Fiscal Policy, the Main Tool to Influence the Capital Markets’ Strength

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Abstract: - Based on the fiscal & monetary theories derived from the economic works mentioned in the present working paper, we intend to argue that far from being a factor with small influence, as shown in literature, fiscal policy is a major factor influencing capital markets, its influence being found in the behavior of all factors mentioned as important for market capital strength, like interest rates, inflation rates and exchange rates. The aim of this work is to examine the effects of fiscal policy on the strength of capital markets. We also employ machine learning techniques in our research outlining the average daily trading on Bucharest Stock Exchange (BVB).

Key-Words: - Fiscal policy, Capital markets, Interest rates, Inflation rates, Exchange rates, Machine learning

1 Introduction
Fiscal policy, through changes in taxation and spending, is an important tool [38] the central administration utilizes to influence the economy. Based on the fiscal policy, the government is able to control the macroeconomic variables [39] such as aggregate demand, disposable income, and economic activity as a whole. The potential market inconsistency and redistributive objectives are dealt with the same fiscal policy, so as to determine the economic growth.

There is a substantial amount of literature on the topic of financial markets and economic growth, which explain the essential dynamics of financial growth within the economic field [5]: Adam Smith (1776), John Maynard Keynes (1936), Modigliani & Miller (1958), Goldsmith (1969). Various theoretical groundwork can be found in their work, so as to develop substitute premises concerning the question of capital markets - which argues that “sound monetary and fiscal policy helps to develop strong capital markets” [5]. These works advocated for the first time a relationship among stock market behavior and tax policy, jointly measured with the monetary policy.

Important studies on the stock market behavior and monetary policy include: Patelis (1997), Lee Unro (1997), Anderson (2004), Laopodis (2006), (2007) etc. But there are only a small number of studies on the relationship involving fiscal policy and stock market performance [25], most of these studies did not analyze the fiscal actions rather than from the perspective of the concept of "market efficiency" (Lee Unro, 1997; Ali, S.M., 2003; Dromel, 2007). Most recent contributions have focused on micro analyses of the fiscal policy and interest swap spreads (Afonso and Strauch, 2003; Engen, 2004; Faini, 2005), the cyclical response of fiscal policies in the euro area (Golinelli, R. and S. Momigliano 2008), or on event analysis (Laubach T., 2004; Muehleisen M. and C. Tower, 2004).

The foundation of tax policy tested by Ross Levine, was former established by Adam Smith [5], who argued that higher taxes would determine persons with capital stock (who were not tied to a specific country) to invest in countries with lower rates [35]. Anderson issued several statements in this direction [5]:

- interest rates, inflation rates, corporate taxes and exchange rate policy drive the level of investment
the foundations of investment are interest rates.
interest rates directly affect borrowing on credit, a facet essential to investment on capital market.
corporate taxes affect the pay out of an investment. The corporate tax level within a country is often considered before the investment.

Faini’s conclusions [18] from such literature are the following:
• fiscal policy, despite the modality of measurement, matters but its effects are quite small (an important issue which we want to challenge in present paper);
• national fiscal policy causing higher deficits or debt in one country may have impact on the level of interest rates, both nationally currency and for the whole currency union as a whole.

Passing from theory to practice, the contemporaneous reality demonstrates that different countries have different fiscal policies and various capital gains taxes. These might obstruct the possible investors or contrarily. Also, the contemporaneous reality demonstrates that different countries have developed or weakened the capital market. The question that rises in this case is if there exists a correlation between the two realities, which is if the fiscal policy in a country determines the strengths or the flaws of its capital market.

Based on the fiscal and monetary theories derived from the economic works mentioned above, we intend to argue that far from being a factor with small influence, fiscal policy is a major factor influencing capital markets, its influence being found in the behavior of others factors above mentioned as important for market capital behavior, like interest rates, inflation rates and exchange rates. This idea lies at the heart of the analysis in this paper. We reflect on the fiscal policy as an important determinant for the stock market, influencing directly or indirectly all the other factors that determine stock market behavior. We also employ machine learning techniques in our research so as to build decision trees outlining the average daily trading on Bucharest Stock Exchange (BVB).

2 Theoretical considerations

The government fiscal policies determine certain consequences on capital markets. An example of how the administration seeks to influence the investments [5], and obliquely the potency of capital markets can be found on the tax policies and the level of corporate taxes.

As noticed in introduction, the empirical results show (and most researchers agree) that inflation, interest rates, corporate taxes and exchange rates all contribute to the strength of capital markets. Let’s name this proposition P1, premise no.1 and note the variables above as follows:

Inflation rate: \(i\)
Interest rates: \(r\)
Corporate taxes: \(\mu\)
Exchange rates: \(e\)
Strength of capital markets: \(scm\)

Premise number 1 becomes:

\[
P1 : sclm = i + r + \mu + e \quad (1)
\]

In general, the investors who seek top outcome will find interesting countries with low corporate taxes, interest and inflation rates, but also strong exchange rates [5]. The judgment behind our premise, is presented in Table 1:

Table 1. Variables and their influence on investors, adapted from [5]

<table>
<thead>
<tr>
<th>Variables</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation</td>
<td>Low inflation protects the investor from artificially higher prices</td>
</tr>
<tr>
<td>Interest taxes</td>
<td>Lower rates open the market to new investors</td>
</tr>
<tr>
<td></td>
<td>Lower interest rates allow the entrepreneur to receive loans without the</td>
</tr>
<tr>
<td></td>
<td>worry to pay back a massive amount</td>
</tr>
<tr>
<td></td>
<td>Money borrowed through debt or equity loans is invested in different firms</td>
</tr>
<tr>
<td></td>
<td>on the capital market</td>
</tr>
<tr>
<td>Corporate taxes</td>
<td>The influx of capital provides for economic growth and a more robust market</td>
</tr>
<tr>
<td>Exchange rates</td>
<td>Investors looking for the best payoffs will look for a country with low</td>
</tr>
<tr>
<td></td>
<td>corporate taxes</td>
</tr>
<tr>
<td></td>
<td>Countries with a strong exchange rate would have higher levels of direct</td>
</tr>
<tr>
<td></td>
<td>foreign investment</td>
</tr>
</tbody>
</table>

P1 is not a descriptive phrase, but a relationship one, stating the link between variables, namely the strength of capital markets and inflation rates, interest rates, corporate taxes and exchange rates. In P1, Fiscal policy is recognized as a factor in the capital market through the variable “corporate taxes”.

Because corporate taxes (\(\mu\)) represent only a part of fiscal policy, we will consider fiscal policy like a
distinct variable, which include the variable “corporate taxes” as follows:

Fiscal policy: pf

\[ \mu \neq pf, \text{ but } \mu \subset pf, \text{ so } \mu = f(pf) \]  (2)

becomes the premise no. 2, P2.

Lower inflation rates increase investor confidence generating more investment, with whom capital markets are stronger. According Anderson’s research, as soon as the inflation becomes significantly superior to the interest rates, there will be a weaker economic development in capital markets [5]. The rationalization is based on the expectation of a negative rate of return on the investment which discourages the investors. High inflation rates within a country also generate higher interest rates, who determine the enhancement of private savings. The high interest rates abate investments and suppress the capital and economic development [5]. So, according to P1, inflation affects capital market. The problem is to see if there are a relationship between inflation and fiscal policy. A government usually collects revenues through levying taxes or fees on goods, services, consumption or incomes of businesses and individuals. High government expenditure (by investing in infrastructure or services) determines a high demand (for goods and services). Reducing taxation may encourage investments and production, thus increasing the supply (for services and goods). As a result, fiscal policy can manipulate the drivers of inflation, demand and supply. Let’s name this proposition, premise no 3, P3.

\[ P3: \quad i = f(pf) \]  (3)

Regarding interest rates, as we show before, most researchers highlight its impact on capital markets’ strength; several authors emphasizing that it have a psychological effect on many investors. “When investors observe a low interest rate, then they believe the incentive of investing will be superior to the risk of borrowing.” [5]. The conclusion is that a policy change would cause an increase of investment within the country which would strengthen the capital market. The question is if exists a determination between fiscal policy and interest rates. We also found several opinions in the mentioned research literature. The combined reaction of trade balance, consumption and real exchange rate can be found on Perotti and Monacelli’s studies[31]. Corsetti and Müller (2006) review the trade reaction [33]. There can be observed an obvious connection between fiscal policy and exchange rates. Let’s name this proposition, premise no 5, P5.

\[ P5: \quad e = \bar{f}(pf) \]  (5)

From the cited research literature incursion follows that the cited authors agree on the existence of the relationships, therefore we can sustain the accurateness of the premises.

3 Practical machine learning study

For the practical part of our research have called for a series of specific technologies in the field of data mining [43], namely decision trees (graphs used to see all the potential results of decisions) and model trees (which store at each leaf a linear regression model predicting the class value of instances that reach the leaf).

These extracts were applied to sets of data from the National Bank of Romania, Bucharest Stock Exchange and National Institute of Statistics, containing the following variables during the years 2003-2010: net product taxes, inflation, gross domestic product, national currency exchange rates (eg.RON-US Dollar), monetary policy interest rate, average daily trading on Bucharest Stock Exchange (BVB).

Decision trees were generated in the WEKA software, using the following methods: REPTree and M5P.

The REPtree method built a decision tree using information gain/variance reduction and pruned it using reduced-error pruning in the following manner [43]:

- only sorted values for numeric attributes once due to its speed optimization optimized for speed;
- dealt with missing values by splitting instances into pieces, as C4.5 another traditional algorithm does.

For the REPtree application we set the following options: minimum number of instances per leaf(1), minimum proportion of training set variance for a split (0.0010), and number of folds for pruning (3). The generated REPtree in textual form has the following structure:
RON_USD_exch >= 2.98
| Net_product_taxes <= 38564.4  
| Net_product_taxes > 38564.4  
| monet_policy_interest_rate < 7.71 : 21,963,215.37 (1/0)  
| monet_policy_interest_rate >= 7.71 : 954,201,957.27 (1/0)  
| Net_product_taxes >= 38,564.4  
| monet_policy_interest_rate < 7.71 : 21,963,215.37 (1/0)  
| monet_policy_interest_rate >= 7.71 : 954,201,957.27 (1/0)  
RON_USD_exch < 2.98
| Inflation_rate < 5.7 : 55,210,722.58 (1/0)  
| Inflation_rate >= 5.7  
| Inflation_rate < 7.21 : 3,989,6347.16 (1/0)  
| Inflation_rate >= 7.21  
| Net_product_taxes < 45365 : 31,618,358.1 (1/0)  
| Net_product_taxes >= 45365 : 27,801,599.15 (1/0)  

From this we can observe the importance of the variable Net_product_taxes in the model tree, for being the root node. Under a value below the 30203.6 RON it determines the LM1 model. The next split is found at the variable RON_USD_exchange rates which, by exceeding the value of 2.982 RON per U.S. Dollar, determines the LM4 model. The last split is the Inflation rate that ultimately determines LM2 and LM3 models.

Based on each model’s indicator we can observe that the model LM2 (50%) is the most representative of this tree, distantly followed by LM1 (17.538%).

It is important to notice that there are certain common issues among both generated trees:

- Net_product_taxes appears in both as one of the main nodes
- the RON_US dollar exchange rate is around the edge 2.98 influencing the BV stock average daily trading
- also the inflation rate around the 7.21% edge has a vast role in the BV stock average daily trading.

5 Conclusions

This work examines the effects of fiscal policy on the strength of capital markets. Although most of authors consider a small influence of fiscal policy on capital market, we argued that fiscal policy can be an successful instrument for alleviating business rotations. The novelty of our work consists of the idea that fiscal policy can be used by the government like very effective means to deal with potential market inconsistencies and to attain redistributive goals. In this fashion, fiscal policy determines a positive development of the economic background and strengthens the capital markets.

We propose in our future research to deeply analyze the influence of fiscal policy on the capital market in Romania, and extend it to the European Union countries. Investors looking to enhance their profits will always search for a place with low corporate taxes, interest and inflation rates, as well as strong exchange rates. All this can be attained through a sound fiscal policy, considered together with a sound monetary policy.

Acknowledgement

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