# UPDATING THE VALUATION OF BANK OF ITALY'S EQUITY CAPITAL[1]

## 1. Preamble

The ownership of the shares of the Bank of Italy (BI) is regulated by law and the Bank's Statute, which establish the economic and governance rights of the shareholders. In the current institutional set-up, shareholders – banks, insurance companies and social security institutions (see Annex 1) – have limited rights. Most importantly, they cannot influence the Bank's institutional activities, such as banking supervision or monetary policy implementation.

This privately-owned, shareholder-based governance model should be preserved. Foremost is the fact that the current ownership and governance structure has guaranteed for decades the full independence of the Bank, shielding it from political influence. Moreover, the shares of the central bank are owned by private financial institutions (in particular commercial banks) in other important countries, such as the United States[2].

However, the Bank's ownership structure should be adjusted for at least three reasons. First, in recent years the concentration of the banking industry has increased the percentage of the shares of the BI held by the largest banking groups. No concrete problems have emerged, thanks the limits to shareholders' rights, but it is necessary to avoid possible (wrong) perceptions that the BI could be influenced by its largest shareholders.

[1] This note has benefited from discussions and comments by the members of the High Level Group of Experts: Prof. Franco Gallo, Prof. Lucas Papademos, and Prof. Andrea Sironi.

[2] Approximately 38% of the 8,039 commercial banks in the United States are members of the Federal Reserve System; national banks by law are members of the aforementioned System.

Second, the adverse consequences of a law approved in 2005 by Parliament but never implemented – which envisages the possible transfer of the ownership of the Bank's capital to the State – should be avoided. The equilibrium that has assured the Bank's independence over many years should not be altered, maintaining the BI's ability to withstand political pressures.

Third, it is necessary to modify the current rules governing the Bank's ownership structure (described below) in order to clarify that the shareholders have no economic rights over the portion of the Bank's reserves stemming from seigniorage, as the latter derives exclusively from the exercise of a public function (the issuance of currency) assigned by law to the central bank. The reform should eliminate any ambiguity on this issue, clearly identifying the economic rights of the shareholders and bringing the rules governing the distribution of profits closer to those of other privately-owned central banks (see Annex 2).

The obvious way to reduce the concentration of the Bank's shareholders is to introduce a ceiling on the stake that any individual shareholder may hold and to expand the shareholder base. To this end, shares must be made readily transferable and attractive to new potential purchasers (institutional investors with a long-term investment horizon).

In order to achieve these goals it is necessary: (i) to estimate the current value of the BI's shares; (ii) to raise the (now merely symbolic) value of the Bank's capital accordingly, by transferring part of the reserves to capital; (iii) to entitle shareholders to a flow of future dividends with net present value equal to the estimated current value of the shares of the Bank (at the same time ruling out any claim on the Bank's statutory reserves); (iv) to set a ceiling to the percentage of the Bank's capital that an institution can hold, obliging shareholders exceeding such limit to sell part of their shares within a given period of time.

## 2. Brief history of Bank of Italy's governance, equity capital, and dividend rules and policies

Most of the rules on the BI ownership structure were established in 1936,[3] when the Bank became a public law institution (previously it had been a private law company). The 1936 law maintained several features of the previous corporate structure, such as the shareholders' meeting, a General Council (GC) named by the shareholders and a board of auditors. It also regulated the types of institutions eligible to own the Bank's shares[4] and restricted the economic and governance rights of shareholders.

Shareholders have limited *voting* rights. As mentioned they cannot influence the Bank's institutional activities, such as banking supervision, monetary policy implementation, etc.

As to their *economic* rights, the present situation is the following. The Bank's share capital was set by the 1936 Law at €156,000 (300 million lire at the time), an amount that by now is purely symbolic. Over the years, the BI has set aside additional reserves, now amounting to €23 billion. Most of these reserves (€15 billion) are ordinary and extraordinary reserves formed under Articles 39 and 40 of the Bank's Statute. These articles (i) authorize the allocation to reserves of up to 40% of the net profit for the year and (ii) establish that the income deriving from the investment of reserves (with the sole exception mentioned below) must be used to augment the reserves.

Under Article 39 shareholders may be paid dividends amounting to up to 10% of the capital (i.e. a maximum of €15,600). Article 40 states that "On a proposal from the General Council and with the approval of the ordinary shareholders' meeting, a sum not exceeding 4% of the amount of the reserves as shown in the annual accounts for the preceding year may be set aside from the annual income generated by the

[3] With substantial amendments in 1948.

[4] At present the following may participate in the BI's capital: banks, pension funds, insurance companies and banking foundations.

investment of the reserves and distributed to shareholders in addition to the amount provided for in Article 39." Shareholders may thus receive an additional remuneration, drawing on the income deriving from the investment of the reserves and not exceeding 4% thereof. In recent decades, this additional amount was the true remuneration of the shareholders. The amount distributed was always considerably less than the ceiling of 4% of the reserves (in the last 14 years it has been 0.5%); in 2012 the amount distributed under this heading amounted to about €70 million.[5]

## 3. How to value Bank of Italy's shares

Following financial principles, the value of an asset is equal to the net present value (NPV) of the income stream it generates. Accordingly, the value of shares of the BI has been estimated using a "dividend discount model" (DDM) in order to evaluate the NPV of the flow of future BI dividends under the current regulatory regime. This required a careful selection of the parameters of the model, such as the risk-free interest rate, the growth rate of the Bank's dividends, the beta coefficient of the shares of the BI, the equity premium, the liquidity discount (all the calculations mentioned in this section are described in detail in Annex 3).

Overall, our analyses suggest that the value of the shares of the BI can be estimated in a range between 5 and 7.5 billion euros. Clearly, the specification of the DDM entails some elements of judgement and is surrounded by significant uncertainty. This is reflected in the width of the range. Moreover, sensitivity analyses suggest that the estimated values would not be significantly altered by changing the assumptions on the parameters of the model.[6] We have also run additional exercises based on the estimation of the maximum potential payout that the shareholders could have received over the years under the current statutory rules. This method presents

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5 Some of these provisions were introduced in 1948.

6 In our baseline DDM model the risk-free rate is equal to the average of the 10-year rate on the German Bund in the last three-months, the liquidity discount is equal to 20%, the growth rate of dividends is 5% in an initial period and 3% afterwards, the equity risk premium is 7 per cent and the beta coefficient is equal to 0.4.

some drawbacks, but can be considered as a proxy of a net-worth approach, commonly used in many instances to complement the DDM. The results obtained under this approach are close to the upper bound of the range of values identified by the DDM (around €7 billion).

In order to be fair, the reform must not affect the value of the equity stake of the shareholders. This condition depends on the dividend flow paid to shareholders under the new regime, which in turn depends on the selected value of the Bank's capital and the dividend rate after the reform. Our analyses show that under current market conditions if the capital of the BI were increased to €6/7 billion and the dividend rate (i.e. the percentage on capital to be distributed to shareholders each year) were set at 6% (360 or 420 million in absolute terms), then the value of the shares after the reform would fall inside the range of €5-7.5 billion indicated above. In other words, the reform would fully compensate shareholders, entitling them to a future flow of dividends whose net present value is equal to the estimated current value of the shares of the Bank.

**ANNEX 1**

# SHAREHOLDERS OF THE BANK OF ITALY

*(15 July 2013)*

| Shareholder | Shares | | Votes | |
|---|---|---|---|---|
| | Number | % of the total | Number | % of the total |
| Intesa Sanpaolo S.p.A. | 91,035 | 30.3% | 50 | 9.3% |
| UniCredit S.p.A. | 66,342 | 22.1% | 50 | 9.3% |
| Assicurazioni Generali S.p.A. | 19,000 | 6.3% | 42 | 7.9% |
| Cassa di Risparmio in Bologna S.p.A. | 18,602 | 6.2% | 41 | 7.7% |
| INPS | 15,000 | 5.0% | 34 | 6.4% |
| Banca Carige S.p.A. - Cassa di Risparmio di Genova e Imperia | 11,869 | 4.0% | 27 | 5.0% |
| Banca Nazionale del Lavoro S.p.A. | 8,500 | 2.8% | 21 | 3.9% |
| Banca Monte dei Paschi di Siena S.p.A. | 7,500 | 2.5% | 19 | 3.6% |
| Cassa di Risparmio di Biella e Vercelli S.p.A. | 6,300 | 2.1% | 16 | 3.0% |
| Cassa di Risparmio di Parma e Piacenza S.p.A. | 6,094 | 2.0% | 16 | 3.0% |
| Cassa di Risparmio di Firenze S.p.A. | 5,656 | 1.9% | 15 | 2.8% |
| Fondiaria - SAI S.p.A. | 4,000 | 1.3% | 12 | 2.2% |
| Allianz Società per Azioni | 4,000 | 1.3% | 12 | 2.2% |
| Banco Popolare s.c. | 3,668 | 1.2% | 11 | 2.1% |
| Cassa di Risparmio del Veneto S.p.A. | 3,610 | 1.2% | 11 | 2.1% |
| Cassa di Risparmio di Asti S.p.A. | 2,800 | 0.9% | 9 | 1.7% |
| Cassa di Risparmio di Venezia S.p.A. | 2,626 | 0.9% | 9 | 1.7% |
| Banca delle Marche S.p.A. | 2,459 | 0.8% | 8 | 1.5% |
| INAIL | 2,000 | 0.7% | 8 | 1.5% |
| Milano Assicurazioni | 2,000 | 0.7% | 8 | 1.5% |
| Cassa di Risparmio del Friuli Venezia Giulia S.p.A. (CARIFVG S.P.A.) | 1,869 | 0.6% | 7 | 1.3% |
| Cassa di Risparmio di Pistoia e della Lucchesia S.p.A. | 1,126 | 0.4% | 6 | 1.1% |
| Cassa di Risparmio dell'Umbria S.p.A. | 1,106 | 0.4% | 6 | 1.1% |
| Cassa di Risparmio di Ferrara S.p.A. | 949 | 0.3% | 5 | 0.9% |
| Banca di Legnano S.p.A. | 873 | 0.3% | 5 | 0.9% |
| Cassa di Risparmio di Ravenna S.p.A. | 769 | 0.3% | 5 | 0.9% |
| Banca Regionale Europea S.p.A. | 759 | 0.3% | 5 | 0.9% |
| Cassa di Risparmio di Fossano S.p.A. | 750 | 0.3% | 5 | 0.9% |
| Banca Popolare di Vicenza S.c.p.A. | 687 | 0.2% | 5 | 0.9% |
| Cassa di Risparmio di Cesena S.p.A. | 675 | 0.2% | 5 | 0.9% |
| Banca dell'Adriatico S.p.A. | 653 | 0.2% | 5 | 0.9% |
| Cassa di Risparmio di S. Miniato S.p.A. | 652 | 0.2% | 5 | 0.9% |
| Cassa dei Risparmi di Forlì e della Romagna S.p.A. | 605 | 0.2% | 5 | 0.9% |
| Banca Carime S.p.A. | 500 | 0.2% | 5 | 0.9% |
| Società Reale Mutua Assicurazioni | 500 | 0.2% | 5 | 0.9% |
| Veneto Banca S.c.p.A. | 480 | 0.2% | 4 | 0.7% |
| Banca Popolare dell'Emilia Romagna S.c. | 430 | 0.1% | 4 | 0.7% |
| Banca CARIM – Cassa di Risparmio di Rimini S.p.A. | 393 | 0.1% | 3 | 0.6% |
| Cassa di Risparmio di Bolzano S.p.A. | 377 | 0.1% | 3 | 0.6% |
| Cassa di Risparmio di Bra S.p.A. | 329 | 0.1% | 3 | 0.6% |
| Cassa di Risparmio di Cento S.p.A. | 311 | 0.1% | 3 | 0.6% |
| Cassa di Risparmio della Spezia S.p.A. | 266 | 0.1% | 2 | 0.4% |
| Cassa di Risparmio della Provincia di Viterbo S.p.A. | 251 | 0.1% | 2 | 0.4% |
| Cassa di Risparmio di Orvieto S.p.A. | 237 | 0.1% | 2 | 0.4% |
| Banca Cassa di Risparmio di Savigliano S.p.A. | 200 | 0.1% | 2 | 0.4% |
| Cassa di Risparmio di Volterra S.p.A. | 194 | 0.1% | 1 | 0.2% |
| Cassa di Risparmio della Provincia di Chieti S.p.A. | 151 | 0.1% | 1 | 0.2% |
| Cassa di Risparmio di Fermo S.p.A. | 130 | 0.0% | 1 | 0.2% |
| Cassa di Risparmio di Savona S.p.A. | 123 | 0.0% | 1 | 0.2% |
| TERCAS - Cassa di Risparmio della Provincia di Teramo S.p.A. | 115 | 0.0% | 1 | 0.2% |
| Cassa di Risparmio di Civitavecchia S.p.A. | 111 | 0.0% | 1 | 0.2% |
| Credito Valtellinese S.c. | 101 | 0.0% | 1 | 0.2% |
| Cassa di Risparmio di Carrara S.p.A. | 101 | 0.0% | 1 | 0.2% |
| CARILO - Cassa di Risparmio di Loreto S.p.A. | 100 | 0.0% | 1 | 0.2% |
| Cassa di Risparmio della Repubblica di S. Marino S.p.A. | 36 | 0.0% | - | - |
| Banca CARIPE S.p.A. | 8 | 0.0% | - | - |
| Banca Monte Parma S.p.A. | 8 | 0.0% | - | - |
| Cassa di Risparmio di Rieti S.p.A. | 8 | 0.0% | - | - |
| Cassa di Risparmio di Saluzzo S.p.A. | 4 | 0.0% | - | - |
| Banca del Monte di Lucca S.p.A. | 2 | 0.0% | - | - |
| **TOTAL** | **300,000** | **100%** | **535** | **100%** |

Source: Banca d'Italia website.

**ANNEX 2**

## SELECTED CENTRAL BANKS WITH PRIVATE "SHAREHOLDERS" RULES ON THE DISTRIBUTION OF PROFITS

| Central bank | Ordinary method of profit distribution | Distribution of final net liquidation receipts in case of resolution of the bank |
|---|---|---|
| U.S. Federal Reserve | The 20 Reserve Banks that make up the Federal Reserve System are subject to the following rules [*Federal Reserve Act, section* 7, *para.* (a)] :<br>1.A. After all necessary expenses of a Federal Reserve Bank have been paid or provided for, the stockholders of the bank shall be entitled to receive an annual dividend of 6 percent on paid-in capital stock.<br>1.B. The entitlement to dividends under subparagraph (A) shall be cumulative.<br>2. That portion of net earnings of each Federal Reserve Bank which remains after dividend claims under subparagraph 1.A have been fully met shall be deposited in the surplus fund of the bank".<br><br>However, these surplus fund deposits have always been sharply curtailed by the Federal Reserve Board's pay-out policy, which puts top priority on transferring earnings to the Treasury. In fact, the deposit in the surplus fund is only the amount required for the surplus fund to equal paid-in capital [*Press release 10.1.2011; Annual Report 2010*]: | [*Federal Reserve Act, section 7, para. "Use of earnings transferred to the Treasury*]<br>[…] Should a Federal Reserve Bank be dissolved or go into liquidation, any surplus remaining, after the payment of all debts, dividend requirements as hereinbefore provided, and the par value of the stock, shall be paid to and become the property of the United States and shall be similarly applied. |

| | | |
|---|---|---|
| | "Under the Board's policy, the residual earnings of each Federal Reserve Bank, after providing for the costs of operations, payment of dividends, and the amount necessary to equate surplus with capital paid-in, are distributed to the U.S. Treasury".<br><br>In accounting terms, the distribution to the Treasury is entered as "Interest on Federal Reserve notes due to U.S. Treasury".<br><br>For the 2000 financial year alone, the law provided for the extraordinary transfer to the Treasury of $3.752 billion, drawn from the stock of "surplus funds" in being at the end of the year [*Federal Reserve Act, section 7, para. (b)* ] | |
| Swiss National Bank | [*Federal Act on the BNS, 3 October 2003*]<br><br>Art. 30 Determination of profits<br><br>1. The National Bank shall set up provisions permitting it to maintain the currency reserves at a level necessary for monetary policy. In so doing, it shall take into account the development of the Swiss economy.<br>2. The remaining earnings are deemed to be distributable profit.<br><br>Art. 31 Distribution of profits<br><br>1. A dividend not exceeding six percent of the share capital shall be paid from the net profit.<br>2. One-third of any net profit remaining after the distribution of a dividend shall accrue to the Confederation and two-thirds to the cantons. | [*Federal Act on the BNS, 3 October 2003*]<br><br>Art. 32 – […] the shareholders shall receive in cash the nominal value of their shares as well as reasonable interest for the period of time since the decision to liquidate the National Bank became effective. The shareholders shall not have any additional rights to the assets of the National Bank. |

| | | |
|---|---|---|
| Bank of Japan | *[Bank of Japan Act, 1997, Art. 53]*<br>(1) The Bank of Japan shall reserve, as a reserve fund, five-hundredths of the surplus resulting from the settlement of profits and losses for each business year.<br>(2) Irrespective of the provisions of the preceding paragraph, the Bank of Japan may, when it finds it especially necessary, reserve the money which exceeds the amount prescribed in the preceding paragraph as a reserve fund, upon authorization from the Minister of Finance.<br>(3) The reserve fund reserved as prescribed in the preceding two paragraphs shall not be disposed of, except to cover losses incurred by the Bank of Japan or to be appropriated for dividends as prescribed in the following paragraph.<br>(4) The Bank of Japan may, upon authorization from the Minister of Finance, pay dividends to contributories out of the surplus resulting from the settlement of profits and losses for each business year; provided, however, that the rate of dividend payments against paid-up capital may not exceed five-hundredths per annum. | *[Bank of Japan Act, 1997, art. 60]*<br>In the case where the Bank of Japan has been dissolved, when the residual assets of the Bank exceed the amount of paid-up capital, the residual assets equivalent to the excess amount shall belong to the national treasury. |
| | (5) After deducting the amount reserved as prescribed in paragraphs 1 and 2 and the dividend payments prescribed in the preceding paragraph from the surplus resulting from the settlement of profits and losses for each business year, the Bank of Japan shall pay the remaining surplus to the national treasury within two months after each relevant business year ends. | |

| | | |
|---|---|---|
| National Bank of Belgium | *[Organic Law on Banque Nationale de Belgique, 1998]*<br>Art. 32 - The annual profits shall be distributed as follows:<br>1° a first dividend of 6% of the capital shall be allocated to the shareholders;<br>2° from the excess, an amount proposed by the Board of Directors and established by the Council of Regency shall be independently allocated to the reserve fund or to the available reserves;<br>3° from the second excess, a second dividend, established by the Council of Regency, forming a minimum of 50% of the net proceeds from the assets forming the counterpart to the reserve fund and available reserves shall be allocated to the shareholders;<br><br>Further, under Article 50 of the BNB Statutes:<br>[ … ] If the profit for distribution among the shareholders is less than 6% per annum, it shall be supplemented by drawing on the reserve fund. This drawing shall be refunded to the reserve if, the next year, this refund can be made without reducing the profit for distribution to below 6%. | Not specified |

| | | |
|---|---|---|
| Central Bank of the Republic of Turkey | *[Law on the Central Bank, 1960]*<br>Art. 60 - The annual net profit of the bank will be allocated in the following order:<br>a) 20% to the reserve fund;<br>b) 6% of the nominal value of its share capital to the shareholders as the first dividend;<br>c) a maximum of 5% of the remaining amount to the Bank personnel in an amount not to exceed the sum of two months of their salaries, and 10% to the extraordinary reserve fund, after deducting the above-stated percentages;<br>d) a second dividend to the shareholders in the ratio of a maximum of 6% of the nominal value of its share capital by a decision of the General Assembly.<br>The balance shall be transferred to the Treasury after this allocation. | *[Law on the Central Bank, 1960]*<br>Art. 62 - In the event of liquidation of the Bank, the principles applicable to liquidation shall be determined in a law. The values of the shares shall be paid out with first priority from the net assets to be obtained as a result of liquidation. Following the payment of the shares at par, 80 percent of the remaining amount shall be transferred to the Government and 20 percent shall be distributed to the shareholders. |
| Bank of Greece | *[Statute, Art. 71]*<br>After making provision for bad and doubtful debts, depreciation in assets, contributions to Personnel and Pension Funds, and such other contingencies as are usually provided for by bankers, and after repayment, out of the net profits of the Bank, of a dividend at the rate of 12 per cent per annum on the capital, one-half of the surplus shall be allocated to the regular reserve fund, until such reserve fund is equal to the capital, and the remaining one-half shall be paid to the Government.<br>After the reserve fund has become equal to the capital, a percentage out of the net profits may be paid to the shareholders, as additional dividend [ ...] after proposal made without fail by the General Council, such decision to be valid only for each respective year, and the balance thereof to be paid to the Government. | *[Statute, Art. 74]*<br>In case of withdrawal of the note-issuing privilege, the Bank shall be dissolved, its assets and liabilities to be valued by three experts […].<br>After having ascertained, as described above, the value of the assets and liabilities of the Bank, the nominal value of the shares shall be, in the first place, paid out to the shareholders, and any net excess in value shall be divided in the proportion of one-half to the Government and one half to the shareholders. |

| South African Reserve Bank | *[South African Reserve Bank Act, 1989, Art. 24]*<br>Of the surplus (if any) remaining at the end of a financial year of the Bank after provision has been made for:<br>(a) bad and doubtful debts;<br>(b) depreciation in assets;<br>(c) gratuities or other pension benefits for its officers and employees;<br>(d) all such items as are usually provided for by bankers; and<br>(e) the payment to the shareholders, out of net profits, of a dividend at the rate of ten per cent per annum on the paid-up share capital of the Bank,<br>one tenth shall be allocated to the reserve fund of the Bank and nine-tenths shall be paid to the Government. | *[South African Reserve Bank Act, 1989, Art. 38]*<br>1. The Bank shall not be placed in liquidation except by an Act of Parliament.<br>2. In the event of liquidation, the reserve fund and surplus assets (if any) of the Bank shall, subject to the provisions of subsection (3), be divided between the Government and shareholders in the proportion of sixty per cent and forty per cent, respectively.<br>3. If the amount payable to a shareholder in terms of subsection (2) exceeds the average market price of his holdings of shares in the Bank over the period of twelve months preceding a day three months prior to the date upon which a Bill providing for such liquidation is introduced in Parliament, so much of that amount as exceeds the said average shall be paid to the Government. […] |
|---|---|---|

**ANNEX 3**

## ESTIMATING THE VALUE OF THE SHARES OF THE BANK OF ITALY

Following financial principles, the value of an asset is equal to the net present value (NPV) of the income stream it generates[7]. Accordingly, the value of shares of the BI has been estimated using a "dividend discount model" (DDM), in order to compute the net present value (NPV) of the flow of future BI dividends under the current regime. Starting from a total remuneration of shareholders of €74 million projected for 2013, this required a careful selection of the parameters of the model, such as the risk-free interest rate, the growth rate of the Bank's dividends, the beta coefficient of the shares of the BI, the equity premium, and the liquidity discount.

Table A1 shows two different estimates under the current Statute provisions and dividend distribution practices, calculated using a two-stage model. The expected growth rate of dividends in the first stage, lasting 20 or 30 years, is set at 5 per cent (the average growth rate registered in the last ten years). In the second stage, the dividends are assumed to grow perpetually at the nominal GDP growth rate, posited at 3 per cent.

The Beta coefficient has been set at 0.4, taking into consideration that the Bank's dividends are less risky than those of private corporations and are relatively uncorrelated with the market portfolio. A Beta ratio of 0.5 was applied by the BIS when it bought out its private shareholders; the Beta of the shares of the Swiss National Bank is estimated at around 0.3[8]. The equity risk premium has been set at 7 per cent, approximately the extra annual yield over the risk-free rate currently demanded by investors in euro-area equities. Applying this premium and a Beta ratio of 0.4 produces a total premium of 2.8 per cent, which added to the yield on ten-year Bunds implies a dividend discount rate of 4.6 per cent.

The value of the shares obtained under the foregoing assumptions ranges between **€6.4 and €7.4 billion**. Applying a liquidity discount of 20%, these values become **€5.1 and €5.9 billion.** [9]

[7] Calculations have been made for the revaluation of the capital provided by the shareholders in 1936, using suitable capitalization indices. The results are much lower than those reported in this note. However, such a methodology is not applicable in the circumstances since it does not take account of the shareholders' right to additional income, introduced into the Bank of Italy's statute in 1948 and equal to the interest earned on the reserves up to a maximum of 4% thereof (see Section 2 above).

[8] Source: Bloomberg.

[9] The liquidity discount imposed on the valuation is justified by the limited number of potential acquirers of the shares and the existence of an approval on the transfer of the shares to other investors.

Table A1

**Valuation of BI's shares – Two-stage dividend discount model**

*(4 October 2013, per cent and millions of euros)*

| | | | |
|---|---|---|---|
| | Stage 1 | | |
| Years | *T* | 20 | 30 |
| Dividend growth rate | *g1* | 5.00% | 5.00% |
| Dividend at t1 (€mln) | *D* | 74.3 | 74.3 |
| Yield on 10-year Bund | $BUND_{10y}$ | 1.80% | 1.80% |
| Equity Risk Premium | *ERP* | 7.00% | 7.00% |
| Beta | $\beta$ | 0.40 | 0.40 |
| Discount rate | $r=\beta*ERP+BUND10y$ | 4.60% | 4.60% |
| Discount factor | *r-g1* | -0.40% | -0.40% |
| **Value, Stage 1 (€mln)** | $W_1 = \frac{D}{r-g1} - \frac{D \cdot (1+g1)^T}{r-g1} \cdot \frac{1}{(1+r)^T}$ | **1,474** | **2,255** |
| | Stage 2 | | |
| Dividend T+1 | $D_{T+1}$ | 193,5 | 315,2 |
| Perpetual dividend growth rate | *g2* | 3.00% | 3.00% |
| Discount factor | *r-g2* | 1.60% | 1.60% |
| Terminal value | $W_{2T} = \frac{D_{T+1}}{r-g2}$ | 12,093 | 19,698 |
| **Value, Stage 2 (€mln)** | $W_2 = \frac{W_{2T}}{(1+r)^T}$ | **4,919** | **5,111** |
| **Value of shares (stage 1+ stage 2) (€mln)** | $W=w_1+w_2$ | **6,393** | **7,365** |
| **Value of shares (after 20% discount) (€mln)** | $0.8 \cdot W$ | **5,115** | **5,892** |

A number of checks and refinements have been performed to assess the sensitivity of these results to alternative assumptions on the parameter values. First, we have changed the risk-free rate and the equity risk premium, raising the former by 50 basis points and lowering the latter by 100 basis points ; under these assumptions, the value of the shares would fall within a range of between €4.8 and €5.5 billion. A second check has been performed by changing the value of the Beta of the BI: a Beta of 0.35 would generate a range of €6.6-7.7 billion. Finally, the initial valuation has been adjusted using a liquidity discount of 10%. In this case, the range would rise to €5.8-6.6 billion.

Overall, our analyses suggest that a fair estimate of the value of the shares of the BI would fall in a range of between €5 billion and €7.5 billion. The width of this range is warranted by the high uncertainty surrounding the estimates.

## 2. Further checks

A further robustness check has been performed by computing the maximum share of the reserves that could have been transferred to shareholders over time in relation to the income generated by the investment of reserves (within the limit of the 4% ceiling set by the Statute for possible distribution to shareholders). This method can be seen as a proxy of a net-worth approach, commonly used in many instances to complement the DDM.

The estimate has been performed by computing the income from the investment of the reserves which could have been distributed to shareholders over the years but was instead retained by the Bank, according to decisions taken by the shareholders' meetings, and added to the reserves. The current (2012) value of these sums has been calculated using different deflators. Table A2 shows two of them and the resulting current value of retained earnings.

Table A2

**Current value of retained earnings**
*(billions of euros)*

| Deflator | Value |
|---|---|
| Stock Return Index | 7.1 |
| Consumer Price Index | 7.0 |

## 3. The value of shares after the reform

In order to be fair, the reform must not substantially affect the value of the equity stake of the shareholders. This condition depends on the dividend flow paid to shareholders under the new regime, which in turn depends on the selected value of the Bank's capital and the dividend rate after the reform.

This section shows that under current market conditions if the Bank's capital were increased to €6-7 billion and the dividend rate were set at 6%, then the value of the shares after the reform would fall within the range of €5-7,5 billion indicated above. In other words, the reform would fully compensate shareholders, entitling them to a future flow of dividends whose net present value is equal to the estimated current value of the shares of the Bank.

The estimation is calibrated as in Table A3. Setting yearly dividends at €360 million, gives an equity value (after the liquidity discount) of €6.3 billion; the value would be €7.3 billion with a €420 million dividend (Table A3).

Table A3

**Valuation of the Bank of Italy's shares – Dividend discount model**
*(4 October 2013, units, per cent and millions of euros)*

| | | | |
|---|---|---|---|
| Yield on 10-year Bund (30/07/13) | $BUND_{10y}$ | 1.80% | 1.80% |
| Equity Risk Premium (ERP) | ERP | 7.00% | 7.00% |
| **Dividend (millions of euros)** | D | **360** | **420** |
| Dividend growth rate | g | 0.00% | 0.00% |
| Beta ratio | β | 0.40 | 0.40 |
| Spread over 10-year Bund | β*ERP | 2.80% | 2.80% |
| Discount rate | r=β*ERP+BUND10y | 4.60% | 4.60% |
| Discount factor | r-g | 4.60% | 4.60% |
| Liquidity discount | Z | 20% | 20% |
| **Market value of equity (millions of euros)** | **(1-z)*W** | **6,261** | **7,304** |
| **Dividend yield** | **D/W** | **5.75%** | **5.75%** |