



## INFORMATIC MODEL USED FOR THE EVALUATION OF TITLES ON STOCK

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### Abstract

The present paper presents both theoretically and practically a new computer model, currently developed only at the conceptual and analytical level. It is a web application called Investor's Valuation, which is in fact a way of evaluating securities listed on the BVB (Bucharest Stock Exchange) using a relational database for storing information

### Key words:

computer model, web application, stock exchange, securities, database

### JEL Codes:

C55  
C61

### 1. INTRODUCTION

Evaluation is an activity in the sphere of professional services, such as consultancy, design, law, etc. The evaluation activity complies with professional standards and a specific ethical code.

In many countries, assessors have set up professional associations, based on voluntary association, to represent their interests and to regulate both the activity of assessment firms as well as that of individual assessors.

By evaluation, as defined in G.O. 24/2011, is meant value estimation activity, materialized in a document called evaluation report, made by an authorized evaluator according to the standards specific to this activity and professional ethics. [1]

Any valuation activity involves knowing the key elements in the valuation, namely:

- the object of the evaluation (enterprise regarded as individuality, real estate, securities);
- the subjects (parties involved in the transaction);
- the position of the assessor providing the landmark for value and price;

- assessment standards (International Valuation Standards, developed by IVSC, Assessment Standards developed by ANEVAR).

Evaluation methods are multiple and constantly changing, being goal-oriented, rely on either historical data or data on projected or combination of them, and are classified into several categories based on the principles, criteria and the destination of the assessment.

There are a lot of classifications on assessment methods, but the most important classification takes into account the practice and groups them in the following categories: [2]

- a) methods based on the enterprise's property values resulting from balance sheet assets and liabilities;
- b) methods that are based on capital returns;
- c) methods that are based on the cash flow generated by the enterprise's business;
- d) other methods based on stock quotes, comparisons, etc.

Any investment in companies listed on a stock exchange, and beyond, is preceded by the question of whether the price is too high. In this case, there is always a need to evaluate the

company, more precisely to find the correct value of that company.

Value is an abstract notion that can assign to a business / company quantitative characteristics based on scientific arguments. The value is determined on the basis of the report made by the valuer, investor, seller, intermediary on the market, etc. who, following a professional judgment, using the experience in the field and an extensive database, gives a quantitative view of the business under review. The value of the business / company may be higher or lower than the market value. Compared with market value, the company may be overestimated or underestimated.

The market value of a listed company at one time is equal to the market price of the company's shares multiplied by the number of shares that make up the share capital. [3]

## 2. COMPUTERIZATION OF THE ASSESSMENT ACTIVITY

The capital market offers the possibility to list dynamic companies on the Bucharest Stock Exchange (BVB), the only securities trading market in Romania. The listing brings important benefits to headline companies: increased visibility among current business partners and current and potential customers; free advertising; establishing a "market value" of the company, which can be much higher than the value in documents; increasing the trust of Romanian and foreign business partners; attracting new partners; increasing the efficiency and effectiveness of stock exchanges between shareholders; attracting capital through issues of shares and bonds.

From a computer point of view, this securities issuance operation on the BVB involves a series of data that once stored and processed becomes useful information for the issuer. For this purpose, a classification of data and information can also be made:

- general data about the issuer: identification data, nature of the activity, share capital, bonds, management, shareholders;
- data about the issuer's activity: operations, economic performance, headquarters, research and

development, judicial procedures, employees, investments, sources of financing;

- data about the public offer: duration, rollout, distributors, allocation, share price, number of shares, subsequent listing;
- financial information taken from the financial statements of the issuer: financial reports, indicators.

These data and information about the issuer are stored in a data repository (database) and then processed using data processing technologies. Information useful to potential investors is displayed through an interface, such as the BVB web interface (<http://www.bvb.ro/>). As a model already created, the proposed application focuses on such a model seen from the perspective of the investor.

Success on the stock exchange and has made many investors more rich, but the risk of losing money is as high as the probability of winning. This success is not entirely due to the risk, even if the chance also has its role, but is the result of a methodical activity of informing, analyzing and tracking listed companies, understanding how the market works. It is a permanent activity that any investor does, no matter his experience and success.

This makes it necessary to assess the securities and their issuer using the "Discount Dividend Model" model [4] and the "Free Cash Flow" [5] model, but also on the basis of financial indicators such as book value, the yield of a share, , earnings per share (EPS), dividend yield, PER index, etc. The way they are calculated is presented in the table below: [6]

Financial indicator	Calculation method
<i>The book value of a share</i>	$BV = \frac{\text{EQUITY}}{\text{TOTAL NUMBER OF SHARES}}$
<i>Net profit per share</i>	$P/B = \frac{\text{Net profit}}{BV}$
<i>Net profit per share</i>	$EPS = \frac{\text{Net profit}}{\text{TOTAL NUMBER OF SHARES}}$
<i>PER indicator</i>	$PER = \frac{\text{PRICE}}{EPS}$
<i>Dividend yield</i>	$\text{Dividend yield} = \frac{\text{NET DIVIDEND}}{\text{PRICE}}$

This assessment operation of securities and issuers involves gathering data and information, which the investor can then process to obtain current market value of a company and securities issued by it. Therefore, there is a need to develop an IT application that stores and processes all the necessary data and information and then displays the resulting information, possibly accompanied by a suggestion (BUY, SELL, HOLD) through an interface.

It is important to note that it is the investor who collects primary or processed data from the issuer's financial statements for a certain period of time. Another source of information and data collection is the company's annual reports on the stock exchange, documents made available to the potential investor through the BVB web platform.

Such a computer model is presented below in this paper.

### 3. "INVESTOR'S VALUATION" WEB APPLICATION

In this part of the paper, a case study is described to demonstrate the usefulness of the Investor's Valuation web application. For this purpose, the title listed by OMV Petrom SA at the Bucharest Stock Exchange (SNP) was chosen as the basis for assessment. This company is listed on the BVB with premium shares, tradable at the moment.



Figure 1. General data of the SNP title

### 3.1. Collecting the financial information necessary for the assessment

To perform the SNP title evaluation, an actual or potential investor needs financial information extracted from the issuer's statements. The nature of the information required depends on the valuation model the investor chooses.

In this case, we assume that there is a potential investor who chooses the evaluation model based on the calculation of indicators, making the decision to use the Investor's Valuation web application.

A first step is to create an account. So go to the application link and choose Log in from the menu provided. Then follow the link to the signup form. Here he introduces some personal data needed for registration, after which he will receive a username and a password to authenticate himself on the site.

The second step is to choose the title for which the evaluation will be done. Thus, the investor selects the Valuation - Indicators option from the menu bar, as shown below:



Figure 2. Choosing the evaluation model within the web application

After selecting the rating option, a new form will be displayed indicating to the investor the necessary data for rating the title. Therefore, in order to evaluate the SNP title, the potential investor needs the following data:

- The current price of the title
- Equity
- Number of shares
- Net profit
- Net dividend

These are collected from the financial statements made available to the investor at [www.bvb.ro](http://www.bvb.ro) under the heading Financial Information. The latest information available is that for 2017 as follows:

- Equity: 26,315,618,304.00 lei
- Number of shares: 56,644,108,335

- Net profit: 1,837,149,568.00 lei
- Dividend net: 0.011200
- Current price: 0.3680 lei

This information shall be entered in the form provided for the assessment of the title by the calculation of indicators.

#### 2.1. The display of results

The next step after entering the data into the form is to display the results. This is the purpose of the investor, to view the results, interpret them, and make the decision to buy back or postpone the purchase of the SNP title.

The results obtained are presented in

the table below:

Table 2. Results obtained from the assessment of the SNP title on the basis of indicators

Indicator	Result obtained
<i>The book value of a share</i>	0.464578
<i>The book value of a share (P/B)</i>	0.792117
<i>Net profit per share (EPS)</i>	0.032433
<i>PER indicator</i>	11.346468
<i>Dividend yield</i>	0.030435

This information is displayed after you click the Calculate button on the webpage, along with the suggestion to buy that title.

## 2.2. Interpreting results

At this stage, the investor performs an analysis of the previously displayed results. It is based on the interpretation of each indicator, being aided by the information presented in the application. This information indicates the significance of each indicator and the situations that the investor may face depending on the result obtained.

The interpretation of the market rates used for the valuation of securities is made taking into account the following information: [7]

PER (Price to Earning Ratio) - stock market capitalization - shows how many times investors are willing to pay net profit per share.

- A small value recorded by PER signifies that the action is cheap and therefore purchases are indicated.
- Otherwise, when PER is fairly high, the action is expensive and can be overstated, and its possession is no longer motivated.

EPS (Earning per Share ) - shows the issuer's ability to make profit.

- The higher the values recorded by the EPS, the greater the growth potential of the society is.
- In the reverse situation, when the values are lower, the risk to society is higher.

PB/V (Price per Book Value) is an indicator showing whether the shares are overvalued or underestimated.

- Actions are considered to be overestimated if they have a high book value and a small shareholders' gain.
- Shares are considered to be underestimated when they have a low book value and a large shareholders' gain.

A sub-unit value recorded by the PB / V indicator signifies a sign for purchase.

Based on this information, the app is set to show a suggestion to buy or not buy the rated title. In the case of the SNP title evaluation, the message displayed is "Not a good moment for buying the share!", Which means that it is not an opportune time to buy the SNP title. The PHP language used contains the condition if ... else as follows:

```
<?
if($nr_of_shares == 0 || $equity == 0) {
    $vc = 0;
} else {
    $vc = Round($equity / $nr_of_shares,6);} if($vc == 0 || $price ==
0) {
    $pb = 0;
} else {
```

```
$pb = Round($price / $vc,6);}
if($net_profit == 0 || $nr_of_shares == 0) {
    $eps = 0;
} else {
    $eps = Round($net_profit / $nr_of_shares,6);}
if($eps == 0 || $price == 0) {
    $eps = 0;
} else {
    $per = Round($price / $eps,6);} if($dividend == 0 || $price ==
0) {
    $dy = 0;
} else {
    $dy = Round($dividend/ $price,6);}
?>
<p style="color:red; font-size:160%"> <? if ($pb <= 1 and $eps>$per ) { echo "Good moment
for buying the share!";} else {echo "Not a good moment for buying the share!";} ?>
</p>
```

The suggested suggestion is based on the following premises:

- There is a high value recorded by the PER indicator (11,35), which shows an overvaluation of the action at this moment, its use becomes useless.
- As regards the value of the EPS indicator, it is noticed that the company is prone to a high risk, hence an investor seeking to place long-term resources and obtain rights within OMV

Petrom will decide not to buy SNP at this time. The company being exposed to the risk denotes the possibility of not making profit, and the placement of long-term sources aims to obtain dividend gains. - The sub-unit value of the Book value indicator signifies the investor's opportunity to acquire the SNP title. On the other hand, also taking into account the results of the other indicators and averaging, it is noticed that several premises tend to balance the balance of the postponement of the purchase of the SNP.

In this case, in order to make a well-founded decision, the potential investor will either continue with the evaluation of the SNP title using the Discounted Dividend Model or choose to postpone the purchase of the title.

### 3. CONCLUSIONS

At present, the major concern of IT specialists is to meet the increasing demand of users for information that will allow them to access

them as quickly and accurately as possible. Data-driven decision support systems can meet this demand for quality information and improve the effectiveness of decision-making.

Information, information products, and the costs and benefits of information become increasingly transnational. Information is "power", it has value, and the ability to store and process certain information can provide an important advantage over competitors.

In order to achieve the proposed objective of demonstrating the usefulness and functionality of a web application in the valuation of securities listed on the BSE, the present paper mostly refers to the developed model called Investor's Valuation.

Thus, through its application in the evaluation of the SNP title, both the advantages and the disadvantages of using such an application have been highlighted in order to make correct and well-founded decisions.

The major consideration of this web application is that it provides potential and current investors with the information they need to be able to make titles assessments without attending specialized courses in the field. They have two evaluation models available and all they have to do is to collect and enter the necessary data in the prescribed forms.

These data refer to the value of certain balance sheet items at a given time, based on the reference period (equity, net profit, dividend / dividend).

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