Valuing banks with the DDM in the Excess Capital variant. Application uncertainties

October 29, 2025

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Working Paper

THE INTRINSIC VALUE

The valuation of banks, as with any other company, becomes necessary in the context of extraordinary transactions, such as mergers and acquisitions. The valuation criteria are the same, but the methods may differ due to the specific characteristics of banking operations[1] — the sources of profitability, the structure of assets and liabilities, and the regulatory framework to which banks are subject, particularly concerning capital adequacy requirements.
This article focuses on the Dividend Discount Model (DDM) in its Excess Capital (EC) variant, highlighting certain points of attention regarding the very definition and estimation of Excess Capital.

First of all, it is necessary to recall the reasons why the valuation of banks has peculiarities compared to that of companies in any other sector. Valuation is always conducted on the equity side, which means that the estimation of equity value is not obtained by first determining the enterprise value and then subtracting net financial debt, but rather by directly discounting the cash flows attributable to shareholders. In non-financial firms, debt represents a source of financing for industrial or commercial operations that develop independently of the necessary financial coverage, which is extraneous to the operating results. Consequently, the operating cash flow, net of taxes but gross of debt servicing, has logical and conceptual autonomy and can be discounted at the Weighted Average Cost of Capital (WACC) (debt and equity) to estimate, as mentioned, the enterprise value of the firm.

In the case of banks, however - particularly commercial banks, though not exclusively - financial intermediation (collecting deposits in various technical forms and employing them in loans and other financial instruments) constitutes the core business. Deposits largely represent the «raw material» on which operations are based. Therefore, it is not possible to distinguish between operational and financial cash flows.
For this reason it is necessary to directly estimate the cash flows attributable to shareholders, in this case represented by expected dividend flows over one or two explicit forecast periods, and by flows related to the subsequent perpetual period for the estimation of the Terminal Value (so called two- or three-stage models). The result of this estimation is the equity value of the bank.

The second reason why the estimation of a bank's intrinsic value presents specific features lies in the capital adequacy requirements provided by regulatory frameworks. Such regulation defines minimum capital requirements as ratios between regulatory capital and risk-weighted assets (RWA). Therefore, current and prospective dividend distribution is conditional upon compliance with such constraints, partly defined by primary legislation and partly by additional individual requirements established *pro tempore* by the supervisory authority (Bank of Italy or ECB, depending on the different scope of responsibilities).

In light of the above remarks concerning the peculiarities of bank valuation, we can now address the estimation of intrinsic value. In practice, the most widely used methods are the Dividend Discount Model (DDM) and its Excess Capital (EC) variant. Less common - based on available evidence - are the Discounted Residual Income Model (RIM) (also known as the Excess Return or

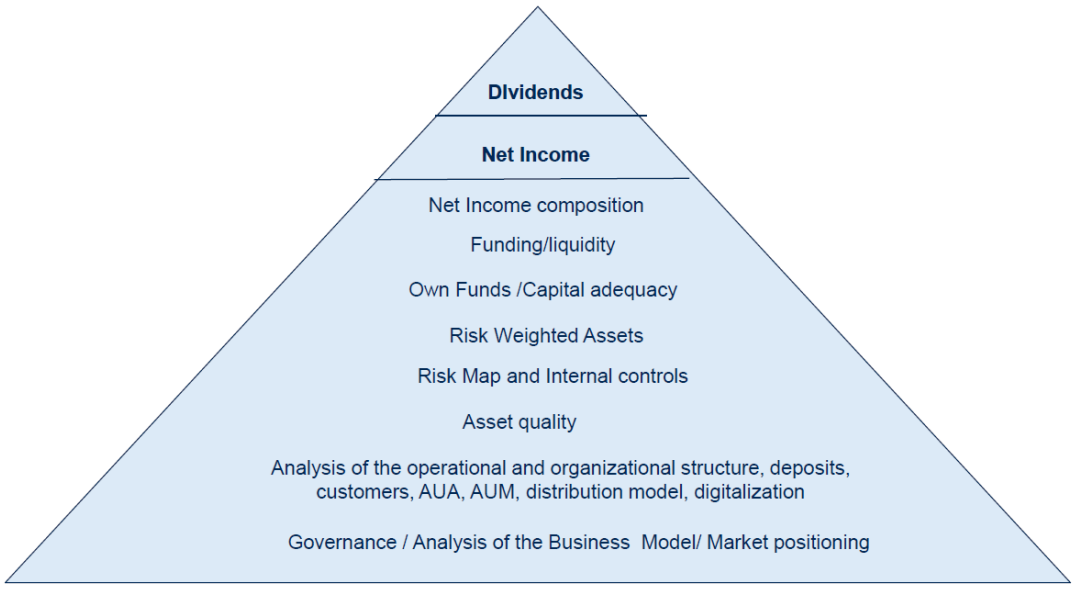
[1] In the article, the general reference to the bank is to be understood also to the banking group.

Discounted Abnormal Earnings Model), the Free Cash Flow to Equity Model, and the Asset/Liability-Based Valuation Model, for which reference should be made to other sources[2].

It should first be noted that: i. Knowledge of the specifics of the bank's balance sheet and the essential accounting and valuation rules is necessary to appreciate the business model, to conduct historical and prospective analysis, and to understand growth trends. ii. Methods for evaluating intrinsic value presuppose that the bank's value drivers and risks are appreciated, that the forecasts of the economic and financial profiles have been evaluated, and that they are deemed consistent with the industrial plan and the market consensus. iii. By its nature, any valuation should not be a mere mechanical application of formulas and criteria, but rather the result of a complex analytical and estimation process that may reflect significant elements of subjectivity.

Figure 1 schematically illustrates the complex process required for the estimation of intrinsic value. It is understood that, regardless of the chosen valuation criterion for the bank, the analyst or appraiser should arrive at income/financial forecasts by «climbing» the pyramid (or assuming that others have already done so: *Equity Research – consensus*).

Figure 1. The valuation process



THE DIVIDEND DISCOUNT MODEL

The Dividend Discount Model (DDM) is well known, though it is very rarely applied in the valuation of non-financial companies. Moreover, given the necessity, mentioned above, of taking capital adequacy requirements into account in the case of banks, its traditional formula is generally not recommended:

[2] There is extensive literature on the topic of bank valuation. It is sufficient here to refer to: M. Rutigliano, *La valutazione delle banche e dei gruppi bancari*, in M. Rutigliano (ed.), *La valutazione delle banche e degli altri intermediari finanziari*, Egea, Milan, 2018, pp. 153–247, and the bibliography cited therein. As for the Sum-of-the-Parts approach to valuing a multibusiness bank or banking group, different methods can also be used to best capture the value of the various operating segments, business areas, or group companies. Reference is made to the source cited above.

$$W = \sum_{t=1}^{\infty} \frac{DIV_t}{(1+K_e)^t} + SA$$

where:

- W = intrinsic value
- DIV_t = expected normalized dividends (from Business Plan or consensus/sector forecasts) for year *t*, starting from the first year, sustainable in the long term
- K_e = discount rate (cost of equity or required return on equity)
- SA = surplus assets, if any

In the case where a constant sustainable growth rate of dividends «*g*» can be assumed (not exceeding the estimated long-term growth rate of the economy as a whole), the result can be summarized by the well-known formula, under the condition $K_e > g$, with dividends and «*g*» being mutually dependent[3]:

$$W = \frac{DIV_1}{K_e - g}$$

or, alternatively, in the equivalent formula: $W = BV_0 (ROE-g)/(K_e- g)$

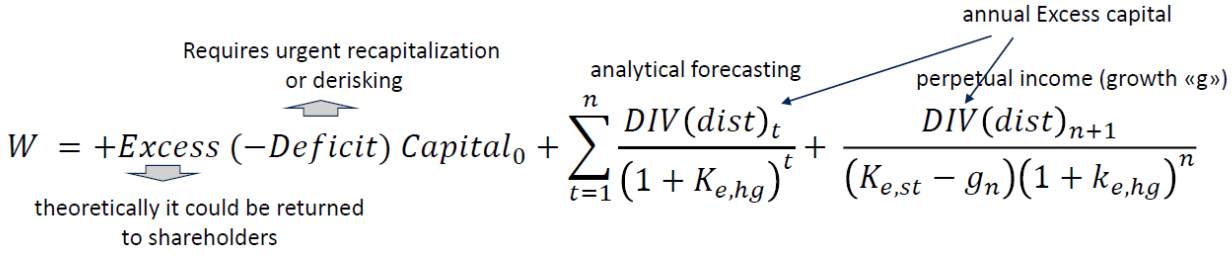
where:

- BV_o = initial book value
- ROE = Return on Equity, assumed constant

The focus here on the DDM not adjusted for Excess Capital is explained by the fact that this model is nevertheless used in practice, including in certain equity research analyses by financial analysts - probably due to the immediacy of obtaining a quick valuation for target price purposes and/or in the absence of detailed information on the prospective dynamics of RWAs and consequent capital requirements. However, it should be emphasized that this traditional version of the DDM is not used for intrinsic value estimation in the context of M&A transactions.

THE DDM IN THE EXCESS CAPITAL VARIANT

In such cases, the DDM in the Excess Capital variant (DDM-EC) is applied. In a two-stage model[4], its formula is typically represented as follows, consistent with the way it is usually presented in specialized publications:



[3] A higher dividend distribution results in lower retained earnings, and therefore lower growth, all else being equal.

[4] The application of a three-stage model is also noted. For example, BPER, Consolidated Financial Statements for the 2024 Fiscal Year (p. 187): «*The forecasts for the periods corresponding to the second stage* (second of three, ed.) *are generally developed using an inertial approach, based on decreasing growth rates and margins broadly in line with those of the previous period, taking into account, where possible, the expected sector trends. The development of inertial forecasts, as required by the IAS 36 accounting standard itself, aims to achieve a normalized situation by the end of the period and to estimate a sustainable long-term income that can be used in the calculation of the Terminal Value*». Similarly, UniCredit, Consolidated Financial Statements for the 2024 Fiscal Year (p. 904).

where:

- Excess/Deficit Capital$_0$ = capital surplus or deficit, in terms of CET1 (Common Equity Tier 1), at the time of valuation
- DIV(dist)$_t$ = potentially distributable dividends, assuming that an adequate level of capital is prospectively maintained, consistent with the development of operations and related risks - thus with the evolution of RWA. For the explicit forecast period, this requires an analytical estimation of projected net profits after taxes

The third addend estimates the present value of the terminal value, calculated as the value of a perpetual annuity based on a normalized distributable cash flow - economically sustainable and consistent with the long-term growth rate (g_n) of net income and RWA.

The logic underlying this model is straightforward. Regardless of the management's projections reflected in the multi-year business plan and annual budgets regarding the dividend payout ratio and consequent capital retention for organic growth, for valuation purposes these plans are overlaid with a projection of dividend flows - hence a «theoretical» payout ratio - constrained by the need to maintain a predefined level of prospective capital adequacy. Accordingly, the distributable dividends, as defined under these constraints, are discounted to estimate the intrinsic value of the bank.

APPLICATION UNCERTAINTIES

The critical aspect of the model lies in the very definition of Excess Capital, namely, what level of capitalization should be taken as a reference for estimating distributable dividends. On this point, which is crucial for the application of the method, there is no clarity in the contributions on the subject, nor uniformity in practical applications.

A first point, however, on which there is broad consensus, is represented by the consideration of the capital configuration (regulatory own funds) in terms of Common Equity Tier 1, i.e. the highest quality aggregate of capital to ensure capital adequacy on a going concern basis. This aggregate (net of intangibles) most closely corresponds (though with other calculation differences) to book equity (share capital and reserves), which represents the equity value under valuation from the shareholders' perspective. It is the component of capital directly affected by the distribution of dividends and, conversely, by the retained earnings that increase reserves. Therefore, for estimating distributable dividends, other forms of regulatory capital -Tier 1 (CET1 + AT1) and Total Capital (Tier 1 + Tier 2)[5] - should not be considered, except insofar as they affect expected profitability through the explicit financial cost of AT1 and Tier 2 instruments, as well as for their role in determining the «theoretical» funding structure required to comply with minimum capital requirements established, as for CET1, for both Tier 1 and Total Capital by primary regulation and supervisory provisions setting additional individual capital requirements.

On the other hand, the CET1 capital threshold, that can highlight a Surplus or a Deficit for the purposes of applying the DDM in the Excess Capital variant, is rather uncertain.

[5] Instruments classified as Additional Tier 1 (AT1) are perpetual securities issued on the market with the features required by specific regulations. Tier 2 instruments are essentially subordinated securities, also issued on the market with features prescribed by the regulations.

In several documents examined - without any claim to completeness or representativeness, but purely for illustrative purposes - we can read statements such as:

1. «... expected dividend flow is understood as the distributable cash flow, taking into account the capital constraints imposed by the Supervisory Authority or deemed appropriate to cover the specific risk of the analyzed activity. Therefore, future cash flows can be identified as those potentially distributable after meeting the minimum allocated capital requirements[6]».
2. «An additional parameter used for calculating the initial allocated capital and its evolution is the Common Equity Tier 1 ratio target[7]».
3. «Distributable cash flows are understood as the future financial flows expected to be generated net of the portion of income that must be retained in capital to preserve regulatory capital adequacy requirements. With reference to the regulatory requirements, a Common Equity Tier 1 ratio of [x%] has been used, as defined in the Group's Risk Appetite Framework. Accordingly, by adjusting expected cash flows upward for excess capital over the above minimum capital limits, or downward for income portions required to cover the growing RWA, the distributable cash flows were determined[8]».
4. «We then add the excess or shortfall of capital over a target which is based on the bank's SREP plus a buffer which includes, among others, P2G and management buffer[9]».
5. «We assume as excess capital the bank's CET1 ratio target from the business plan of [X%][10]».
6. «For the estimation of maximum distributable cash flows, the minimum level of capital necessary to ensure the bank's operations was defined as a CET1 ratio target of X%, corresponding to the average CET1 ratios observed among comparable banks (Italy and EU)[11]».

From the above, it seems clear that applying the DDM-EC involves a high degree of subjectivity in defining the threshold for estimating Excess/Deficit Capital[12], and consequently in estimating distributable dividends and the bank's intrinsic value. The following approach is therefore proposed, starting from what Excess/Deficit Capital should represent from a managerial standpoint, which is also relevant for valuation purposes. To this end, reference is made to the Risk Appetite Framework (RAF) of the bank, approved annually by the Board of Directors and submitted to the Supervisory

[6] Conflicting and inconsistent references are immediately apparent: a) capital requirements imposed by the Supervisory Authority; b) deemed appropriate for risk coverage; c) minimum allocated capital requirements.

[7] This refers to the CET1 ratio target, which is certainly higher than the minimum requirements and corresponds to a level deemed appropriate for risk coverage, as in Case 1.

[8] As will be clarified further below, the RAF identifies a plurality of capital adequacy «thresholds», ranging from the regulatory minimum to the Risk Appetite level, so the reference is generic and does not specify a threshold for the purpose of estimating Excess Capital.

[9] Once again, there is a reference to the target, specifying that it is set based on the minimum requirements established by the ECB in the bank's annual communication following the Supervisory Review and Evaluation Process (SREP), but supplemented by the (formally) non-mandatory Pillar 2 Guidance (P2G), as well as additional buffers decided by the Board of Directors to further strengthen capital adequacy.

[10] Another reference to the target, specifically the one presented in the Business Plan.

[11] The reference to the «market» CET1 ratio, based on CET1 ratios derived from a sample of comparable banks (Italy and EU), represents an additional approach for estimating distributable dividends, and thus the intrinsic value, of a specific bank. Obviously, the estimated excess capital has no relation to the financial and capital situation of the bank being assessed.

[12] There are also generic references to maintaining «a satisfactory level of capitalization», or to the fact that «the capital requirements imposed by the Supervisory Authority on the Bank have been taken into account».

Authority. The RAF constitutes «*the reference framework that defines, in line with the maximum risk that can be assumed, the business model and the strategic plan, the risk appetite, the tolerance thresholds, the risk limits, the risk governance policies, the reference processes necessary to define and implement them*[13]».

Figure 2. The Risk Appetite Framework thresholds for the CET1 ratio

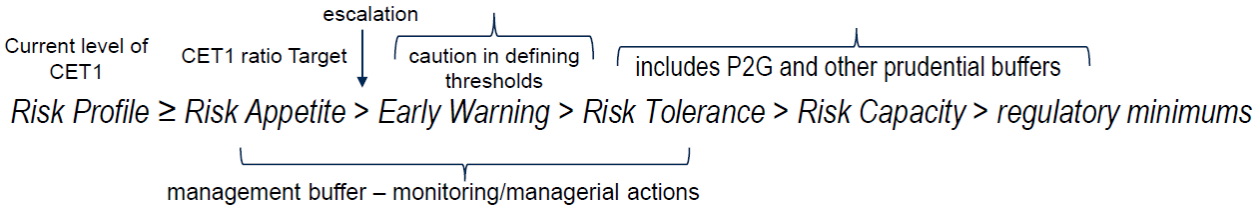


Figure 2 illustrates the various thresholds presented in the RAF, where the minimum threshold is obviously represented by the regulatory minimum established by primary legislation and by the indications provided in the annual SREP addressed to each individual bank[14]. Above the minimum threshold lies the so-called Risk Capacity, that is the «unbreachable» CET1 ratio level set by the bank to avoid reaching or falling below regulatory minimum, which would trigger supervisory intervention according to regulatory provisions. The Risk Tolerance and Early Warning levels represent further safety margins: *Tolerance* accounts for the Pillar 2 Guidance (P2G) - an additional CET1 requirement formally «non-mandatory» but highly recommended by the supervisory authority; *Early Warning* reflects prudential buffers established to alert management when approaching the Tolerance threshold.

The Risk Appetite represents the target level for the CET1 ratio declared by the bank in its RAF, while the Risk Profile expresses the current level of the indicator, which may be higher (as in Figure 2) or lower than the Risk Appetite level[15].

Before addressing which ratio threshold should, in principle, be considered most appropriate for estimating Excess or Deficit Capital - and hence distributable dividends - it is useful to note that, in practice, it is highly unlikely, referring to the above DDM-EC formula, that a Deficit Capital would be recognized (and thus subtracted) at the very time of valuation. Rather, in such a case, the estimation of the first dividend(s) would reflect the need to rebuild CET1 through profit retention, until alignment with the reference threshold is achieved. Moreover, it is not realistic to assume a deficit even with respect to the regulatory minimum CET1 requirements, since that would necessitate an immediate recapitalization or derisking under a Recovery Plan. Under going-concern conditions, those regulatory minima can never be considered as reference thresholds for estimating distributable dividends.

[13] Bank of Italy, Circular No. 285 of 17 December 2013, Part One, Title IV, Chapter 3, Section I.

[14] In most cases, internal policies also include Alerts (for example, for market and macroeconomic indicators, the maximum deviation from expectations, beyond which it is necessary to assess whether to recalibrate the RAF) and Risk Limits, which represent the breakdown of risk objectives into exposure limits by risk type, business units and/or lines of business, product lines, client types, and other relevant categories.

[15] Both continuous monitoring and potential managerial actions to bring the indicator back to deemed appropriate levels are, of course, always provided, as well as escalation procedures up to the Board of Directors in the event of approaching the Early Warning threshold.

Likewise, it also seems improbable - except in special cases and despite the structure of the theoretical formula - that an Excess Capital would be explicitly recognized at the valuation date as an additive component of the equity value. This is because the ratio above which an excess would arise can only correspond to the target CET1 ratio level indicated in the RAF (the Risk Appetite level), which is necessarily higher than the lower thresholds depicted in Figure 2. If, at the valuation date, the Risk Profile CET1 ratio exceeds the Risk Appetite, such excess should rather be reflected in the forecasted distributable dividends during the explicit projection period, considering that such an excess is unlikely to remain significant over time without contradicting the capital and funding plans embedded in the RAF[16].

Therefore, in principle, the minimum threshold for identifying Excess Capital is represented by the CET1 ratio target indicated in the RAF. If the actual ratio (Risk Profile) were somewhat below this target - though within the Tolerance or Capacity limits - corporate policies would trigger managerial actions and escalation procedures up to the Board of Directors aimed at restoring the declared level of capital adequacy. Consequently, during the explicit forecast period, expected earnings must be retained to the extent necessary to maintain this CET1 ratio target, while only the residual portion is considered distributable dividends for the purpose of intrinsic value estimation[17].

With regard to the Terminal Value in the formula, it is traditionally defined as the present value of a perpetual stream based on a normalized, economically sustainable distributable cash flow, consistent with a long-term growth rate («*g*»). However, for this purpose, it is not necessary (nor reasonable) to attempt to explicitly model future balance-sheet aggregates, RWA evolution, and distributable dividends to maintain the current RAF CET1 target «in perpetuity». If the target ratio is projected to be met in the final explicit forecast year, the Risk Appetite threshold will prospectively continue to be respected in perpetuity. Indeed, assuming perpetual growth in distributable dividends at rate «*g*» implies that all economic and balance-sheet values (earnings and book value), as well as RWA, grow at the same rate, ensuring consistent long-term development.

Thus, more simply: $\mathrm{DIV}(dist)_{n+1} = \mathrm{DIV}(dist)_n\,(1+g)$
Accordingly, the second term can be rewritten using Gordon's formula[18]: $\mathrm{BV}n\,\frac{ROE-g}{K_e-g}$

Furthermore, the DDM formula in the Excess Capital variant could generally be simplified as follows:

[16] It should, however, be emphasized that there is a substantial financial equivalence between any Excess Capital recognized at the time of the valuation and an EC allocated to the periods of the explicit forecast. If, in the first case, theoretical financial charges or income related to the replacement of the considered excess capital with debt, or to the reduction of exposures hypothetically funded by the excess capital, are taken into account.

[17] Since the Risk Appetite level is not disclosed to the market, external reporting regarding the valuations discussed in these notes will be less explicit, provided it is consistent with the conclusions presented here, as correctly illustrated in the previously cited example from an analyst report: «We then add the excess or shortfall of capital over a target which is based on the bank's SREP plus a buffer which includes, among others, P2G and management buffer».

[18] It should be noted that «g» is constrained in the aforementioned relationship: $g = ROE \cdot (1-p)$, with a constant ROE and p = payout, also constant. Therefore, if, in the last year of the explicit forecast, compliance with the CET1 ratio target is ensured through distributable dividends consistent with the capital adequacy profile, subsequent economic and capital values (including RWA and own funds) will grow at the rate «*g*», thus maintaining the above-mentioned equilibrium «in perpetuity». For the cited relationship, see: M. Rutigliano, La valutazione delle banche e dei gruppi bancari, cit., pp. 155 et seq.

$$W = \sum_{t=1}^{n} \frac{DIV(dist)_t}{(1+k_e)^t} + BV_n \frac{ROE - g}{(k_e - g)(1+k_e)^n}$$

The preceding considerations highlight that, in practice, the reference threshold for identifying Excess Capital is not uniformly defined. However, the implications of such heterogeneity on the intrinsic value estimate - the most critical aspect – have not been explicitly discussed. Recognizing Excess Capital, for instance, relative to the regulatory minimum, i.e., setting the threshold below the CET1 ratio target in the RAF, has the effect—*all else equal*—of overstating the intrinsic value. This occurs because not only is the initial excess overstated, but future earnings retention needs - required to satisfy only the lower «minimum» threshold - will be underestimated, thereby overestimating distributable dividends and thus the intrinsic value of the bank[19].

CONCLUSIONS

In extraordinary transactions involving banks - but also other supervised financial intermediaries - the estimation of intrinsic value is most often carried out using the Dividend Discount Model in the Excess Capital variant. This is because banks are subject to capital adequacy requirements established both by primary legislation and by specific supervisory provisions (under the SREP) addressed to individual institutions, which condition the distributability of dividends. However, beyond these regulatory constraints, banks themselves define much higher levels of capital adequacy within their Risk Appetite Framework (RAF), approved annually by the Board of Directors and submitted to the supervisory authority. Therefore, the minimum threshold for the CET1 ratio to be used in estimating distributable dividends should correspond to the CET1 ratio target, that is, the Risk Appetite level. On this point, as far as we know, varied, contradictory and uncertain "declared"[20] approaches have been observed with respect to the threshold for the reference CET1 ratio for the identification of Excess Capital, making the concrete application of the method apparently indefinite.

And it must be excluded that in each different extraordinary management transaction, which requires the assessment of a bank's intrinsic value, a different interpretation of Excess Capital could be given, with effects on the estimate of distributable dividends, and therefore of the intrinsic value itself. This does not imply advocating a dogmatic approach to a valuation process that, by nature, involves non-negligible subjective assumptions. Rather, the point is that banks are managerially and regulatorily committed to maintaining the level of capital adequacy defined in their RAF -specifically, the Risk Appetite level. A breach of that threshold, even when it does not constitute a violation of regulatory minima, would nonetheless trigger managerial interventions and possibly escalation to the Board and control bodies aimed at restoring the desired adequacy level - unless the RAF itself were revised. In any case, this confirms that the CET1 ratio target represents the appropriate reference threshold for estimating any Excess Capital.

[19] This also applies if the economic effects referred to in note 16 are included in the estimate. However, it should be considered that an overestimation of the «theoretical» payout relevant for the valuation (and thus an underestimation of retained earnings) has a downward effect on growth, summarized in the parameter «g» used for the Terminal Value estimate. The net result of these three effects on the intrinsic value is not uniquely predictable a priori, but there is no doubt that an inconsistent estimate of Excess Capital undermines the reliability of the outcome.

[20] «Declared», since in most (if not all) cases there is no analytical transparency on the evaluations delivered by advisors to clients, even in case of transactions of direct interest to the shareholders of listed companies.

Of course, there may be significant exceptions, such as in hostile takeover bids, where comparable and homogeneous information regarding CET1 ratio targets between the bidder and target may be unavailable. In such cases, exceptionally, it may be reasonable to refer to average CET1 ratios observed for comparable banks. Nevertheless, this should be viewed only as a practical expedient adopted for a specific situation, rather than a methodologically consistent approach with the underlying logic of the DDM-EC, which is meant to reflect a specific institution's internal capital and risk structure.

Finally, we underlined that estimating Excess Capital inadequately - specifically, overestimating it relative to a threshold that should, in principle, correspond to the CET1 ratio target – can results in an overvaluation of intrinsic value.

One last note. When applying market-based valuation methods (such as market multiples or linear regression), the only usable indicators are those that lead to an equity value estimate, typically P/E, P/BV, and P/TBV, for the same reasons discussed in the introduction. Moreover, in the case of banks, when these market-based methods are applied, the metrics are adjusted for excess capital, even if the lack of a uniform definition of Excess Capital can affect the reliability of results.