	1,374	1,368	1,361	See Valuation Revenue Breakdown
Sales	M€	101	104	106	108	110	112	114	117	
Other operating Revenue	M€	30	31	32	32	33	33	34	35	
A&C										
Services rendered	M€	94	99	101	103	104	106	108	111	See Valuation Revenue Breakdown
Sales	M€	13	13	13	14	14	14	14	15	
Other operating Revenue	M€	0.7	1	1	1	1	1	1	1	
Operating Costs										
Wages and salaries	%	10%	11%	11%	11%	11%	12%	12%	12%	Linked to inflation
Direct Costs	operating costs	39%	41%	42%	42%	42%	42%	42%	42%	Projection resulting from 2022 direct costs over Revenues
Cost of Products Sold		12%	12%	12%	13%	13%	13%	13%	14%	Projection from 3 prior years of COPS over Sales
Marketing and advertising		4%	5%	5%	5%	5%	5%	5%	5%	Linked to inflation
Support services		11%	11%	11%	11%	11%	11%	11%	11%	Projection from 7 prior years of Support services over Sales
Supplies and external services		19%	19%	20%	20%	21%	21%	21%	22%	Linked to inflation
Other operating losses / (gains)		0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	Projection from 6 prior years Other operating losses over Other Operating Revenues
Taxes		4%	4%	4%	4%	4%	4%	4%	5%	Projection from last three years taxes over sum of Direct Costs, COPS and Supplies and External Services
Provisions and adjustments		0%	0%	0%	0%	0%	0%	0%	0%	Kept at 0, See Appendix with Balance
EBITDA										
D&A	M€	400	394	385	372	357	353	353	352	Maintaining the company's depreciation rate, adjusted for new Capex
EBIT										
Borrowings	%, Kd	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	See Appendix WACC
Finance leases	% RoU	-9.8%	-9.8%	-9.8%	-9.8%	-9.8%	-9.8%	-9.8%	-9.8%	Expectation from 2 prior years of finance leases over Rights of Use
Others	% interest expense	6.3%	6.0%	5.8%	5.5%	5.3%	5.0%	4.7%	4.5%	ratio over interest expense. Yearly decrease of 25bp
Income tax	% of EBT	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	For our forecasts we will assume the nominal tax rate of 21%+ Derrama municipal tax rate of 1.5%
Dividends	€/share	0.43	0.325	0.325	0.325	0.325	0.325	0.325	0.325	See Financial Analysis, Dividends

Appendix 6: Balance Sheet Assumptions

Balance Sheet Assumptions	Unit	2023E	2024F	2025F	2026F	2027F	2028F	2029F	2030F	Notes for assumptions
Non-current assets										
Tangible assets	%NCA	38%	37%	37%	36%	36%	35%	35%	34%	Team Calculations of tangible Assets (TA) as prior year TA + TA Capex – TA depreciation
Investment property	M€	514	514	514	514	514	514	514	514	Assumed constant due to lack of necessary information to estimate
Intangible assets	%NCA	41%	40%	39%	39%	38%	37%	36%	36%	Team Calculations of Intangible Assets (IA) as prior year IA + IA Capex – IA amortization
Contract costs	%NCA	6%	6%	6%	6%	6%	6%	6%	6%	Team Calculations of Contract Costs (CC) as prior year CC + CC Capex – CC depreciation
Rights of use	%NCA	10%	10%	10%	10%	10%	10%	10%	10%	Team Calculations of Rights of Use (RoU) as prior year RoU + RoU Capex – RoU depreciation
Investments in jointly controlled companies and associated companies	M€	39	39	39	39	39	39	39	39	Assumed constant due to lack of necessary information to estimate
Other Non-Current Assets	M€	111	111	111	111	111	111	111	111	Assumed constant due to lack of necessary information to estimate

| Current assets										
Inventories	DIO	252	250	248	245	241	236	231	227	Projection from 7 prior years
Accounts receivable - trade	DSO	83	83	83	83	82	82	82	82	Projection from 7 prior years
Contract assets	% Services Rendered	4,4%	4,4%	4,4%	4,4%	4,4%	4,4%	4,4%	4,4%	Projection from 7 prior years of Contract Assets over Services Rendered
Accounts receivable - other	% Services Rendered	1,4%	1,4%	1,4%	1,4%	1,4%	1,4%	1,4%	1,4%	Projection from 5 prior years of AR over Services Rendered
Tax receivable	% Revenues	0,3%	0,3%	0,3%	0,3%	0,3%	0,3%	0,3%	0,3%	Projection from 5 prior years of tax receivable over Services Rendered
Prepaid expenses	% Direct Costs	15,1%	15,1%	15,1%	15,1%	15,1%	15,1%	15,1%	15,1%	Projection from 2022 Prepaid expenses over Direct Costs
Other current assets	M€	9	9	9	9	9	9	9	9	Assumed constant due to lack of necessary information to estimate
Non-Current Liabilities										
Borrowings	%Total Debt	82%	80%	78%	76%	74%	72%	70%	68%	See Appendix 6: FCFE
Provisions	M€	81	81	81	81	81	81	81	81	Assumed constant due to lack of necessary information to estimate
Other Non-Current liabilities	M€	95	95	95	95	95	95	95	95	Assumed constant due to lack of necessary information to estimate
Current Liabilities										
Borrowings	%Total Debt	18%	20%	22%	24%	26%	28%	30%	32%	See Appendix 6: FCFE
Accounts payable - trade	DPO	896	899	896	888	874	857	837	818	Projection from 5 prior years of AP over Services Rendered
Accrued expenses	% Operating Costs	22,93%	22,93%	22,93%	22,93%	22,93%	22,93%	22,93%	22,93%	Projection from 5 prior years of Accrued expenses over Services Rendered
Deferred income	% revenues	2,36%	2,36%	2,36%	2,36%	2,36%	2,36%	2,36%	2,36%	Projection from 5 prior years of Deferred Income over Services Rendered
Other Current Liabilities	M€	93	93	93	93	93	93	93	93	Assumed constant due to lack of necessary information to estimate

Appendix 7: Level of digitalization of billing process
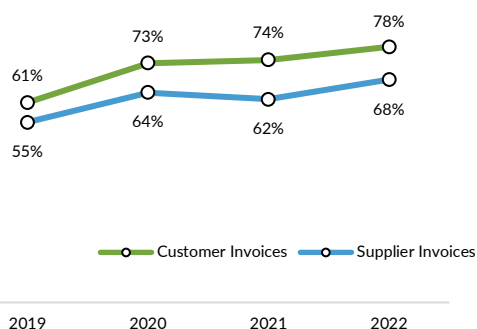
Source: Team Calculation

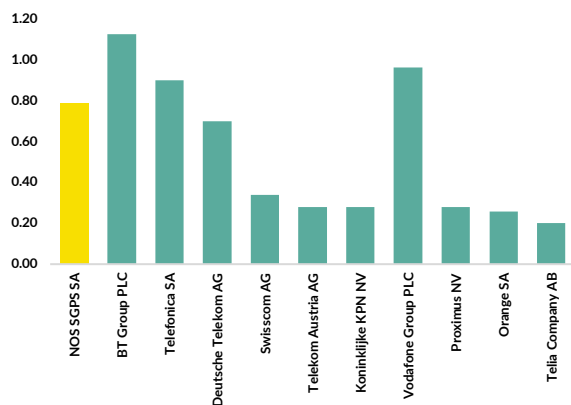**Appendix 8: Distribution of employees**
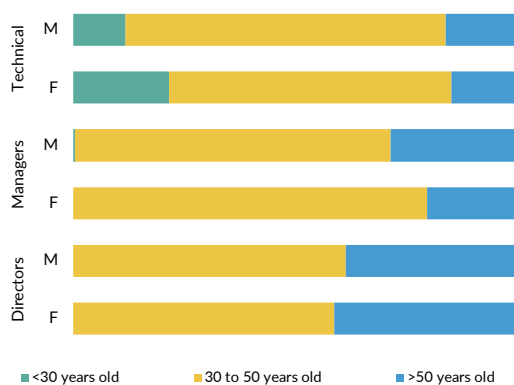
Source: Team Calculation

Appendix 9: Management Team

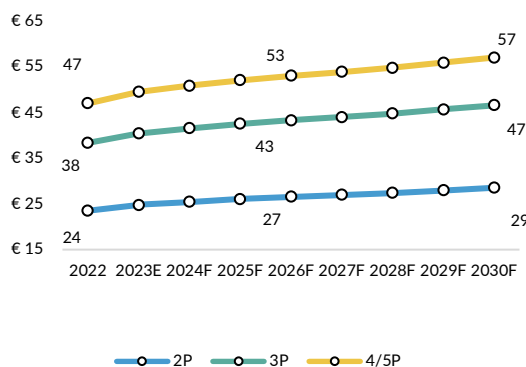| Name	Position (Since)
Miguel Almeida	CEO (2013)
José da Costa	CFO (2007)
Luís Nascimento	Member of EC (2017)
Jorge Graça	CTO (2016)
Manuel Eanes	Member of EC (2013)
Filipa Carvalho	CCO (2021)
Daniel Beato	Member of EC (2021)

Source: NOS' data

Appendix 10: Market Levered Betas

Source: Refinitiv

Appendix 11: NOS' Bundles Average Selling Pice

Source: Team Estimates

Appendix 12: Swot Analysis

Strengths	Weaknesses	Opportunities	Threats
Established infrastructure | Major players control extensive communication networks, requiring high CAPEX, creating barriers for new entrants.	**Rural Connectivity |** Telecom operators face challenges with high-speed internet in remote areas, competing with satellite service providers.	**More Efficient Networks |** Advanced technologies boost efficiency, flexibility, and cost savings, enhancing network performance.	**New Entrants |** Innovative new players can increase competition, challenging the market share and profitability of established firms.
Market Reputation | Established operators have strong brand recognition, posing a challenge to the entry of new players.	**Saturated Market |** With 92,8% penetration, the Portuguese telecom market has limited growth potential due to saturation.	**Emerging Technologies |** Cutting-edge technologies enable higher performance and more services, better meeting consumer needs.	**New Substitutes |** Over-the-Top services and satellite providers are gaining popularity, potentially disrupting the industry.
Diversified Offerings | Portuguese Telecom companies provide diverse bundled services, appealing to consumers with varied needs.	**Economic Conditions |** Telecom usage fluctuates with economic conditions, increasing during booms and decreasing in recessions.	**Improved Customer Experience |** Enhanced service, personalization, communication, and security foster loyalty and attract new subscribers.	**Cybersecurity |** Advances in technology improve services, but also introduce cyber threats, requiring enhanced cybersecurity measures.
High Penetration | High market penetration allows easy upselling to existing users, reducing acquisition costs.	**Regulations |** Regulators protect consumers and promote competition, but strict compliance limits decision making flexibility.	**Strategic Partnerships |** Collaborating with tech companies helps telecom firms at the forefront of technology.	**Changing Consumer Preferences |** Evolving consumer preferences push telecom companies to invest in new services to meet these changing needs.

Appendix 13: WACC Assumptions

NOS's business is split into two distinct segments, each with unique risk levels and required rate of return. Consequently, our team calculated separate discount rates for the Telco and A&C segments.

Cost of Equity (Ke) | Estimated using the Capital Asset Pricing Model (CAPM: Ke = RFR + b * ERP + FRP). Due to YoY variability in NOS' capital structure affecting the b, the cost of equity is expected to fluctuate with a downward trend as NOS deleverages.

Betas | Derived from a sample of 65 European integrated telecom service providers, the levered betas of the peers were gathered and then adjusted using the Hamada formula to remove leverage based on each peer's capital structure. We then calculated the average unlevered betas for each segment and estimated NOS' unlevered betas at 0.45 for Telco and 0.83 for A&C. These betas were re-levered for each forecasted year, considering NOS' projected yearly capital structure. For the terminal value of the unlevered Telco beta, we increased it to 0.55 to account for long-term risks, such as regulation and technological developments, ensuring our model reflects future uncertainties in the segment.

RFR and MRP | The risk-free rate was based on the normalized 10Y German Bond Yield, as of 6th of January 2024 (2.1%). The market risk premium was obtained from "Country Default Spreads and Risk Premiums, last updated: *January 5, 2024*" (Aswath Damodaran) obtaining a value of 6.85%.

Cost of Debt | Computed as the sum of the RFR, for which the normalized 10-Year German Government Bond Yield (2.14%) was used, and NOS' spread regarding its Rating (2%), based on its BBB Fitch rating, resulting in an after-tax cost of debt of 3.21%.

	2024F	2025F	2026F	2027F	2028F	2029F	2030F	TV
Debt ratio	50.8%	50.3%	49.8%	49.3%	48.6%	47.8%	47.0%	46.2%
Cost of debt	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
Cost of equity	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**TV**
Telco	8.1%	8.1%	8.0%	8.0%	7.9%	7.8%	7.8%	8.9%
A&C	12.3%	12.2%	12.1%	12.0%	11.8%	11.7%	11.7%	11.6%
WACC	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**TV**
Telco	5.7%	5.7%	5.7%	5.7%	5.7%	5.7%	5.7%	6.5%
A&C	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.9%

Appendix 14: Peers

Rank	SARD	Company	ROE	Rank	Asset Turnover	Rank	EBITDA Margin	Rank	Net Debt/EBITDA	Rank	Beta	Rank
	0	**NOS SGPS SA**	**16,3%**	**5**	**0,45**	**10**	**45,3%**	**4**	**2,90**	**8**	**0,80**	**9**
1	25	BT Group PLC	12,6%	8	0,40	13	39,7%	9	2,57	12	1,13	4
3	32	Telefonica SA	6,0%	14	0,37	17	32,1%	13	2,88	9	0,90	8
3	32	Deutsche Telekom AG	10,6%	9	0,39	16	32,0%	15	3,71	6	0,70	11
2	27	Swisscom AG	15,4%	7	0,45	11	40,9%	6	1,51	16	0,34	15
7	48	Telekom Austria AG	18,3%	4	0,58	7	38,1%	11	1,22	19	0,28	17
5	34	Koninklijke KPN NV	24,3%	3	0,43	12	39,7%	8	2,39	13	0,28	17
6	36	Vodafone Group PLC	5,4%	15	0,30	18	41,4%	5	3,42	7	0,96	7
10	53	Proximus NV	10,3%	10	0,59	5	30,5%	17	1,93	14	0,28	17
8	51	Orange SA	5,1%	16	0,40	15	32,0%	16	2,87	10	0,26	20
8	51	Telia Company AB	21,9%	21	0,40	14	40,7%	7	2,64	11	0,20	22

Source: Refinitiv

To value NOS using a multiples valuation, we adopted a Sum-of-Parts (SoP) approach to Relative Valuation, creating distinct peer groups for the Telco and A&C segments. For selecting peers in the telecommunications segment, we applied the Sum of Absolute Rank Differences (SARD) method as described by Knudsen et al. (2017). This involved choosing and ranking several financial metrics — Return on Equity, EBITDA margin, Net Debt/EBITDA, Asset Turnover, and Beta —across the group.

Initially, we selected companies within the telecommunications sector (excluding non-European). However, to address currency disparities among these companies, we refined our sample by excluding companies from some Eastern Europe countries, such as Poland, Romania and Hungary. This refinement aimed to ensure a more cohesive and representative sample with similar macroeconomic risks.

Subsequently, we examined the different businesses operating within the sample. Given the sector's diversity, we focused our analysis on companies that were pure plays in the areas NOS operates, such as Fixed TV, Fixed Voice, Broadband, and Mobile services.

Peers	Market Cap (€)	FttH Coverage*	Capex	EV/EBITDA*	Description
BT Group	14,20B	MEDIUM	Increasing	4.34	Headquartered in London, the United Kingdom, the company operates in the UK, Europe, the Middle East, Africa, the Americas, and the Asia Pacific. BT Group plc is the largest telecom operator in the UK with over 30% market share.
Telefónica	20,36B	HIGH	Decreasing	5.32	Telefónica, S.A. is a telecommunications giant headquartered in Madrid, Spain, serving Europe and Latin America. Its services cover mobile, fixed telephony, broadband, and wholesale offerings, with a market share exceeding 35% in Spain.
Deutsche Telekom	107,78B	LOW	Stable	6.44	Deutsche Telekom AG, based in Germany, is a leading provider of integrated telecommunication services globally. It operates in over 50 countries, having ~30% market share in Germany and being the 3rd largest operator in the U.S.
swisscom	27,89B	MEDIUM	Stable	7.38	Headquartered in Bern, Switzerland, Swisscom AG leads the telecommunication sector in Switzerland, having over 50% market share in the Mobile segment. It is also growing significantly in Italy and internationally.
A1 Telekom Austria Group	5,06B	MEDIUM	Stable	4.10	Based in Austria, Telekom Austria AG and its subsidiaries provide integrated telecommunication solutions across several countries within Central and Eastern Europe, including Belarus, Bulgaria, Croatia, North Macedonia, Serbia, and Slovenia.
kpn	12,30B	HIGH	Stable	7.18	Koninklijke KPN N.V., headquartered in the Netherlands, is a premier provider of telecommunications and IT services within the region, with over 40% market share in most of the segments.
vodafone	21,46B	MEDIUM	Increasing	4.02	Vodafone Group PLC, based in UK, is a global leader in telecommunications services across Europe and internationally. It operates through both digital and physical channels and it is a pioneering force since its establishment in 1984.
proximus	2,90B	LOW	Increasing	3.77	Proximus PLC, headquartered in Brussels, Belgium, is a leading provider of digital services and communication solutions within Belgium, with over 40% market share, and with a small international presence.
orange	27,37B	HIGH	Decreasing	5.17	Based in France, Orange S.A. is a leading provider of telecommunications and data transmission services globally, operating in 26 countries across Europe, Africa, and the Middle East, having over 35% market share in its domestic market.
Telia	9,12B	HIGH	Decreasing	6.39	Telia Company AB (publ), based in Solna, Sweden, is a leading telecommunications provider in Sweden, Norway, and Finland, and the second-largest provider in Denmark, Estonia, Latvia, and Lithuania.
NOS	1,65B	HIGH	Decreasing	4.58	

*Domestic   *2023E

**Source:** *Refinitiv and Companies' guidance*

It is important to note that Altice Portugal's parent company, Altice USA, Inc, was excluded from our peer comparison due to concerns regarding its reported debt and capital structure. According to sources like Financial Times and Bloomberg, the company is exploring a potential sale of its Portuguese operations, with several interested buyers including António Horta Osório, the Warburg Pincus investment fund, billionaire Xavier Niel, and Saudi Telecom. These uncertainties have led to Altice being priced below its peers due to increased risk, which would distort the average valuation of our peer group. To ensure accuracy, we created a Core Peers group, accounting for disparities in capex cycles. Therefore, we excluded companies undergoing a capex expansion cycle, as these pose distinct risks compared to NOS.

For the A&C segment, due to the lack of listed pure play companies, we selected a sample of 6 cinema theatre operators with similar behavior to NOS' A&C segment before and after COVID-19, given the significant impact of the pandemic on cinema operators. The selected peer group includes Kinepolis Group NV (KIN.BR), AMC Entertainment Holdings, Inc. (AMC), Cinemark Holdings, Inc. (CNK), Cineplex Inc. (CGX.TO), Wanda Film Holding Co., Ltd. (002739.SZ), and CJ CGV Co., Ltd. (079160.KS).

Appendix 15: Multiples Valuation

Our multiples valuation is based on the 2024F data from Refinitiv Multiples. We collected multiples data for each of NOS's segments from our chosen peers. Using the weighted average of EV/EBITDA for 2024F, we derived a price target of €4.59/sh, indicating a 40% upside. By averaging the price targets from the four assessed multiples equally, we obtained a price target of €3.89/sh, reflecting a 19% upside. We preferred EV/EBITDA due to the varied capital structures among companies, and some A&C Peers group were not profitable and had negative book values. However, the average upside of 19% supports our buy recommendation.

Analyzing NOS' historical multiples shows it consistently traded at or slightly above its Core Peers group across various metrics. However, following the COVID-19 correction, NOS is now trading below the average of its comparables. We anticipate this will normalize in the near future. Currently, NOS is trading at 4.41x EV/EBITDA 2024F, representing a discount of approximately 27.1% compared to its Core Peers group. This further supports our analysis.

Historical PE

Historical EV/Sales

Historical EV/EBITDA

Historical EV/FCF
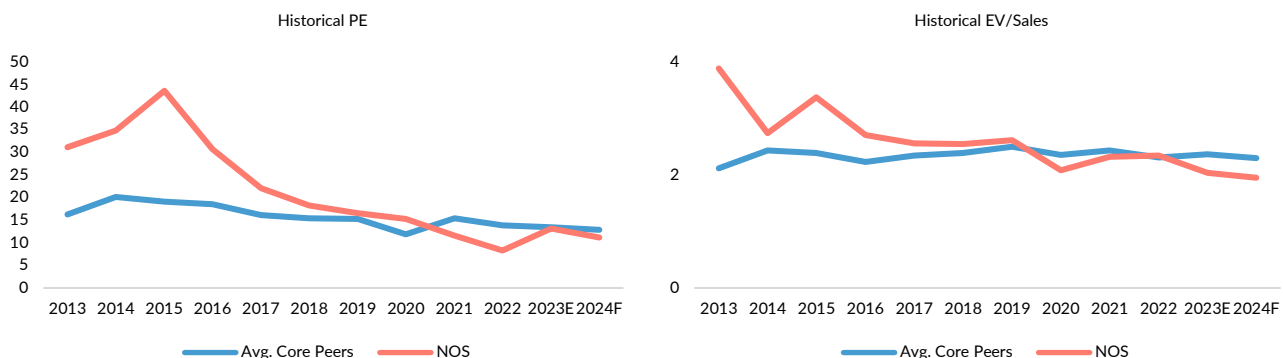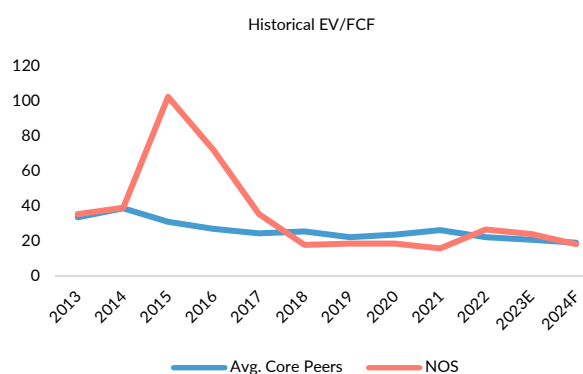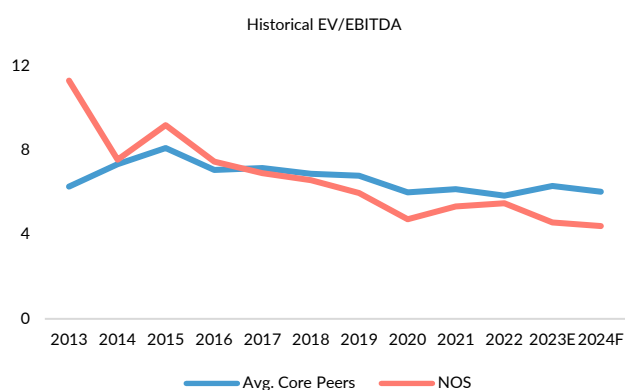
		P/E			EV/Sales			EV/EBITDA			EV/FCF	
	2022	2023E	2024F	2022	2023E	2024F	2022	2023E	2024F	2022	2023E	2024F
Avg. Peers Telco	11,75	10,70	11,15	2,02	2,01	1,95	5,17	5,41	5,34	24,38	26,08	24,05
Avg. Core Peers Telco	13,87	13,41	12,96	2,32	2,37	2,30	5,86	6,31	6,05	22,27	20,76	19,04
Avg. Peers A&C	40,72	15,27	13,33	2,48	1,71	1,50	58,78	8,80	8,10	31,71	18,03	15,38
NOS Multiple	8,30	13,25	11,24	2,35	2,05	1,96	5,48	4,58	4,41	26,55	24,17	18,13
Price Target*			3,78			3,76			4,59			3,39

Average price target of **€3.89/share,** indicating **upside of 19%.**

Appendix 16: FCFF Valuation

FCFF TELCO	2024F	2025F	2026F	2027F	2028F	2029F	2030F	TV
Revenues	1 502 778	1 521 575	1 527 286	1 526 033	1 519 572	1 516 293	1 512 428	1 512 428
OPEX (including provisions)	825 899	850 380	857 251	863 275	867 749	874 476	881 144	881 144
EBITDA	676 879	671 194	670 035	662 758	651 823	641 817	631 284	631 284
D&A	-403 346	-393 327	-379 683	-364 264	-359 379	-358 603	-357 689	-357 689
EBIT	273 534	277 867	290 351	298 494	292 444	283 213	273 595	273 595
Taxes	-43 105	-44 360	-47 475	-49 629	-48 675	-47 015	-45 258	-45 258
NOPAT	230 429	233 507	242 876	248 865	243 769	236 198	228 337	228 337
+ D&A	403 346	393 327	379 683	364 264	359 379	358 603	357 689	
- Change in NWC	6 208	2 245	-1 259	-1 796	-3 608	-2 884	-3 018	
- Capex	366 678	357 570	345 167	331 149	326 708	326 003	325 172	
Reinvestment Value = (CAPEX - D&A + DNWC)								-35 535
FCFF	260 889	267 019	278 652	283 776	280 048	271 682	263 872	192 802
WACC	5,66%	5,66%	5,66%	5,66%	5,66%	5,66%	6,51%	6,51%
Discount Factor	0,95	0,90	0,85	0,80	0,76	0,72	0,67	0,67
Telco Discounted FCFF	246 914	239 179	236 226	227 679	212 647	195 237	178 035	2 384 645
Telco Enterprise Value			3 920 562					

FCFF A&C FLOWS	2024F	2025F	2026F	2027F	2028F	2029F	2030F	TV
Revenues	112 797	115 391	117 468	119 465	121 496	123 926	126 404	126 404
OPEX (including provisions)	-61 991	-64 490	-65 934	-67 581	-69 380	-71 470	-73 643	-73 643
EBITDA	50 806	50 901	51 534	51 884	52 116	52 455	52 761	52 761
D&A	-30 275	-29 829	-29 203	-28 516	-28 734	-29 308	-29 895	-29 895
EBIT	20 531	21 072	22 332	23 367	23 382	23 147	22 866	22 866
Taxes	-3 235	-3 364	-3 651	-3 885	-3 892	-3 843	-3 783	-3 783
NOPAT	17 296	17 708	18 680	19 482	19 490	19 304	19 084	19 084
+ D&A	30 275	29 829	29 203	28 516	28 734	29 308	29 895	
- Change in NWC	466	170	-97	-141	-288	-236	-252	
- Capex	27 522	27 117	26 548	25 924	26 122	26 644	27 177	
Reinvestment Value = (CAPEX - D&A + DNWC)								-2 970
FCFF	19 582	20 250	21 432	22 215	22 391	22 204	22 054	16 114
WACC	7,70%	7,71%	7,71%	7,71%	7,71%	7,71%	7,71%	7,94%
Discount Factor	0.93	0.86	0.80	0.74	0.69	0.64	0.6	0.6
A&C Discounted FCFF	18 181	17 456	17 153	16 508	15 447	14 222	13 086	139 066
A&C Enterprise Value			251 119					

To accurately determine NOS' Equity Value from NOS' Enterprise Value, within our FCFF model, we made several adjustments. We accounted for Debt (short and long-term borrowings), Cash & Equivalents and Net trade Accounts Receivable. We excluded non-controlling interests, Provisions and Other financial undertakings as they negatively impact the company's value. Within Provisions, we identified €22.9M in contingent liabilities, which based on the total inherent value of €55.3M suggests a 41% implicit likelihood of incurring these potential losses. Conservatively, we adjusted this probability to 75%. In Other financial undertakings we included €61.5M in tax guarantees and €299.5 in Assignment agreements for football broadcast rights. It is important to note that the incremental Cash Flows from these rights are included in our forecasted market share evolution, justifying the adjustments from EV to Equity Value. The following tables reflect the FCFF (SoP) segmented between Telco and A&C segments. The calculations of the segments' terminal values follow a separate methodology. In this approach we subtracted the reinvestment value (calculated as the ratio of NOS' terminal value growth by its ROIC) from the NOPAT and then discounted the perpetuity. Throughout the valuation, we applied a 22.5% effective tax rate.

NOS Enterprise Value	4 171 682
Adjustments from EV to Equity Value	
Noncontrolling interests	-6 251
Cash & Equivalents	15 783
Debt	-1 706 678
Provisions and Contingent Liabilities (revised)	-99 842
Net Accounts Receivable - trade	107 332
Other financial undertakings	-361 012
Equity Value	2 121 013
Share Price	**€ 4,15**
Nos SGPS SA (XLIS: NOS)	**€ 3,27**
Upside	**27%**

Appendix 17: FCFE Valuation

NOS' equity value was derived by calculating the FCFE starting from the Net income and making adjustments for the company's non-controlling interests. Net borrowings in 2023 reflected the amount needed to finance the operation, particularly considering the extra dividend payment following the sale of the towers, in the previous year. From 2024 onwards, net borrowings were estimated based on NOS' cash generation and its ability to deleverage.

FCFE	2024F	2025F	2026F	2027F	2028F	2029F	2030F	TV
NI	159 616	164 384	176 102	184 326	181 062	175 176	168 917	168 917
D&A	433 620	423 156	408 886	392 780	388 113	387 912	387 584	387 584
CAPEX	394 200	384 687	371 714	357 073	352 830	352 647	352 349	352 349
dNWC	6 674	2 415	-1 356	-1 936	-3 896	-3 119	-3 270	-3 270
Net Borrowings	-29 692	-32 532	-34 591	-46 804	-48 535	-47 376	-47 348	-47 348
FCFE	162 671	167 905	180 038	175 165	171 706	166 184	160 073	160 073
Discount rate	8,43%	8,38%	8,34%	8,27%	8,20%	8,14%	9,13%	9,13%
Discount factor	0,92	0,85	0,79	0,73	0,67	0,62	0,57	0,57
FCFE 0	150 024	142 872	141 409	127 072	115 120	103 033	90 945	1 130 420
Equity Value	2 000 895							g = 1%

Appendix 18: Dividend Discount Model

DDM		2024	2025	2026	2027	2028	2029	2030	TV
Dividends		167 427	167 427	167 427	167 427	167 427	167 427	167 427	167 427
Discount Factor		0,92	0,85	0,79	0,73	0,67	0,62	0,57	0,57
Discounted Dividends		154 410	142 466	131 504	121 459	112 251	103 804	95 123	1 223 942
Equity Value	2 084 960								
Non-Controlling Interests	-6 251								
Equity Value	2 078 709								
Equity Value per Share	**€4,06**								

Appendix 19: Risk Matrix

Market Risk | Energy Prices (MR3)

The volatility and unpredictability of energy prices, driven by recent geopolitical conflicts, pose a notable risk to companies across various sectors, including NOS. However, this risk has relatively limited impact to NOS, as energy costs constitute only approximately 2% of the company's overall expenses. Mitigation: NOS is currently leveraging an energy provisioning strategy based on a long-term PPA (power and purchase agreement), which, according to the CFO during 3Q2023 conference call, provides NOS "very attractive prices". This PPA covers 35% of the company's energy consumption, while the remaining 65% is procured at spot market rates.

Market Risk | Inflation and Interest Rates (MR4)

In recent years, inflation has been a significant concern for companies and consumers globally. Despite a slight easing of the inflation rate in Portugal (at 2.1% YoY in the last reported month), uncertainty remains about high inflation has ended. This affects interest rates, and consequently, the company's average cost of debt., which has increased from 1.3% (4Q2022) to 3.9% (3Q2023). Mitigation: NOS contracts include clauses allowing price increases based on inflation. Additionally, NOS adopted a policy of hedging its risk using interest rate swaps to hedge against interest rates on its debt.

Operational Risk | Intense Capex (OR1)

The telecom sector requires significant capital expenditure for maintenance and expansion, posing a risk. of financial distress from large investments in infrastructure and technology that might fail to generate the expected returns. Mitigation: After a period of heavy investment in FttH and 5G, NOS plans to reduce annual capex, improving its cash flows and strengthening its financial position.

Operational Risk | Potential Natural Disasters (OR2)

Climate change increases the frequency and severity of extreme weather events, increasingly becoming important factors for managers to consider. Particularly for NOS, natural disasters pose a risk to infrastructure, supply chains, potentially disrupting business and affecting the financial performance and, consequently, the company's ability to generate shareholders' returns. Mitigation: NOS has a Business Continuity Management (BCM) program to enhance the resilience and availability of critical operations, infrastructure (networks, facilities, and the communications support services), and NOS' business activities. This program protects employee's health and safety through its OHS management system.

Financial Risk | Solvency and Liquidity (FR2)

In a capex intensive industry, maintaining strong liquidity is crucial to handle unexpected events, as well as the company's forthcoming obligations. NOS relies on operating cash flow, committed commercial paper programs, and cash & equivalents. Mitigation: NOS has a proactive risk management strategy, targeting a Net Financial Debt / EBITDA AL at or below 2. Regarding its cash & liquidity position, the company has 267.5 million euros of unissued available committed commercial paper and 11.9 million euros in cash. Strong operating cash flows continue to comfortably cover capex, with reduced future capex further strengthening liquidity.

Appendix 20: Scenario Analysis

Scenarios	Bear Case	Base Case	Bull Case
WACC	5.21%	6.51%	7.8%
4/5P (% Mkt)	31.9%	36.43%	38.99%
4/5P Price	51.40 €	57.11 €	62.82 €
3P (% Mkt)	26.1%	29%	31.90%
3P Price	41.96 €	46.60%	51.28 €

A Monte Carlo simulation was conducted to address the valuation key drivers under uncertainty. The variables used in the analysis are shown in **Figure**. Additionally, a bull and bear case analysis was performed. In the bear case, we considered the entry of new market players and increased price rivalry, leading to a decrease in NOS's market share and pricing. In the bull case, NOS becomes the market leader in 4/5P Bundles and is able to sustain price increases. Details are outlined below:
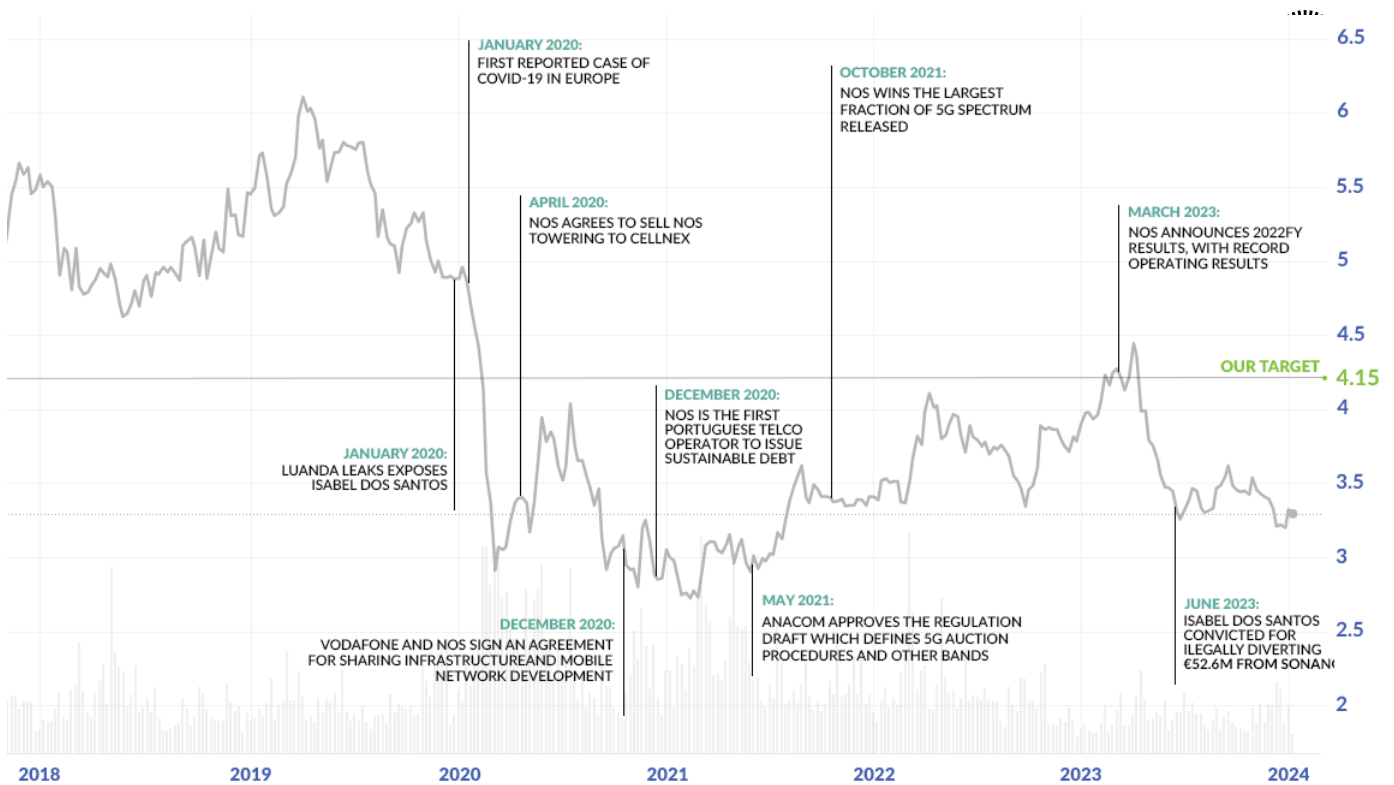
BULL CASE
€5.96

BASE CASE
€4.15

3.27

BEAR CASE
€2.48

8

6

4

2

2015 — 2024 YE

Appendix 21: Sensitivity Analysis

A sensitivity analysis was performed to evaluate the impact of 2 key valuation drivers on the FCFF price target. By stressing these variables, we analyzed their effect on the valuation. We discovered that if the 4/5 Bundle Price in 2030 falls below 54.61€ and the WACC rises above 5.71%, our recommendation would change. However, most scenarios support our buy recommendation, with target prices significantly above the current trading price.

		4/5P Bundle Price in 2030			
WACC		52.11 €	54.61 €	57.11 €	59.61 €	62.11 €
5.71%	3.06 €	3.98 €	4.91 €	5.84 €	6.77 €
6.11%	2.78 €	3.63 €	4.49 €	5.35 €	6.20 €
6.51%	2.54 €	3.33 €	4.15 €	4.92 €	5.72 €
6.91%	2.33 €	3.07 €	3.81 €	4.55 €	5.29 €
7.31%	2.15 €	2.85 €	3.54 €	4.23 €	4.93 €

Appendix 22: Stock price evolution & important events

JANUARY 2020:
FIRST REPORTED CASE OF COVID-19 IN EUROPE

OCTOBER 2021:
NOS WINS THE LARGEST FRACTION OF 5G SPECTRUM RELEASED

APRIL 2020:
NOS AGREES TO SELL NOS TOWERING TO CELLNEX

MARCH 2023:
NOS ANNOUNCES 2022FY RESULTS, WITH RECORD OPERATING RESULTS

DECEMBER 2020:
NOS IS THE FIRST PORTUGUESE TELCO OPERATOR TO ISSUE SUSTAINABLE DEBT

OUR TARGET
4.15

JANUARY 2020:
LUANDA LEAKS EXPOSES ISABEL DOS SANTOS

DECEMBER 2020:
VODAFONE AND NOS SIGN AN AGREEMENT FOR SHARING INFRASTRUCTURE AND MOBILE NETWORK DEVELOPMENT

MAY 2021:
ANACOM APPROVES THE REGULATION DRAFT WHICH DEFINES 5G AUCTION PROCEDURES AND OTHER BANDS

JUNE 2023:
ISABEL DOS SANTOS CONVICTED FOR ILEGALLY DIVERTING €52.6M FROM SONAN

2018 2019 2020 2021 2022 2023 2024

Source: Refinitiv, Team Analysis

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