An Econometrical Analysis of the Debt Market in Albania

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Abstract

The paper provides an overview of the debt instruments marketed in Albania, where the highest share is outlined by treasury bills with short term maturities. The paper provides the database construction profile, econometric models applied to process the data into summarized information. The models include the role the banking system plays and should perform in this regard. The econometrical analysis uses a multiple linear regression, attempting to delineate the interrelationship amongst the discount/interest rate on 3-month tenure T-bill, the inflation rates, and the Central Bank interest rates and the budget deficit magnitude. The analysis and the respective statistical tests support the hypothesis about the strong correlation and consistent trend of a sustainable relationship of all above mentioned factors. The work includes some finding and recommendations for debt management techniques and governmental policies the Albanian authorities should undertake regarding the wideness of financial market participants in Albania, alternate opportunities and sound approaches ensuring the achievement of European standards.

Keywords: Bonds, Debt Market, T-Bill trade program, yields, inflation, TIPs.

1. The Focus of the Paper and Its Objective

The paper aims at explaining, from a theoretical point of view, the effects of the bond markets in the Albanian economy and at discussing the typology and characteristics of the debt instruments and related interest rates.

The definitive point is to show the relationship among the T-bills interest rates, inflation rates and the budget deficit. The relationship is theoretically inverse i.e. an increase in the inflation rate or in the budget deficit would negatively affect the cost of debt instruments, by increasing it. The paper takes into consideration the quality and magnitude of the debt/bond markets in emerging economies and deepen to examine the role of the banking system and of governmental entities for the set up and development of the debt markets. It also looks at how the debt market may improve the banking system by improving market discipline.

The empirical work consists in a regression analysis which studies the interaction and the correlation among interest rates of T-bills traded in the government's auctions (dependent variable) with three independent variables being inflation rate, the three-month base rate and the budget deficit.

The data are organized and allocated on quarterly basis and include the last eight years (2005-2013) in order to better express the degree of correlation among the variables.

2. The Actual Situation in Albania - An Overview

The financial sector in Albania is dominated by the banking sector. As a result of the last years' developments other nonbank financial institutions, mainly foreign-owned, such as insurance companies or factoring agencies, have started operating with the Albanian economic system.

The Albania banking sector, currently fully private and mainly under foreign ownership, dominates the financial sector, accounting for total assets of ALL 1,190 billion as at March 2013, up 4.7% from 2012, It manages more than 96% of the total financial assets. This is under the context of an absent active capital market. The country's financial sector has suffered from a relatively low level of financial intermediation, which has constituted a major impediment to the

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development of the private sector. The causes of the problem are legal and practical and include uncertainties in the legal framework on transactions, weak corporate governance standards and drawbacks in the financial markets.

Access to the financial markets is very important for the development of the private entrepreneurship because of financial leverage and financial support. In absence of credit opportunities and facilities such private enterprises cannot grow or ideas cannot turn into profitable projects. Although 16 commercial banks are currently operating in the Albanian financial market, not all of them are active in crediting the local economy, leaving a gap in the level of required financial intermediation to boost the development of the private sector. The increase in the financing of corporates and small and medium enterprises is a very important challenge to the financial sector.

The banking system is also the main stakeholder of the public debt in Albania. Bank of Albania accounts for 13% of the internal public debt whereas individuals subscribe close to 13.5%. The remaining part of the internal public debt is owned by commercial banks, with Raiffeisen Albania leading the table subscribing 25% of the public debt. The weight on individuals subscribing the internal debt has been increasing in the last years highlighting the need to develop further the bond market as individuals could constitute a healthy financing source.

The debt market consists mostly on government securities (TB). It is diversified more by maturities rather by currencies depending on the government's demand. No other actors are issuing debt publicly. The subscribers of the government debt are the banks, insurance companies and the individual and are doing so in the government auction. Following the acquisition of the government debt security, there is very little possibly for the debt subscribers to further trade the securities they own in the secondary market in order to fulfil their liquidity or speculation objectives. There is basically a non-existing secondary market for the trading of the government debt securities.

A financial sector made up solely by commercial banks places savvy individuals in a weak position in the absence of investment opportunities that can be provided by a well-functioning debt market. They are faced with very limited choice and the majority exhibits the tendency to keep such assets as bank deposits ending up with very low return rates. Under more extreme circumstances they might be able to generate more returns from non-financial assets such as real estates, gold or silver, which in turn would reduce the amount of savings that can be mobilized for investments that are more productive to the overall economy of the country. In the long term, this might result in a lower level of economic welfare. An active and efficient debt market would offer to savers investment opportunities covering a wider range of assets thus granting them a better choice of risk profile in order to make optimal decisions for the investment of their savings.

An important development to be mentioned is the rating of the Albanian government's securities with B1 by Moody in November 2012. The assessment of the Albanian government securities reflects a balance between the more optimistic and the more pessimistic scenarios around such securities. The assessment by Moody reflects the following factors:

- 1- Noted improvements of institutional capacities mainly led by the progress made toward the European Union integration process.
- 2- The existence of uncertainties and doubts around access to credit arising from the high levels of debt in the context of the medium-term strategy of the country on the fiscal consolidation and reduction of debt.

The credit rating agency Moody also emphasized that the challenges to the crediting of the Albanian economy are mainly linked to the deterioration in the budgetary performance of the government in the last year, which has resulted in debt levels that are materially higher than those of countries with a similar rating of B1. Such challenges become more relevant given the fragile financing structure of the debt.

Moody commented that the strong aspects of the credit extended to Albania include the relative elasticity of the Albanian economy vis a vis the global financial crisis and the Eurozone debt crises, owing to its system of monetary and fiscal policy. Nevertheless, the country continues to report low average income, the economy remains small in size, it has a narrow export base and maintains important trade and financial relations with the Eurozone. Moreover, the economic activity has slowed down considerably in 2012 owing mainly to the limited credit offer.

3. The Econometric Model and Regression Analysis (Case of Albania)

3.1 The Data Base Compatibility with Econometrical Model

The empirical work based on the regression analysis studies the interdependence and the correlation among the Treasury Bills rates as traded in government auctions with the inflation rate, the base interest rate and the budget deficit. The data used in the construction of the econometrical model are quarterly data in the form of time series from the first quarter of 2005 to the last quarter of 2013. This part explains the descriptive statistics used to initially assess the data in

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the form of time series which are thereafter used in the regression analysis. The explanatory statistics consist in the assessment of several statistical variables which are significant to the regression analysis. The key elements used are the trend illustrating the progress of the variables, the mean, the standard deviation, maximal and minimal points.

The data in the times series differ from other data as they come in accordance with e time order. We can claim that the data of year 2005 will have an effect on the following year, i.e. 2006 given that they follow each other. It is a well-known fact in the analysis of the time series in social science that the past has an effect on the future but not the other way around. It is also important to emphasize that the time series are the results of chance variability given it is impossible to know what values will be recorded in the future. The time series of economic indicators have the tendency to increase over time. Therefore, when performing statistical analysis of such variables it is important to keep in mind that in some series the only factor responsible for the increase in values from one period to the other is time itself. On the other hand, in other time series the change in the value of the variables from one period to the other is the result of the correlation that such variables exhibit among each other.

Indicators	Budget Deficit (ALL bln)	IBASE(%)	IBILL(%)	INFL(%)
Mean	44,831.31	5.334	5.771	2.77
Median	41,842.50	5.375	5.785	2.7
Maximum	80,883.00	6.5	6.33	4.2
Minimum	28,176.00	3.75	5.07	1.27
Stand Dev	14,876.97	0.668	0.446	0.807
Observations	36	36	36	36

 Table 1: Statistical analysis of variables

Source: authors' work (2014)

The above table gives a statistical summary on the time series of the data used in the regression analysis. The data on the interest rates of the T-Bills, the base rate and inflation rate are express in percentage, whereas the data on the budget deficit are expressed in absolute terms, i.e. ALL billions. This statistical summary gives more information on the trend previously studied, especially with regard to the correlation between T-Bill rates and inflation rates.

3.2 The setup of the initial model

The initial model which was set up aims at studying the correlation between the 3-month T-Bill rates, the 3-month base rate, inflation rate and the budget deficit, is of the following form:

$i3 = \beta 0 + \beta 1 infl + \beta 2 ibaze + \beta 3 deficit+u$

where:

- i3 is the coupon rate of the 3-month T-Bill, dependent variable,
- **β0** is the intercept,
- β1,2,3 are coefficients that reflect the impact of the independent variable on the dependent variable,
- infl is the quarterly inflation rate, independent variable,
- ibase is quarterly base rate, as published each quarter by Bank of Albania, independent variable,
- **deficit** is the government budget deficit, expressed in billions, independent variable

The *regression analysis* of the time series is based on the following assumptions:

- Expected mean deviation must be equal to zero.
- The regression is linear according to parameters.
- There is on specification error and the the regression is linear according to variables.
- There is no relationship between variables the model does not suffer from multicollinearity

Following such assumptions further assessments will be made to see whether the model supports such assumptions.

3.3 The setup of the hypothesis and their confirmation

In order to see whether the model is important we test it using the Fisher Test by raising the hypothesis: <u>H0: β 0=0 Model is not significant</u>

Ha: β0≠0 Model is significant

After entering the data in the program we have the following results from the Eviews table:

Table 2: Observation on the significance of the model

Dependent Variable: 13				
Method: Least Squares				
Date: 01/10/14 Time: 19:34				
Sample: 2005Q1 2013Q4				
Included observations: 36				
Variable	Coefficient	Std. Error	t-Statistic	
С	2.972806	0.640899	4.638494	
INFL	0.194968	0.076971	2.532995	
IBASE	0.282554	0.095374	2.962582	
DEFICIT	1.67E-05	4.30E-06	3.898610	
R-squared	0.462028	Mean dependent var		
Adjusted R-squared	0.404388	S.D. dependent var		
S.E. of regression	0.344058	Akaike info criterion		
Sum squared resid	3.314525	Schwarz criterion		
Log likelihood	-9.127290	Hannan-Quinn criter.		
F-statistic	8.015777	Durbin-Watson stat		
Prob(F-statistic)	0.000520			

The initially assessed model has the following form:

I3 = 2.973 + 0.195*INFL + 0.283*IBASE + 0.0000167*DEFICIT

The above equation shows the relationship between the 3-month T-Bills rate, inflation, the 3-month base rate and the budget deficit. From what we can see from the above equation the relationship among variables is positive.

The above equation shows that for each increase by one percent in the inflation rate, the interest rate would increase by 0.195 units, regardless of the fact that investors would look for an increase in the return rate which exceeds the increase in inflation rate. When inflation grows it is normal for investors to look for higher returns on their funds in order for those returns to exceed the inflation rate otherwise their funds would be earning "negative" real interest.

In addition, when the base rate increases individuals would be looking for higher returns in order to invest their funds in government debt securities instead of keeping such funds in the form of deposits. The equation shows that for each increase by one unit in the base interest rate, the 3-months T-bills rate would grow by 0.283 units.

Finally, as the budgetary deficit increases it is normal to expect an increase in the T-bills interest rates. As the deficit grows, the government is in need of more funds resulting in savers increasing the "price" of the money that they will lend to the government to cover the deficit. The above equation shows that as the budget deficit increases by ALL 1 billion the interest rate on 3-month T-Bills increases by 1.67*10^-5 percent. As to the explanation of the dependent variable from the independent variables we see that it stands at 46.2% whereas the adjusted coefficient of determination stands at the level of 40.44%. Such correlation is not very good taking into account that we have used 3 explanatory variables.

F critical α : k–1: n–k= $F_{0.05}$: 2:32 = 2.9

Given that the factual Fisher = 8.15 > critical Fisher = 2.9 then the first hypothesis that the model set up is not significant fails. Therefore, it is obvious that the depicted model is significant. Consequently the significance proof accesses to the analysis whether the variables under consideration are significant by testing them using the *Student test*.

The hypothesis on the relevance of the variables we arrange is as follows. <u>H0: $\beta 0=\beta 1=\beta 2=\beta 3=0$ Variables are not relevant</u> Ha: $\beta 0\neq \beta 1\neq \beta 2\neq \beta 3\neq 0$ Variables are relevant

Table 3: Observation on the relevance of the variables

Variable	С	Infl	lbase	Deficit
t-Statistic	4.64	2.53	2.96	3.9

Source: Eviews

Also $t_{critic} = t_{2}^{\alpha}:n-k=t_{0.025};33=2.3518$

From the observation we can see that:

- 1. $t_{actual \beta 0} > t_{critic}$ the base hypothesis falls and the variable $\beta 0$ is relevant.
- 2. $t_{actual \beta 1} > t_{critic}$ the base hypothesis falls and the variable $\beta 1$ is relevant.
- 3. $t_{actual \beta 2} > t_{critic}$. the base hypothesis falls and the variable $\beta 2$ is relevant.
- 4. $t_{actual \beta 3} > t_{critic}$ the base hypothesis falls and the variable $\beta 3$ is relevant.

In order to see whether any of the assumptions made at the beginning of the analysis we have to go through further statistical steps and tests until we reach the right statistical model.

Also, so far we can state that the first three assumptions are not violated and therefore it is necessary to study the last assumption.

4. Test for Heteroscedasticity and Correlation

The existence of heteroscedasticity in a model implies the absence of the constant variance over time thus resulting in incorrect model valuations.

Test of the model for Heteroskedasticity.
 We need to prove that the dispersion is variable and not the same.
 In order to test for heteroskedasticity we set up 2 hypotheses:
 <u>H0: the initial model is significant, does not suffer from heteroskedasticity</u>
 Ha: the initial model is not significant, suffers from heteroskedasticity

Table 4: Test of Heteroskedasticity

Heteroskedasticity Test: White				
F-statistic	1.753402	Prob. F(9,22)		0.1359
Obs*R-squared	13.36611	Prob. Chi-	Prob. Chi-Square(9)	
Scaled explained SS	7.529267	Prob. Chi-Square(9)		0.5822
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 01/10/14 Time: 13;01				
Sample: 2005Q1 2013Q4				
Included observations: 36				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
С	0.055947	2.626527	0.021301	0.9832
INFL	0.113046	0.461989	0.244694	0.8090
INFL ²	0.005756	0.033390	0.172383	0.8647
INFL*IBASE	0.003353	0.074851	0.044802	0.9647
INFL*DEFICIT	-2.95E-06	2.21E-06	-1.331143	0.1968
IBASE	-0.023747	0.662028	-0.035870	0.9717
IBASE^2	0.011395	0.049361	0.230844	0.8196
IBASE*DEFICIT	-1.69E-06	4.86E-06	-0.347465	0.7315
DEFICIT	-3.63E-06	3.50E-05	-0.103468	0.9185
DEFICIT^2	1.62E-10	1.35E-10	1.200215	0.2428
R-squared	0.417691	Mean dependent var		0.103579
Adjusted R-squared	0.179473	S.D. dependent var		0.127658
S.E. of regression	0.115636	Akaike info criterion		-1.226434
Sum squared resid	0.294177	Schwarz criterion		-0.768391
Log likelihood	29.62294	Hannan-Quinn criter.		-1.074606
F-statistic	5.753402	Durbin-Watson stat 2		2.132146
Prob(F-statistic)	0.135881			

Source: Eviews

In order to evaluate the hypothesis we used the Fisher test. In our case the factual Fisher =1.75 < critical Fisher = 2.9 so the first hypothesis stands and the model is not exposed to the risk of heteroskedasticity.

The dispersion is not constant and the initial model is significant.

4.1 The Results of the Study

The econometrical analysis performed in order to study the relationship between the yield on the 3-month T-Bill, inflation, the three month base interest rate and the budget deficit has made use of the data in the form of time series from the first quarter of year 2005 to the fourth quarter of 2013.

The analysis shows a positive analysis among the dependent and the independent variables, meaning that the dependent and the independent variable would change in the same direction.

The model build up is proven to be significant. In addition, each of the coefficients of the variables tested through the Student's Test is relevant.

After the tests for auto correlation and heteroskedacticity we can say that the model which best expresses the correlation among variables is the linear model.

The independent variables are certainly interrelated macroeconomic variables, nevertheless the coefficients of correlation show that the correlation is not as significant as to have an important effect on the overall impact that the independent variables have on the depended variable.

5. Conclusions and Recommendation

- 1- Debt markets constitute very important elements of the financial sector and the development of the financial sector of a country is directly linked to economic development. Actually the financial sector in Albania is dominated by banks. They serve as the main financing source and the most significant intermediaries of the financial system.
- 2- The development of the bond market and of the financial sector, thereafter, would result in several positive effects among which we can mention:
 - Enhanced financing opportunities to local governments,
 - Risk management,
 - Lower cost sources of finance,
 - Increase in the effectiveness of the monetary policy.
- 3- Based on the econometrical analysis we can state that there exists a positive linear relationship among the coupon rate of the 3-month T-Bills, the 3-month base rate, inflation and budget deficit. The analysis and the relationship among variables indicates that it is important for the government, aiming at securing internal debt at the lowest rates possible, to try and maintain the base interest rate, inflation and budget deficit at low levels.
- 4- The process of developing a debt securities market is of a long-term nature and it is not an easy one as it requires the coordination of reforms undertaken in the legislative and regulatory aspects with serious investments from the financial institutions who aim at becoming principal actors of the market.
- 5- There are serious efforts to complete the needed legal and supervisory framework thus paving the way to the expansion of the market. On the other hand, we are conscious that the improvement and alignment of the legislation with the developments in the international markets is a constant challenge.
- 6- It becames a necessary criterion to change the existing content of financial market in Albania. The missing financial companies like investment funds, factoring, stock exchange, etc., should be promoted and supervised as an efficient alternative way of financing in secondary/tertiary market level beside the banking system.
- 7- The legal framework improvements is very important drawback. The resolution of existing conflicts is very poor and still it is so. The development of the debt market in Albania. Entails risk relationships amongs businesses who issue debt and other businesses and individuals who invest or buy debt instruments.
- 8- There is no internal rating in existing financial institutions. The opportunity cost of non having rating enterprise is much higher than the cost of neglecting it.
- 9- There are other peripherial factors who serve to accomplisht and perfect the implementation of the process.
- The complementary suggestions and respective interpretatives stressed particularly are as follows:
- Another important policy to be pursued by the government and regulators is to promote the development of the

secondary markets for securities. One way to do so is to agree on market maker actors to a limited number, i.e. 3-4 major banks and then the rest of the actors including business, state institutions and individuals to be able to access the bond market to either buy or sell debt only at the secondary market level.

- An important development would be the promotion of the increase in the number of debt issuers. There is no reason for the central government to be the sole issuer of the debt securities in the role of borrower. Tirana Municipality and other major municipalities with repayment capabilities may issue debt instruments in the market in order to secure the financing of their projects at reasonable cost. The same is valid for the large Albania businesses, which given the current restrictions on the credit available from banks may be exploring possibilities of borrowing directly from the public. We still have to see the interest of the public on such instruments and such interest would constitute a good indicator of the investors perception on the risk associated with municipalities and local companies.
- The setup of an internal rating agency in Albania would be helpful in the development of the debt securities market in Albania. This would also result in banks being not the only actors in the debt securities market in the country. For the time being, the banks in Albania, in absence of local credit rating agencies, are performing such functions internally within their subscribing services.
- Another matter noted during the empirical study was the restricted availability of data. This might be due to the lack of transparency from the Albanian institutions with regard to the information of the public on the important macroeconomic variables.

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