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THE RELATIONSHIP BETWEEN PRICE-TRADE VOLUME AND WEATHER EFFECT IN ISTANBUL STOCK EXCHANGE: ASYMMETRIC CAUSALITY TEST ANALYSIS

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Abstract

This research examines the effects of weather on investor choices. For this purpose, 4772 daily data sets, which are in the range of 1987-2006 years, are used. The article investigates the effect on the investor preferences change in temperature by using daily data. Unlike previous studies in the existing literature, negative and positive effects of change in temperature on investors are researched separately. As indicator parameter of behavior of investors, BIST100 price index and total trade volume are used. Thus, the effects of positive and negative shocks happened in temperature change, are examined both as return and trade volume. According to findings, investors react both positive and negative temperature change in same direction. In other word, positive temperature changes can be assumed as a factor increases the trade volume and positive returns in stock market. Similarly, negative temperature changes affect stock market in direction of decreasing trade volume and returns.

Keywords: Weather Effect, Asymmetric Causality, Behavioral Finance, Turkey

JEL Classification: G02, G11, G14

1. Introduction

According to behavioral finance approach, human psychology is a significant factor which can affect investment choices. Mood of investors has a direct impact on risk perception, which is one of the most important factor determining stock market strategy. Thus, the

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mood of investor emerge as determining financial choices by affecting risk perception. Good decisions taken in a good mood and bad decisions taken in a bad mood, actually, reflect the timing and decision-making abilities of investors in stock markets. This fact, also, affect the financial performance of investor.

According to psychology researches, one of the important factors which has an impact on people's mood is temperature. To this, whereas low temperature leads people to act aggressive behaviors; high temperature may cause both apathy and aggressive behaviors. In financial markets, this fact has an impact on risk taking level of investors. Accordingly, aggressive behaviors thought it is caused by low temperature, increases the risk taking level of investors. Then, apathy, caused by high temperature, may lead investors to keep away from risk taking behaviors. Beside of these, temperature changes, which have an impact on risk taking levels, also, affect the expected return level of investor. Accordingly, if accepted that low temperatures lead us aggressive behaviors, it is so natural that high return expectations emerge in response to high risk. However, in high temperatures, a certain return expectation is out of question. Just because, high temperature may not only cause high return but also low returns. Therefore, risk-taking level of investors shows up as one of the determining factors of trade volume processed and return level changes in financial markets.

There are many researches examining the correlations between temperature change and stock market returns. In existing literature, researching return-temperature correlations, it is seen that the factors examined focus on causality relations by using time sequence analyses. Yet, effects of positive and negative shocks are not identical. In current literature, counting temperature, stock market returns and trade volume in just one direction, so that simultaneous positive and negative values taken, may mislead us at the point of which if it provides proper information to explain the changes of ups and downs upon each others properly. In other words, it is once agreed that the effects of both positive and negative direction temperature changes on investor psychology are the same. Yet, psychology researches claim that, this case is not like that, contrary, whose effects are very different from each others. At this point, the most crucial contribution of this research to the current literature is that the effects of negative and positive shocks in temperature in financial markets can be viewed separately. Thus, by forming positive

and negative values in question for stock market returns and trade volume, it is researched that if positive and negative changes in temperature provides useful information.

The researches in current literature, once examines the correlations between environmental data and stock market return by using time sequence analysis. This research, then, unlike current literature, is carried out with an asymmetric causality test assuming effects of positive and negative shock are not same. Findings also support that, in developing markets, the researches carried out with current time sequence analyses may provide misleading information and that the effects of positive and negative shocks in financial markets are different from each others. It is thought that this research can contribute to current literature at this particular point. This study has also contribution to making effective predictions in relation to possible responses investors in Turkey will give to the relevant market in the face of temperature changes. In this case, it is thought that this article is significant for the study of weak form market efficiency in Turkey. In this direction, the research consists of four parts. After introduction part, the current literature researches are presented in second part, focused on methodology and data set used in this research in third part. In fourth part, the results are presented. In last part, the research is evaluated in the light of these results.

2. Literature review

Whether daily weather affects financial market behavior is an interesting question to financial economists and psychologists. There are many results studying the relationship between the stock returns and weather conditions that are thought to affect investor's psychology. On the one hand, there are researches demonstrating a relationship between meteorological events and stock returns. On the other hand, no relationship was found in some of the other researches.

A pioneering work in behavioral finance area analyzing the relationship between meteorological events and stock market returns is documented by Saunders (1993). In this research, the effect of regional weather events on American Stock Exchange and New York Stock Exchange market is investigated from 1927 to 1989. According to the results, cloudiness level is determined to be an important factor that affects the return values. When the weather is %100 cloudy

returns are lower than average value. If it is below %20 then returns are higher than average value.

Keef and Roush (2002) study whether temperature, wind and cloudiness have effects on New Zealand stock returns or not. Daily data set between June 1986 and October 2002 has been used. The results support that cloudiness does not effect stock returns. However, the temperature is a little bit effective factor while the wind is stated to be the most powerful variable.

The effect of weather conditions on Spanish market is studied by Pardo and Valor (2003) from January 1981 to May 2000. Daily return values consist of the data set of this study. Return values are divided into groups based on humidity levels and sunny days for the research. According to findings, there is no interaction between weather events and stock prices. Meanwhile, there is no important difference amongst the returns grouped with respect to meteorological events.

Goetzmann and Zhu (2005) investigate whether cloudy and sunny days have any effect on stock buying and selling investors' behaviors in the US or not. The authors document that there is no relationship between the weather events and the investors' behaviors. Moreover, there is no significant difference in trade investors' behavior in sunny or rainy days.

Tufan and Hamarat (2004, 2006) analyze the weather effect in ISE. 3662 daily data sets are used from October/26/1987 to July/26/2002. The results support that cloudy and rainy days do not affect ISE. However, snow days affect ISE.

Cao and Wei (2005) examine whether stock returns are affected by temperature. Analysis is performed for nine different market that are US, Canada, UK, Germany, Sweden, Australia, Japan and Taiwan between the years 1962-2001. The results support a negative correlation between temperature and stock market return.

Shu and Hung (2009) study the wind effect on 18 European market returns between 1994-2004. According to results the temperature and powerful seasonal effects exist on the investigated stocks.

Yoon and Kang (2009) examine whether any relationship between cloudiness, humidity, temperature and returns belong to Korean Stock Market from January/15/1990 to December/13/2006 exist or not. The research documents that weather variables lose their

effect with the 1997 financial crisis. Because the reduced effect of the weather events depending on the increased market activities.

The relationship between weather condition variables and stock market volatility is analyzed by Symeonidis, Daskalakis and Markellos (2010). A relationship between the cloudiness and stock market volatility is found in the article.

Floros (2011) analyzes the relationship between the weather conditions and stock returns in Portugal by considering the calendar anomaly. Daily data set between 1995-2007 is used in the study. The results indicate that there is a negative relationship between the temperature and Portugal stock market. However, this effect arises depending on the effect of January and the traded month. Furthermore, a result of having higher stock returns is documented in the first two weeks of the month and in January. It is stated that the low temperature in January causes higher stock returns depending on aggressive risk-taking behavior of the investor.

Nissim, Liran and Eshel (2012) study the relationship between the factors that are temperature, earthquake, wind, daylight and investor's mood on Israeli Stock Exchange. 2295 daily data from September/3/2000 to December/31/2009 is studied in the research. According to the results, perceivable earthquakes are not effective on stock returns while rainy days have negative effect. Temperature and wind effects are observed as mixed.

Tuna (2014) examines the weather effect on ISE for the period between January/11/1987 and December/31/2006. While the research analyzes the relationship between the weather variables and stock returns, at the same time weak-form efficiency test in ISE is applied. The results support that the selected weather variables do not affect ISE. For this reason there is an efficient market in the weak form.

A number of studies have been also assigned to evaluating the dynamic relationship between variables by using asymmetric Granger causality approach (Chen and Lin (2014); Gozhor (2014); Tiwari (2014); Nguyen, Sousa and Uddin (2015)). Such as Nguyen, Sousa and Uddin (2015) find two-way asymmetric causality between the US equity returns and returns of commodity futures. The effect of inflation, the investment horizons and commodity futures under consideration affect the direction of causality.

Chen and Lin (2014) examine asymmetric causality between foreign exchange and stock markets for six Pacific RIM countries that

are Japan, Taiwan, India, South Korea, Singapore and Indonesia. Finally the authors indicate that for the first three countries above there is uni-directional symmetric and asymmetric Granger causality from foreign exchange rates to stock prices.

Gozgor (2014) examines causal relation between economic growth, domestic credit and economic globalization. The empirical results indicate that in seven developing economies there is causality running from domestic credit to economic growth. Additionally, unidirectional causality is found from economic growth to domestic credit in five developed and ten developing countries.

3. Methodology

In traditional Granger (1969) causality test, on future directed predicting of one factor it is tested if second factor provides useful information. For traditional Granger causality test, the series in question should be fixed. In Granger causality analyze, firstly, VAR model is taken as basis, as below. Assuming that all temperature, trade volume and return are integrated variables each can be presented as the following:

$$Y_t = \alpha_{01} + \sum_{i=1}^{p} \alpha_{1i} Y_{t-i} + \sum_{i=1}^{p} \beta_{1i} X_{t-i} + u_{1t} \qquad (1)$$

$$X_t = \alpha_{02} + \sum_{i=1}^{p} \alpha_{2i} Y_{t-i} + \sum_{i=1}^{p} \beta_{2i} X_{t-i} + u_{2t} \qquad (2)$$

In first model, in order to test the hypothesis indicates that X is not the Granger cause of Y, the first model is predicted according to Least Squares Method, then the residual sum of squares of this model is reached. In latter grade, the restricted model below, which there are no lags of X, is predicted according to Least Squares Method and residual sum of squares are obtained.

$$Y_t = \alpha_{01} + \sum_{i=1}^{p} \alpha_{1i} Y_{t-i} + u_{1t} \qquad (3)$$

F test statistic below is obtained, by using residual sum of squares of both restricted and unrestricted model:

$$\frac{(RSS_{rest} - RSS_{unrest})/m}{RSS_{unrest}/(n-k)} \qquad\qquad (4)$$

Where, m displays constraint number, k is the predicted parameter numbers in unrestricted model. This test statistic taken is compared with F table value in (m, (n-k)) degree of freedom. If, $F_{(critical)} > F_{(table)}$ basic hypothesis claims that Y is not Granger cause of X, is rejected.

3.1. Hacker-Hatemi-J Causality Test

In Hacker-Hatemi-J (2006) test, for causality relations between factors, Toda-Yamamoto test is applied however bootstrap critical values are obtained, in case errors are not normal distributed.

In this test, the causality relation between two series is based on a lag(s) augmentation of the vector autoregressive model (VAR) below.

$$Y_t = \alpha + A_1 Y_{t-1} + \cdots + A_p Y_{t-p} + u_t \qquad\qquad (5)$$

where y_t, α and U_t are n-dimensional vectors and A_r is a parameter vector for lag r.

Toda and Yamamoto (1995) propose the following augmented VAR model to test the causality between integrated variables:

$$Y_t = \hat{\alpha} + \hat{A}_1 Y_{t-1} + \cdots + \hat{A}_p Y_{t-p} + \cdots + \hat{A}_{p+d} Y_{t-p-d} + \hat{u}_t \qquad\qquad (6)$$

where the circumflex above a variable represents its OLS estimate.

The order p of the process is assumed to be known and d is equal to the maximum order of integration of the variables. The k th element of y_t is not Granger-cause of the j th element of y_t if the following hypothesis

H_o: The row j, column k element in A_r equals zero for r=1…p

is not rejected. Here, the parameters for the extra lag(s) are unrestricted in testing for Granger causality.

According to Toda and Yamamoto (1995), this is to guarantee the use of asymptotical distribution theory. The test statistics introduces by Toda-Yamamoto for testing the hypothesis of interest can be written as:

$$Y = \hat{D}Z + \hat{\delta} \qquad\qquad (7)$$

Let us define the above denotations:

$Y: (y_1, \ldots . . y_T)(nXT)matrix$

$\widehat{D} := (\hat{\alpha}, \hat{A}_1, \ldots \ldots, \hat{A}_p, \ldots \ldots . \hat{A}_{p+d})(nX(1 + n(p + d))))$

$$Z_t := \begin{bmatrix} 1 \\ Y_t \\ Y_{t-1} \\ . \\ . \\ . \\ Y_{t-p-d+1} \end{bmatrix} \quad ((1+n(p+d))X1 \text{ matrix for t=1,...,T,}$$

$Z: = (Z_0, \ldots ., Z_{T-1})((1 + n(p + d))XT) \, matrix,$

$\hat{\delta} := (\hat{u}_1, \ldots ., \hat{u}_T)(nXT)$

The suggested Wald test statistic by Toda-Yamamoto (1995) to test non-Granger causality of one variable in y_t on another variable in $\square_t$ is written as:

$$MWALD = (C\beta)'[C((Z'Z)^{-1} \otimes S_U)C']^{-1}(C\beta) \qquad (8)$$

where $\otimes$ is the Kronecker product. Here, β=vec(D) and vec denotes the column-stacking operator. C is a pXn(1+np) indicator matrix with elements ones for restricted parameters and zeros for the rest of the parameters. S_U is the variance-covariance matrix of the unrestricted VAR model estimated as $\frac{\hat{\delta}'_U \hat{\delta}_U}{T-q}$, where q is the number of parameters in each equation of the VAR model.

3.2. Hatemi-J (2012) Asymmetric Causality Test

The idea of transforming data into both cumulative positive and negative changes comes forward from Granger and Yoon (2002). This approach is used to test for cointegration by the authors that is entitled as hidden cointegration.

There are four important cases in Hatemi-J (2012) asymmetric causality analysis: Determining the lag length of the VAR model, determining the added additional lag length to the model, obtaining the critical values for the Wald test statistics and finally change of causality relationship depending on the time.

In Hatemi-J (2012), Hatemi-J extends the article of Granger and Yoon (2002) to causality analysis and refers to it as asymmetric causality testing. According to Hatemi-J (2012), it is asymmetric in the sense which positive and negative shocks may have different causal

impacts. It is assumed that the casual relationship between two integrated variables y_{1t} and y_{2t} defined as the following random walk processes:

$$Y_{1t} = Y_{1t-1} + \varepsilon_{1t} = Y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i} \tag{9}$$

$$Y_{2t} = Y_{2t-1} + \varepsilon_{2t} = Y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i} \tag{10}$$

where t=1,2,... T, the constants $y_{\{1,0\}}$ and $y_{\{2,0\}}$ are the initial values and the variables ε_{1i} and ε_{2i} signify white noise disturbance terms. Positive and negative shocks are defined as follows:

$$\varepsilon_{1i}^{+} = \max(\varepsilon_{1i}, 0), \varepsilon_{2i}^{+} = \max(\varepsilon_{2i}, 0), \varepsilon_{1i}^{-} = \min(\varepsilon_{1i}, 0), \quad \varepsilon_{2i}^{-} = \min(\varepsilon_{2i}, 0),$$

respectively. Therefore, it can be expressed $\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}$ and $\varepsilon_{2i} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$. Equation 9 and 10 can be rewritten as the following:

$$Y_{1t} = Y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-} \tag{11}$$

$$Y_{2t} = Y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{2i}^{-} \tag{12}$$

Finally, the positive and negative shocks of each variable can be defined in a cumulative form as

$$Y_{1t}^{+} = \sum_{i=1}^{t} \varepsilon_{1i}^{+}, Y_{1t}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-} \tag{13}$$

$$Y_{2t}^{+} = \sum_{i=1}^{t} \varepsilon_{2i}^{+}, Y_{2t}^{-} = \sum_{i=1}^{t} \varepsilon_{2i}^{-} \tag{14}$$

In Hacker and Hatemi-J (2006) bootstrap Granger causality test, in order to detect the causality between variables, Toda-Yamamoto causality test (1995) is applied, however the bootstrap critical values are obtained with Monte Carlo simulation in case the errors are not normal distributed. However, the lack side of this model is that cannot distinguish the positive and negative shocks. In this context, in asymmetric causality test developed by Hatemi-J (2012), in case there is existence of asymmetric information in financial markets and are heterogeneous participants, because the

participants do not give similar reactions to same identical positive and negative shocks, the results of this test may be fallacious. In this context, Hatemi-J (2012) causality test is the positive and negative shocks' decomposed form of Hacker and Hatemi-J (2006) bootstrap Granger causality test.

So, this method is pretty available for those researches at which financial time sequences are used.

4. Data

4772 daily data set are used in the range of November/2/1987- December/29/2006 dates. Cause of using daily data is to find out the effects of change in temperature as clear as possible. In other word, it is aimed to prevent the problem of insufficient data taken from weekly, 15 days and monthly data. BIST 100 Return Index and total trade volume data were used in research. BIST 100 Return Index and total trade volume data are taken from the official website of Istanbul Stock Exchange. Temperature data, then, are taken from The Ministry of Turkey Forestry and Water Affairs, Meteorology General Office. Effects of temperature are examined for both BIST 100 Index and total trade volume separately. All analyses are carried out on raw data. Basic statistical values about variables used in research are presented in Table 1.

Table1

Summary Statistics

	MEAN	STD. DEV.	MINIMUM	MAXIMUM
BIST 100	7797.599	11135.44	3.62	47728.5
TRADEVOLUME	79535.50	134245.4	0.011	1014475.25
TEMPERATURE	14.56243	7.355954	-4.5	32

Basic statistical values of stock return index, trade volume and temperature values are presented in Table 1. All these time sequences are basic. Temperature ranges between -4.5 and 32. In the light of these ranges, the maximum values of the BIST100 Return Index and trade volume are 47728.5 and 1014475.25, respectively. Further, the minimum values of the BIST100 Return Index and trade volume are 3.62 and 0.011, respectively.

When analyzing data E-Views for Granger causality test, Gauss for Hatemi-J bootstrap (2006) and Hatemi-J (2012)

asymmetric causality tests are used (Gauss codes are taken from Hatemi's website).

5. Empirical Analysis

5.1. Granger Causality Analysis

Initially, Granger causality test is applied on selected variables. Results taken are presented in Table 2.

Table 2

Granger Causality Test Result

Null Hypothesis	Chi-sq	Prob.
Temperature Δ (BIST100) is not Granger cause	12.09122	0.0600
Temperature Δ (Trade Volume) is not Granger cause	6.163430	0.4051

* Δ displays first difference of the series..

According to the results taken, in %5 significance level the hypothesis is rejected. In other mean, temperature is not Granger cause for BIST100 Return Index. So, explaining the change in return, temperature variable does not provide helpful data. Similarly, temperature is not also Granger cause for trade volume. So, explaining the change in trade volume, temperature variable does not provide helpful data.

5.2. Hacker and Hatemi-J (2006) Causality

Before applying bootstrap causality test suggested by Hacker and Hatemi-J (2006), it is required to truly determine the stability level and lag of model of variables. Yet, the model on which the causality is tested need to be added addition lag as much as variable's stability level. To this, Hacker and Hatemi-J Bootstrap causality test results are presented in Table 3.

Table 3

Hacker and Hatemi-J Bootstrap Causality

Causality Direction	Test Statistics	Bootstrap Critical Values		
		%1	%5	%10
Temp. > Trade Volume	607.687*	24.427	18.880	16.169
Temp. > Return	5746.925*	19.734	13.480	11.066

* displays %1 significance level.

As we can see in Table 3, according to the results of Hacker and Hatemi-J bootstrap causality test (2006), test statistics are bigger than bootstrap critical values. So, it is seen that there is a causality relationship between temperature and both trade volume and returns. To support this finding taken from the research, examining the correlation in question are carried out with Hatemi-J (2012) Asymmetric causality test for both positive and negative shocks.

Table 4

Hatemi-J Asymmetric Causality Test Results

Causality Direction	Test Statistics	Bootstrap Critical Values		
		% 1	% 5	% 10
Temp. > Return (+)	184.866*	11.858	6.750	5.096
Temp. > Return (-)	168.843*	15.676	9.625	7.562
Temp. >Trade Volume (+)	2825.834*	14.461	9.801	7.879
Temp. > Trade Volume (-)	2835.250*	14.116	9.656	7.852

* displays %1 significance level

According to the results of Hatemi-J (2012) Asymmetric causality test presented in Table 4, it is seen that there is causality from temperature to return in both positive and negative shocks. There is also causality from temperature to trade volume for both positive and negative shocks. Thus, the positive changes in temperature affect both stock market return and trade volume in positive direction. Same fact is also valid for negative direction changes.

6. Conclusions
The effects of negative and positive shocks happen in temperature values on trade volume and stock market returns are examined. Research period is between 1987-2006 years, and analyses are carried out with daily data. According to the results of

the research, positive change in temperature provide useful data in direction to that trade volume and return level also increase. Similarly, negative change in temperature provide useful data in direction to that trade volume and return level also decrease. This data taken is opposite to the theory about temperature and investor behaviors which conflict with many former researches in literature like Cao and Wei (2005). At the end of this research, it is ended up claiming that, unlike many researches focusing on that there is a negative correlation between temperature and return, is a positive correlation between them. This case also support that there is a positive correlation between temperature and stock market return in developing financial markets.

According to behavioral finance, in cold weather investors act aggressively and take more risks. Yet, after this research with empirical applications carried out in such one of the developing stock markets Istanbul Stock Exchange it is reached that as temperature decreases trade volume and return levels also decreases. So, investors tend to be less risk-taking as temperature decreases.

Similarly, as temperature rises both return and trade volume also rises. In this case, in developing markets, it can be viewed as investors tend to be more risk-taking with temperature rising. In behavioral finance, whereas there is no certain thing about the position of investors when temperature rises, it is known that when temperature decreases investors tend to be more risk taking. The research carried out in Istanbul Stock Exchange, one of the developing markets, whereas the results taken have parallel values with temperature risings, support that the contrary happens in low temperatures.

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FISCAL RULES: REASONS AND EVOLUTION

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Abstract

The fiscal rules' framework is presented in a simple and logical manner, considering the reasons for their implementation from different perspectives. Thoughtfully analysing the specific literature, the importance of an appropriate design for fiscal rules is underlined, and the arguments for rule compliance are identified. The current situation of fiscal rules practice and application is mentioned and analysed.

Keywords: economic policies, deficits, fiscal reform

JEL Classification: E62, H30, H6, H87

1. Introduction

The main body of specific economic literature suggests that fiscal rules may constrain the policy makers' behaviour, resulting in better management of deficit and debt. While fiscal rules framework is different across countries, it brings into attention the costs for monitoring and the issue of asymmetric information, the relation between the policy makers and voters and markets.

Expansionary policies before elections and unappropriated allocation for spending can produce deficit and debt prejudice. The issue of economic policies manipulation before the elections and the evolution of electoral business cycles and lately fiscal cycles are presented in Ciumara and Lupu (2015).

Linked or not with the electoral cycle, the time inconsistency issues are producing shortcomings for fiscal imbalances improvement (the promised adjustments are not respected due to different economic or political circumstances). Another example of reasons that induce deficit and debt issues is the distribution of costs and benefits among groups of interest and generations (Alesina and Drazen, 1991; Cukierman and Meltzer, 1989).

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In the specific case of a monetary union, the deficit and debt issue of one member country can endanger the entire union by adding supplementary costs for financing and instability (Detken et al., 2004).

Considering these premises, the article continues the analysis of fiscal rules, and mentions the reasons for adopting fiscal rules in section 2 and identifies the types of fiscal rules and will describe their trends in section 3. The sections 4 addresses the subject of fiscal rules design, while the section 5 presents the final remarks.

2. The reasons for introducing fiscal rules

The general explanation for introducing fiscal rules is that by doing this, the governments' behaviour is restricted, assuring the public and the markets that future policies will conduct to sound public finances. The sustainable and stabilizing fiscal rules should limit the discretionary measures and also decrease the uncertainty about future policies.

After the recent economic crises, appeared numerous budgetary problems, including fiscal deficits and public debt increases and as a result, a commonly agreed solution appears at the international level – short and long term fiscal measures. In the last years were discussed and implemented numerous fiscal and financial policies intended to help the economic recovery and protect against contagion (a presentation of the theoretical perspective of contagion is presented by Lupu, 2012).

While fiscal rule are increasingly in fashion, their efficiency is not yet addressed in many papers (Bergman and Hutchison, 2014). More research in this area will help to identify mistakes in designing fiscal rules and introduce another generation of rules, smarter and more adequate, combining the discipline with flexibility.

The deficit bias is fathomed in the literature, Persson and Tabellini (2000) offering a large presentation and Wren-Lewis (2011) suggesting the reasons for their existence. Wyplosz (2011) underlines the two main reasons – proclivity towards impelling the fiscal burden to future administrations or generations and the interface between democracy and interest groups actions. The "common pool" issue is often discussed, including here the problem of moving the debt burden for the future and spending more than revenues, in a context with heterogeneous voters.

Another reason for introducing fiscal rules is to avoid the pro-cyclicality. As presented by Cespedes and Velasco (2014), in

emerging and developing countries, we find more pro-cyclical fiscal policies, although in the last years many emerging countries succeeded to step out form this category (Frankel et al., 2011). Bergman and Hutchison (2014), after analysing 81 economies over the period 1985-2012, concluded that the introduction of fiscal rules, together with government efficiency may decrease the pro-cyclicality, and, at particular extent may even entail counter-cyclical reactions.

3. Types of fiscal rules and their evolution

The forms that fiscal rules can take are various, starting with numerical rules or procedural rules for the budget process, budget balance, and public spending or revenues. The numerical fiscal rules, including ceilings and targets for budgetary aggregates, usually impose some long term (at least three years) obligations for the fiscal policy.

The numerical fiscal rules can target a debt limit or a budget deficit limit, including structural budget balance. As presented by Schaechter et al. (2012), in a simple form, these rules are facile to communicate and easy to monitor, usually with explicit medium and long term guidance, but with the possibility to support pro-cyclicality. From another perspective, the numerical limitation can set targets for expenditure or revenue (volume, intervals or percent of other economic indicators). Although these types of rules have positive influence on the economy, they do not directly support the debt sustainability, and the revenue rules can conduct to pro-cyclicality

In time, the number of countries using numerical fiscal rules has been rising continuously. From a total of 89 countries taken into analysis (using IMF Fiscal Rules Dataset, 2015), at the end of 1980's there were only few countries (considerable less than 10 for each type of rule) using numerical limits for fiscal policies. In 1985 (the first year for which data is available) there were six countries using budget balance rules (Australia, Germany, Indonesia, Japan, Malaysia and Singapore), two countries using expenditure rules (Australia and Germany), one country using revenue rules (Australia) and one debt rule (Malaysia). It is worth to mention that Australia (that had in 1985 three types of rules in place and four types in 2014) had a period between 1989 and 1997 with no type of numerical rule in place.

Figure 1

Number of countries using different types of national and supranational numerical fiscal rules, 1985-2014
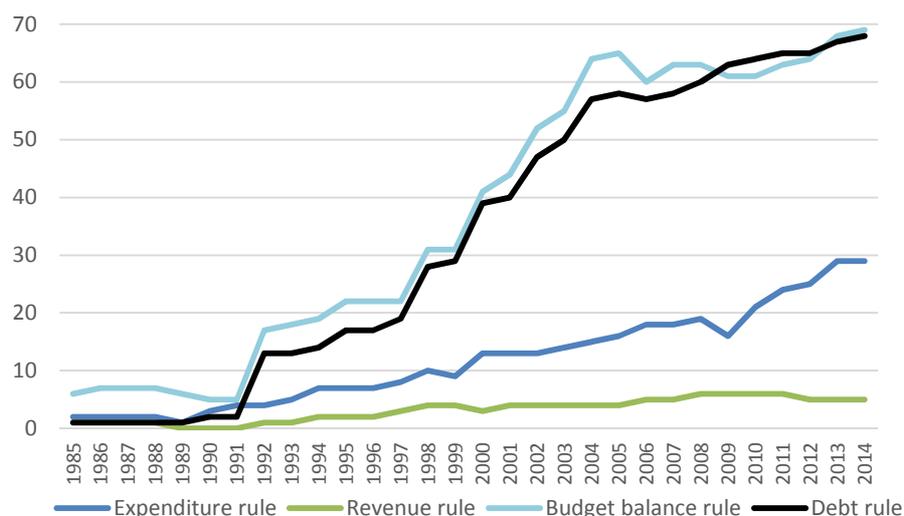
Source: author's calculations, using IMF Fiscal Rules Dataset, 2015.

In 1992 is noticeable a strong increase of the number representing countries that use fiscal rules, especially the number of countries using budget balance rule (from 5 in 1991 to 17 in 1992) and debt rule (from 2 in 1991 to 13 in 1992). From then, the increase was intense, at least for these two types of numerical fiscal rules, the number of countries that introduced at least one of these fiscal rules being 69 for budget balance rule and 68 for debt rule. The number of countries using revenue rule is a modest one, remaining even in 2014 lower than 10 (5 countries were using this type of rule in 2014, while the maximum number of countries was 6).

The numerical rules are used quite often in combination, with the intention to reduce the negative effects of a specific rule; on the other side, multiple targets raise the complexity of the fiscal policy and sometimes are even incompatible one with each other. The most used combination of rules is the budget balance rule with debt rule (56 countries using it in 2014). The expenditure rule is often used together with budget balance rule (23 countries having it in 2014) or with the debt rule (18 countries in 2014). The revenue rule (a rule that is not so frequent as previously showed) is mostly used with all other

rules together; between 2009 and 2011, 5 countries used all the rules in the same time (Australia, Denmark, France, Lithuania, Netherlands), this being the maximum number in the analysed period. Between 2012 and 2014 the number of countries that applied all 4 rule in the same time decreased to 4, Denmark renouncing to use the revenue rule.

Figure 2

Number of countries using at least two types of national and supranational numerical fiscal rules in the same time, 1985-2014
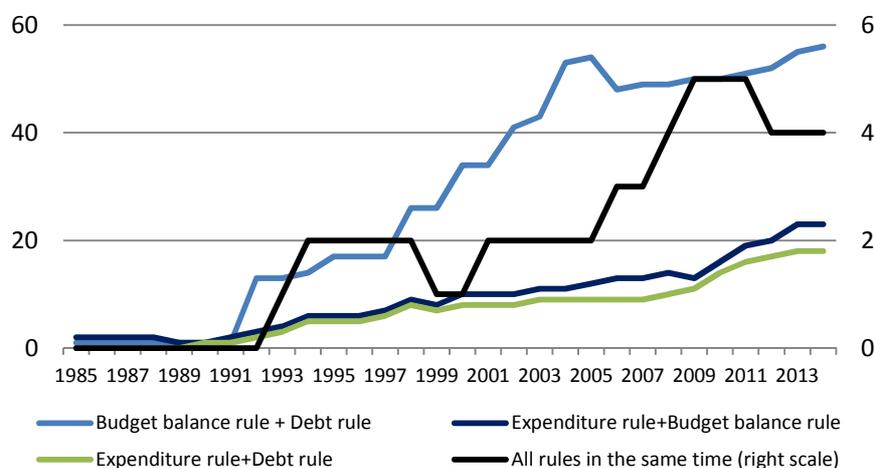
Source: Source: author's calculations, using IMF Fiscal Rules Dataset, 2015

Knowing the limitations of the numerical rules (Kydland and Prescott, 1977) that may be arbitrary or suboptimal, another option for improving the fiscal policy is the introduction of a well-designed fiscal institutions type of rule (or procedural fiscal rules). This category of fiscal rules may refer to an increasing transparency of fiscal policies, by creating conditions for a better monitoring that may be imposed through a Fiscal Responsibility Law.

4. Designing fiscal rules. The need for simple and clear fiscal rules and rule compliance

The issue of choosing between simple and more complex fiscal rules is also discussed in the literature. While simple fiscal rules are facile to monitor, their compliance is followed by market and public that may evaluate and sanction the deviations.

In order to have the public support and power for enforcement, the fiscal rule should be credible and fair from the economic point of view, existing in the specific literature pros and cons for what to include or exclude from the targets. A broad economic coverage is desired for countries where are many quasi-fiscal activities that can put additional pressure on sustainability of the fiscal policies. Besides this, the quality of the fiscal policy may be influenced by a proper design of the fiscal rules, respecting the specific needs of the countries.

There is another debate in literature sustaining the idea that "soft lows" enhance transparency (diminishing the political transaction costs) and became "self-enforcing" if they are appropriately projected, helping to avert from large policy deviations (Schuknecht, 2004). Moreover, is it considered to be a first step in a learning process, before implementing a "hard law".

The implementation of the fiscal rules may be impaired by the commitment's deficiency or the use of non-reliable data and frequent forecast errors. As already mentioned, some rule may lead to pro-cyclicality. The cyclicality issue was addressed in some countries (or economic unions) by adopting some fiscal rules that provide for cyclically adjusted targets, including here structural or cyclically adjusted budget balance targets.

According to IMF Fiscal Rules Dataset, the European Nordic countries are using this type of rule that allow to account for cyclicality starting from 1990's and until now, Denmark introducing it in 1992 and Finland in 1995 (with a short period between 2011 and 2012 without cyclically adjusted rules). Sweden and Norway inserted such rules in 2000, respectively 2001, and United Kingdom in 1997. A special case is Germany that is accounted in the IMF fiscal dataset with 0.5 rules for the period 1985-2009 because it was in force an escape clause for situations that affect the macroeconomic equilibrium, but starting with 2011 it was introduced at the national level a fiscal rule accounting for the cycle. Most of the countries that use this category of rules are European, the number of countries using them increasing after 2010, when the European sovereign debt crisis started. Among countries that introduced cyclically adjusted fiscal rule we find few from South America: Chile (from 2001), Colombia (from 2011), and Peru (from 2014).

Figure 3

Number of countries using fiscal rules that allow for cycle adjustments at national level, 1985-2014
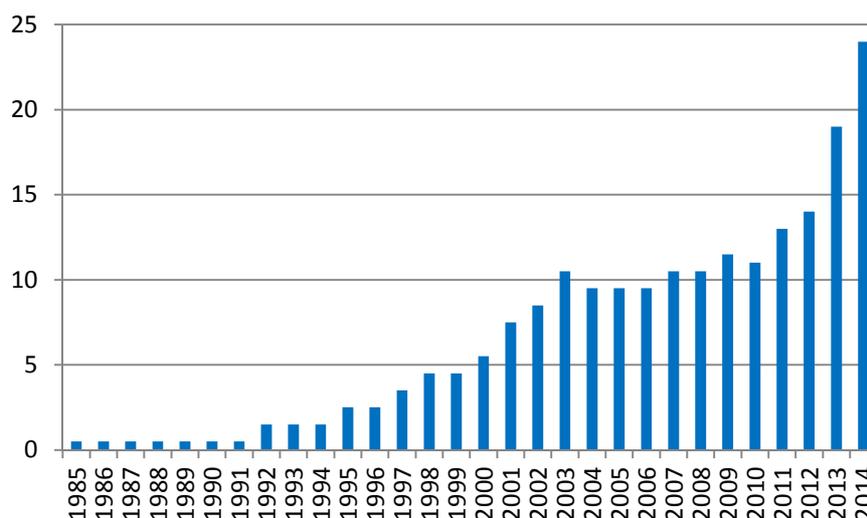
Source: author's calculations, using IMF Fiscal Rules Dataset, 2015

There are authors that consider the need for more complex rules, the level of complexity depending on countries' specific economic and institutional features. These more complex rules should consider particular situations or differences for good and bad periods from the economic point of view.

Another way to adapt the fiscal policy to specific or exceptional cases is to accept different exceptions for rule compliance. While in some extraordinary cases like natural disasters, economic recessions or other situations outside the government control, the escape clauses are generally accepted in the literature (with clear definitions of such situations, voting process and guidance for interpretations and adjustment towards the normal), there are some censurable forms like change in government or in budget coverage.

At least at national level, the countries that usually apply escape clauses are especially advanced economies; the number of emerging economies that introduced escape clauses increased after 2004.

Figure 4

Number of countries with well specified escape clauses at national level, 1985-2014
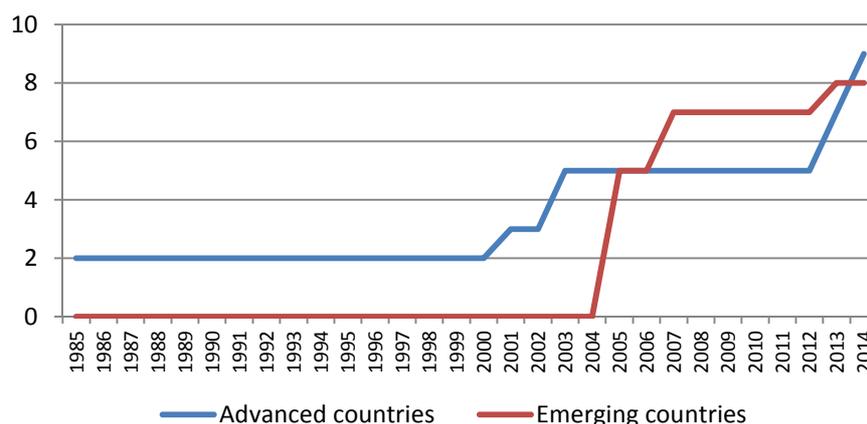
Source: author's calculations, using IMF Fiscal Rules Dataset, 2015

A proper and timely reporting regarding the budget process is essential for a better external monitoring of rules' compliance. In this sense, starting with 1990's, it was mentioned in the literature the suggestion to create at national (and European Union) level independent fiscal councils with the role of independent assessment of fiscal performance, constraining the rules compliance (von Hagen and Harden, 1994; Wyplosz, 2002; Fatas et al., 2003).

Even in some countries the fiscal countries had only an advisory role, the reputational cost may affect policymakers when the fiscal policy does not comply with the rules. This action is visible and brings some constraint.

In some countries, the need to assure the implementation of the fiscal rules or procedures was supported by introducing Fiscal Responsibilities Laws that are more frequent in emerging countries than in the advanced economies. The reasons for less attractiveness of these regulations in the advanced countries are represented by the existence of good legislations for the budget process that are appropriate and effective and also the already introduced supranational rules, especially in the case of European Union.

Figure 5

Number of countries with Fiscal Responsibility Laws by economy type, 1985-2014
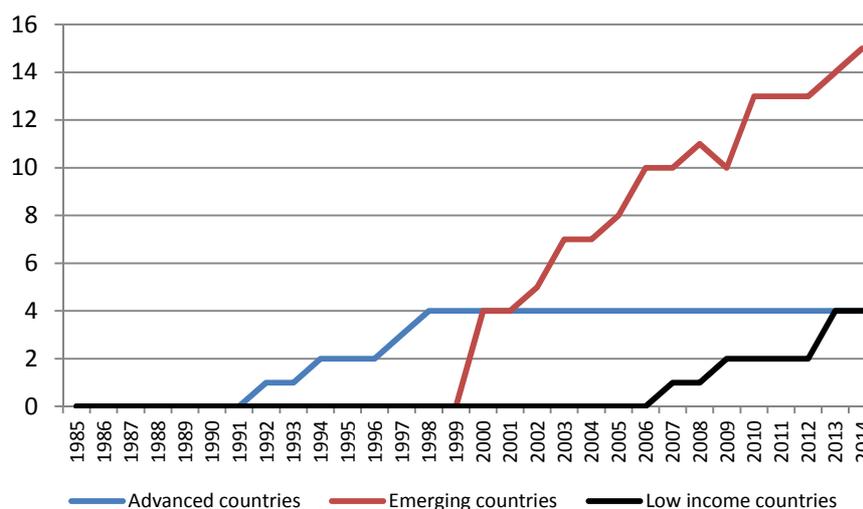
As observed by Lienert (2010), many countries from Latin America have adopted Fiscal Responsibility Laws, but in general they are not directly targeting fiscal transparency. Fiscal stability and fiscal rules are the main subjects of this kind of law in this region.

Although the rules imposed by the law support a stabile fiscal framework for a longer period of time and are not facile to change, they are adopted harder and are not always effective if not sustained by enforcement mechanisms and institutional responsibility.

5. Final remarks

The evolution of fiscal rules and their current distributions and special features accounts for the fact that every country needs a specific design, based on country's economy and institutional settings. The design of the rules for one specific country or union should reflect the objectives that are intended to be achieved, in a well-established flexible or inflexible manner based on exceptional events or cyclical adjustment, and in line with the other macroeconomic policies.

In order to obtain a good result, the rules should be accompanied by procedures and responsible fiscal institutions, while assessments made by independent monitoring bodies can improve transparency and credibility.

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SOCIAL INCLUSION DEVELOPMENTS - A EUROPEAN CROSS-COUNTRY PERSPECTIVE

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Abstract

Although social inclusion occupies a top position on the agenda of international bodies and national policymakers, both practitioners and academia find it challenging to comprehensively define and accurately measure this phenomenon. Our paper aims at exploring the features and the dynamics recorded by main determinants of social inclusion, through employing a bottom-up analytical approach. It has been followed the Eurostat's delineation of social inclusion indicators into three broad dimensions. The analysis has been conducted for the 28 European Union member states, at two key moments of time, to identify, based on the signals provided by each indicator, the countries recording most extreme values. Indicators recording big values suggest that those countries are exposed to higher degrees of social exclusion, as there are large imbalances between different categories of population regarding the monetary, educational or labor force issues. Indicators depicting small values provide a good signal, characteristic to a state of social inclusion. It has been performed a classification of countries into best and worst performers in terms of social inclusion. An important finding is that, in appreciating the degree of a country's social inclusion, the leading criterion is the monetary poverty. Indirectly, based on the mutually reinforcing relationship between social and financial inclusion, it can be argued that countries identified to depict a pattern of social inclusion are also deemed to perform well in the field of financial inclusion.

Keywords: social inclusion, financial inclusion, proxy indicators, correlation, descriptive statistics

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1. Social inclusion - importance and link with financial inclusion

The roots of the global concern related to creating favorable premises for achieving a state of social inclusion date back to the 1995 World Summit for Social Development which took place in Copenhagen. It was stated that a major priority in the achievement of reliable, sustainable social development is the social integration process which, in turn, is significantly determined by unemployment and poverty (UN, 2010). The recent years' developments, on the background of a severe financial and economic crisis, made it clear that social disparity not only persisted, but the gap between countries or between the individuals living in the same country increased, requiring a more concerted, active and timely intervention of national policymakers and international bodies.

In this respect, the European Commission has positioned fighting against poverty and social exclusion at the core of its Europe 2020 strategy for smart, sustainable and inclusive growth. It is acknowledged that, at present, EU countries are still far from reaching the target set through the 2020 strategy.

World Bank perceives social inclusion in a dual way, as an outcome of measures undertaken by policymakers and as a process for improving individuals' ability to integrate in society and to benefit from equal access to markets and services, of any nature.

United Nations (2010, p.1) define social inclusion "as the process by which societies combat poverty and social exclusion". Social exclusion is considered to be "the involuntary exclusion of individuals and groups from society's political, economic and societal processes, which prevents their full participation in the society in which they live".

When it comes about measuring the state of social inclusion in a given country, it is generally agreed that it is a difficult, challenging task both because in defining it one has to comprehensively identify all the dimensions that compose it and because each dimension has to be reliably and soundly measured by a set of relevant indicators.

In a report issued by European Commission (2008) it is argued that between financial exclusion and social exclusion is a part-whole relationship, the latter concept being more comprehensive and including the former, as it refers to individuals lacking access to basic

services, such as a permanent job, housing, education, health care. Financial exclusion is defined in this report as "a process whereby people encounter difficulties accessing and/or using financial services and products in the mainstream market that are appropriate to their needs and enable them to lead a normal social life in the society in which they belong" (p. 9).

Another report published by the Centre of International Political Studies (2013) and financed by the European Commission and the Italian Ministry of Interior outlines that financial exclusion is both an important cause and consequence of social exclusion.

There is a strong, self-fulfilling interrelation between the two concepts. Socially excluded people naturally confront themselves with financial exclusion, as they will be rejected by banking system due to their inability of proving sound creditworthiness or good quality collateral. On the other hand, financial exclusion reinforces the risk that, at certain moment in time, an individual faces with social exclusion due to low understanding of the features and use of financial products, or simply the inability of accessing them from both the perspective of a depositor or a borrower.

According to United Nations (2010, p. iii), "the failure of social integration would lead to social fragmentation and polarization, widening disparities and inequalities". Further, these disequilibria reflected in different degrees of exclusion will be passed on the financial behavior of individuals. The result is the entrance into a vicious circle, as increasingly more access to basic financial services is perceived as a prerequisite for active "participation in the social and economic life of a modern society and, therefore, for social inclusion" (Centre of International Political Studies, 2013, p. 8).

Consequently, in the process towards reaching a steady state of social inclusion, strengthening financial inclusion is a key step. As Sarma and Pais (2008) outline, financial exclusion is a reflection of a broader problem affecting social exclusion. Indeed, the main indicators that proxy the state of social exclusion is also generating effects on the financial exclusion side, too. A high level of financial exclusion is associated by several studies with large levels of income inequality (Buckland and Guenther, 2005; Sarma and Pais, 2008; Park and Mercado, 2015), job insecurity or unemployment (Goodwin et al. 2000; European Commission 2008), vulnerable people such as low-income or elderly (Connolly and Hajaj, 2001; Barr, 2004).

Existing empirical research is neither broad nor conclusive regarding the direction of causality between the two concepts, although there is generally agreed the presence of a link between social and financial exclusion (Kempson et al, 2004; Corr, 2006; Anderloni and Carluccio, 2006; McKay and Collard, 2006).

Social exclusion is multifaceted, being determined by a complex mix of factors. In this paper we have followed the approach proposed by EC, which delineates the broad typology of determinant factors into three main components: educational, monetary and labor market factors. Each component is proxy by several indicators that became the starting point for our analytical approach. By relying on the generally accepted interrelated link between social and financial inclusion, the findings obtained will allow us to indirectly gain a perspective on financial inclusion developments within the two time periods considered and across the EU member states.

2. Methodology employed

It has been performed a comprehensive country-by-country analysis, covering all the 28 EU member states, at two moments of time: 2008, to gain a picture of social inclusion phenomena during the year that marked the onset of the financial crisis, and 2013 for a more recent picture. Data have been extracted from Eurostat database, the most recent data series being available until 2013. According to European Commission's classification, social inclusion can be proxy by means of: a) monetary poverty and living conditions; b) education and c) access to labor market. Each of these three broad dimensions can be quantitatively assessed by employing several indicators, which have been synthesized in Table 1 (see the Annex 1).

Before aggregating the signals provided by each of the nine indicators, it is of interest to analyze the statistical features depicted by individual indicators' data series. This descriptive approach allows us to establish the pattern of evolution or the dynamics recorded by one indicator both within the sample of nine indicators and across the two time periods considered. Tables 2 and 3 (see the Annex 1) depict the correlation matrix for each year, to notice the presence of a relationship between indicators, its strength and its direction (positive or negative).

Correlation coefficients close to zero depict no relationship between the variables, while a correlation of +/- 1 indicates perfect synchronization of their evolution. Coefficients in the range 0.9 - 0.7

show strong correlation, moderate correlation if they lie in the range 0.6 - 0.4 and a weak, maybe random correlation for levels smaller than 0.39.

For 2008 there is a strong correlation between inequality of income distribution and persistent-at-risk-of-poverty rate for 50-64 years(0.72), in-work at-risk-of-poverty rate and persistent-at-risk-of-poverty rate for 25-49 years 0.71) respectively inequality of income distribution (0.74). It means that there is a strong relationship between these variables in the sense that they vary together; however, it cannot be stated the causality direction but only the presence of a relationship. The correlation coefficients' sign is positive meaning that they move in the same direction: as one variable increases (decreases), the other with which it is correlated increase (decrease) as well. However, for most of the variables considered, the correlation relationship is low, questionable.

At end-2013 it is maintained the strong correlation between in-work at-risk-of-poverty rate and persistent-at-risk-of-poverty rate for 25-49 years (0.73) respectively inequality of income distribution (0.72). In respect of inequality of income distribution and persistent-at-risk-of-poverty rate for 50-64 years, the correlation recorded a slight decrease to 0.68, while the correlation between the former indicator and persistent-at-risk-of-poverty rate for 25-49 years increased with around 9 percentage points, until 0.76. This shift suggests that income gap raises more when disposable income obtained by people aged 25-49 falls below the risk-of-poverty threshold.

For at-risk-of-poverty-rate by highest level of education the strength of correlation changed: in 2008 it was moderately correlated with persistent-at-risk-of-poverty rate for 50-64 years and inequality of income distribution, while in 2013 it became weak.

Households with very low work intensity proved no correlation in 2008 with persistent-at-risk-of-poverty rate for 25-49 years, inequality of income distribution and early leavers from education and training, while in 2013 it recorded a jump towards a moderate, positive correlation. This dynamics suggests that young adults gaining low wages and youth abandoning the education system are more prone to depict low work intensity features.

Long-term unemployment rate depicted weak correlation with persistent-at-risk-of-poverty rate for 25-49 years, severely materially deprived population, inequality of income distribution, in-work at risk

of poverty rate and households with very low work intensity at end-2008 but converted into moderate correlation in 2013.

To sum up, for 2013 data some indicators maintained their correlation strength, while others acquired a moderate pattern of synchronization.

Tables 4 and 5 (see the Annex 1) summarize several descriptive statistics, meant to give a picture on the data series properties.

Standard deviation is a very informative statistic as it points out the dispersion of a variable's values around its mean. The smaller its value, the closer to the central tendency is the range of values recorded by a given variable. The variables depicting a pattern of relative homogeneity within the data series or, in other words, few extreme values are inequality of income distribution (the lowest standard deviation, of only 1.13), long-term unemployment rate (1.42), households with very low work intensity (2.21), persistent-at-risk-of-poverty rate (25-49 years) (2.67), at-risk-of-poverty-rate, by highest level of education attained (2.75) and in-work at risk of poverty rate (2.76). At the opposite, the highest standard deviations have been recorded by severely materially deprived population (8.65), early leavers from education and training (7.79) and lifelong learning (7.36). The reason resides in the wide disparities across EU member states in terms of the indicators above mentioned.

Kurtosis describes the shape of a probability distribution, while skewness adds information related to its asymmetry. A kurtosis equal to 3 is specific to the normal distribution. All kurtosis statistics record positive values, meaning that all indicators have a leptokurtic distribution, with high peaks and fatter tails. Severely materially deprived population has the highest kurtosis; consequently, its distribution depicts the highest tails which is a clue for the presence of many extreme values.

Skewness is a statistic measuring a distribution's lack of symmetry. Zero skewness is a feature of normal distribution. All the indicators in our sample show asymmetry towards right tail, outlining hence the higher frequency of positive extreme values. Again, severely materially deprived population depicts the widest asymmetry, having the longest right-tail.

Jarque–Bera statistic acts as a goodness-of-fit measure to test jointly whether a dataset skewness and kurtosis depict the

features of a normal distribution. The smaller its value, the closer is the dataset from a normal distribution.

According to 2013 statistics, inequality of income distribution maintained the lowest standard deviation, of 1.06 while severely materially deprived population depicted the highest level (9.54). Lifelong learning witnessed a small increase of its standard deviation level while early leavers from education and training recorded a decrease from 2008 level. Long-term unemployment rate's standard deviation marked an increase from 1.42 in 2008 to 4.02 in 2013 signaling rising heterogeneity across EU member states and pressures on the labor market. As in 2008, the highest standard deviations have been recorded by the same three indicators, namely severely materially deprived population, early leavers from education and training and lifelong learning. The reason resides in the wide disparities across EU member states in terms of the indicators above mentioned, disparities that still persist five years later. The indicators for which standard deviation shows larger values are lying at the origin of main differences between countries, in terms of social inclusion criteria.

The highest kurtosis, of over 6, has been recorded by two indicators, namely severely materially deprived population and long-term unemployment rate. Their skewness values are also closely related, suggesting that at end 2013 they witnessed a broad range of extreme values, with a higher frequency of positive ones (right side asymmetry). However, for all the nine social inclusion indicators skewness depicted smaller values at end-2013 than at end-2008, pointing out a generalized attenuation of the lack of symmetry. Jarque-Bera statistic also compressed its values, for all the indicators in the sample.

3. Social inclusion – cross-country assessment and dynamics

To establish which of the three main criteria that proxy social inclusion are at the root of the heterogeneity between EU countries, being the determinant of households' status of socially inclusive or exclusive, we have performed an analytical research. Having as starting point the raw data series for each indicator, in each EU country, we marked both the smallest and the largest values and kept in the analysis only those countries that recorded best/worst performance for at least three indicators. Except lifelong learning, all

the indicators recording high values prove the presence of large imbalances between different categories of population in respect of monetary, educational or labor force issues. Consequently, those countries are exposed to higher degrees of social exclusion. On the contrary, indicators depicting small values (again except lifelong learning) are a signal of social inclusion. Low levels of lifelong learning indicate that people are not willing to continue their education or training, to improve and expand their skills and knowledge, while big values reflect a good attitude towards education. The biggest number of indicators pointing towards a positive, beneficial state a country holds, the more pronounced the degree of social inclusion.

In addition to the statistical features discussed above, it should be mentioned also the forward-looking nature of social inclusion indicators. Individuals who are reported in official statistics as being socially excluded for unemployment or absence/low level of income purposes are susceptible to maintain these features in the future, too. The same is valid for education indicators which indirectly measure the exposure to the risk of social exclusion in the later working life, due to early school leaving or refusal to update skills and knowledge through trainings (UN, 2010).

Tables 6 and 7 (see the Annex 1) summarize the results obtained and the countries' clustering in terms of the degree of social inclusion.

At end-2008 only 5 out of 28 EU countries depicted relatively persistent extreme values for at least three social inclusion indicators. In respect of the different social inclusion dimensions, most indicators are concentrated in the monetary poverty field, followed by education and labor market access. It means that, in 2008, monetary poverty exerted the largest influence on a country's overall status of social inclusion.

Denmark and Sweden were the best performers in terms of persistent-at-risk-of-poverty rate for 25-49 years, income distribution, lifelong learning and long-term unemployment. At the opposite are the countries with the highest exposure to social exclusion, namely Latvia, Portugal and Romania, table 6 illustrating those indicators with increased vulnerability.

Compared with the picture from end-2008, in 2013 it have been identified 12 EU countries that recorded extreme values for at least three out of nine social inclusion indicators. Again, the highest concentration of best and worst performers is in the area of indicators

that proxy monetary poverty. In addition, we notice the shift between labor market access and education criteria, the former gaining weight. Thus, in appreciating the degree of a country's social inclusion, the leading criterion is the monetary poverty followed by pressures on the labor market and education issues. Going a step further, the appearance of a favorable, beneficial value has been registered in only 25% of cases for monetary poverty criterion, in 62% of cases for education criterion and in 80% of cases for labor market access criterion. This suggests that countries in table 7 succeeded most at facilitating entrance on labor market as an active, well paid worker. Also, most countries succeeded to maintain individuals' interest in ongoing investment in their career, by fulfilling each stage of the public educational process, and in updating their skills, by enrolling for additional training. In respect of monetary poverty criterion, although it seems to hold the pivotal place when assessing a country's degree of social inclusion, it is also the hardest to be managed. Most countries show large vulnerabilities and record the lowest values from the entire sample of 28 EU countries.

The best values for their indicators and hence the highest degree of social inclusion has been recorded by Denmark, Finland, Sweden, followed closely by Czech Republic and Luxembourg. The highest exposure to social exclusion is signaled in Greece (5 out of 9 indicators), Latvia and Bulgaria. Greece and Latvia are the worst performers for each of the four indicators that proxy the monetary poverty dimension. Romania is the only country in the sample with mixed evolution, as it shows vulnerabilities for four indicators and favorable evolutions for two indicators.

4. Conclusions

The paper aimed at bringing together several indicators that cause the manifestation of social exclusion phenomenon, to centralize their influence and analyze their evolution in a cross-country framework. Although the factors leading to social exclusion are many and varied, a general tendency can be noticed: monetary poverty is the dimension holding the main importance in assessing the state of social inclusion or exclusion of a country. It is also the hardest to be mitigated, as most countries recorded high levels of the vulnerability indicators.

Taking a closer look at countries' evolutions, it can be observed that more countries entered on a social inclusion path in

2013, compared with 2008. The same is valid also for countries depicting major exposure to social exclusion.

The findings of our study are valuable because they may constitute the starting point for any analyses, with various degrees of comprehensiveness, time coverage and complexity, trying to determine the direction of change of social inclusion phenomenon and of its main determinant factors, in a comparative cross-country perspective. Indirect outcomes may be represented by assessing whether the measures undertaken for mitigating social exclusion gave beneficial results or how improved social inclusion might translate into better financial inclusion.

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Table 1. Indicators for social inclusion assessment

Category	Indicator	Denomination in text	Explanation
MONETARY POVERTY AND LIVING CONDITIONS	Persistent-at-risk-of-poverty rate (25-49 years)	Variable 1a (Var. 1a)	The indicator is defined as the share of persons with an equivalised disposable income below the risk-of-poverty threshold in the current year and in at least two of the preceding three years. The threshold is set at 60 % of the national median equivalised disposable income.
	Persistent-at-risk-of-poverty rate (50-64 years)	Variable 1b (Var. 1b)	
	Inequality of income distribution	Variable 2 (Var. 2)	The ratio of total income received by the 20 % of the population with the highest income (top quintile) to that received by the 20 % of the population with the lowest income (lowest quintile). Income must be understood as equivalised disposable income.
	Severely materially deprived people	Variable 3 (Var. 3)	Severely materially deprived persons have living conditions severely constrained by a lack of resources and they experience at least 4 out of 9 following deprivations items: cannot afford i) to pay rent or utility bills, ii) keep home adequately warm, iii) face unexpected expenses, iv) eat meat, fish or a protein equivalent every second day, v) a week holiday away from home, vi) a car, vii) a washing machine, viii) a colour TV, or ix) a telephone.
EDUCATION	Early leavers from education and training	Variable 4 (Var. 4)	The indicator is defined as the percentage of the population aged 18-24 with at most lower secondary education and who were not in further education or training during the last four weeks preceding the survey.
	At-risk-of-poverty-rate, by highest level of education attained	Variable 5 (Var. 5)	This indicator is defined as the share of persons with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers).
	Lifelong learning	Variable 6 (Var. 6)	Lifelong learning refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding those who did not answer to the question 'participation in education and training'.
ACCESS TO LABOR MARKET	Households with very low work intensity	Variable 7 (Var. 7)	People living in households with very low work intensity are people aged 0-59 living in households where the adults work less than 20% of their total work potential during the past year.
	In-work at-risk-of-poverty-rate	Variable 8 (Var. 8)	The share of employed persons of 18 years or over with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers).
	Long-term unemployment rate	Variable 9 (Var. 9)	Long-term unemployed (12 months and more) comprise persons aged at least 15, who are not living in collective households, who will be without work during the next two weeks, who would be available to start work within the next two weeks and who are seeking work

Source: definitions from Eurostat

Table 2. Correlation matrix for 2008 year-end indicators

	Var.1a	Var.1b	Var.2	Var.3	Var.4	Var.5	Var.6	Var.7	Var.8	Var.9
Var.1a	1									
Var.1b	0,60	1								
Var.2	0,36	0,23	1							
Var.3	0,67	0,72	0,51	1						
Var.4	0,41	0,28	-0,06	0,46	1					
Var.5	-0,06	0,49	-0,10	0,45	0,05	1				
Var.6	-0,66	-0,36	-0,57	-0,40	-0,14	0,24	1			
Var.7	0,02	-0,11	0,05	-0,09	0,02	-0,12	-0,01	1		
Var.8	0,71	0,55	0,22	0,74	0,39	0,31	-0,36	-0,22	1	
Var.9	0,36	0,05	0,30	0,06	0,11	-0,35	-0,63	0,23	0,13	1

Source: authors, based on Eviews computations

Table 3. Correlation matrix for 2013 year-end indicators

	Var.1a	Var.1b	Var.2	Var.3	Var.4	Var.5	Var.6	Var.7	Var.8	Var.9
Var.1a	1									
Var.1b	0,59	1								
Var.2	0,50	0,28	1							
Var.3	0,76	0,68	0,60	1						
Var.4	0,47	0,23	0,14	0,43	1					
Var.5	0,08	0,29	-0,29	0,20	-0,02	1				
Var.6	-0,65	-0,49	-0,64	-0,43	-0,17	0,30	1			
Var.7	0,48	0,16	0,37	0,55	0,52	0,16	-0,21	1		
Var.8	0,73	0,62	0,23	0,72	0,22	0,25	-0,39	0,27	1	
Var.9	0,63	0,35	0,42	0,63	0,36	-0,02	-0,52	0,63	0,55	1

Source: authors, based on Eviews computations

Table 4. Descriptive statistics for 2008 year-end indicators

	Var.1a	Var.1b	Var.2	Var.3	Var.4	Var.5	Var.6	Var.7	Var.8	Var.9
Mean	6,66	7,55	8,95	4,70	13,86	6,09	10,15	7,62	7,67	2,31
Maximum	11,3	17,2	41,2	7,3	34,9	13,3	29,9	12	14,3	6,7
Minimum	2,6	0,5	0,7	3,4	5	2,3	1,4	4,5	3,6	0,5
Std. Dev.	2,67	3,85	8,65	1,13	7,79	2,75	7,36	2,21	2,76	1,42
Skewness	0,11	0,85	2,31	0,61	1,36	0,64	1,18	0,59	0,63	1,20
Kurtosis	1,89	3,87	9,11	2,33	4,35	3,09	3,54	2,45	2,58	4,75
Jarque-Bera	1,28	3,61	58,75	1,92	9,26	1,66	5,85	1,69	1,75	8,87
Probability	0,53	0,16	0,00	0,38	0,01	0,44	0,05	0,43	0,42	0,01

Source: authors, based on Eviews computations.

Table 5. Descriptive statistics for 2013 year-end indicators

	Var.1a	Var.1b	Var.2	Var.3	Var.4	Var.5	Var.6	Var.7	Var.8	Var.9
Mean	8,02	8,08	10,73	4,77	10,42	6,54	11,27	10,26	7,78	5,20
Maximum	14,2	13,7	43	6,6	23,6	12,3	31,4	18,2	13,1	18,5
Minimum	3	1,9	1,4	3,4	3,9	1,8	1,7	6,6	3,7	1,3
Std. Dev.	2,81	3,07	9,54	1,06	4,89	2,60	7,89	3,04	2,52	4,02
Skewness	0,26	0,02	1,82	0,46	1,24	0,11	1,08	0,87	0,08	1,77
Kurtosis	2,56	2,45	6,41	1,82	3,92	2,54	3,48	3,05	2,26	6,13
Jarque-Bera	0,48	0,31	25,96	2,32	7,25	0,28	5,12	3,15	0,60	23,25
Probability	0,79	0,85	0,00	0,31	0,03	0,87	0,08	0,21	0,74	0,00

Source: authors, based on Eviews computations

Table 6. Social inclusion indicators, by country, in 2008

Country	MONETARY POVERTY				EDUCATION			LABOR MARKET ACCESS		
	Persistent-at-risk-of-poverty rate		Severely materially deprived population	Inequality of income distribution	Early leavers from education and training	At-risk-of-poverty-rate, by highest level of education attained	Lifelong learning	Households with very low work intensity	In-work at risk of poverty rate	Long-term unemployment rate
	from 25 to 49 years	from 50 to 64 years								
Denmark	√			√			√			√
Latvia		×		×		×			×	
Portugal	×				×				×	
Romania			×	×		√	×		×	
Sweden	√	√		√			√			√

Source: authors, based on data retrieved by Eurostat.
Legend: √ = Low levels of distress indicators, signaling a state of social inclusion; × = High levels of distress indicators, signaling large exposure to social exclusion

Table 7. Social inclusion indicators, by country, in 2013

Country	MONETARY POVERTY				EDUCATION			LABOR MARKET ACCESS		
	Persistent-at-risk-of-poverty rate		Severely materially deprived population	Inequality of income distribution	Early leavers from education and training	At-risk-of-poverty-rate, by highest level of education attained	Lifelong learning	Households with very low work intensity	In-work at risk of poverty rate	Long-term unemployment rate
	from 25 to 49 years	from 50 to 64 years								
Bulgaria	×		×	×			×			
Denmark	√	√					√			√
Greece	×	×	×	×						×
Latvia	×	×	×	×						
Romania			×	×		√	×	√	×	
Finland				√			√		√	√
Sweden			√	√			√			√
Czech Republic				√		√		√		
Spain	×			×	×					
Lithuania	×	×		×						
Luxembourg			√					√		√
Portugal	×	×		×						

Source: authors, based on data retrieved by Eurostat.
Legend: √ = Low levels of distress indicators, signaling a state of social inclusion; × = High levels of distress indicators, signaling large exposure to social exclusion

EVOLUTION OF TAXATION AT MICROECONOMIC LEVEL IN THE PERIOD 2003-2014

Nicoleta MIHĂILĂ, PhD *

Abstract

In this article we have proposed to make a presentation of the main tax regulations in the period 2003-2014, regulations that have had significant effects on small and medium enterprises' sector in Romania (especially during the economic crisis). Therefore, we shall use a descriptive methodology in order to outline the multitude of tax changes of the Tax Code, aspect that actually determines the tax unpredictability, a feature of our tax legislation. For a friendly fiscal environment is needed predictability and stability, and this variety of tax changes produced in a short period of time causes tax uncertainty, which implicitly brings new costs for companies, decrease of financial results or tax evasion.

Keywords: taxation, fiscal regulations, SMEs, economic crisis

JEL Classification: H25, H32

1. Introduction

Taxation is one of the areas that has passed through the most important changes in recent years; these changes have occurred either too slow or too sudden, determining the taxpayer's certainty to interpret tax legislation as a factor of instability in the development of the Romanian economy.

Adam Smith proposed in 1776 four principles for tax imposition. Taxation principles formulated below must be fulfilled by all rational tax systems, repectively:

1. maximum for justice (social justice in terms of taxes, all citizens contribute to fiscal resources in conjunction with their revenues);

2. Maximum for certainty (laws on taxpayer's tax obligations must be concise, clear and anticipated by contributors);

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3. Maximum for convenience, refers to methods of compliance for tax obligations payment that should be convenient and easyand the costs generated by them should be minimal;

4. Maximum of economy and efficiency (involves charging a lower tax burden for all taxpayers, but they should be fully collected)

The structure of the tax system should be a coherent, well defined one, based on economic and applied principles, in which the components are integrated and the system's deformations must be minimized. The Tax Code changes in the period 2003- 2014 did not provide long-term stability, stability so much desired by investors, the representatives of the Ministry of Finance even declaring that stable taxation and increased predictability are more important to reduce uncertainty for taxpayers than any discussion of "distributive effects" of taxation.

Therefore, along with no less important problem of high fiscal pressure, a serious problem in Romania is the complexity of taxation and fiscal policy unpredictability. If we want long-term results, it is required both a reduction in taxation, as well as simplifying and stabilizing the tax system.

2. Economic agent's fiscal obligations

According to the Fiscal Code, the tax liabilities of the entity are: corporate tax, wage tax, dividend tax, value added tax, excise duty, contribution to social security, unemployment insurance, health insurance, accident and occupational diseases insurances, guarantee fund to pay salary receivables, stamp tax, buildings and auto taxes. Among these, taxes for certain activities are added: taxes on gambling, the contribution for tourism, advertising taxes, annual different taxes for authorization, licenses, fines, penalties, and delay increases for failure to pay them in time.

According to Law no. 571/2003 regarding the Fiscal Code, as amended and supplemented, we briefly present the entity's tax obligations:

- *Income tax* (16%);

- *dividend tax*. Dividends paid by a Romanian company to another Romanian company are taxed with 16% on dividends. These dividends are not taxable if the dividends beneficiary holds, at their payment date, minimum of 10% of the other legal

persons' shareholdings for a period of two years by the date of their payment inclusively.

 - *income tax*, is 16% and is applied on taxable income corresponding to each source in each category to determine the income tax from: independent activities, salaries, investments, pension, agricultural activities, awards or other sources.

- *enterprises' income tax* . Starting with 1 January 2014, it has been established a maximum threshold of 20% on income from consulting and management for application of the taxation of micro-enterprises. Thus, if the share of revenues from these activities in total income does not exceed this threshold, these companies can apply the income tax regime of microenterprises' revenues. Startups are required to pay tax on microenterprises income starting from the first fiscal year. The tax rate for enterprises' income is 3%.

- *local taxes and other taxes*, which include the following: building tax, land tax, tax on means of transport, registration and vehicle registration fees, taxes for the issuance of certificates, permits and licenses, the tax for use of means of promotion and advertising, tax on entertainment, the hotel tax.

We mention here the case of *contruction tax* due to the introduction from 1 January 2014 of the tax for special constructions, set out in Group 1 of the catalog for the classification and the normal operational periods of fixed assets, other than those for which the building tax is due. Starting with 2015, the constructions tax is calculated by applying a rate of 1% on the buildings' value which exist in the heritage of taxpayers at December 31 the year before. Previously, the construction's tax rate was 1.5% .

- *the VAT* standard rate is 24%; the reduced rate of 9% applies to the tax base for certain services and / or supplies of goods; the reduced rate of 5% is applied to the tax base for the delivery of housing as part of social policy, including the land on which they are built. The land on which the house is built include the footprint of the house.

- *Contributions to the State Social Insurance Budget*

In Romania, all employers and employees, and other individuals, are included in the category of contributors to the the state social insurance system.

Employee contributions

Contributions to the state social insurance (SIC): 10.5%

Contributions to unemployment: 0.5%;

Contributions to social health: 5.5%.

Employers' contributions

Till October 1, 2014, the employers' contributions were:

Contributions for social insurance contribution: 20.8%; 25.8%; 30.8%, depending on working conditions (capped);

The contribution to health insurance: 5.2%;

Contribution for holidays and health insurance benefits: 0.85% (capped);

Contribution to the guarantee fund for payment of wage claims: 0.25%;

Contributions to unemployment: 0.5%;

Contribution for of insurance against accidents at work and occupational diseases: 0.15% - 0.85%, differentiated according to the working conditions.

Starting with October 2014, the employers' social contributions were reduced by 5 percentage points, becoming, depending on the working conditions, 15.8%, 20.8%, 25.8%.

3. Evolution of taxation at the microeconomic level, in the period 2003 – 2014

The evolution of taxation at the microeconomic level is achieved by using a few indicators: labor taxation dynamics, dynamics of profit tax and dividends, the number of taxes and duties.

Table 1

	Labor taxation dynamics
2003	34% for normal work conditions, of which 24.5% employer and 9.5% employee; - 39% for special work conditions, of which 29.5% employer and 9.5% employee; - 44% for particular work conditions, of which 34.5% employer and 9.5% employee. It was envisaged the reduction of social security contributions by 5 percentage points, starting with January 2003, which were added to the reduced 3 percentage points in 2002, given their very high level.

	Labor taxation dynamics
2004	31,5% for normal work conditions, of which 22% employer and 9.5% employee; - 36.5% for special work conditions, of which 29.5% employer and 9.5% employee; - 41.5% for particular work conditions, of which 32% employer and 9.5% employee. It is noted an important reduction of the social security contributions for the employer.
2005	31,5% for normal work conditions, of which 22% employer and 9.5% employee; - 36.5% for special work conditions, of which 29.5% employer and 9.5% employee; - 41.5% for particular work conditions, of which 32% employer and 9.5% employee.
2006	29,15% for normal work conditions, of which 19.65% employer and 9.5% employee; - 34.15% for special work conditions, of which 24.65% employer and 9.5% employee; - 39.15% for particular work conditions, of which 29.65% employer and 9.5% employee. The employers' contributions to the unemployment insurance fund decreases by 0.5%, the contribution of insured persons based on a contract for unemployment insurance is reduced by 0.5% and also the contributions to the state social insurance is decreased by 0.75%. By Emergency Ordinance 158 / November 2005, regarding holidays and allowances for health insurance, was introduced, starting with 1 January 2006, the contribution rate for holidays and allowances, designed exclusively to finance expenditures payment of the rights stipulated by the emergency ordinance, by 0.75%. It can thus be appreciated that taxation on labor decreased on average by 0-1%.
2007	29% for normal work conditions, of which 19.5% employer and 9.5% employee; - 34.5% for special work conditions, of which 24.5% employer and 9.5% employee; - 39% for particular work conditions, of which 29.5% employer and 9.5% employee. The employer's contributions to health insurance decresed at 6%. Contribution to the unique national health insurance fund increased to 0.85%. It was introduced the contribution to the National Guarantee Fund for payment of wage claims of 0,25% applied to the total fund of monthly gross salaries realized by employees. Contribution to the unemployment fund fell to 2% In these circumstances, we can appreciate that taxation on labor decreased by 0.9%.

	Labor taxation dynamics
2008	Beginning with decembre 2008, according to the law 387/2007, the social contributions were: 27.5% for normal work conditions, of which 18% employer and 9.5% employee; - 32.5% for special work conditions, of which 23% employer and 9.5% employee; - 37.5% for particular work conditions, of which 28% employer and 9.5% employee. The employer's contributions to health insurance decresed at 5.2%. *Employee's contribution increased to 6.5%; The employer's contribution to the unemployment fund rose to 0.5% and the employee's increased to 0.5%.* *The employer's contribution to the fund for work accidents increased to 0.4% and is applied on monthly gross income. Taxation on labor decreased by 6.9% (employer's contributions decreased by 3.1% and the contributions paid by employee by 0.5%).*
2009	*Taxation on labor has increased by 2-3% in 2009, compared to 2008.. According to GEO 226/2008, from January 2009 the social security contributions are:* 33% for special work conditions, of which 23.5% employer and 9.5% employee; - 38% for particular work conditions, of which 28.5% employer and 9.5% employee. From February, by the Law 19/2009, the contributions to social insurance become as follows: 31.3% for normal work conditions, of which 20.8% employer and 10.5% employee; - 36.3% for special work conditions, of which 25.8% employer and 10.5% employee; - 41.3% for particular work conditions, of which 30.8% employer and 10.5% employee. Also: - at health insurance, in the period 01.07.2009- 31.12.2009, the contribution is of 5.2%, compared to the value of 5.5% from the interval 01.07.2008 – 30.11.2008 and 5.2% in decembre 2008 - to the National Guarantee Fund for payment of wage claims the contribution is 0.25% - the same as last year; - to the unemployment fund, contribution is of 0.5% in July - December 2009, compared to 1% in the period 01.07.2008 - 30.11.2008 and 0.5% since December 2008 - at Insurance fund for accidents at work and occupational diseases, contribution is from 0.15% to 0.85% in the second half of 2009, depending on the risk category, compared to 0.4% to 2% in 2008.

	Labor taxation dynamics
	- ITM fee - the same 0.75% - contribution for health insurance is of 0.85%, the same as 2008 Employees' contributions are: *- at social insurance is 10.5% in the period july- decembre 2009, compared to 9.5% in 2008* *- at health insurance in 5.5% in the second semestre of 2009, the same as the second semestre of 2008* *- at unemployment fund, the rate is of 0.5% in the second semestre of 2009, the same as the second semestre of 2008*
2010	*Labor taxation remained constant*
2011	The labor taxation reduced, as the ITM commission of 0.75% being eliminated
2012	Labor taxation remained constant
2013	Labor taxation remained constant *Employees contributions:* Contributions to the state social insurance (SIC): 10.5% Contributions to unemployment: 0.5%; Contributions to social health: 5.5%. Employers contributions: Contributions for social insurance contribution: 20.8%; 25.8%; 30.8%, depending on working conditions (capped); The contribution to health insurance: 5.2%; Contribution for holidays and health insurance benefits: 0.85% (capped); Contribution to the guarantee fund for payment of wage claims: 0.25%; Contributions to unemployment: 0.5%; Contribution for of insurance against accidents at work and occupational diseases: 0.15% - 0.85%, differentiated according to the working conditions.

	Labor taxation dynamics
2014	The labor taxation reduced, because of the decreasing with 5 pp of employer's social contributions: *Employees contributions* Contributions to the state social insurance (SIC): 10.5% Contributions to unemployment: 0.5%; Contributions to social health: 5.5%. *Employers contributions:* Contributions for social insurance contribution: 15.8%; 20.8%; 25.8%, depending on working conditions (capped); The contribution to health insurance: 5.2%; Contribution for holidays and health insurance benefits: 0.85% (capped); Contribution to the guarantee fund for payment of wage claims: 0.25%; Contributions to unemployment: 0.5%; Contribution for of insurance against accidents at work and occupational diseases: 0.15% - 0.85%, differentiated according to the working conditions.

Source: Assessment of the general situation of SMEs in Romania, NCSMER Report, 2004-2014

If during the period 2004- 2008 taxation on labor decreased, in 2009 it has increased, especially due to the increase in social security contributions, both to the employer and employee. The year 2014 brings a labor taxation reduction by 5 percentage points, due to the decrease of the employer's social security contributions.

Table 2

	Profit tax dynamics
2003	25% Taxpayers engaged in night bars, clubs, nightclubs, discotheques, casinos or sports betting and the profit tax due for nightclubs activities referred to in this Article is lower than 5% of those revenues are required to pay a tax of 5% of such revenues earned.
2004	25%
2005	Introduction of the flat tax of 16%

	Profit tax dynamics
2006	16%
2007	16%
2008	16%
2009	16% In 2009 the minimum income tax was introduced (companies will continue to pay a tax of 16%, but not less than the minimum limit). Enterprises' income tax rate is 3% in 2009 compared to 2.5% in 2008. If the microenterprise's tax due is less than the annual minimum taxthey are obliged to pay the tax at the level of this amount.
2010	16%
2011	16%
2012	16%
2013	16%
2014	16%; we mention that firms may opt for a fiscal year different from the calendar year

Source: Assessment of the general situation of SMEs in Romania, NCSMER Report, 2004-2014

It notes, according to the table, that the 16% profit tax has remained constantly throughout the period 2005-2013, but in 2009 is introduced the minimum tax, which will be removed a year later, but had a negative impact on the sector SMEs. To mention that in 2014 it is introduced the regulation for exempting tax on reinvested profit. Exemption from profit tax related to investments is granted in the limit of the profit tax due in that period.

Table 3

	Dividend taxation in the period 2003-2014
2003	5% for individuals; 10% for legal entities
2004	10%
2005	10%
2006	10%
2007	10%
2008	10% or16%

	Dividend taxation in the period 2003-2014
2009	10% or 16%. Reinvested dividends beginning with 2009 for the purpose of maintaining and creating new jobs for the development of the activity of Romanian legal entities who distribute dividends, according to their object of activity registered at the National Trade Register, are exempted from tax on dividends. Are exempted from the tax on dividends and dividends reinvested in the social capital of another Romanian legal entities, in order to create new jobs, to develop its business, according to the activity object enrolled at the Trade Register Office.
2010	10% or 16%
2011	10% or 16%
2012	Constant
2013	16%
2014	16%

Source: Assessment of the general situation of SMEs in Romania, NCSMER Report, 2004-2014

The dividend tax remains constantly during the analyzed period (10% -16%), excluding reinvested dividends starting with 2009, in order to maintain and increase new jobs for the activities development of the Romanian legal entities who distribute dividends, which are exempted from its payment. Starting with 2014, dividends received from a Romanian firm or from a resident company in a state with which Romania has concluded a convention for avoiding double taxation are not taxable, if the beneficiary owns at the time of their payment 10% of equity securities of the other legal entity for a period of one year, accomplished by the date of their payment inclusive. (PWC, 2015, "Taxation in Romania. Pocket edition").

Table 4

	Dynamics of taxes and dues
2003	It was intended to gradually reduce the tax burden and especially the labor taxation, namely the reduction of social security contributions by 5 percentage points starting with January 2003; reducing the development tax included in electricity tariff by one percentage point, in order to reduce production costs in that sector; gradually increasing the the profit tax rate for profit related to the

	Dynamics of taxes and dues
	export revenues, towards the standard rate; increasing the excise duty according to the schedule to achieve the tax rates gradually, towards EU standards.
2004	It was intended to further reduce labor costs, by decreasing rates of social insurance contributions; 9% VAT reduction for some products and services, from 2004; applying the standard rate and the profit related to the export activity; gradual increase of excise duties on petroleum products, tobacco and alcoholic products based on the schedule in the process of accession negotiating to the European Union;
2005	The number of taxes rises by increasing taxes, introducing new taxes, growing excise, energy price increases, increasing the tax base. Tax on interest increased to 10%; there are introduced new excise: for electricity, natural gas, fuel oil; tax for real estate transactions made by individuals; tax for agricultural land; tax on income from agricultural activities increased from 15% to 16%; normal VAT for medicines; there are introduced special VAT schemes for farmers, tourism, works of art, antiques, second hand goods, goods sold on consignment and pawn system; VAT is introduced for individual farms; is introduced VAT for the sale of licenses for films; it is removed the exemption with deductibility for the construction of churches; Is introduced VAT on the supplies of goods and services made by detainees; VAT is introduced for research activities and development
2006	The number of the most important taxes paid to the state budget remained unchanged
2007	It increased the amount in the case of taxes (excise duty on beer, cigarettes, fuel oil, leaded petrol, taxes on vehicles, etc.) or declined for other taxes (excise on green coffee, roasted coffee, etc. to). In terms of the number of taxes, it grew, new taxes being introduced, such as special tax for cars and motor vehicles.
2008	The number of taxes of the Fiscal Code has remained constant. There are no definitive official statistical data on the number of non-tax levies
2009	According to the information provided by the government, that have been reduced, canceled or merged 119 taxes and tariffs,

	Dynamics of taxes and dues
	thereby the number reaching 300
2010	Starting with 1 July 2010 there are introduced new taxes: - income as interest on deposits / current accounts, as well as customer deposits are taxed with 16% of their value. The following revenues are taxed at a rate of 16%: - present tickets - nursery tickets, granted by law - holiday vouchers granted by law; - amounts representing compensatory payments calculated on the basis of average net salaries per unit, received by people whose individual employment contracts were terminated as a result of collective redundancies according, to the law and the amounts representing compensatory payments, calculated on the average net wage per economy, received by civilian staff of the national Defence, public order and national security on termination of labor or service, as a result of reductions and restructuring needs, granted by law; - amounts representing compensatory payments calculated on the basis of net monthly salaries, granted to military personnel passed into reserve, or whose contract is terminated as a result of reductions and restructuring and aids determined in relation to the monthly net salary, accorded to him to transition in reserve or directly in retiring with pension entitlement or who do not qualify for pension and benefits or compensation received by police officers in similar situations, whose amount is determined in relation to the basic monthly net salary net, granted under the relevant legislation, become taxable beginning with the rights corresponding to July 2010. Also, from 1 October 2010, the minimum tax is eliminated.
2011	Number of taxes and fees still remains increased with 5 (those introduced in July 2010)
2012	It remained constant
2013	Increased, by introducing new taxes and dues
2014	Increased, by introducing the special construction tax („pole tax") and the increased level by 7 eurocents for excise duties and implicitly changing the formula used to calculate them

Source: Assessment of the general situation of SMEs in Romania, NCSMER Report, 2004-2014

The number of taxes and fees has declined significantly in recent years, reaching a figure of 14, according to the Doing Business 2015 report, prepared by the World Bank and PriceWaterhouse. We hold the position 52, compared with the previous year, when we placed on position 128 of 189 countries surveyed. The biggest problem continues to be the labor taxation. Of the 159 hours required to pay taxes, 80 hours are consumed for social security contributions and 54 for VAT. At the same time, social contributions represent 23.5% of total tax rate of a company, which is about 43.2%.

4. Small and medium enterprises in the period 2008-2014

In the period 2008-2011 of economic crisis, SMEs recorded an accelerated decrease, fact that determined the tax regime instability, changing social environment, rising inflation, enhancing the activity of underground economy, the existence of a banking system reticent to lending to small firms etc.

Below, it is presesnted the comparative evolutions on the registrations (R), suspensions (S), deletions (DL), dissolutions (DS) and total exits (E), for SMEs, in 2008- 2014 (see Table 5).

Table 5

SMEs situation during 2008- 2014

Year	(DL)	(R)	(S)	(DS)	(E)	Dynamics $(R - E)/R$ (%)
2008	17676	144239	12019	3762	33457	+76.8
2009	43713	111832	134441	30105	208259	-86.2
2010	186144	119048	66420	8191	260080	-118.5
2011	73244	132069	21086	11660	106125	+19.6
2012	71746	125603	24078	22500	118324	-5.8
2013	80786	124816	22079	23208	126073	-1.0
2014	63798	88103	13471	15344	92613	-5.1

Source: Trade Registry Office Reports, 2008-2014

Therefore, the population dynamics of enterprises in 2008-2013 was marked by a series of turbulence, caused mainly by installing of the economic crisis, with extended effect up to the present moment. The series of successive positive increases in the number of registrations of new companies, which occurred until 2008, stopped abruptly in 2009, as the effect of economic and financial

crisis, and the values recorded subsequently did not enrolled on a clear development trend.

The dynamics of registrations in the period 2008-2013 is marked by several inflection points: in 2008, when from the maximum number of 144.239 firms registered, it has dropped to a minimum of 111.832 in 2009, followed by resumption of growth of registrations till 2011 to a number of 132.069 and again to successive decreases in 2012 and 2013, up to 124.816 registrations.

This fluctuating dynamics, with negative tendencies, in the number of startups registered, within a relatively short reference interval, suggests the instability of the business environment, at least in the segment of startups in the initial stage of entrepreneurial activity. As shown in the table above, the downward trend in new firms registrations has doubled, simultaneously with the cumulative increase in the number of suspensions, dissolutions and deletions, according to the to NTC statistics from 2009-2014.

The evolution of population growth calculated every year (2008-2014) gives a revealing indication about the evolution way of enterprises population legally registered in Romania. Thus: from an increase of + 76% in 2008, the values decreased to a very minimum of -118.4% in 2010, being slightly improved in favor of new registrations in 2011 (19.6%) and then regressing successively in 2012 and 2013 and the first 10 months of 2014, up to - 5%.

The negative effects of this extended phenomenon and amplified in the first 10 months of 2014 seriously affected on long-term SMEs population and jobs in Romania, but also the innovative and creative potential of startups, which was generated by them in any economy.

The impact of the crisis could explain up to a point the paradigm shift of perceptions and attitudes against the entrepreneurship manifested in the Romanian society in recent years. But opportunity factors, as free access to the single market, to cooperation networks and to the European Union resources and especially the large number of programs and projects with related financial allocations, addressed to the objective of promoting the culture and entrepreneurial education, should have been in counterweight.

5. The main obstacles faced by entrepreneurs and tax proposals for the development of business

According to the report prepared by Ernst & Young, "Entrepreneurs speak. Romanian entrepreneuship Barometer 2015", the most important obstacles in starting and developing a business in Romania are the aspects of fiscal nature: unpredictability of regulations, complicated system of fiscal requirements and regulation, the level of taxes, bureaucracy, the attitude of the local or central fiscal authorities against the taxpayer.

Also, entrepreneurs mention among the shortcomings they're facing with: lack of fiscal predictability, lack of qualified human resources, lack of interest for entrepreneurs within the local and central administrations, the public policies lack of vision, lack of business incubators, of financial resources or entrepreneurial education.

Basically, the authorities is necessary to focus more deeply on the tax system to help development of entrepreneurship in Romania through measures as reducing administrative costs and corporate compliance, simplify complexity of the legislation, especially for small enterprises, with poor resources, and lowering the tax burden, especially for start-ups.

Other targeted measures in taxation and bureaucracy concerns: reducing VAT, a better tax collection, fiscal facilities for start-ups, a tax code that would not change for 5 years, simplifing the SMEs accounting, reducing the number of fiscal controls, adopting an entrepreneurial law, the correlation of the provisions of various normative acts, state administration officials to be penalized in the event of obstruction the business activity, a single office for starting a new business, e-government.

A solution, especially for young entrepreneurs, consists of online information and educational resources of the entrepreneurs in complying with the requirements of the Romanian state. These online resources, as the single office online for the creation of firms, would further simplify the processes of opening and managing start-ups, leaving more time to shareholders to focus on defining products and services, winning their first customers and optimize business processes.

Many times, when discussing about taxes, the conversation is focused on the tax level, but the most pressing problem for entrepreneurs is the their complexity. According to a survey

conducted by Thumbtack, owners of small companies in United States consider the level of the taxes complexity and of compliance costs a better indicator for measuring how friendly the state is with entrepreneurs, than the level itself of the paid taxes . The 159 hours / year that a new company must spend in Romania, according to Doing Business report, to navigate through the tax system, is actually a decrease in productivity for that company.

Also in the United States, according to the Small Business Administration, compliance costs for a small firm are 206% higher than for a large firm, which has significant resources to comply with the Tax Code. Such a calculation, in Romania, has not yet been realized.

Regarding tax simplification in Romania, we refer to the the payment of VAT, which may create administrative difficulties and cash problems to small and growing firms. Therefore, some countries have taken steps in this regard, including Romania, where VAT may be paid to the state to receivement.

Starting with 1 January 2014, companies with turnover below 2.250.000 Ron (500,000 euro) have the possibility to opt for this scheme or normal system, depending on how they want to operate. Also, we have a real VAT on receipt and not a deferred one, being removed the 90 days period after which the VAT becomes chargeable, whether or not the amounts are received.

Also, the firms with turnover of less than 35.000 euro per year in Romania is applicable a simplified accounting system, with a reported structure more easily to drawn.

6. Conclusion

The purpose of this article was to highlight the multitude of tax provisions in the period 2003-2014, emphasizing the aspect that contributed to fiscal unpredictability in Romania. The frequency with which changes of Tax Code were undertaken demonstrated the lack of predictability and stability of the fiscal framework, investors being often placed in the position to reconsider their plans in the medium and long term, literally for fiscal reasons, rather than business .

Moreover, for many of these changes there was a very short time between the moment of publication and the entry into force of the new provisions. The direct consequence was an increase in the tax system complexity and compliance costs for fair taxpayers.

Essential components in terms of the attractiveness of the business environment, predictability and fiscal stability, were affected by the multitude of changes in the legislation. It is well know that the interest of foreign investors for the development of local business is closely related to ensuring a favorable investment climate and implicitly to modernize the tax administration and the relationship between tax authorities and taxpayers.

Strengthening the taxes and duties in Romanian tax system should be the main concern for the authorities to ensure predictability for any business and the economy as a whole. If things are simple and focused on income and not on the modality of its achieving, it will increase firms voluntary compliance. We believe that one way that may be used is simplifying the system of taxes based on a ranking of " costs involved versus collection made".

Also, lately the trend has been to move the tax burden from direct taxes towards indirect taxes, especially VAT. This may be balanced somehow by reducing the VAT to products "Made in Romania", so as to be sustained domestic production and consumption. For example, the import of vegetables and fruits has a considerable weight, therefore a reduction in VAT to domestic goods would result in a price competitive for them and to be preferred by consumers, with all the benefits that follow for the economy, the private sector and, not least, the population health.

In conclusion, we need a radical reform of the taxes system, through programs that provide simultaneously significant increasing of revenue to the state budget, decrease of administrative costs and stimulating the economic growth by supporting the business environment.

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AN EMPIRICAL STUDY OF RELATIONSHIP BETWEEN SHARE PRICE AND INTRINSIC VALUE OF COMPANY

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Abstract

A company price should be determined by value. Value can be calculated by different valuation method. Investors need to understand the valuation method usage and calculation. In fact, there is no one-valuation method to estimate value of companies. Valuation can be related with the companies' price. Comparable valuation can show signals of companies in different positions. Hong Kong companies in different industries may suffer from different factors. Different valuation method is estimation in different situation or data source to transfer as value of companies. Valuation and share price become supportive relationship and explanation of companies' value. Ten valuation methods can be summarized as typical approaches. There is a simple analysis for different type valuation to have different effect on share price and companies valuation. Also, the research mentioned that valuation is related to share price. The relationship can be a signal for companies and investors' trend study or business analysis. Also, research summaries residual difference with ten valuations, correlation for valuation and share price and regression model for valuation and share price. The research can base on different testing to carry out conclusion and finding on valuation application and share price. Hong Kong Thirty companies from 2006 to 2010 can be tested for research purposes.

Keywords: intrinsic value, finance, valuation, share price

JEL Classification: G1, G2, M4.

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1. Introduction and Background of the Research

People always decide how to spend our money in daily life. They always compare the price and valuation of everything because they want to make a good decision. After 2008 financial tsunami, the stock price decreases very much. Investors will think more and carefully about value of their investment. Value and price are useful for many stakeholders of company. Their relationship can make clear the company position in the market. Intrinsic value represents an analytical judgment of value based on the perceived characteristics inherent in the investment and amount that an investor considers, on the basis of an evaluation of available facts. (Pratt and Niculiță, 2007) All stakeholders will try to compare the price and intrinsic value of company. Company may base on intrinsic value to adopt policies to keep good position because companies have undervalued or overvalued in the stock market. Whenever any company goes public, it is very difficult to judge how much investors will be prepared to pay for the stock. (Brealey, Myers and Allen, 2010) Company cannot always base on share price to determine value of company. Therefore, a detailed study on relationship between value and price is important for people to decide investment.

Value is a certain measure of performance because it takes into account the long-term interests of all stakeholders in a company (Koller, Goedhart and Wessels, 2010). Price can provide message to different users. They can trust price in an efficient market because all information reflects in price and no more valuable information can be used for any gains. Price come from the point that buyer is willing to pay and sellers is willing also accept but the competition is allowing at the price point. Investor and other stakeholders will plan their investment action and decision for the future. People will get information from different valuation approach for their decision and judge for any mispricing. That's mean there is an opportunity to gain from mispricing. The reason is that information valuation difference or expectation difference can make people to gain for investment decision in market.

1.1. Statement of Aim and objectives

The study starts from stock mispricing. Price mean expectation of certain investors and implies valuation of company. When people have different expectation on company, the price will differ. The different valuation approach will get different result

because of capture of different kinds of information. Therefore, mispricing will make different between valuation and price. The study will select the common approach for valuation estimation and compare with share price. Then, different approaches in the testing can explain price and compare with price. Testing can provide more information from price and valuation.

The study refers to National Association of Certified Valuators and Analysts (NACVA) to summarize objectives for the misprice of company:

1. Review of application of the valuation approach and price;

2. Review of valuation approaches and explain approaches application to estimate the price of Hong Kong companies;

3. The research adopt residual difference to select valuation approach to compare with share price and relationship of price and valuation;

4. Formulation of a mathematical model to capture the price of the companies from a group of valuation method;

5. Summarize the relationship between share price and companies value;

6. Summarize the limitations in the research and make recommendation or improvement for the further investigation to foresee company valuation.

1.2. Problem Statement and reason for research

The main problem statement in the research is "what is the relationship between price and valuation for company?" People would like to know how to estimate the price of company in the market. The study will make a suitable valuation method to estimate valuation of company and compare with price. (Fernandez, 2002) Also, the price and selected valuation method will be concluded their relationship of company. The selected companies valuation and price will be overseen to support conclusion.

The research review summarizes the major components for the valuation and price in our research. In fact, there is no one-valuation method to fulfill all need for different users and purposes. The research will review different valuation method and find out suitable grouping for selected methods including in our components for the model. The research should maintain conclusion for model for estimation of price and valuation. Also, the research will explain relationship between value of companies and price.

2. Literature Review of Valuation approaches

The study will base on different information to review the valuation approach and point out brief definition, usages and application of different approach application. Fundamental analysis is the method of analyzing information in current and past financial statements, in conjunction with other firm specific, industry, and macroeconomic data to forecast future payoffs and eventually arrive at a firm's intrinsic value because of mispriced stocks for investment. The research separates three difference approach including income approach, asset approach, and Market-based approach. There is some common method for company valuation estimation. (Torrez, 2006) The testing will conclude the result from each valuation method from income, asset and market value method.

Income Approach

The income approaches determine fair market value by selected company times a discount or capitalization rate. The most correct method for a going-concern operating company. Company keep to continue their business and their income is stable. Income should be their valuable resource. Smaller companies are difficult to project future earnings and set up an appropriate discount rate. Stable and sizable companies can be easier to estimate their earning power to transfer the business valuation.

Discounted cash flow method (DCF): It emphasizes on peer companies with matching payout, risk and growth characteristics but less reliance on current market valuations Also, it focus on the full-information estimation of free cash flows over a multi-period, the choice of an appropriate finite horizon, estimation of growth beyond the horizon, and in its standard implementation, estimation of an appropriate weighted average cost of capital (*WACC*). If riskier firms are harder to forecast, *DCF* will have higher forecast residual difference because the research cannot capture the value of risk easily. *DCF* more frequently value small firms. However, high-risk firms, loss making firms and firms with a limited number of industry peers will be difficult to get information for valuation. (Demirakos, Strong and Walker, 2009) An ideal constant growth rate of cash flows is defined for no opportunities for extra-profitability in the long-term. An ideal growth rate shows the asymptotic equivalence between profitability and cost of capital and the determination of ideal target prices that respect the long-term steady-state assumptions. They get

a sample of 784 equity reports for European companies in the period 2003-2005. (Cassia and Vismara, 2009)

Many people apply this method to estimate company valuation from internal figure and not including market effect. It is common method for people to know the company valuation even it is not completely accuracy. It can be easy and worthy to have a preliminary valuation and appropriate valuation method on companies for research. (Berkman, Bradbury, Ferguson, 2000).

Dividend discount models (Gordon Growth Model) (DDM): A model determines the intrinsic value of a stock and bases on a future series of dividends that grow at an annualized constant rate. It can determine value by growing dividends at a constant rate for an infinite period if a stock is mispricing in the current market. Stock market prices from as dividends is very substantial with the bivariate *DDM*. (Jiang and Lee, 2005)

Residual income valuation (RIV): The intrinsic value of the firm has two components: The current book value of equity, and the present value of future residual income. Residual income model is more useful and meaningful because accounting earning and book values can bring more information than dividend. (Jiang and Lee, 2005) Asset returns can be predictable by accounting value. (Lee, 2006). Performance and return of company can generate company valuation. A firm's intrinsic value by an expectation of future earnings using future stock returns estimates (Barniv et al., 2010) Also, valuation should include relative costs, cost leadership, industry demand conditions, and the information content of sales for capital expenditure. (Walker, Wang, 2002) There are difference between actual share price and estimate of share value from risk-free rates of return because of both systematic risk and total volatility in residual return on equity. (Baginski and Wahlen, 2003)

Arbitrage Pricing Theory (APT): The expected return of a financial asset can be treated as a linear of various factors, where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. The researchers Beenstock and Chan test UK securities market and review US market by APT, they conclude that systematic risk should be priced. A firm's risk means its value and ability to develop business. (Beenstock and Chan, 1986) Value of risk can be important valuation part of companies.

Capital Asset Pricing Model (CAPM): A model relates an expected profitability of an asset in a certain market and equilibrium

with its undiversified risks. (Filho, Garcia and Imoniana, 2009) It is good for calculating the cost of equity since it takes into consideration the business level of systematic risk relative to the stock market. It is not possible to test the *CAPM* by a "true" beta. No precise method for calculating the beta and the market risk premium. (Hickman and Petry, 1990) < Beenstock and Chan 1986> test *CAPM* and *APT* in the context of the UK securities market. Tests of *CAPM* model were very disappointing. More and more people feel *CAPM* not get a good result for the valuation. (Beenstock and Chan 1986)

Market Approach:

It is useful when it attempts to apply actual public valuations to value a similar company. The value of business in the economic rationale of competition affect directly by a free market means the demand and supply.

Investment Models / Tobin's q Model (TQM): The model bases on efficient capital markets and perfect information. No one can gain because they equally access to capital markets regardless of risk, therefore the amount borrowed and the cost of capital will only differ because of investment demand. The ratio of the stock market value of the firm to its replacement cost (*Tobin's Q*) should be a sufficient statistic for investment. (Bond et al., 2004) Fixed investment depends on Tobin's q measured by the output capital ratio. (Franke and Semmler, 1999) Ownership positively related to firm value. (Wei, Xie Zhang, 2005) The quality of control directly affects firm policies and value.

Guideline Publicly Traded Company Method (GPT): Company valuation can base on stocks prices of similar companies in a public market, a publicly traded equivalent value. Company marks as market valuation. If companies are in same industry, normally structures are similar. Company valuation can refer other similar companies' value and other companies' actual price in public market.

Guideline Merged and Acquired Company Method (GMAC): The valuation is actual transactions of comparable companies, a valuation reference for investment decision. Buyer or injectors will partly acquire company and offer the price.

Asset-based Approach

Value of companies is liquidated by tangible assets or high quality balance sheet, business book values that are similar with fair market values. Good presentation on asset and liabilities can represent the position of companies and value at the date.

Tangible Book Value (TBV): Intangible asset is estimation or difference for pricing of company. It base on a company position and ability. If a company's development tend to be worse, intangible assets will be useless. Tangible valuation means book value deducts from intangible assets.

Economic Book Value (EBV): An analysis adjusts the assets to their market value. Such as, goodwill, real estate, inventories and so on. That's mean book value mark to market. It base on company's property to count the value by market trading price.

The Capitalized Excess Earnings Method (CEE): A procedure generates value from net tangible assets that subtracting adjusted liabilities. Also, calculate the excess earnings from the total business earnings and the net tangible assets. (E.g. goodwill) A company values its future and its ability net tangible asset.

Asset Accumulated Method (AAM): According to balance sheet format, fair market value of all business assets, both tangible and intangible is determined and contingent liabilities. It also includes some off-balance sheet assets including intellectual property items, customer contracts and so on. However, unrecorded liabilities are difficult to value for a company in normal position. When company is allocated to the purchase price, unrecorded liabilities can be treated as a realistic value. This requires expertise in valuation standard and method.

3. Empirical Methodology

According to study, the research should set up a model to estimate a share price and a model to apply intrinsic value of company for relationship with share price. Then, the relationship between share price and intrinsic value of company can bring investment signal or deeply business analysis. The model should consider different valuation approach as the followings:

3.1. Data Sources

Stock price: Price comes from Hong Kong public market for the selected companies' year ended at the date. Also, each company also refer similar company price to estimate value. The closing prices as at year ended are used for comparison and data analysis.

Financial record: The research review selected companies' financial figure for valuation. E.g. cash, asset, liabilities, net book value or other contingencies value. The research bases on different valuation method to collect financial data. Valuation methods need to

collect different financial data in different year ended. All financial data come from relevant companies' website and investment website.

Interest rate: Data subtract from discount window rates - Hong Kong Monetary Authority (HKMA). Also, company bears different interest rate on their deposit or debts. Hence, the research base on financial report to define interest bearing. Present value and market risk will affected by this factors.

3.2. Process and design of testing

Data collected and hypotheses setting by researcher. The research assumed the null hypothesis (H_0) to be true, alternative hypothesis (H_1) represented to reject the result of sample to the population. The importance of the research hypothesis as a method of organizing inquiry was obscured. (Shields and Tajalli, 2006) In this research, the hypotheses were defined as followings:

H_0: intrinsic value of companies are positive affect to the to share price

H_1: intrinsic value of companies is not positive affect to share price

The research bases on different nature on the study to define the following point:

1.   Relationship between share price and valuation and Comparison valuation with share price;

2.   Suitable valuation method to estimate companies value and price;

The testing for different valuation method separates following parts:

Part A: Share price and valuation explanation analysis

Residual difference: absolute value for difference between each valuation and share price. Correlation of valuation and share price: relationship of share price and valuation itself.

Part B: The precise of valuation method for share price by approach type

I) The importance on each method for each approach;

II) The importance on different approach on testing by income, market and asset approach.

To use testing (T-test and F-test) prove effectiveness of each valuation with share price.

Part C: a model for intrinsic value of companies and the trend explanation for model and share price. To build up a model explain and estimate share price of companies.

All methods in testing were selected and normally apply in valuation. Also, there are many valuation methods in real. Research mentioned common valuation in real for further study and testing.

The research should compare each company valuation to know the approach effect. "Comparability" is valuation study's base requirement. In this study, population referred to valuation of all companies in Hong Kong. "Feasibility" also becomes our study criteria. It is impossible to conduct whole testing on all companies' valuation. The sample should be set greater than 30. The testing conducts for 30 companies. In order to know different condition and more precise on estimation value on selected companies. The data is collected from 2005 to 2010. Therefore, the sampling becomes larger. Therefore, the sample size was determined as 150 valuations in this research.

To fulfill the target, the research should select different industries companies. Then, the data will cover different structure companies and capture different effect on valuation method. Hence, 30 companies for 5 years should be tested by research. The data in five year can show different status of companies. The valuation result also can provide different kinds of economy effect. Also, the testing needs to find most suitable approach to company. The research should apply further testing on different analysis and all of approach on the finding.

3.3. Data Collection and Calculation

The testing includes 30 (15 pairs) Hong Kong listed companies' data to test different approaches for 5 years data analysis (2006 to 2010). Every two companies are same industry. It is easy to know different effect of valuation approach for same industry company. All data are made as the following treatment for valuation calculation. The research applies 5 years data of 30 same companies because there are different situations of companies. Valuation can easily conclude the result on completely view. Also, data collect as at companies' financial years. It reduces any timing difference problem. All data can be stated at the same point and disclosed more. The testing compares share price with each valuation. There are some conclusions for method selecting, analysis, trend study and so on.

Discounted cash flow method (DCF): The research bases on cash balance to discount all value as at year 2010 by discount Window rates from HKMA. Also, the discounted cash value will add share capital par value in total value because cash flow balance only shows the operation abilities of companies. Par value means the share original value. Hence, total value becomes more reliable.

Dividend discount models (DDM): The value comes from dividend by different between dividend growth rate and *WACC*. Dividend growth rate is equal to return on equity and Plowback ratio.

Residual income valuation (RIV): Retained earnings are discounted as present value by *WACC* at year 2010. Also, the value adds on book value on the total value. It is an income approach to estimate value of companies.

Arbitrage Pricing Theory (APT): The total amount includes interest from HKMA and the interest bearing from the company bearing. That's mean the company bears interest from bank deposit or loan. It value company market risk free cost and interest bearing for their business.

Capital Asset Pricing Model (CAPM): The research applies difference for market returns, price of Hang Seng Index to calculate "E (Rm)". Beta comes from difference of companies' return and difference of market return. The value bases on market returns and companies returns to estimate value.

$$E(R_i) = R_f + \beta_i \left(E(R_m) - R_f \right)$$

Tobin's q Model (TQM): The research summarizes total price including share price and quantities and net book value of companies in this method. This method marks companies' value as market price.

Guideline Publicly Traded Company Method (GPT): The Company value mark as market value that come from similar company's share price and base on company book value to mark as market value. The pricing of other companies in same industries is applied to estimate companies' value.

Guideline Merged and Acquired Company Method (GMAC): This method will not apply in the research since the data is not comparable. "Comparability" can be standard of the research. There are not all of companies to mark this valuation method. When the companies get merged or acquired by others, companies' value will be offered. However, the value should be partly component in companies or offered at specific time. The value cannot be applied in

different years or some companies that did not get any offered price. Also, the offered price can be judged as objective or not because the price may not be fair value of companies.

Tangible Book Value (TBV): The amount deducts intangible value of companies. However, if the company did not have any intangible part, value equal to net book value. However, the amount still can apply because no intangible part mean book value accompany with relevant from physical event and not estimation.

Economic Book Value (EBV): This method marks all balance value as market. It is difficult to define all market value of balance sheet components. There is no objective standard to judge value for liabilities and intangible asset. Also, research is limited source to review value and adjust a value.

The Capitalized Excess Earnings Method (CEE): The value comes from net tangible assets that subtracting adjusted liabilities. There is same situation for EBV. It is lack of information to make adjusted value for liabilities.

Asset Accumulated Method (AAM): It will include all unrecorded items. For examples, contingency liabilities and any leased income and expenses. Therefore, valuation can be included future information and increase value of instable.

3.4. Data Analysis

Mispricing can vary companies' valuation from many methods because the result of testing can support relationship between share price and valuation. Share price can be supported and explained by valuation. Valuation from different source can show share price suffer from different factors or different situation. Share price should be undervalued or overvalued if the share price cannot have evidence to link of them.

Part A: Share price and valuation explanation analysis

Residual difference with share price**:** This major objective focuses on the different valuation method and approach to explain share price. It is simple analysis for different valuation method and companies. This analysis bases on difference between valuation result and share price. The negative or positive difference per share price can show residual difference, simple trend of result of valuation. Firstly, research assumes absolute value of the residual difference because the testing purpose is explanation from the valuation for share price. Different mean overvalue or undervalue of companies.

Both of them also reduce explanation of share price. Therefore, absolute value is easy to have a trend analysis for different valuation. The residual difference separates six level by each 20% from the least "below 20%" and the worst "over 100%". Range setting can be analyzed valuation trend with share price. It is simple and preliminary study of companies' value.

Correlation of valuation and share price: In this part, the research adopts correlation between share price *(Y)* and other valuation method *(X$_1$)* to *(X$_{10}$)*. Higher Coefficients of *X* mean become higher relationship with *Y*. The testing base on price and each valuation result to set up a correlation by Microsoft excel. Also, this testing can compare with each valuation because correlation of each valuation. It is easy to estimate different trend of different approach. The trend can show different methods in each approach and result of different approaches.

Part B: The precise of valuation method for share price

I) The importance on each method for each approach.

II) The importance on different approach on testing by income, market and asset approach.

The analysis applies t-test and f-test for each valuation with share price. The hypothesis testing set up purpose as price and valuation are same direction. Hence,

H$_0$: intrinsic value of companies are positive affect to the to share price

H$_1$: intrinsic value of companies is not positive affect to share price

This is a two-tail t-test and the reject regions are below:

T > *T $_{α/2}$* or *T* < *T $_{1-α/2}$*

Also, one-trail f-test is adopts and the reject regions are below:

F > *F $_α$* ,or *F* < *F$_{1-α}$*

Testing can show feasibility of each valuation. The result can show the suitable valuation for estimation of share price. Also, the components of model can be determined.

Part C: a model for intrinsic value and share price

The research bases on all valuation method to set up a model to explain the relationship for all valuation method and share price. Also, another model can be made by elements from previous testing result. The model can show us the importance of each valuation and

explanation of price. Two models can compare different valuation method explanation. Therefore, the model can explain relationship between share price and all valuation methods.

The multiple regression line:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} \,,$$

where:
Dependent variable *(Y)* - share price of relevant companies;
Independent variables *(X)*:
Discounted cash flow method *[DCF (X_1)]*
Dividend discount models *[DDM (X_2)]*
Residual income valuation *[RIV (X_3)]*
Arbitrage Pricing Theory *[APT (X_4)]*
Capital Asset Pricing Model *[CAPM (X_5)]*
Tobin's q Model *[TQM (X_6)]*
Guideline Publicly Traded Company Method *[GPT (X_7)]*
Net book value *[NBV (X_8)]*
Tangible Book Value *[TBV (X_9)]*
Asset Accumulated Method *[AAM (X_{10})]*

3.5. Limitations for research

The incorporation of foreign firms: The incorporation of foreign firms with different accounting and regulatory standards raises complications. Data need to be arranged at the same presentation and comparable form. Also, companies in different countries suffer from different factors. Valuation cannot be analyzed at the same situation. Any fluctuation can be occurred and affected in different factors from different countries. If companies locate in same country, valuation can be easily summarized a conclusion. Such as, economy or government regulation and so on.

Special events: Some matters suddenly occur and factors should be known. Such as financial tsunami or financial crisis. However, it is no any adjustment on valuation because the research base on raw data to estimate value. The analysis can be affected from raw effect. Also, any factors effect on share price and valuation are not same. Unadjusted value can show actual difference from all factors for price and valuation.

Sample size: Researcher cannot adopt more samples because limited resources. The sample can be accessed limited to 15 industries for estimation for 5 years data of 30 companies. Research

adopts 5 years because data can be included different situation of companies. Users need to compare more valuation and data source of each valuation. "Feasibility" and "comparability" need to be considered by users. Not all valuation can apply in real because valuation method can be applied in all companies. Limit of "feasibility" and "comparability will reduce valuation testing reliability.

Data disclosure for listed companies: The research adopts for listed companies because the data can be collected in public other than private companies. However, for companies' valuation comparison, private companies and listed companies comparison should be more informative. Also, the sizes of companies can also alternative analysis for valuation by listed or private because sizable companies will face different resource problem and factors. Size of companies affects the cost, income, and human resource. Therefore, valuation becomes more complex and valuable for comparison.

4. Research Findings and Analysis

Before showing testing result, a model including all valuation can be generated (Table 1, Annex).

The R square shows that 95.41% and intercept is –0.549 only. Hence, that's ten valuation can explain with share price closely. Therefore, the testing is performed and major valuations are selected to explain for share price.

Findings in Part A: Share price and valuation explanation analysis

Residual difference calculation: The testing generates residual difference from different valuation with price. In order to simply result of residual difference, the testing set out total six ranges for ranking. The research selects 30 companies for valuation calculation comparison from year 2006 to 2010. There are 150 testing results for residual difference. If valuation explains better for price, the ranking percentage becomes less. The least residual difference implies that relevant valuation method can estimate price easily (Table 1a, Annex)

It is a brief testing on the valuation method. In order to be objective and reliable, tangible book value and Asset Accumulated Method will not include in our testing. They adjust net book value to a new valuation. The testing also can state that their results are very similar nature. There are no material effects on the result to omit them in research. No testing result occurs within 20% to 40%. Most valuation method based on historical data to estimate value of

companies by different source. Historical data may not estimate any occasional events on share price or other unpredictable factors. Hence, the result becomes not precise. (Residual difference >40%) The valuation method can estimate price easily within 20% residual difference. Therefore, residual difference from 20% to 40% may not exist for testing.

Residual difference below 20% for valuation is much precise. From table 1a and 1b, testing result is 29% of total sample in below 20% residual difference. That's all ranking occupied largest percentage. According to result, research can select suitable method to explain price. Some element in this group can effectively explain the price because of ranking percentage. When residual difference of valuation method is over 29% in below 20% residual difference, explanation of valuation with price is better than total. Residual difference of *DDM (X_2)*, *TQM (X_6), GPT (X_7)* and *NBV (X_8)* are 43%, 37%, 33% and 39%. All are over 29%. Therefore, the precise of share price estimation is better than others valuation method. In contrast, the residual difference over 60% mean less precise on estimation. Residual difference over 60% in all samples is 57%. *DDM (X_2), RIV (X_3) TQM (X_6), GPT (X_7)* and *NBV (X_8)* are 51%, 56%, 53%, 55% and 34%. That's mean those valuation is less error on estimation with share price (Table 1a 1 and Table 1b 1, Annex).

According to the result, researcher can briefly oversee the suitable method to explain share price. For residual difference below 20%, the research selects the most suitable 4 methods. The total residual differences become more precise from 29% to 39%. Also, the total residual differences become less precise from 34% to 56%. There is a trend on this testing. The fluctuation on testing occurs because of using historical data for valuation. Hence, ***DDM (X_2), RIV (X_3) TQM (X_6), GPT (X_7) and NBV (X_8) are selected in this testing for future modeling.***

Correlation: The result can show the explanation of valuation for share price. The coefficients of correlation between all valuations can focus on relationship between share prices *(Y)* and other valuation *(X_1 … X_{10})*. *DDM (X_2)* and *CAPM (X_5)* are negative relationship with share price *(Y)*. Also, they are opposite to other methods. However, *CAPM* is totally negative relationship with all methods and share price. The coefficients of correlation show relationship for price and valuation.

Also, there is same reason as testing (Residual difference calculation). *NBV, TBV and AAM* are also same nature valuation (Table 2, Annex). *RIV, TQM, GPT* and *NBV* can be more relevant to share price. Income approach becomes less relationship with share price because income approach comes from various sources. E.g. dividend retained earning, cash flow and so on. The valuation in income approach may not have same result. Mostly, valuation and share price are positive relationship. The coefficients of correlation for *RIV, TQM, GPT* and *NBV* are 47%, 87.66%, 80.79% and 88.91%. All are nearly half or above. That's mean their value is closely related with share price. *RIV (X_3), TQM (X_6), GPT (X_7) and NBV (X_8) are selected in this testing for future modeling*.

Part B: The precise of valuation method for share price

F-test is adopts to determine evidence to the population. When F is less then F with one tail, the hypothesis is accepted. That's mean the method is positive relationship with share price. The following calculation decides whether to reject the null hypothesis or not (Table 3, Annex):

F > Fα/ 2, v1, v2 = F .025,149,149 ~F .025,148, 148 = 1.48

Or

F < F α/ 2, v1, v2 = F .975,31,31 = 1/F.025,149, 149 ~ 1/F.025,148,148 =0.676

Rejection region:

1.48<F or F <0.676

DCF (X_1): *F* = 62.63 fall into the reject region because it is greater than 1.48, we reject the null hypothesis.

DDM (X_2): *F* = 0.08 do not fall into the reject region, because it is not greater than 1.48 or smaller than 0.676, we accept the null hypothesis.

RIV (X_3): *F* = 8.736 fall into the reject region; because it is greater than 1.48 we reject the null hypothesis.

APT (X_4): *F* = 132.77 fall into the reject region; because it is greater than 1.48 we reject the null hypothesis.

CAPM (X_5): *F* = 7644.676 fall into the reject region because it is

greater than 1.48, we reject the null hypothesis.

TQM (X_6): F = 0.139, do not fall into the reject region because it is not greater than 1.48 or smaller than 0.676, we accept the null hypothesis.

GPT (X_7): F = 0.3926 do not fall into the reject region because it is not greater than 1.48, or smaller than 0.676, we accept the null hypothesis

NBV (X_8): F = 2.536 fall into the reject region because it is greater than 1.48, we reject the null hypothesis.

TBV (X_9): F = 2.678 fall into the reject region because it is greater than 1.48, we reject the null hypothesis.

AAM (X_{10}): F = 2.592 fall into the reject region because it is greater than 1.48, we reject the null hypothesis.

According to result, DDM, TQM and GPT are accepted. Therefore, market approach is closed relationship with share price.

When t Stat is small than t Critical one-tail, 1.6551, the sample will fail in rejection region. Also, P-value exceeds 0.1 say not significant, then accept H_0.

DCF (X_1): T = 5.577 fall into the reject region because it is greater than 1.6551. Also, when p-value is 0.000000056 (<0.1), we reject the null hypothesis.

DDM (X_2): T = 0.2581 did not fall into the reject region because it is not greater than 1.6551. Also, when p-value is 0.79666 (> 0.1), we accept the null hypothesis.

RIV (X_3): T = 4.587 fall into the reject region because it is greater than 1.6551. Also, when p-value is 0.00000472 (<0.1), we reject the null hypothesis.

APT (X_4): T = 4.594 fall into the reject region because it is greater than 1.6551. Also, when p-value is 0.00000459 (<0.1), we reject the null hypothesis.

CAPM (X_5): T = 6.246 fall into the reject region because it is greater than 1.6551. Also, when p-value is 0.00000000209 (<0.1), we reject the null hypothesis.

TQM (X_6): T = -2.977 did not fall into the reject region because it is

not greater than 1.6551. Also, when p-value is 0.001696 (<0.1), so we reject the null hypothesis. T test and P value have different result.

GPT (X_7): T = -0.8394 did not fall into the reject region because it is not greater than 1.6551. Also, when p-value is 0.201 (>0.1), we accept the null hypothesis.

NBV (X_8): T = 4.039 fall into the reject region because it is greater than 1.6551. Also, when p-value is 0.0000427 (<0.1), so we reject the null hypothesis.

TBV (X_9): T = 4.60 fall into the reject region because it is greater than 1.6551. Also, when p-value is 0.00000443 (<0.1), so we reject the null hypothesis

AAM (X_{10}): T = 4.472 fall into the reject region because it is greater than 1.6551. Also, when p-value is 0.00000762 (<0.1), so we reject the null hypothesis

Table 4 (in the Annex) shows the summary of result for T-test. T-test is any statistical hypothesis under a research's t distribution if the null hypothesis is supported. When the test statistic would follow a normal distribution and the value in the test statistic were known, T test can be done.

T< t Critical one-tail because Test Statistics falls outside the Critical Region, *H0* will be accepted. The T stat of *DDM (X_2), TQM (X_6) and GPT (X_7) are* 0.258, -2.9775 and -0.8394. The t Critical one-tail of them is 1.655. Therefore, other methods are not accepted to *H_0*. **DDM (X_2), TQM (X_6) and GPT (X_7) are selected in this testing for future modeling.**

The p-value can measure statistical evidence amount to support the alternative hypothesis. Normally, the p-value > 0.1 is not significant for alternative hypothesis to be true. Hence, P-value >0.1, H0 is accepted. The result concludes that **DDM (X_2) and GPT (X_7) are selected in this testing for future modeling.**

Summary of testing result

According to our testing, residual difference can show the valuation precise.

Summary of acceptance of testing on each valuation

H0 : intrinsic value of companies are positive affect to the to share price

H1 : intrinsic value of companies are not positive affect to share price

	DCF (X1)	DDM (X2)	RIV (X3)	APT (X4)	CAPM (X5)	TQM (X6)	GPT (X7)	NBV (X8)	TBV (X9)	AAM (X10)
Residual difference		Accept H0	Accept H0			Accept H0	Accept H0	Accept H0		
Correlation			Accept H0			Accept H0	Accept H0	Accept H0		
f test		Accept H0				Accept H0	Accept H0			
t test		Accept H0				Accept H0	Accept H0			
P value Result		Accept H0					Accept H0			

Correlation can show the valuation how to relate with share price. F test and t test can show our hypothesis to be accepted for the result of each valuation. Finally, the model will include all methods that support by any testing. *DDM (X₂), RIV (X₃), TQM (X₆), GPT (X₇) and NBV (X₈)* are selected in the modeling. Share price are explained by those method.

Part C: a model - intrinsic value and share price - Multiple Regression Model

As per chapter 3, valuation investigates the different method to explain on share price. The equation of multiple regression line is shown in Table 5 (Annex).

The detail is same as chapter 3 and "Data Calculation" mentioned. *α* (Alpha) means intercept of the equation. *β* (Beta) refers the slope (coefficient) for each independent variable (*X*).

Before section mentioned, *TBV* and *AAM* related to *NBV*. Result of correlation concludes that *RIV (X₃), TQM (X₆), GPT (X₇)* and *NBV (X₈)* are over 40% relationship with share price. F test and T test support evidence for relationship for *DDM (X₂), TQM (X₆)* and *GPT (X₇)* with share price. After testing result, model revised as the following:

Y = α+β2 X2 +β3 X3 +β6 X6+β7X7+β8 X8

According to revised model, R square becomes 95.222% for share price that is explained by five kind valuation methods. Hence, the major five valuations can explain 95.222%. Hence, other five valuations become less important explanation for share price. The revised model still can maintain explain on share price. 95.222% is high performance of the model. Hence, it can conclude the valuation is positive relationship with share price.

The model revised as the following:

Y = 1.19+ (-0.00175) X_2 + (0.089) X_3 + (0.181) X_6+ (0.084) X_7+ (0.72) X_8

Findings in the multiple regression models

Share price= 1.19+ (-0.00175) *DDM*+ (0.089) *RIV*+ (0.181) *TQM*+ (0.084) *GPT*+ (0.72) *NBV*

The coefficients (*β*) of each independent variable *(X)* describe the relationship between the share price and different valuations. The model to make conclusion as below:

Intercept: The value of intercept (*α*=1.19) is meaningless and irrelevant in this model. However, α value is not in major items in model.

Dividend discount models: From the model, T-stat value is -0.326 and p-value is 0.745. The coefficient *(β)* of -0.175% means adverse relationship for this valuation method and share price. This valuation comes from dividend. More dividends for shareholders will make less investment on companies' activities. From the calculation of this model, data come from Plowback ratio. It can explain that more dividends will make less investment return. Hence, the share price will decrease because less value added from companies' activities. Hence, it shows the negative relationship with share price. ***The higher valuation in DDM comes to lower share price.***

Residual income valuation: T-stat value is 0.910 and p-value is 0.364. The coefficient *(β)* of 8.9% means this valuation is linear relationship with share price. It is less important items on the model. When *RIV* valuation increases 1 unit, share price increases 8.9%. When income increases, people's expectation on companies also increase. The share price also increases. Also, income increase means the valuation of companies increase. The share price will be affected positively. ***RIV and share price are same direction***

Tobin's q Model: T-stat value is 16.72 and p-value is nearly Zero. The coefficient *(β)* of 18.13% means this valuation is linear relationship with share price. It is important items on the model. It is a market-based method and better to estimate the share price. Since valuation base on book value to mark as market rate. ***This valuation can have direct relationship with share price.***

Guideline Publicly Traded Company Method: T-stat value is 4.225 and p-value is nearly Zero. The coefficient *(β)* of 8.45% means this valuation is linear relationship with share price. It is less important items on the model. The price refers from other companies.

Since it is difficult to find a good and relevant reference, the valuation may not have an objective base. However, other companies in same industries may provide some signals for companies' valuation. Companies' valuation cannot rely on this method fully because different companies get various structure and business performance. Therefore, ***this valuation can affect share price lightly.***

Net book value: T-stat value is 9.182 and p-value is nearly Zero. The coefficient *(β)* of 72.16% means this valuation is linear relationship with share price. It is an important item for share price. Companies' net asset value means companies' ability to generate future economic income. It affects the people expectation. Also, more asset value can show the company more investment performance. Companies' book value can imply the companies earning power. When companies have an enough power to earn future income, people's expectation and companies' business opportunities will also increase. Share price is reasonable to increase at the same time with net book value. ***Net book value is linear relationship with share price.***

Finally, the correlation expressed in table 6 (Annex) can show their relationship of the valuations that are not selected in the model. They are same direction and it mean they can explain with share price. The negative relationship is with share price.

5. Conclusion

Mispricing of companies implies opportunities of investment. Normally, valuation is related to share price. Different valuation can be in different position on share price. However, there are many valuation methods to be less important. Also, No one valuation can explain share price. Valuation comes from different source of companies. Income, market and asset approach are typical method data to estimate companies valuation. Share price need to be estimated by different valuation. Share price come from different aspect of information and expectation. Each valuation only can explain one aspect. More valuation method can provide more information on share price estimation. Relationship between share price and valuation can show the trend of companies and different view of companies.

Therefore, a model should include a group of valuation that can explain and estimate share price. *DDM (X_2), RIV (X_3), TQM (X_6), GPT (X_7) and NBV (X_8)* are suitable to explain share price from result

of residual difference, correlation, f test and t test for hypothesis of research. *DDM* (X_2) can show information of investment for the companies. *RIV (X_3)* show the income for the companies. *TQM (X_6)* is market value of the companies. *GPT (X_7)* is companies' value mark from competitor price. *NBV (X_8)* is value of companies to generate future income. Hence, this model includes income, asset, competitor, and investment signals in the model. Those factors are necessary for a company's development or business operation. Valuation can explain closely with share price. They mostly are in positive relationship. Positive relationship means that valuation can explain share price. A group of valuation can estimate price. Companies' intrinsic value can directly affect and estimate the share price. *NBV (X_8)* is major element of the model because earning power is major factor in a company. It is important because companies depend on income to survive. Therefore, the model can explain share price. Valuation and price are close relationship. The intrinsic value of companies is directly related to and affects the share price. The modeling of research can estimates share price of companies.

6. Recommendations and further research

Share price and valuation are direct relationship. There is no evidence for a best valuation to explain share price well. To know relationship of them, it can understand more companies worth and how to know what factors to affect share price. It is not a tool for earning because an analysis cannot have a precise estimation and complete modeling. The result of testing is not criteria to select best valuation method. Different valuation should be applied in different position and companies.

Valuation in research follow by income, market and asset based. There are many factors not include in our study. A complete valuation based can provide more information and smooth estimation. The research can provide a brief conclusion on valuation. Surely, the sampling is limit. Further testing and research can provide more and deeply information for further study.

This empirical research may raise some implication for future research. Larger scale of research, valuation can have more detailed study on share price between different companies in different industries. Also, further research on valuation can be categorized by different base approach. There is different structure or result for all

companies in same industries. Research can adopt more samples to conclude different companies' responses of different events.

Further study should adopt more valuation method to include different environment factors and estimate with effect of news in Hong Kong. Different companies will have different level of effect from all news or factors.

Also, from our testing result, positive relationship for valuation with share price becomes components of model. However, negative relationship also can provide more information and make the model more precise. It is lack of information to explain more on negative relationship. Hence, more samples on testing and detailed study on negative relationship can provide more information on amendment of model. More valuation method includes in research and sample in testing. It will summarize a model to make intrinsic value of companies.

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Table 1

Table of outcome of model for variables X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9 and X_{10}

Regression Statistics	
Multiple R	0.976807453
R Square	0.9541528
Adjusted R Square	0.95085444
Standard Error	9.394841548
Observations	150

ANOVA

	df	SS	MS	F	Significance F
Regression	10	255328.226	25532.8226	289.2809988	8.50759E-88
Residual	139	12268.56363	88.26304771		
Total	149	267596.7896			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	-0.549642826	1.974125706	-0.278423418	0.781101102	-4.452840196	3.353554545	-4.452840196	3.353554545
DCF (X_1)	0.078944066	0.159713828	0.494284475	0.621885543	-0.236838557	0.394726688	-0.236838557	0.394726688
DDM (X_2)	-0.00314542	0.005391696	-0.583382367	0.560581297	-0.013805762	0.007514921	-0.013805762	0.007514921
RIV (X_3)	0.03149552	0.105019621	0.299901289	0.764700468	-0.176146935	0.239137974	-0.176146935	0.239137974
APT (X_4)	0.208547424	0.218785615	0.953204463	0.342141148	-0.224030619	0.641125468	-0.224030619	0.641125468
CAPM (X_5)	-0.242257654	1.636424022	-0.148040881	0.882525043	-3.477758777	2.993243469	-3.477758777	2.993243469
TQM (X_6)	0.175047663	0.011168372	15.67351676	1.59236E-32	0.152965807	0.19712952	0.152965807	0.19712952
GPT (X_7)	0.075770982	0.021143965	3.583574861	0.000467963	0.033965605	0.117576359	0.033965605	0.117576359
NBV (X_8)	1.258922425	0.25518411	4.933388789	2.2743E-06	0.754378088	1.763466762	0.754378088	1.763466762
TBV (X_9)	-0.481598725	0.276985019	-1.738717589	0.084298588	-1.029247335	0.066049885	-1.029247335	0.066049885
AAM (X_{10})	-0.025333698	0.168487707	-0.150359323	0.880699101	-0.358463838	0.307796443	-0.358463838	0.307796443

Table 1a

Summary of residual difference for 150 testing

	Income	Income	Income	Income	Income	Market	Market	Asset-based	Asset-based	Asset-based	
	DCF (X_1)	DDM (X_2)	RIV (X_3)	APT (X_4)	CAPM (X_5)	TQM (X_6)	GPT (X_7)	NBV (X_8)	TBV (X_9)	AAM (X_{10})	Total
x<20%	25	65	36	29	14	55	49	59	57	53	442
20%<x<40%	-	-	-	-	-	-	-	-	-	-	-
40%<x<60%	22	8	30	17	8	15	19	40	26	24	209
60%<x<80%	23	5	36	20	8	23	23	27	38	28	231
80%<x<100%	76	32	37	38	110	14	20	8	9	17	361
Over 100%	4	40	11	46	10	43	39	16	20	28	257
	150	150	150	150	150	150	150	150	150	150	1,500

Table 1b

Summary of % for residual difference for 150 testing

	Income	Income	Income	Income	Income	Market	Market	Asset-based	Asset-based	Asset-based	
	DCF (X_1)	DDM (X_2)	RIV (X_3)	APT (X_4)	CAPM (X_5)	TQM (X_6)	GPT (X_7)	NBV (X_8)	TBV (X_9)	AAM (X_{10})	Total
x<20%	17%	43%	24%	19%	9%	37%	33%	39%	38%	35%	29%
20%<x<40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
40%<x<60%	15%	5%	20%	11%	5%	10%	13%	27%	17%	16%	14%
60%<x<80%	15%	3%	24%	13%	5%	15%	15%	18%	25%	19%	15%
80%<x<100%	51%	21%	25%	25%	73%	9%	13%	5%	6%	11%	24%
Over 100%	3%	27%	7%	31%	7%	29%	26%	11%	13%	19%	17%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Over 60%	69%	51%	56%	69%	85%	53%	55%	34%	45%	49%	57%

Table 1a.1
Summary of residual difference for 150 testing

	DDM (X2)	RIV (X3)	TQM (X6)	GPT (X7)	NBV (X8)
x<20%	65	36	55	49	59
20%<x<40%	-	-	-	-	-
40%<x<60%	8	30	15	19	40
60%<x<80%	5	36	23	23	27
80%<x<100%	32	37	14	20	8
Over 100%	40	11	43	39	16
	150	150	150	150	150

Table 1b.1
Summary of % for residual difference for 150 testing

	DDM (X2)	RIV (X3)	TQM (X6)	GPT (X7)	NBV (X8)
x<20%	43%	24%	37%	33%	39%
20%<x<40%	0%	0%	0%	0%	0%
40%<x<60%	5%	20%	10%	13%	27%
60%<x<80%	3%	24%	15%	15%	18%
80%<x<100%	21%	25%	9%	13%	5%
Over 100%	27%	7%	29%	26%	11%
	100%	100%	100%	100%	100%
Over 60%	51%	56%	53%	55%	34%

Table 2

Table 2
The table of correlation between share price and the various parameters (different approach)

		Share price (Y)	DCF (X1)	DDM (X2)	RIV (X3)	APT (X4)	CAPM (X5)	TQM (X6)	GPT (X7)	NBV (X8)	TBV (X9)	AAM (X10)
	Share price (Y)	1										
Income	DCF (X1)	0.280880266	1									
Income	DDM (X2)	-0.078725089	0.03164645	1								
Income	RIV (X3)	0.473375318	0.235983286	-0.186734036	1							
Income	APT (X4)	0.122532103	-0.098041765	0.048825071	-0.031173651	1						
Income	CAPM (X5)	-0.152479395	-0.050935487	-0.001873818	-0.118885244	-0.06405636	1					
Market	TQM (X6)	0.876646012	0.20817591	-0.022253425	0.167868595	0.152402855	-0.135346595	1				
Market	GPT (X7)	0.807895513	0.350019572	0.044352486	0.284257098	0.102870262	-0.075385978	0.68410606	1			
Asset-based	NBV (X8)	0.889062346	0.26720553	-0.137094749	0.711039044	0.046852214	-0.139999357	0.648054098	0.73394423	1		
Asset-based	TBV (X9)	0.866490896	0.260216267	-0.150342788	0.700972397	0.049189441	-0.118103242	0.626157081	0.715751914	0.990838071	1	
Asset-based	AAM (X10)	0.866005105	0.265619723	-0.144611253	0.653511935	0.021586784	-0.106582688	0.642116867	0.721131105	0.975177425	0.982741257	1

Table 3

Table 3
Hypothesis
H0 : intrinsic value of companies are positive affect to the to share price
H1 : intrinsic value of companies are not positive affect to share price

null hypothesis : independent variable - intrinsic value of companies (X) is positive relationship to the dependent variable - price (Y) significantly
alternative hypothesis : independent variable - intrinsic value of companies (X) is not positive relationship to the dependent variable - price (Y) significantly

	DCF (X1)	DDM (X2)	RIV (X3)	APT (X4)	CAPM (X5)	TQM (X6)	GPT (X7)	NBV (X8)	TBV (X9)	AAM (X10)
F	62.63373358	0.081426094	8.73627627	132.7742185	7644.675738	0.139426401	0.392637688	2.5366648	2.678431445	2.591559282
P(F<=f) one-tail	3.11553E-92	0	2.10634E-34	5.1999E-116	1.118E-246	0	1.08761E-08	1.24334E-08	1.95366E-09	6.06148E-09
F Critical one-tail	1.310442985	0.763100731	1.310442985	1.310442985	1.310442985	0.763100731	0.763100731	1.310442985	1.310442985	1.310442985
Outcome	F > F CL	F < F CL	F > F CL	F > F CL	F > F CL	F < F CL	F < F CL	F > F CL	F > F CL	F > F CL
Result	Don't accept H0	Accept H0	Don't accept H0	Don't accept H0	Don't accept H0	Accept H0	Accept H0	Don't accept H0	Don't accept H0	Don't accept H0

Table 4

Table 4
Hypothesis
Ho : intrinsic value of companies are positive affect to the to share price
H1 : intrinsic value of companies are not positive affect to share price

null hypothesis : independent variable - intrinsic value of companies (X) is positive relationship to the dependent variable - price (Y) significantly
alternative hypothesis : independent variable - intrinsic value of companies (X) is not positive relationship to the dependent variable - price (Y) significantly
The rejection region is t Stat >t Critical one-tail
p-value exceeds 0.1 say not significant, accept H_0

	DCF (X1)	DDM (X2)	RIV (X3)	APT (X4)	CAPM (X5)	TQM (X6)	GPT (X7)	NBV (X8)	TBV (X9)	AAM (X10)
t Stat	5.576952455	0.258130288	4.587467135	4.594142824	6.246242944	-2.977466022	-0.839426541	4.03936326	4.602597821	4.472326485
P(T<=t) one-tail	5.60128E-08	0.398331278	4.72361E-06	4.59314E-06	2.08755E-09	0.001696698	0.201287399	4.27649E-05	4.43287E-06	7.6243E-06
t Critical one-tail	1.655144534	1.655144534	1.655144534	1.655144534	1.655144534	1.655144534	1.655144534	1.655144534	1.655144534	1.655144534
P(T<=t) two-tail	1.12E-07	0.796662555	9.44723E-06	9.18627E-06	4.17509E-09	0.003393396	0.402574799	8.55299E-05	8.86574E-06	1.52486E-05
t Critical two-tail	1.976013178	1.976013178	1.976013178	1.976013178	1.976013178	1.976013178	1.976013178	1.976013178	1.976013178	1.976013178
Outcome	t Stat >t CL	t Stat <t CL	t Stat >t CL	t Stat >t CL	t Stat >t CL	t Stat <t CL				
T test Result	Don't accept H_0	Accept H_0	Don't accept H_0	Don't accept H_0	Don't accept H_0	Accept H_0	Accept H_0	Don't accept H_0	Don't accept H_0	Don't accept H_0
P value Result	Don't accept H_0	Accept H_0	Don't accept H_0	Don't accept H_0	Don't accept H_0	Don't accept H_0	Accept H_0	Don't accept H_0	Don't accept H_0	Don't accept H_0

Table 5

Table 5
Table of outcome of model for variables X2, X3, X6, X7 and X8

Regression Statistics	
Multiple R	0.975819677
R Square	0.952224043
Adjusted R Square	0.950565155
Standard Error	9.422451327
Observations	150

ANOVA

	df	SS	MS	F	Significance F
Regression	5	254812.0968	50962.41936	574.0136656	3.50915E-93
Residual	144	12784.69282	88.78258901		
Total	149	267596.7896			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	1.19177461	0.923400865	1.290636229	0.198898229	-0.633396516	3.016945735	-0.633396516	3.016945735
DDM (X2)	-0.001753234	0.005375324	-0.326163515	0.744774171	-0.012377965	0.008871496	-0.012377965	0.008871496
RIV (X3)	0.089347525	0.098136557	0.910440799	0.364111548	-0.104626746	0.283321796	-0.104626746	0.283321796
TQM (X6)	0.181303026	0.010845961	16.716179	1.52938E-35	0.15986517	0.202740883	0.15986517	0.202740883
GPT (X7)	0.084517471	0.020004037	4.225020741	4.21882E-05	0.04497799	0.124056952	0.04497799	0.124056952
NBV (X8)	0.721599788	0.078585367	9.182368383	4.17709E-16	0.566269911	0.876929665	0.566269911	0.876929665

Table 6

Table 6

	DDM (X2)	APT (X4)	CAPM (X5)
DDM (X2)	1		
APT (X4)	0.049492478	1	
CAPM (X5)	0.000935416	-0.065327975	1

MODELING THE INFORMAL ECONOMY: A REVIEW

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Abstract

Informal economic elements are present worldwide and especially in emerging countries. Such elements are found in a wide range of economic aspects and seem to be immune to various policies aiming to contain and remove them. Quantifying the dynamics of informal economy is a complex endeavor. Despite this fact, the empirical literature dedicated to informal economic aspects has expanded during the last decades aiming to clarify the drivers and the dimensions of these phenomena. This paper follows the main contributions brought to the field in order to observe the evolution of the modeling tools devised to investigate, characterize and measure informal economy.

Keywords: informal economy, econometric modeling, estimation

JEL Classification: C01, C13, E26

1. Introduction

In general, informal economy describes those activities that are not quantified as formal economic or fiscal parameters. The specific literature has consecrated a wide array of definitions and synonyms: shadow, submerged, irregular, subterranean (Frey and Pommerenhne (1982)), underground, parallel, unrecorded or twilight (Tedds (1998)). The most current definition presents informal economy as the sum of both legal and illegal activities that are not contained in the official formulation of the GDP. This is a very tractable solution as it does not require an expression in local currencies and thus rends a comparable character to the estimation.

Other authors such as for example, Tanzi (1999) extend this definition and consider as underground economy any practice which implies that forms of revenue aren't reported or detected by official fiscal authorities.

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The factors that catalyze the formation and expansion of such informal elements are numerous and in general country specific. In addition to this, many characteristic of informal economic actions are sector specific. In this logic, measuring the dimension of the informal economy is not the easiest of tasks. Despite this complex character, economic literature has germinated a series of approaches that try to fundament on the genesis and dynamics of informal economy.

Giles and Tedds (2002) and Tedds (2005) argue on the existence of six classical modeling approaches for informal economy applications. These methodologies rely on parameters such as: the circulation of currency in the economic system, national accounts, Mimic models, and relationships between different economic variables.

Dell'Anno (2003) arranges the investigation alternatives of informal practices into three distinct categories: direct methods (investigations on forms of undeclared revenue), indirect methods (investigations on the clues that derive from official statistics and hint to possible underground practices) and modeling approaches.

La Porta and Shleifer (2014) build on the taxonomy of methods for the assessment of informal economy. Among the standard quantifying apparatus they highlight the relevance of surveys and census counts and the study of the dynamics of certain variables that can be used as proxies, such as for example aggregate electricity consumption.

In addition to these modeling tools, the economic literature has witnessed the creation of wide range of empirical instruments that address various forms of informal activity. In this context, the aim of this paper is to investigate both classical and modern approaches in order to offer a compressive review on the evolution of informal economy modeling tools.

2. Investigations on the informal economy

As observed by Tedds (2005), several early modeling initiatives rely on the quantification of the currency that circulates in the economic system. This approach originates from the study of Gutmann (1977) which considers informal economy as a quantity of undisclosed income. Following this logic, the author decomposes the money supply and focuses on the dynamics of its components.

Another fundamental contribution comes from Tanzi (1980) and assumes a cash ratio approach. The author considers that the

motivation of informal economy resides in tax avoidance and from this logic sees tax elasticity and demand for currency as suitable proxies. Relying on the currency to deposits ratio, Tanzi (1980) puts forward the following model:

$$(C/M_2) = \alpha_0 + \alpha_1 T_t + \alpha_2 W_t + \alpha_3 Y_t + \alpha_4 R_t + \upsilon_t$$

Where:
C/M_2 – cash ratio;
T_t – ratio of income taxes relative to income;
W_t – share of wage in total income;
R_t – current interest rate for deposits;
Y_t – real per capita income;

According to Tanzi (1980) the above mentioned equation forms a link between the dynamics of income taxes and changes in the cash ratio that is related to the existence of an informal economy in which transactions are done by using cash. In an estimation exercise, the author concludes that the dimension of US informal economy ranged at that time between 3.4% and 5.1% of GNP.

Tanzi (1983) builds on the same modeling approach, but considers a different equation:

$$ln\left(\frac{C}{M_2}\right) = \beta_0 + \beta_1 \ln(T) + \beta_2 ln\left(\frac{WS}{NI}\right) + \beta_3 lnR + \beta_4 ln(Y) + \mu$$

Where $\left(\frac{WS}{NI}\right)$ denotes the portion of cash wages in national income.

Despite the pioneering status of these modeling approaches, their assumptions and specification have been questioned in the specific literature in studies such as Thomas (1986), Porter and Bayer (1989), Thomas (1989), Thomas (1992) or Ferwerda et al (2010).

An alternative modeling scenario was the so called monetary transaction methodology put forward by Feige (1979) and later refined in Feige (1980 a) and Feige (1989 b). This approach does no track the dynamics of currency but focuses on the quantity of payments issued. The Feige model starts from the expression of total income:

$$Y_T = Y_R + Y_U$$

Where Y_T denotes the total income;

Y_R – the official (recorded) income and;
Y_U – the unrecorded income.

The author then expresses the PT term that derives from Fisher's equation ($MV = PT$) in the following manner:

$$PT = CV_c + DV_d$$

Where:
C – amount of currency;
D – amount of deposits;
V_c – currency speed or velocity;
V_d – deposit velocity;

By restructuring the above noted equations, Feige (1989 b) obtains:

$$Y_U = \left[\frac{CV_c + DV_d}{K} \right] - Y_R$$

This equation states that the informal economy can be estimated for given levels of the total and recorded income. Using this procedure, Feige (1979) finds that for the year 1976 the informal economy gravitated between 13.2% and 21.7% of GNP.

This approach also received a considerable amount of criticism in studies such as Thomas (1989) and Porter and Bayer (1989), given the clear frailty of its assumptions.

The end of the 90th decade sees an increase in the use of the MIMIC models (or the latent variables models) in estimating the size of the shadow economy. This method is a particular case of the Structural Equation Modelling and allows the presence of a relationship between determinants, the latent variable and the indicators as the effects of that unobserved variable. Schematically, the above mentioned parameters are characterized by the following set of equations:

$$\eta = \gamma X + \xi \text{ – for the scalar latent variable}$$

and

$$y = \lambda n + \epsilon \text{ - for observable indicators (Tedds, 1998).}$$

For example, Tedds (1998) estimates the size of the informal economy in Canada during 1976 to 1995 starting with a MIMIC 6-1-3

model. The author finds that the dimension of the Canadian hidden economy reached 15% of GDP in 1995.

A year later, Giles (1999) uses the latent variable model (the MIMIC model) for estimating the size of the informal economy in New Zealand during 1968 to 1994. For calibration, the author employs the information provided by the currency-demand model he develops in the research.

Dell'Anno (2003) uses the MIMIC (Multiple Indicators and Multiple Causes) model approach in order to estimate the informal economy of Italy. In the model also, shadow economy is seen as a latent variable, depending on several observable variables (as is the case, in the model, of tax burden, the real government consumption, the unemployment rate, the self-employment, the index of efficacy in justice and the index of illegality) and that produces other observable effects (on the real GDP and on the currency outside the banks, in the mentioned study). In this respect, the accuracy of the model is given by the variables included and by the calibration value.

In a more recent research, Dell'Anno (2007) employs a similar method for estimating the shadow economy of Portugal in the period 1977 to 2004. The author starts with the MIMIC 6-1-2 model with means and intercepts, using as cause-variables the government employment in labor force, the tax burden, the percentage of subsidies in GDP, the social benefits paid by government, the self-employment and the unemployment rate. The indicators (or the effects variables) are the index of real GDP and the labor force participation ratio. The model is composed of a structural component and a measurement model as show below.

Structural Model

$$\eta = \gamma_{11}X_1 + \gamma_{12}X_2 + \gamma_{13}X_3 + \gamma_{14}X_4 + \gamma_{15}X_5 + \gamma_{16}X_6 + \zeta$$

Measurement Component

$$Y_1 = \lambda_{11}\eta + \varepsilon_1$$

$$Y_2 = \lambda_{21}\eta + \varepsilon_2$$

According to Dell'Anno (2007), the size of the informal economy decreased from 29.6 percent in 1978 to 17.6 percent in 2004, while the main determinants of its evolution are the social benefits, the lack of economic freedom, the unemployment rate and the percentage of self-employed in the total labor force.

The method of the structural equation model continues to be employed and tested in identifying the size of the shadow economy. Buehn and Schneider (2009) develop a more complex model, with two latent variables (corruption and shadow economy) also using a set of causes and indicators. Besides the identification of the relevant determinants, the authors prove the positive relationship among the two latent variables.

In Buehn and Schneider (2009) the structural equation model is given by the following relation:

$$\eta = B\eta + \Gamma x + \varsigma$$

Where vector x contains all the possible determinants for the latent variables captured by the vector η. The relation between the latent variables and their determinants are expressed as a matrix denoted by Γ. The authors add a measurement model given by:

$$y = \Lambda\eta + \varepsilon$$

In this setup, the authors observe a clear link between large levels of corruption and informal economy.

Another popular approach in modeling informal economy relies on monitoring the discrepancies between certain economic variables that in general follow a certain equilibrium. Key contributions in this direction have been brought by MacAfee (1980) and Dilnot and Morris (1981). These paved the way to more fundamental methods that rely on consumer expenditure.

Pissarides and Weber (1989) offer a model that uses a consumption function to estimate informal economy that has the following form:

$$\ln C_{ij} = Z_{iaj} + \beta_j lnY_{ti} + \gamma_j SE_i + \eta_i$$

Where
C_{ij} represents the amount of the good j consumed by the household i;
a_j – parameter vector;
β_j – marginal propensity of consuming
Y_{ti} – income after taxation;
SE – dummy variable for the portion of the population that is self-employed;

Following this logic, Pissarides and Weber (1989) succeed to estimate the UK informal economy at approximatively 5.5% of GDP. Similar contribution can be observed in McCrohan and Smith (1986) or McCrohan, Smith and Adams (1991).

Lyssiotou et al. (2004) formulate a demand scenario considering as sources of income regular wages and self-employed income. They also consider six types of non-durable goods and build the following model:

$$\omega_{ih} = \alpha_i + \sum_j \alpha_{ij} z_{jh} + \delta_i y_h^s$$
$$+ \beta_i \big[ln Y_h + ln(\theta_o y_h^\omega + \theta_1 y_h^s)$$
$$+ \lambda_i [ln Y_H + ln(\theta_o y_h^\omega + \theta_1 y_h^s)] \big]^2 + v_{ih}$$

Where
ω_{ih} - budget for good i
Z - vector that characterizes the households;
y_h^s, y_h^ω – proportions for the two categories of income;
θ – informal economy factor

By estimating this equation, the author obtains informal economy coefficients that range from 2.18 to 1.64 for UK households.

Gunes et al (2013) extend the perspective found in Pissarides, Weber (1989), Lyssiotou et al. (2004), and Fortin et al. (2009) and estimate the informal economy for Turkey in a consumption behavior framework.

The authors start from the Hicksian cost function which has the following form:

$$C(p, U) = F(c(p, U), d(r, U), U)$$

Where *p, r* and *U* characterize price vectors for durable and nondurables goods,
and **c** and *d* stand for price indices for the respective goods.

In this context, the demand for a nondurable good can be written in the following way:

$$q_i = \frac{\partial F(.)}{\partial c} \frac{\partial c(.)}{\partial p_i}$$

From this point the model assumes the fact that the household determines the amount of the budget invested in nondurable goods. This has the following expression:

$$w_t = \frac{p_i q_i}{Y} = \frac{p_i \frac{\partial F(.)}{\partial c} \frac{\partial c(.)}{\partial p_i}}{\frac{\partial F(.)}{\partial c} c(.)} = \frac{p_i \frac{\partial c(.)}{\partial p_i}}{c(.)} = \frac{p_i}{\partial p_i} \frac{\partial c(.)}{c(.)} = \frac{\partial lnc(.)}{\partial lnp_i}$$

Albu (1995) provides an extensive and industrious research aiming at the underground economy and its linkages with financial policies. After reviewing a consistent part of the specific literature, the author provides econometric evidence for informal economy assessment. The perspective is extended for the case of Romania in Albu et al (2001). Starting from the income structure of households Albu (2008) finds that almost a quarter of the household income is informal. This spatial distribution approach is also used in Albu et al (2011).

More recent, applications incorporate elements of informal economy in DSGE modeling setups. Interesting examples can be found in: Busato and Chiarini (2004), Ahmed et.al (2012) or Orsi et al (2014).

3. Conclusions

Informal economy has been studied profoundly during the last decades given the importance of the phenomenon and its multiple reverberations on the economic system, its health and dynamics.

This paper sets out to review and analyze several key contributions brought to this literature, following the main landmarks in terms of modeling progress. We investigate the logic, the characteristics, the modeling particularities and the construction and estimation details for the major contributions that appeared in the academic literature from the pioneering days of Gutmann (1977) and Tanzi (1980) until present.

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