

**ART**

Autorità
di Regolazione
dei Trasporti

**DETERMINATION OF THE RATE OF RETURN ON INVESTED
CAPITAL TO BE APPLIED IN THE PROCEDURES FOR UPDATING
OR REVISING EXISTING MOTORWAY CONCESSIONS,
PURSUANT TO ARTICLE 43 OF LEGISLATIVE DECREE 43 OF
DECREE-LAW 201/2011, AS WELL AS FOR NEW
CONCESSIONS**

Annex 'A' to Decision No 124/2024 of 13 September 2024

ART

SUMMARY

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1. FOREWORD

This document outlines the methodology for calculating the rate of return on invested capital and establishes its applicable value, in effect from the date of publication until the next update. It applies to the procedures for updating or revising existing motorway concessions, as referred to in Article 43 of Decree-Law No 201 of 6 December 2011, as well as to new concessions, in accordance with the regulatory acts listed in **Table 1** in the Annex.

2. GENERAL PRINCIPLES

The rate of return on invested capital for the motorway sector shall be determined in accordance with the weighted average cost of capital¹ (R) methodology and shall be carried out by applying the following formula:

$$R = g \cdot \frac{R_d (1 - t)}{1 - T} + (1 - g) \cdot \frac{R_e}{1 - T}$$

where:

- R_d cost of debt;
- R_e cost of equity;
- g proportion of financial debt (so-called *gearing*);²
- $(1-g)$ share of equity;
- t tax rate for calculation of the 'tax shield' of financial expenses³, i.e. the corporate income tax (IRES) rate;
- T theoretical tax rate reflecting the impact of taxes on the pre-tax operating result, equal to the sum of the corporate tax rate (IRES) and the tax on productive activities (IRAP).

The rate of return thus determined is nominal and pre-tax, i.e. before taxation, and can be converted into real terms (R_r) using the Fisher formula. This conversion applies the arithmetic mean of the inflation rates planned for the years of the regulatory period (\bar{P}), as derived from the latest available *Documento di Economia e Finanza* (DEF):

$$R_r = \frac{1 + R}{1 + \bar{P}} - 1$$

The **cost of equity** (R_e) is determined according to the Capital Asset Pricing Model (CAPM) methodology, based on the following formula:

$$R_e = rfr + \beta_e \cdot erp$$

where:

- rfr risk-free rate, i.e. rate of a risk-free asset;
- β_e equity beta, i.e. measure of non-diversifiable systematic risk of equity;
- erp equity risk premium.

¹ The *Weighted Average Cost of Capital* methodology, hereinafter WACC, is used to calculate the weighted average cost of a company's financing sources, i.e. equity and debt, weighted by their impact on the total invested capital.

² *Gearing* (g) is the weight of debt on total financing sources, and serves as an indicator of corporate indebtedness. Given the financing sources, i.e. debt (D) and equity (E), the gearing ratio is defined as follows:

$$g = D/(D + E), \\ 1 - g = E/(D + E).$$

³ i.e. deductibility of borrowing costs from taxable income.

The **cost of debt** (R_d) estimates the amount a company would pay to obtain financing under market conditions. It consists of two components: the risk-free rate (rfr) and the debt premium (dp):

$$R_d = rfr + dp$$

3. ESTIMATION OF WACC PARAMETERS

The parameters of the WACC formula have been estimated by the Authority, as specified below.

3.1. Risk-free rate

The rfr is given by the arithmetic mean of the ten-year BTP⁴ yields, calculated on the basis of the daily average values of the last available 12 months.

Data source: Bank of Italy.

3.2. Leverage and gearing

To determine the financial leverage applicable to the sector, the average of the (positive) debt-to-equity ratios (D/E) of motorway concessionaires over the last five available years was considered; from this value the weighting ratio $D/(D+E)$, i.e. the *gearing*, is also obtained.

Data source: AIDA database, ART data and corporate financial statements.

3.3. Debt premium

The debt premium takes into account the default risk and is linked to the company's rating. It is set based on the five-year average cost of debt for motorway concessionaires (calculated as the ratio of financial expenses to financial debt, excluding intra-group transactions and arrangements with shareholders), on the basis of the financial data in the corporate financial statements of motorway concessionaires, and the risk-free rate of the corresponding last 12 months, with a maximum allowable limit of two percentage points.

Data source: AIDA database, ART data, corporate financial statements, Bank of Italy.

3.4. Tax rate

The tax rate is calculated as the algebraic sum of the IRES and IRAP rates, which can be derived from the sector-specific legislation in force.

Data source: Ministry of Economy and Finance – Department of Finance.

3.5. Equity beta

The equity beta coefficient measures the systematic, non-diversifiable risk to which a company operating in a given market is exposed. It is calculated as the ratio of the covariance of the return of an i -th asset to the variance of the market return.

⁴ "BTP" stands for Buoni del Tesoro Poliennali, which are Italian government bonds .

This value is determined through a comparative analysis of the daily stock performance of so-called comparables, i.e. other companies operating in the same sector or comparable sectors, compared to the reference market performance, represented by the STOXX Europe 600 index, over a five-year period.

On the basis of these "levered" betas, the "unlevered" value is calculated for each company using its specific leverage and tax rate, derived from its accounting values (see

Table 2 in the Annex). The average of the resulting unlevered betas is then subjected to a "relevering" process, applying the notional (sector) values set by ART for financial leverage and tax shield, ultimately determining the equity beta value.

Data source: Refinitiv database.

3.6. *Equity risk premium*

The Authority estimates the ERP using the Dimson, Marsh & Staunton (DMS)⁵ time series. The ERP is determined by applying both the geometric and arithmetic mean of ERP calculated on long-term data, calculated as the difference between market returns and risk-free asset returns (i.e., government bonds). This approach is based on the assumption that past trends can provide a meaningful estimate of the expected developments of the relevant parameters.

In general, it should be noted that, as a rule, the arithmetic and geometric mean of returns obtained from time series analysis typically represent the upper and lower bounds of the range within which the sought (ERP) is estimated. In the past, the Authority has tended to assign greater weight to the arithmetic mean (AM) over the geometric mean (GM), applying the so-called "Blume formula"⁶.

$$ERP = \frac{t-n}{t-1} \cdot AM + \frac{n-1}{t-1} \cdot GM$$

Data source: E. Dimson, P. Marsh and M. Staunton, "UBS Global Investment Returns Yearbook 2024".

4. DETERMINATION OF WACC

Based on the parameters thus determined, the nominal pre-tax WACC is **7.67%**, while the real pre-tax WACC is **6.50%** (see **Table 3** in the Annex).

⁵ E. Dimson, P. Marsh and M. Staunton, (2002). *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press.

⁶ Blume, M.E. (1974). "Unbiased estimators of long-run expected rates of return", *Journal of the American Statistical Association*, 69:347, pp.634-638.

Table1: ART toll charging systems

Decision	Date	Subject	Ref. Annex A
119/2017	28/09/2017	Concession scheme and toll charging system related to the motorway sections A5 (Turin-Ivrea-Quincinetto), A4/5 (Ivrea-Sanità), Turin ring road system, Turin – Pinerolo Branch and A21 (Turin-Alessandria-Piacenza)	14.6
73/2018	18/07/2018	Toll charging system related to the in-house award of the operation of the A22 Brennero-Modena motorway section	16.6
133/2018	19/12/2018	Toll charging system related to the in-house award of the operation of the motorway sections A4 Venice-Trieste, A23 Palmanova-Udine, A28 Portogruaro-Conegliano, A57 Mestre ring road for the relevant part and A34 Villesse-Gorizia junction	16.6
64/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Raccordo autostradale Valle d'Aosta S.p.A.	16.7
65/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Società Autostrada Tirrenica p.A.	16.7
66/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Strada dei Parchi S.p.A.	16.7
67/2019	19/06/2019	Toll charging system related to the Concession agreement ANAS S.p.A. - Concessioni Autostradali Venete - CAV S.p.A.	16.7
68/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Società SATAP Tronco A4	16.7
69/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Società Milano Serravalle-Milano Tangenziale S.p.A.	16.7
70/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. – Società Autostrada Brescia-Verona-Vicenza- Padova S.p.a.	16.7
71/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Autostrade per l'Italia S.p.A.	16.7
72/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Società di Progetto Autostrada Asti - Cuneo S.p.A.	16.7
73/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Autocamionale della CISA S.p.A.	16.7
74/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Autostrada dei Fiori S.p.a.	16.7
75/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Autostrada Torino Savona S.p.A.	16.7
76/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - SALT S.p.A.	16.7
77/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - SAV Società Autostrade Valdostane S.p.A.	16.7
78/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - SITAF S.p.A. Autostrada A32 Torino-Bardonecchia	16.7
79/2019	19/06/2019	Toll charging system related to the Single concession agreement ANAS S.p.A. - Tangenziale di Napoli S.p.A.	16.7
119/2019	12/09/2019	Concession scheme and toll charging system related to the motorway sections A12 Sestri Levante-Livorno, A11/A12 Viareggio-Lucca, A15 La Spezia Branch and A10 Ventimiglia-Savona	16.7
29/2020	12/02/2020	Toll charging system related to the Single concession agreement Concessioni Autostradali Lombarde S.p.A. – Tangenziale Esterna S.p.A.	16.7
106/2020	18/06/2020	Toll charging system related to the Single concession agreement Concessioni Autostradali Lombarde S.p.a. – Autostrada Pedemontana Lombarda S.p.A.	16.7
87/2021	17/06/2021	Toll charging system related to the Single concession agreement Concessioni Autostradali Lombarde S.p.a. – Società di Progetto Brebemi S.p.A.	16.7
28/2023	23/02/2023	Toll charging system related to the Single concession Ministry of Infrastructure and Transport – Autovia Padana S.p.a.	16.3
180/2023	23/11/2023	Toll charging system related to the Concession agreement ANAS – Consorzio per le Autostrade Siciliane	16.3

Table 2: Comparables

<i>Comparables</i>	<i>Equity beta</i>	<i>Tax complement</i>	<i>Leverage</i>	<i>Asset beta</i>
FERROVIAL	1.034	0.79	2.88	0.315
EIFFAGE	1.246	0.46	2.79	0.546
SNAM	0.817	0.76	2.19	0.307
TERNA	0.709	0.70	2.28	0.272

Table 3: WACC estimate

WACC estimate		Note	WACC September 2024	Period of reference considered
Nominal risk-free rate	[1]	RFR	4.096%	01/07/2023-30/06/2024
Debt premium	[2]	cap 2%; floor 0%	0.076%	2019-2023; 01/07/2023-30/06/2024
Cost of nominal debt	[3]	[1] + [2]	4.17	
IRAP	[4]	2017 Budget Law	4.82	
IRES/tax shield	[5]	2017 Budget Law	24.00%	
Tax rate	[6]	[5]+[4]	28.82%	
Pre-tax nominal cost of debt	[7]	[3] x (1-[5]) / (1-[6])	4.45%	
Gearing (D/(D+E))	[8]	[9] / (1 + [9])	0.598%	
Leverage (D/E)	[9]	sector average	1.488	2019-2023
Asset Beta	[10]	comparable average	0.360	30/07/2019 – 30/07/2024
Equity Beta	[11]	[10] x (1+ [9] x (1 – [5]))	0.767	
Equity Risk Premium	[12]	Blume formula	6.22%	Series DMS 1900-2023; t =124; n=15
Post-tax Nominal Cost of Equity	[13]	[1] + ([12] x [11])	8.87%	
Pre-tax Nominal Cost of Equity	[14]	[13] / (1 – [6])	12.47%	
Pre-tax Nominal Wacc	[15]	[7] x [8] + [14] x (1 – [8])	7.67	
Inflation	[16]	EFD 2024, approved by the Council of Ministers of 9 April 2024	1.10%	Available for 2024, P _{average} coincides with P ₂₀₂₄
Pre-tax real Wacc	[17]	(1 + [15]) / (1 + [16]) - 1	6.50%	