
Business Administration and Business Economics

**Analysis of the Role of Export
Value on the Reserve of South Africa**

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Abstract: South Africa's reserve played a vital economic defence role during the economic crises of the recent past. However, little research has examined the relationship between export value and the reserve of South Africa. This paper contributes by assessing the impact of four independent variables (export value, government effectiveness, foreign direct investment and GDP) on the reserve of South Africa. Data were from the World Bank Archives of Global Financial Indicators and from the World Bank Archives of Governance Indicators from 1996 to 2014. A cointegration and the OLS regression test showed a long run relationship between export value, government effectiveness, foreign direct investment and the reserve of South Africa. The Granger causality test revealed that foreign reserve may influence export value (unidirectional), and that reserve may enhance government effectiveness. The paper offers policy recommendations that may improve the level of reserve and provides an agenda for further research.

Keywords: export value; reserve; economic growth; governance; public policy

JEL Classification: D4; D24; O4

1. Introduction

In this paper, the author attempts to evaluate the influence of export value on the total reserve of South Africa. This research is significant given the acclaimed critical role of a nation's reserve as a shock absorber against external economic turbulence and internal inflation cushioning. The paper is also pertinent because South Africa's economic and financial credibility has recently come under scrutiny with attendant uncertainty by international rating agencies. However, a nation's reserve plays a vital economic defence role against any form of financial turbulence or economic crises (Rodrik, 2006). South Africa's previous reserve cushioned the country against the recent-past global financial crisis. However, whilst much research exists on the benefits of foreign reserve on economic stability, little exists in existing research on the unique effect of the export value on the total reserve of South Africa. This paper

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is unique as it goes beyond export value effect on foreign research; it also looks into the likely effect of foreign direct investment and governance effectiveness on foreign reserve. Inclusion of governance effectiveness became apposite since Aizenman and Marion (2004) highlight that political economy might influence the level of reserve, but the truism in this assertion remains untested in South African setting. Another genre of literature point to the fact that economic policies affect government effectiveness (Dunleavy, 2014; Ilzetzki et al. 2013; Stiglitz & Rosengard, 2015; Fernández-Villaverde et al, 2015). However, the salient relationship between export value, reserve and the implication on government effectiveness is not common in South African literature.

2. Research Problem

The global financial crisis of the recent past galvanises the need for strengthening financial and economic policies (Rey, 2015). Research indicates that trade, investment and the concomitant creation of foreign reserve are vital ingredients to enhance governance (Jensen, 2003; Globberman & Shapiro, 2002). Interdependencies between economic policies, trade and investment deserve understanding for policy makers and administrators to strengthen economic progress of nations (Sternberg, 2015). Whilst some literatures have highlighted export-led growth in reserve, others have also indicated the importance of governance effectiveness, foreign direct investment (FDI) and GDP on reserve (Aizenman & Marion, 2004; Stevens & Lipsey, 1992; Aizenman, Cheung & Ito, 2015). However, to the best of the researcher's knowledge, no current research in South Africa has attempted to explore the combined relationship between the four independent variables (export value, governance effectiveness, FDI, and GDP) on the reserve of South Africa. Therefore, this paper aims to bridge this gap in the literature within the South African context and therefore contribute a new knowledge to the literature by analysing the combined relationship of the above four independent variables on the reserve of South Africa. The outcome of the analysis should provide a policy direction for improving reserve and as well, serve as an agenda for academic and research debate.

The following sections of the paper proceeds as follows. Immediately after the introduction, the paper presents a review of related literature. This is followed by the methodology and data analysis section. The final section presents the conclusion and recommendations.

2.1. Research Questions and objectives

Drawing from the preceding research problem, this research attempts to provide an answer to the following questions:

- How does export value relate to reserve?;

- Does governance effectiveness have a relationship with reserve?;
- What is the relationship between the GDP and reserve?;
- Does foreign direct investment relate to reserve?.

Therefore, given the research question above, this research reclines on the following objectives:

- to examine the relationship between export value and reserve;
- to evaluate the relationship between governance effectiveness and reserve;
- to analyse the relationship between the GDP and reserve;
- to assess how foreign direct investment relates to reserve.

3. Related Literature

In their analysis of precautionary demand for international reserves, Aizenman and Marion (2004) demonstrated that political issues might affect the amount of foreign reserve of a nation. They equally provide a stunning evidence to demonstrate that political venality tend to diminish the level of commitment by government to increase reserve in preference to increased external borrowing, which has the tendency of plunging a nation to greater financial risk and instability. As emerging markets exports increases, there is a higher propensity to accumulate enough income to pay off debts. This is why a decline in international debt of emerging markets has been found to boost their international reserves (Lane & Milesi-Ferretti, 2007). Higher reserve and/or growth in reserve against debt accumulation absorb countries from financial crisis (Bussière, Cheng, Chinn & Lisack, 2015). In a study on the effect of export on growth in India, the cointegration and Granger causality tests disclosed no long run association between economic growth and export values (Kumari & Malhotra, 2014); differing results in past research findings are attributed to variations in timing of data, proxies of variables used and analytical techniques (Kumari & Malhotra, 2014). A slight difference is notable in the findings of export led growth research in Europe; export diversification and portfolio increase amongst trading partners might add more value to growth (Ribeiro, Santos & Carvalho, 2013). Export-led growth and reserve accumulation has therefore been found to have a strong statistical relationship in current research (Srinivasan, Mahambare & Ramachandran, 2015). Nevertheless, the relationship that exists between exports and reserves can be conditional upon trade intensity and/or composition (Aizenman, Cheung & Ito, 2015).

Related study, which applied econometric approach within the Southern African Development Community (SADC) have shown a long-run positive relationship between export of manufactured products and economic growth of the region

(Mosikari, Senosi & Eita, 2016). Similarly, in another current exploratory review paper, Odhiamb and Malefane (2016) found a linkage between exports and economic growth of Lesotho; emphasis is on the need for exports to emanate be from manufacturing sector to enhance economic growth (Odhiamb & Malefane, 2016). These findings have been corroborated by another research from Kosovo, which concludes that the reserve of a nation can be enhanced through domestic production of goods and a properly strategized export oriented economy; this is important to avoid a country's spending outweighing its income (Merovci1 & Sekiraça, 2014). Other research has also supported earlier findings of export enhancement potential on economic growth (Iyidoğan et al, 2017; Shirazi & Manap, 2005). However, the levels of sophistication of goods play a significant role in enhancing economic growth (Jarreau & Poncet, 2012).

Despite the burgeoning extant research on export-led growth, little research has examined specifically the relationship between export value, reserve and government effectiveness in South Africa. Therefore, this paper hopes to contribute by adding this genre of analysis from the South African perspective to the existing literature.

4. Research Method

The paper adopted a quantitative research approach by using the ordinary least square and Pairwise Granger Causality regression. Data were collected from the World Bank Archives of Global Financial Indicators and from the World Bank Archives of Governance Indicators covering from 1996 to 2014. Data analysis was first conducted by performing the co-integration test, followed by the Granger Causality test (Granger, 1969); thereafter the regression model for this paper was tested to determine the extent of relationship by using the least square approach. The Eviews Software was used in conducting the analysis.

The regression model:

$$\gamma = \beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2 + \beta_3 \chi_3 + \beta_4 \chi_4 + \varepsilon$$

where:

Y = Total reserve;

b_0 = Y intercept ;

b_{1-4} = regression coefficients;

χ_1 = export value.

Control variables:

χ_2 = Government effectiveness (GE);

χ_3 = foreign direct investment (FDI);

χ_4 = GDP;

e = error.

5. Analysis of Results

Table 5.1. Cointegration Test

Sample (adjusted): 1998 2014				
Included observations: 17 after adjustments				
Trend assumption: Linear deterministic trend				
Series: X1 X2 X3 X4 Y				
<i>H0: variables are not cointegrated at 0.05</i>				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.950091	135.3786	69.81889	0.0000
At most 1 *	0.881545	84.42026	47.85613	0.0000
At most 2 *	0.848761	48.15548	29.79707	0.0002
At most 3 *	0.572160	16.04429	15.49471	0.0413
At most 4	0.090423	1.611190	3.841466	0.2043

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: author's statistical analysis

Table 5.2. Granger Causality Tests

Pairwise Granger Causality Tests			
Sample: 1996 2014			
Lags: 2			
Where: χ_1 = export value; χ_2 = Government effectiveness;			
χ_3 = foreign direct investment; χ_4 = GDP			
Null Hypothesis:	Obs	F-Statistic	Prob.
X2 does not Granger Cause X1	17	1.27077	0.3158
X1 does not Granger Cause X2		18.9687	0.0002
X3 does not Granger Cause X1	17	1.31264	0.3051

X1 does not Granger Cause X3		2.63288	0.1127
X4 does not Granger Cause X1	17	0.52119	0.6067
X1 does not Granger Cause X4		0.90106	0.4319
Y does not Granger Cause X1	17	18.8783	0.0002
X1 does not Granger Cause Y		0.60599	0.5614
X3 does not Granger Cause X2	17	2.59990	0.1153
X2 does not Granger Cause X3		3.04954	0.0849
X4 does not Granger Cause X2	17	1.97916	0.1808
X2 does not Granger Cause X4		1.15636	0.3473
Y does not Granger Cause X2	17	39.6629	5.E-06
X2 does not Granger Cause Y		0.22042	0.8054
X4 does not Granger Cause X3	17	1.29904	0.3085
X3 does not Granger Cause X4		0.56933	0.5805
Y does not Granger Cause X3	17	3.03427	0.0858
X3 does not Granger Cause Y		1.23732	0.3247
Y does not Granger Cause X4	17	1.03635	0.3844
X4 does not Granger Cause Y		0.36930	0.6988

Source: author's statistical analysis

Table 5.3. Ordinary Least Square (OLS) Test Result

Dependent Variable: Y				
Method: Least Squares				
Sample: 1996 2014				
Included observations: 19				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.23657	7.661786	1.988645	0.0667
X1 (ExportValue)	0.128434	0.016776	7.655621	0.0000
X2 (GovEffectivenss)	-30.23358	9.387059	-3.220772	0.0062

X3 (ForeignDI)	0.606126	0.293077	2.068142	0.0576
X4 (GDP)	-0.262093	0.570492	-0.459416	0.6530
R-squared	0.976555	Mean dependent var		24.29474
Adjusted R-squared	0.969857	S.D. dependent var		18.23575
S.E. of regression	3.166046	Akaike info criterion		5.363778
Sum squared resid	140.3339	Schwarz criterion		5.612315
Log likelihood	-45.95589	Hannan-Quinn criter.		5.405841
F-statistic	145.7882	Durbin-Watson stat		2.611878
Prob(F-statistic)	0.000000			

Source: Author's statistical analysis

Table 5.4. Normality Test: Jarque-Bera Test for Normality

<p><i>Ho: Data is not normally distributed</i> <i>Since P = 0.023, we reject the null hypothesis, hence research data is normality distributed</i></p>	
<p>Series Residuals Sample 1996 – 2014 Observations 19</p>	
Mean	-7.64e-15
Median	0.045796
Maximum	8.321059
Minimum	-5.246968
Std. Dev.	2.792190
Skewness	0.948256
Kurtosis	5.418251
Jarque_Bera	7.477051
Probability	0.023789

Source: Author's statistical analysis

Table 5.5. Heteroskedasticity Test: ARCH

<p>Heteroskedasticity Test: ARCH <i>Ho: there is no ARCH effect</i> <i>Since P > 0.05, we accept the null hypothesis that there is no Arch effect</i></p>			
F-statistic	0.213469	Prob. F(6,6)	0.9589
Obs*R-squared	2.286915	Prob. Chi-Square(6)	0.8915

Source: Author's statistical analysis

6. Discussion

This paper aimed at examining how export value relates to the reserve of South Africa, in doing this, the researcher added other three variables highlighted in the literature as having potential relationships with reserve, which are governance effectiveness, FDI and GDP. The preceding analysis from the OLS show that, indeed export value relates to reserve within the period of analysis, but the relationship is unidirectional because the Granger causality test shows that reserve might affect the level of export. Similarly, the Granger causality test shows that the reserve of South Africa might affect the level of government effectiveness. This might be plausible, as a nation with enough reserve would use available financial resources to provide service delivery rather than servicing of accumulated debts. The statistical results can be interpreted to be valid since the normality and heteroskedasticity tests indicate that research data were normally distributed and that there is no Arch effect – showing there is no heteroskedasticity. In addition, although the Granger causality test does not show causal effect on FDI, but the OLS results show that foreign direct investment (FDI) might boost the reserve of South Africa, this is noteworthy for economic policy makers. This finding can be comparable to the findings of Temiz and Gokmen (2014) in which they find relationship between FDI, balance of payment and export value.

7. Conclusion & Future Direction for Research and Policy

Results from the analysis of data, has shown that a relationship does exist between South Africa's reserve and export value. However, the relationship is unidirectional since the findings show that reserve might affect the level of export value. A noteworthy finding is that South Africa's reserve might affect the level of government effectiveness and level of export value. Additionally, FDI is depicted to have a relationship with the reserve of South Africa. These findings offer important economic policy and future research implications. Rather than preference to the importation of goods, South Africa's economic policy should assume a radical stance by encouraging manufacturing-FDI inflow as this might improve the level of reserve, thereby reducing borrowing and debt servicing; this will enable the channelling of internally generated revenue to basic service provision. In addition, given the dire need for improved government effectiveness in South Africa, the paper recommends that economic policies should encourage a boost in the level of manufactured exports to increase the reserve of the nation. Such policies might include financial liberalisation that would enable the growth of private finance businesses and improved local manufacturing businesses, which exists in developed countries.

Future research is apposite to add corruption to the regression model to ascertain the likelihood that corruption might affect the level of reserve.

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Analysis of Plant Layout Design for Operational Efficiency with Craft Algorithms

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Abstract: This paper presents an exhaustive analysis of a pulley factory layout design for operational efficiency and effective production. Focusing exclusively on the pulley factory layout problem in a Thai factory, this study applies Craft algorithm to analyse the layout and arrive at an effective design. The analyses reveal that CRAFT algorithms ease free flow of materials and personnel at the least cost, minimize distance travelled and improve the original layout by twenty percent (32%). For this reason, the new layout design witnesses flexible operations, effective functionality, and meet cost savings objectives. Therefore, it is recommended that operation managers should adopt the Craft algorithm program to overcome material flow obstruction and ineffective operations resulting from ineffective layout designs.

Keywords: Pulley Factory Layout Design; Operational Efficiency; Material Handling Cost; Distance Travel; Craft Algorithm

JEL Classification: C12; C18; C52; C55

1. Introduction

Plant or facility layout design refers to a plan of an optimum arrangement of facilities including personnel, operating equipment, storage space, material handling equipment and all other supporting services along with the design of the best structure to contain all these facilities (Moore,1962; Telsang, 2007). It is one of the most significant current discussions in production and operations management. A good layout design well suited to the manufacturing philosophy is a sine qua non for

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effective production and efficient operations in any organization. The objective being to have quick and easy flow of material at the lowest cost and with the least amount of handling in processing the product from the receipt of material to the shipment of the finished product (Singh & Sharma, 2006; Tompkins, 2003), increase output and facilitate the control of information and material flows (Fu & Kaku, 1997; Parveen & Ravi, 2013), and decrease the work in process (WIP) and the throughput times (TT) (Asking & Standridge, 1993).

However, many organizations especially manufacturing firms suffer from a number of operational constraints owing to poor layout design. For example, a poorly conceived layout can also result in congestion, prohibitive material handling cost, increased accidents, decreased inventory space (Banjoko, 1998; Vaidya, 2013) or it can lead to accumulation of work in process inventory, overloading of material handling system, inefficient setups and material flow obstruction (Anucha, Phichit, Patcharee & Wisitsree, 2011). The implication is that 20% to 50% of total operating manufacturing costs related to material handling activities could be increased by 10% to 30% annually with inefficient facility layout design (Filippo, Maria, Orlando & Mario, 2013).

A number of study have attempted to explore the influence of facility layout design on operational efficiency in some manufacturing firms (Anucha et al, 2011; Drira, Pierreval & Gadony, 2007; Pinto & Shayan, 2007; Tao, Wang, Oioao & Tang, 2012; Telsang, 2007; Vaidya, 2013; Yifei, 2012). This study is an extension of the work carried out by Anucha et al, (2011) with emphasis on quantitative analyses of facility layout design. Anucha et al's work was descriptive in nature lacking quantitative support and largely based on intuition. This paper is presented in five sections. Initial introduction is followed by review of relevant literature on facility layout design and operational efficiency. Section three explains the methodology of the research while section four analyses the original layout with Craft algorithm. Section five discusses the results and concludes the paper.

2. Literature Review

The subject of plant layout design and organisation operational efficiency has aroused the interest of many research scholars. In 1991, Francis & White surmised that proper analysis of the layout design is a vital prerequisite for running an efficient and cost effective business. They concluded that effective layout design is the result of an improvement in any production line. This necessitates sufficient evidence in the literature to suggest that optimising plant layout can improve safety and quality of products, ease free flow of materials and personnel, and thereby enhance organisations operational efficiency (Apple, 1977; Banjoko, 1998; Hassan & Hogg, 1991; Muther, 1995; Pinto & Shayan, 2007).

The efficiency of operations and production depends on how well the various machines, services production facilities and employee's amenities are located in a plant. Parveen & Ravi (2013) established this evidence in their study on a review of metaheuristic approaches to solve facility layout problem, that Particle Swarm Optimization (PSO), Genetic Algorithm (GA) and Tabu Search (TS) are used to optimize the multi-objective layout problem. They added that facility layout directly depends on safe movement of personnel and machine between and within departments. The study affirmed that intelligent optimization approaches enhance minimization of material handling cost, ease free flow of materials at the least cost, and minimise total closeness between machines/departmental and total distance travelled. In another study, Yifei (2012) analysed facility layout design with random demand and capacitated machines in a stochastic environment where demand is uncertain. The study reveals that distributed layout minimized the total expected material handling cost subject to arrangement of production facilities within a plant.

Some scholars have argued that efficient material flow and closeness rating factors are two common variables necessary for optimum design of manufacturing cell layout in any organization whose management philosophies are productive and efficient operations. For instance, Ghosh & Dan (2012) addressed the problem of manufacturing cell formation using simulated annealing metaheuristic approach. The findings showed that metaheuristic approach is extremely effective and efficient in term of solution quality for designing effective layout. Corroborating this view, Vaidya (2013) in a study of plant layout design asserted that a good facility layout is essential to efficient production and complete success in an organisation. The study showed that the most important factors for effective plant layout were the location, materials flow and the machinery or capital investment. The reason is because capital investment requires huge amount of money. If layout planning is done poorly, the company would incur losses which would affect growth. Even if the correct machineries were bought, maintenance cost could be high.

Aligned with the foregoing, Anucha et al (2011) presented analysis of plant layout for effective production in a pulley factory in Thailand. They observed obstruction in material flow caused by poor layout design. The plant layout, operation process of each section and the materials flow of each operation were identified. Theoretically, the result showed that disassembly surface, finishing and inspection sections should be arranged to enhance free flow of materials, minimize accidents and distance travelled of materials, and thereby increase productivity. Consequently, the piece that seems to be missing from the work of Anucha et al (2011) is the quantitative support for the subject matter. This is the basis of this study and the gap this research intends to fill.

3. Research Methodology

3.1. Modelling Approach

The main objective of this study is to provide a quantitative analysis of the pulley factory layout design for effective production and operations. Specifically, the study examines how material handling system, material flow and distance travel of material improve productivity and operational efficiency. The study employs the computer-based Craft algorithm to analyse the secondary data adapted from the work of Anucha et al (2011). The main objectives of the Craft program is the minimization of the total cost of distance travelled between facilities. Stated mathematically, we have

$$\text{Min } C = \sum_{i=1}^m \sum_{j=1}^n f_{ij} d_{ij}$$

Where f_{ij} is the number of flows / loads or movements between facilities i and j
 d_{ij} is the distance covered between facilities i and j ($i=1,2, n$) ($j= 1,2, m$).

3.2. The Craft Algorithm: Requirements and Basic Assumptions.

The Craft Program requires the following:

- The initial layout;
- The flow matrix;
- The cost matrix; and
- The number, sizes and locations of departments.

While basic assumptions of the Craft Program assumed in this study include:

- The flow and distance matrices are symmetrical;
- A move from one department to the other costs 1Thai Bayt (Thailand currency);
- No restriction exist as to where a particular department should be sited;
- And movement costs have linear relationship with distance.

4. Analysis of Original Layout with Craft Algorithm

This research focuses on factory layout design and operational efficiency with particular reference to the Thai pulley factory layout problem captured in the work of Anucha et al (2011). The factory adopts process layout design for the initial plant layout as shown in fig 1. Area of each department and the number of equipment/machine movement are presented in Table 1 while Table 2 represents

flow of equipment. The operation is described as follows. Initially, metals from scrap yard were moved to furnace for melting, along with core making and store then followed the sand mold, disassembly and furnace finish. The pulleys are investigated by inspection section where work is inspected to know whether the work has defect or not. The work with defect identified will be sorted out while the work with no defect will be sent to warehouse to wait for delivery to customers (Anucha et al, 2011).

Table 1. Area of department and material handling

S/N	Department	Total working area (M ²)	Material handling
1	Scrap yard	33	-
2	Core making	29.4	-
3	Melting casting (furnace)	106.2	6
4	Core store	25.92	-
5	Sand plant	212.4	2
6	Sand mold by machine	386.56	-
7	Disassembly surface	19.47	1
8	Inspection	98.15	-
9	Sand warehouse (packaging)	35	1
10	Raw Material	48.01	-
11	Inventory	2.25	1
12	Sand mold by hand	53.1	-

Source: Anucha et al (2011)

Table 2. Number of equipment and machine movement between departments

To/From	1	2	3	4	5	6	7	8	9
1	-	-	1	-	-	-	-	-	-
2	-	-	-	10	-	-	-	-	-
3	-	-	-	-	-	2	-	-	-
4	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	2	-	-	-
6	-	-	-	-	-	-	16	-	-
7	-	-	-	-	-	-	-	2	-
8	-	-	-	-	-	-	-	-	1
9	-	-	-	-	-	-	-	-	-

Source: Anucha et al (2011)

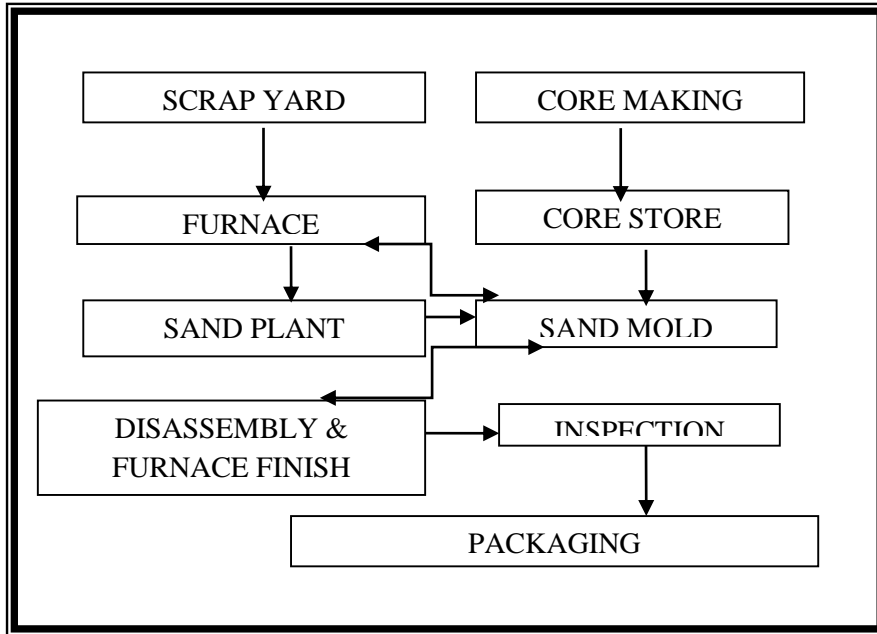


Figure 1. Process layout design (Anucha et al, 2011)

Table 3. Distance matrix of the initial layout

To/From	1	2	3	4	5	6	7	8	9
1	-	1	1	1	2	2	3	3	4
2	-	-	1	1	2	2	3	3	4
3	-	-	-	1	1	1	2	2	3
4	-	-	-	-	1	1	2	2	3
5	-	-	-	-	-	1	1	1	2
6	-	-	-	-	-	-	2	1	2
7	-	-	-	-	-	-	-	1	1
8	-	-	-	-	-	-	-	-	1
9	-	-	-	-	-	-	-	-	-

Source: Computed from initial layout presented by Anucha et al (2011)

The initial cost of the original process layout of the pulley factory is calculated first before analysis of craft algorithm is incorporated.

Table 4. Initial Cost Matrix

To/From	1	2	3	4	5	6	7	8	9	Total cost
1	-	0	1	0	0	0	0	0	0	1
2	-	-	0	10	0	0	0	0	0	10
3	-	-	-	0	0	2	0	0	0	2
4	-	-	-	-	0	0	0	0	0	0
5	-	-	-	-	-	2	0	0	0	2
6	-	-	-	-	-	-	32	0	0	32
7	-	-	-	-	-	-	-	2	0	2
8	-	-	-	-	-	-	-	0	1	1
9	-	-	-	-	-	-	-	-	0	0
										B50

The total cost of this initial layout is 50 Thai-Bayt. To improve on this initial layout cost, Craft algorithm is employed to rearrange the department. Departments with the highest cost from the initial cost matrix are relocated closer to each other. As a result, this rearrangement of departments is reflected in the improved layout shown in fig 2 and fig 3 and the corresponding improved layout cost are shown in table 6 and table 8 respectively.

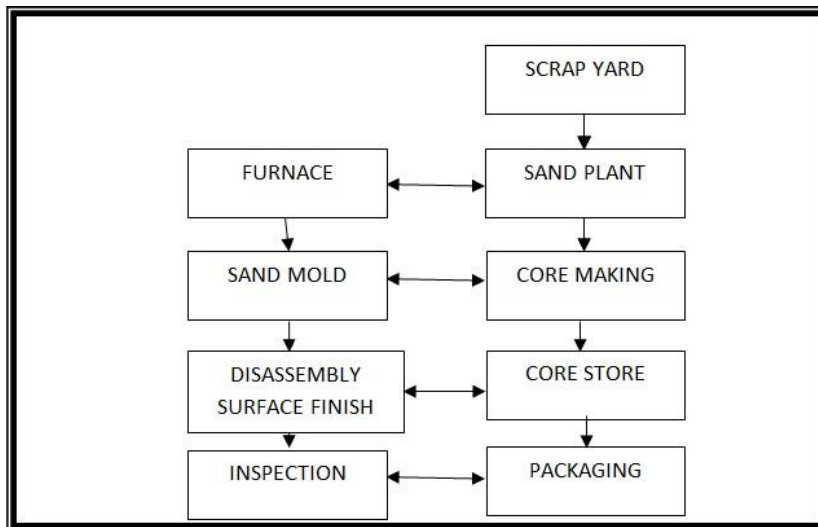


Figura 2. First improved layout

Table 5. Distance of the first improved layout

To/From	1	2	3	4	5	6	7	8	9
1. 1	-	2	1	3	1	2	3	4	4
2. 2		-	1	1	1	1	1	2	2
3. 3			-	2	1	1	2	3	3
4. 4				-	2	1	1	1	1
5. 5					-	1	2	3	3
6. 6						-	1	2	2
7. 7							-	1	1
8. 8								-	1
9. 9									-

Source: Computed from the first improved layout

Table 6. First improved cost matrix

From/To	1	2	3	4	5	6	7	8	9	Total Cost
1. 1	-	0	1	0	0	0	0	0	0	1
2. 2		-	0	10	0	0	0	0	0	10
3. 3			-	0	0	2	0	0	0	2
4. 4				-	0	0	0	0	0	0
5. 5					-	2	0	0	0	2
6. 6						-	16	0	0	16
7. 7							-	2	0	2
8. 8								-	1	1
9. 9									-	0
										34 Thai- Bayt

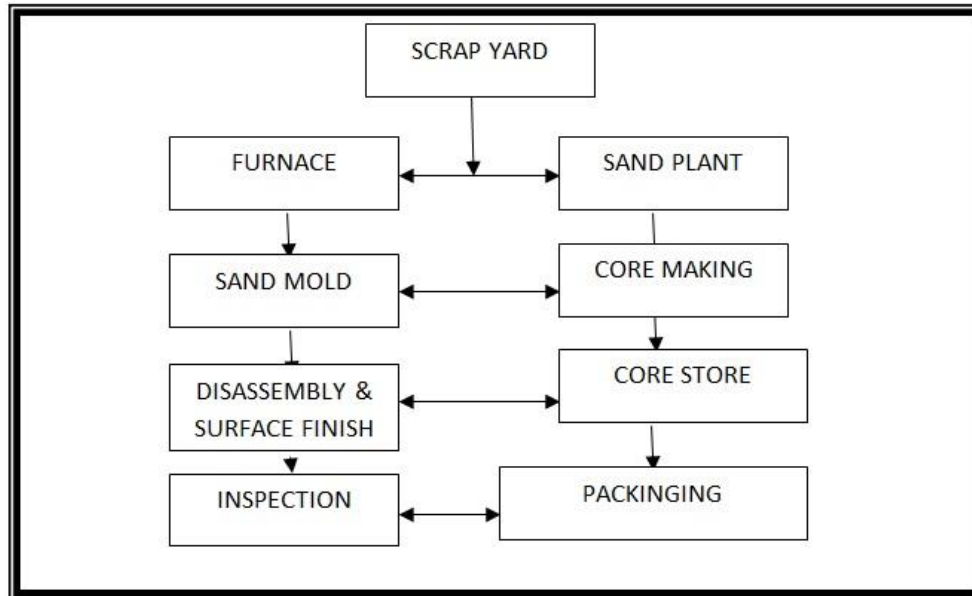


Figura 3. Second improved layout

Table 7. Distance of the second improved layout

To/From	1	2	3	4	5	6	7	8	9
1. 1	-	2	1	3	1	2	3	4	4
2. 2		-	1	1	1	1	1	2	2
3. 3			-	2	1	1	2	3	3
4. 4				-	2	1	1	1	1
5. 5					-	2	2	3	3
6. 6						-	1	2	2
7. 7							-	1	1
8. 8								-	1
9. 9									-

Table 8. Second improved cost matrix

To/From	1	2	3	4	5	6	7	8	9	Total cost
1. 1	-	0	1	0	0	0	0	0	0	1
2. 2		-	0	10	0	0	0	0	0	10
3. 3			-	0	0	2	0	0	0	2
4. 4				-		0	0	0	0	0
5. 5					-	4	0	0	0	4
6. 6						-	16	0	0	16
7. 7							-	2	0	2
8. 8								-	1	1
9. 9									-	0
										36 Thai-Bayt

There is no feasible way of reducing further the material handling cost (34 Thai-Bayt) obtained in table 6. Any attempt to improve further would result in the outcome obtained in table 8 (36 Thai-Bayt). Consequently, the best layout of departments in terms of the material handling cost is 34 Thai-Bayt shown in table 6 by layout design in fig 2.

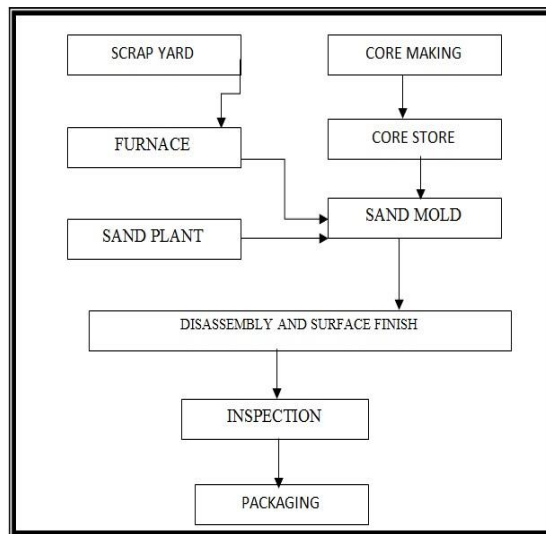


Figure 4. Improved layout (Anucha et al, 2011)

Table 9. Distance matrix layout (Anucha et al, 2011)

To/From	1	2	3	4	5	6	7	8	9
1. 1	-	1	1	1	2	2	3	4	5
2. 2		-	1	1	2	2	3	4	5
3. 3			-	1	1	1	2	3	4
4. 4				-	1	1	2	3	4
5. 5					-	1	1	2	3
6. 6						-	1	2	3
7. 7							-	1	2
8. 8								-	1
9. 9									-

Table 10. Cost matrix layout

To/From	1	2	3	4	5	6	7	8	9	Total cost
1	-	0	1	0	0	0	0	0	0	1
2		-	0	10	0	0	0	0	0	10
3			-	0	0	2	0	0	0	2
4				-		0	0	0	0	0
5						2	0	0	0	2
6						-	16	0	0	16
7							-	2	0	2
8								-	1	1
9									0	0
										34 Thai-Bayt

Source: Researchers' analysis

Anucha et al's (2011) layout design is also subjected to quantitative analysis. The study revealed material handling cost of 34 Thai-Bayt as shown in table 10. The implication is that Anucha's layout cost is similar to this study's improved layout cost which was obtained using the Craft method.

5. Results and Conclusions

In this study, analysis of factory layout design in the pulley factory in Thailand was conducted quantitatively in order to overcome material flow obstruction resulting from ineffective layout design. The study employed the Craft algorithm program to improve the initial layout of the pulley factory by minimization of material handling costs, material flow and distance travel for effective production and operations. Given the initial layout of the pulley factory, material flow matrix and the initial distance matrix, the initial cost of the pulley factory layout was 50 Thai Bayt and was obtained by multiplying the distance matrix by the number of flows between

departments as showed in table 4. To improve on this initial layout, Craft algorithm was employed and the departments with highest cost from the initial cost matrix were relocated closer to each other. As a result of this, improved layout was designed and the total layout cost was 34 Thai Bayt. Thus, the original layout was improved by 32% resulting in efficient operations and effective production. In addition, attempt was made to evaluate the improved layout to determine whether further improvement is possible. The study revealed that such attempt could push total costs beyond the current amount of 34 Thai-Bait because the minimum possible cost has been obtained as shown in Table 6. Consequently, the best layout for the departments in terms of material handling cost is the first improved layout obtained by Craft method as revealed in Table 6.

In addition, efforts were also made to subject Anucha et al's layout (2011) to quantitative analysis. The findings showed the same result with the result obtained by Craft algorithm. Although, Anucha et al (2011) have carried out an accurate analysis of the departmental pulley factory layout design descriptively, however, this study has been able to confirm this result quantitatively. Hence, it is concluded that Craft algorithm is an attractive improvement tool to minimize material handling cost, enhance free flow of materials, reduce distance travel for materials and to eliminate unnecessary obstruction of material flow through effective design of plant/factory layout for optimum production and efficient operation.

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The Effect of Tax Understanding, Tax Payness Consciousness, Quality of Tax Service, and Tax Sanctions on Compulsory Tax of SMEs in Banyumas Regency

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Abstract: The main aim of this research is to examine the effect of understanding the level, awareness to pay taxes, tax services quality and tax penalties on SMEs tax compliance. The type of this research is quantitative research using survey method. The population in this research is SMEs in Banyumas. The selection of sample using purposive sampling method, with the amount 60 SMEs. In this research using primary data. Data collection techniques are distributing questionnaires to SMEs owner. The analytical method used in this research is multiple linear regression analysis. The research show that implementation of examine taxation understanding level, awareness to pay taxes, tax services quality and tax penalties have positive and significant effect on SMEs tax compliance. The result of adjusted R square examination show that the effect of the understanding level, tax awareness, tax services quality and tax penalties on SMEs tax compliance in Banyumas by 64.5% while the remaining 36.5% is explained by factors is not examined.

Keyword: tax understanding; awareness to pay taxes; tax service quality; tax penalties; and tax compliance

JEL Classification: M40; M42

1. Introduction

In this era of globalization, many developing countries are beginning to increase the development of their country, one of them is Indonesia. Indonesia has begun to increase development in all areas. The development can run smoothly if supported by adequate funding. The government needs a source of state revenue to finance all the development undertaken. The source of the country's financing can come from

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tax revenues as well as non-tax state revenues. According to Mardiasmo (2011) the tax is a public fee to the state treasury under a law (which can be imposed) that can be directly demonstrated and used to finance public expenditure.

The role of tax in Indonesia is very large, the role of tax revenue determines the way the wheels of the economy as it is today. Therefore, the government relies on tax revenue as the main source of revenue as well as in developed countries. Based on data from the Central Bureau of Statistics, the realization of tax revenue in 2016 amounted to Rp 1,539.6 trillion. The revenue is mostly derived from income tax receipts amounting to Rp 1.053.2 trillion, one of the sources of income from income tax that is income tax on SMEs.

SMEs sector has an important role in encouraging the growth of the Indonesian economy. With the sector of SMEs, unemployment due to unabsorbed labor force in the world of work is reduced. SMEs sector has proven to be a pillar of a tough economy. The contribution of the SMEs sector in determining the Gross Domestic Product (GDP) and the country's foreign exchange earning sector is also unquestionable. Currently, SMEs have been made the main agenda of economic development of Indonesia (www.kemenkeu.go.id). Contribution of SMEs in Indonesia to the National GDP according to current prices in 2011 amounted to Rp 4,321.8 trillion or 58.05%, while in 2012 Amounting to Rp 4,869.5 trillion or 59.08% (www.bi.go.id). Seeing the size of the role of SMEs in the economy, it is interesting to see how the role of these SMEs in tax revenue. By using statistical data BPS, then it can be said that 99% of approximately 20 million registered taxpayers are SMEs. Nevertheless, the contribution portion of tax revenue from SMEs is relatively small given that most of tax revenue is dominated by large taxpayers amounting to less than 1%. Based on these facts, the potential of tax revenue from SMEs is still high (www.pajak.go.id). This is the basis of the government in mid-2013 to enact Government Regulation No 46 of 2013 for SMEs sector at a rate of 1 percent of gross turnover (turnover) that does not exceed Rp 4.800.000.000, - a year. The 1 percent rate imposed by the government is an effort to simplify the calculation of the indebted tax.

Based on data obtained from the Department of Industry, Trade and Cooperatives, recorded the number of SMEs in Banyumas Regency by economic sector in 2014 reached 66,533 business units. The largest number of SMEs are trade, hotel and restaurant sector with 36,014 units. The number of SMEs in Banyumas Regency until April 2016 increased to 66,586 business units. Tax compliance of SMEs perpetrators also increased after the enactment of Government Regulation No 46 of 2013. Data from Tax Office Purwokerto since the enactment of Government Regulation No 46 in 2013 indicates that in 2013 tax revenue from SMEs sector in Banyumas regency of 1.69 billion rupiah of 4,157 registered taxpayers. In 2014, tax revenues increased dramatically from 1.69 billion rupiah to 11.02 billion rupiahs, the number of registered taxpayers also increased from 4,157 taxpayers to 40,503

taxpayers. In 2015, tax revenues increased from 11.02 billion rupiah to 16.6 billion rupiah, the number of registered taxpayers also increased from 40,503 taxpayers to 62,595 taxpayers. Most registered SMEs registered taxpayers by 2015 are East Purwokerto District with 12,584 taxpayers. The taxpayer compliance ratio of SMEs in fulfilling its taxation obligation from year to year has experienced a significant increase after the enactment of Government Regulation No. 46 of 2013. Therefore, the researcher is interested to examine what factors cause the taxpayer compliance of SMEs perpetrators to increase. Taxpayer compliance can be influenced by two types of factors: internal factors and external factors. Internal factors are factors derived from the Taxpayers themselves and related to the characteristics of individuals who become triggers in carrying out its tax obligations. While external factors are factors that come from outside the Taxpayers themselves, such as the situation and the environment around the Taxpayer. Internal factors in this research is the level of tax understanding and awareness of paying taxes. While external factors are the quality of tax services and tax sanctions.

2. Literature Review

Effect of Tax Understanding on Taxpayer Compliance Performer SMEs

Understanding the taxpayer against the tax law is the way taxpayers in understanding the existing tax laws. Taxpayers who do not understand the tax laws are clearly likely to become disobedient taxpayers. According to research Prajogo (2013), the level of understanding tax regulations taxpayer positively affect compliance taxpayers SMEs. In addition, according to Purnaditya (2015) states that the understanding of taxpayers partially have a positive and significant impact on taxpayer compliance. As tax understanding increases, tax compliance will also increase. Based on the hypothesis that can be formulated is:

H1: The level of understanding of taxes have a positive effect on taxpayer compliance of SMEs perpetrators in Banyumas District.

The Effect of Awareness of Paying Taxes to Compliance of Taxpayers of SMEs

Awareness of paying taxes means the circumstances in which a person knows, understands, and understands how to pay taxes. If the taxpayer has knowledge and understanding of tax regulations and quality services to taxpayers will arise awareness of paying taxes. Awareness of paying taxes because taxpayers have an obligation to pay taxes. The taxes they pay are used by the government to finance public services and national development. According to research Jatmiko (2006) states that the consciousness of taxpayers have a positive and significant impact on taxpayer compliance. In addition, according to research Hardiningsih (2011), awareness to pay taxes have a positive effect on the willingness to pay taxes. This shows that the higher the awareness of the taxpayer makasemakin increase the

willingness to pay tax obligations. Based on the above, the hypothesis can be formulated is:

H2: Awareness to pay taxes have a positive effect on taxpayer compliance of SMEs perpetrators in Banyumas District.

The Influence of Quality of Tax Service to Compliance of Taxpayer of SMEs

Taxpayer Compliance in fulfilling the obligation to pay tax depends on how the tax officer give the best service quality to the taxpayer (Jatmiko, 2006). Good tax service will provide convenience for the taxpayer. Hospitality of tax officers and the ease of tax information system included in the service of taxation. Fuadi (2013) in his research states the quality of service tax officers have a positive and significant impact on improving compliance of UMKM taxpayers. Research conducted by Hardiningsih (2011) also states that the quality of service has a positive and significant impact on the willingness to pay tax. This indicates that the taxpayer has received adequate services so as to increase the willingness to pay taxes. Based on the hypothesis that can be formulated are:

H3: Quality of tax services have a positive effect on taxpayer compliance of SMEs perpetrators in Banyumas District.

The Effect of Tax Sanctions on Compliance of Taxpayers of SMEs

Tax penalties are made with the aim that taxpayers are afraid to violate the Taxation Law. The taxpayer shall comply with his tax payments when deeming that sanctions will be more harmful (Jatmiko, 2006). According to research Prawagis et al (2016), tax witnesses have a positive and significant impact on compliance of UMKM taxpayers. In addition, research conducted by Fuadi (2013) concluded that the sanctions of taxation partially have a positive and significant impact on improving compliance of UMKM taxpayers. Based on the above, the hypothesis can be formulated is:

H4: Tax sanctions have a positive effect on taxpayer compliance perpetrators of SMEs in Banyumas district

3. Research Method

This study is a type of quantitative research using survey methods in obtaining the required data, that is by providing a list of questions (questionnaires) to respondents. Data used in this study merupakan primary data. Research Sites The research was conducted on Micro-Small Medium Enterprises (SMEs) located in Banyumas Regency. Respondents in this study are the perpetrators of SMEs taxpayers registered in KPP Pratama Purwokerto. Population is a generalization area consisting of objects/subjects that have certain qualities and characteristics set by the researcher

to study and then drawn conclusions (Sugiyono, 2012). The population in this study is SMEs in Banyumas Regency that is 66,586 business units in 2015. The sample is part of the number and characteristics possessed by the population (Sugiyono, 2012). How to determine the sample in this study, the author uses purposive sampling. According Sugiyono (2012), purposive sampling is a technique of determining the sample with certain considerations/criteria. The criteria used for the determination of the sample as follows:

1. SMEs located in East Purwokerto District
2. Having gross circulation \leq Rp 4.800.000.000, - for 1 year
3. Small and medium business
4. Moving in the field of trade, hotels , and restaurants.

4. Results and Discussion

Reliability Test

The reliability test is used to measure whether the respondent's answer to the statement in the questionnaire is consistent or stable over time. A variable or construct is said to be reliable if the Cronbach Alpha value of each variable > 0.60 (Ghozali, 2009). In the following table presented the results of the reliability test. Reliability test results can be seen in Table 1.

Table 1. Summary of Reliability Test

Variable	Cronbach Alpha	
Y	0,817	Reliable
X ₁	0,888	Reliable
X ₂	0,767	Reliable
X ₃	0,848	Reliable
X ₄	0,839	Reliable

Based on the data in Table 1. it can be seen that the reliability coefficient of each variable is greater than 0.60. Thus, then all the questions for each variable is declared reliable, so it can be used as a means of data collection.

Validity Test

Testing the validity used in this study is to correlate each question on each variable with a total score using Product Moment correlation formula, then compare the Corrected Item-Total Correlation (r-count) value with r table, if r arithmetic $>$ r table then the question is considered valid, vice versa (Suliyanto, 2011). In this research

note that value of $df = 30$ ($df = n - 2$) with significant value 5% then r_{table} value in this research that is 0,361. Here is a table of validity test results:

Table 2. Summary of Test Results Taxpayer Compliance Validity (Y)

	r count	r table (Level of confidence 95%)	
1.	0,817	0,36	Valid
2.	0,619	0,36	Valid
3.	0,614	0,36	Valid
4.	0,835	0,36	Valid
5.	0,690	0,36	Valid
6.	0,744	0,36	Valid

Table 3. Summary of Validity Test Results Variable Questionnaire Level of Tax Understanding (X₁)

	r count	r table (Level of confidence 95%)	
1.	0,724	0,36	Valid
2.	0,835	0,36	Valid
3.	0,825	0,36	Valid
4.	0,736	0,36	Valid
5.	0,880	0,36	Valid
6.	0,93	0,36	Valid

Table 4. Summary of Validity Test Results Variable Questionnaire Tax Pay Awareness (X₂)

	r count	r table (Level of confidence 95%)	
1.	0,82	0,36	Valid
2.	0,847	0,36	Valid
3.	0,675	0,36	Valid
4.	0,756	0,36	Valid

Table 5. Summary of Validity Test Results Variable Questionnaire Quality of Tax Service (X₃)

	r count	r table (Level of confidence 95%)	
1.	0,78	0,36	Valid
2.	0,796	0,36	Valid
3.	0,749	0,36	Valid
4.	0,820	0,36	Valid
5.	0,80	0,36	Valid

Table 6. Summary of Validity Test Results Variable Questionnaire Tax Sanctions (X₄)

	r_{count}	r_{table} (Level of confidence 95%)	
1.	0,89	0,36	Valid
2.	0,678	0,36	Valid
3.	0,707	0,36	Valid
4.	0,894	0,36	Valid
5.	0,721	0,36	Valid

Based on Table 2 – Table 6 note that (r count) Product Moment correlation each item statement for each variable is greater than the critical value (r table) of 0.361 at the level of significance 95 percent ($\alpha = 0.05$). Thus, the entire item statement is declared valid, so it can be used as a means of data collection.

Multiple Linear Regression Analysis

Testing the significance of the influence of independent variables of the level of understanding of taxes, awareness of paying taxes, the quality of tax services, sanctions taxation to the dependent variable taxpayer compliance, in this study using multiple linear regression analysis. Based on the results of statistical calculations, then obtained summary of the results of the calculations can be seen in Table 7.

Table 7. Results of Multiple Linear Regression Analysis

Variables	Coef.	t _{count}	t _{table}	Sig.
Constant	-1,455	-0,526	1,67252	0,601
Tax understanding/Undstd (X ₁)	0,236	2,297	1,67252	0,025
Tax pay awareness/Aware (X ₂)	0,507	3,582	1,67252	0,001
Quality of tax service/QTS (X ₃)	0,320	2,160	1,67252	0,035
Tax sanctions/Sanct (X ₄)	0,333	2,498	1,67252	0,016

Based on the data in Table 7, multiple regression equations can be created as follows:

$$Y = -1,455 + 0,236\text{Undstd} + 0,507\text{Aware} + 0,320\text{Qual} + 0,333\text{Sanct} + e$$

Testing Coefficient of Determination Analysis (R²)

Based on the results of regression analysis, then obtained the coefficient of determination (R²) which can be seen in Table 8.

Table 8. Determination Coefficient Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.818 ^a	0.669	0.645	1.422

Based on the data in Table 8. note that the value of coefficient of determination (R^2) of 0.669. The value of R^2 indicates that 66.9 percent of variation of change and decreasing compliance of taxpayers of SMEs in Banyumas Regency can be explained by the variable of tax understanding level, tax paying awareness, tax service quality and tax sanction while 33.1 percent can be explained by variables other variables not examined.

Testing Goodness of Fit

To test the accuracy of the model used. Based on the error rate (α) = 0.05 and degree of freedom (df) = ($k - 1$) and ($n - k$) it is known that the F table value is 3.16. As for the output of multiple linear regression analysis, the value of F arithmetic amounted to 27.834. The result of multiple regression also shows the value of p (Sig.) is 0.000 smaller than α (alpha) 0,05. Thus it is stated that the overall variable is declared fit or fit.

Table 9. F Test Result

Variabel	F _{count}	F _{table}	Sig.
Tax Payer Compliance	27,834	3,16	0,000

Hypothesis Testing

Testing significance of influence by using t test. Through the error rate (α) = 0.05 and degree of freedom (df) = ($n - k$) obtained t table value of 1.67252. The result of multiple regression also shows the value of P (Sig.) Is 0.000 and 0.000 smaller than α (alpha) 0,05. From the t test output of multiple linear regression analysis results, it can be made a summary of the results as listed in Table 10.

Table 10. First Model t Test Result

Variabel	Coef.	T _{count}	T _{table}	Sig.
Tax understanding/Undstd (X_1)	0,236	2,297	1,67252	0,025
Tax pay awareness/Aware (X_2)	0,507	3,582	1,67252	0,001
Quality of tax service/QTS (X_3)	0,320	2,160	1,67252	0,035
Tax sanctions/Sanct (X_4)	0,333	2,498	1,67252	0,016

Based on the data in Table 10 can be explained that the level of tax understanding has a significant positive effect on taxpayer compliance. The first hypothesis in this study is to examine the level of understanding of taxes on compliance of taxpayers in Banyumas regency. Based on the results of the first hypothesis test shows the results t arithmetic $2.297 > t$ table 1,67252, meaning ***H1 is accepted***. It shows that the level of tax understanding has a significant positive effect on taxpayer compliance of SMEs perpetrators in Banyumas Regency. Most of the taxpayers of SMEs in Banyumas Regency have understood and understood the tax related matters concerning Government Regulation No. 46 year 2013, understood how to fill the tax letter form and know the rights and the obligations of taxation. This is in line with

research from Prajogo (2013) which states that the level of understanding tax regulations taxpayers positively affect compliance of SMEs taxpayer.

The second hypothesis in this study is to examine the awareness of paying taxes on compliance of taxpayers in Banyumas regency. Based on the results of the second hypothesis test shows the results t arithmetic $3.582 > t$ table $1,67252$, meaning ***H2 is accepted***. It shows that the awareness of paying tax has a significant positive effect on taxpayer compliance of SMEs perpetrators in Banyumas Regency. Most of the taxpayers of SMEs in Banyumas already have a high awareness in paying their taxes, besides the taxpayers also realize that paying taxes is a liability. This is in line with research from Jatmiko (2006) which states that the consciousness of taxpayers have a positive and significant impact on taxpayer compliance

The third hypothesis in this study is to examine the quality of tax service to the compliance of taxpayers in Banyumas regency. Based on the results of the third hypothesis test shows the results t arithmetic $2.160 > t$ table $1,67252$, meaning ***H3 is accepted***. It shows that the quality of taxes have a significant positive effect on compliance of taxpayers of SMEs in Banyumas Regency. Most of the taxpayers of SMEs in Banyumas Regency have felt the positive impact of the quality of services provided by the tax officers themselves and the programs that have been provided for mandatory tax in order to facilitate in fulfilling its tax obligations. This is in line with research from Fuadi (2013) which states that the quality of service tax officers have a positive and significant impact on improving compliance of SMEs taxpayers.

The fourth hypothesis in this study is to test the sanction of taxpayer compliance against the perpetrators of taxpayers in Banyumas Regency. Based on the results of the fourth hypothesis test shows the results t arithmetic $2.160 < t$ table $1,67252$, meaning ***H4 is accepted***. It shows that taxation has a significant positive effect on taxpayer compliance of SMEs perpetrators in Banyumas Regency. Most of the taxpayers of SMEs in Banyumas Regency have understood the existing taxation sanction and felt that the existence of tax penalty makes taxpayers discouraged in neglecting their tax obligations so as to improve taxpayer compliance. This is in line with research from Prawagis et al (2016) stating that tax witnesses have a positive and significant impact on compliance of UMKM taxpayers.

5. Conclusions, Limitations and Future Research

Conclusion

1. The level of Tax Understanding has a positive effect on the compliance of Taxpayers of SMEs in Banyumas Regency;
2. Awareness of Paying Tax positively affects the compliance of Taxpayers of SMEs in Banyumas District;

3. Quality of Tax Service has a positive effect on the compliance of Taxpayers of SMEs in Banyumas Regency;
4. Taxation sanctions have a positive effect on compliance of taxpayers of SMEs in Banyumas Regency.

Limitations

1. This research is only conducted on one sector only, namely in trade, hotel and restaurant sector. While the economic sector in umkm itself consists of 9 sectors;
2. This study only includes four independent variables used to determine the effect on taxpayer compliance, whereas there are still many independent variables that are suspected to affect taxpayer compliance.

Future Research

1. It is expected in subsequent research to expand the research area, not only Banyumas Regency but in some other regency or districts. So that can be obtained research with a higher level of generalization;
2. It is expected in subsequent research to add other SMEs sectors so that the results of the research can be more generalized;
3. It is expected in the next study to increase the number of other independent variables associated with taxpayer compliance.

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New Challenges for the Balkan Economies in the Context of the European Union

Romeo-Victor Ionescu¹

Abstract: The paper deals with the idea that EU has to reformate as a result of the latest challenges, including the Brexit. A possible effect and opportunity from this can be a stronger position for the EU Balkan Member States. The analysis in the paper takes into consideration all Balkan economies, including candidate countries in order to obtain a general approach for the region. This approach is new because it puts together member and candidate members from a region, in the context of re-evaluating the EU, and leads to the idea of finding a regional leader able to generate regional progress and to support the region's interests in the European Institutions. The analysis covers five representative economic indicators (GDP growth rate, gross fixed capital formation, unemployment rate, inflation rate and general government gross debt) and is realized on three levels: a comparative analyses, a cluster analysis, and a cumulative analysis as well. Moreover, regression is used in order to point out the economic disparities across the region. The main conclusion of the analysis is that the great regional economic disparities can be decrease using common regional policies. Moreover, the analysis identifies a regional economic leader able to coordinate common initiatives at least on short and medium terms. The analysis and the conclusions in the paper are supported by the latest official statistic data, pertinent tables and diagrams.

Keywords: Regional disparities; regional clusters; regional economic forecasts; economic development; regional economic competitiveness

JEL Classification: R11; R12; R59

1. Introduction

The Balkans became a very interesting region from political, military and economic point of view. The region covers 666,700 square km and more than 60 million inhabitants.

There is not a unique approach on the countries which belong to Balkans. Finally, 11 states are taken into consideration as belonging to the region. Six of them are 100% of their surfaces included in the region: Albania, Bosnia and Herzegovina, Bulgaria, Greece, Montenegro and FYR of Macedonia (Danforth & Crampton, 2015). The other five belong partially to the region: Serbia (80%), Croatia (49%),

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Slovenia (27%), Romania (9%) and Turkey (5%) (Columbia Encyclopaedia, 2015).

All these countries have a direct connection to the European Union. Bulgaria, Greece, Croatia, Romania and Slovenia are Member States. Albania, Montenegro, FYR of Macedonia, Serbia and Turkey are candidate countries, while Bosnia and Herzegovina formally applied for EU membership in February 2016.

The global crisis had greater impact on these countries. Grexit represents a well-known example, which is far away of solving yet. Moreover, the Brexit became reality and its impact on the EU is not simply of quantifying.

As a common trend, all Balkan economies suffered the most from the recent global recession. After an economic contraction of 5.2% in 2009, the recession started in 2010 in these countries. Even Romania, which is the largest Balkan economy, had not efficient economic solutions for fighting against recession (Laza Kekic, 2012).

The global crisis impact was specially analysed on Western Balkan Region. The analysis is focused on representative macroeconomic indicators (GDP, employment, inflation rate, budget deficit, trade relation) before and during the years of crisis (Pere & Hashorva, 2011).

A very important indicator is foreign direct investment (FDI) into the Balkan region. FDI flows present great disparities in the volume, timing and sectorial structure between the Balkan economies. The use of a gravitational model and a comparative analysis to the Central East European countries lead to the conclusion that the Balkan region received less FDI with direct effect on the present and future economic development (Estrin & Uvalic, 2013).

Other recent research is focused on a comparative competitiveness analysis between Western Balkans and the EU countries. At least five advantages for the investors are identified in this region: the EU adhering perspective, the high degree of macroeconomic stability, the geographic proximity and tariff-free access to EU markets, the economic diversity of the region, the taxes and labour costs' levels (Sanfey, Milatovic & Kresic, 2016).

A less optimistic approach is that starting to a complex macroeconomic analysis of the Balkan economies and finishing with the conclusion that the region will face to low long term trend growth in the last at least 40 years or so (Gligorov, 2016).

The approach in this paper is that the "new EU27" can create new opportunities for the Balkan economies. The question is if the region is able or not to become a sustainable growth pole. At least from the theoretical point of view, the present Member States have to generate economic stability and sustainable development and to become examples for the candidate countries, as well.

The problem of defining regional political and economic leaders can be essential. These leaders can result only from a very rigorous economic analysis.

2. Balkan Economies' Challenges and Opportunities

In order to point out the present economic performances in Balkan region, five representative economic indicators are used in the analysis. The analysis covers 2012-2016 and the official forecasted data for 2017-2018 (European Commission, 2016).

The dimension of the Balkan economies in terms of GDP leads to great disparities (see Figure 1).

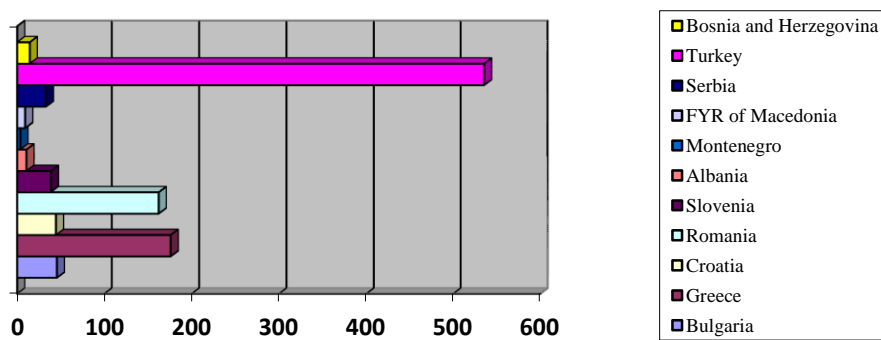


Figure 1. GDP in 2015 (billion euros)

A better approach is that related to the trend of the economic growth in these countries (see Figure 2). This figure supports the idea that the Balkan economies can be grouped into two clusters in 2016. The first one covers the states with achieved GDP growth rates less than 3.0% (Greece, Croatia, Slovenia, Montenegro, FYR of Macedonia, Serbia and Turkey). The second cluster includes Bulgaria, Romania, Albania and Bosnia and Herzegovina.

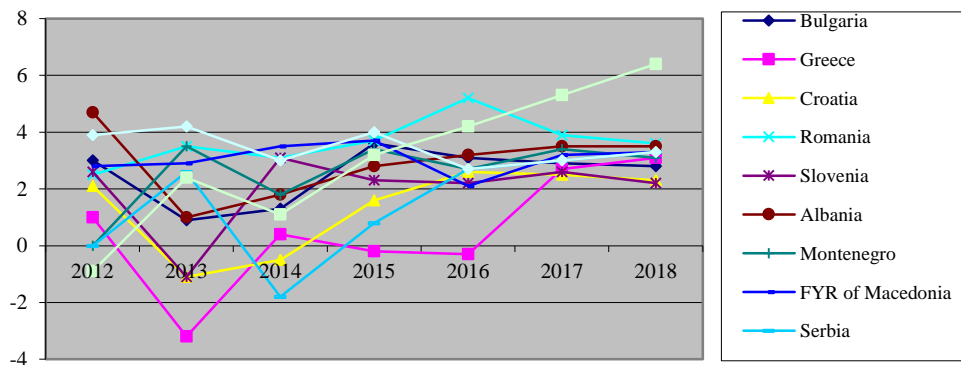


Figure 2. GDP growth (%)

The viability of this approach is supported by a two-step cluster analysis for 2016 (see Figure 3). The cluster quality is good (0.8).

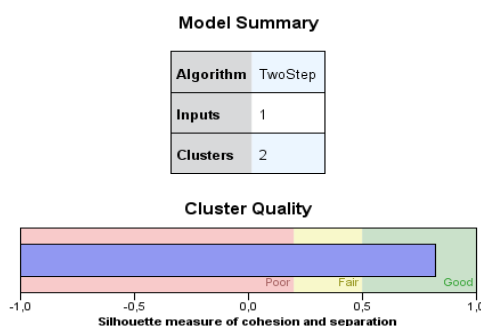


Figure 3. GDP growth cluster approach for 2016

The economic recovery is supported by the gross fixed capital formation. Of course, the value of this indicator varies from a country to another. Moreover, the growth rates show the same great disparities (see Figure 4).

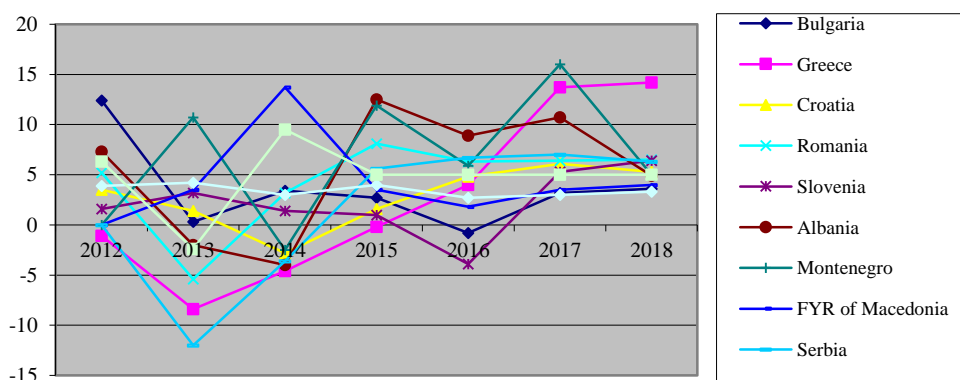


Figure 4. Gross fixed capital formation (%)

The above cluster approach can be used in building two clusters. First of them covers those countries with gross fixed capital formation rates less than 5.0% (Bulgaria, Greece, Croatia, Slovenia, FYR of Macedonia and Turkey), while the second is formed from: Romania, Albania, Montenegro, Serbia and Bosnia and Herzegovina. The quality of this cluster approach is 0.7 (see Figure 5). Moreover, 72.7% of the components of these two clusters are the same.

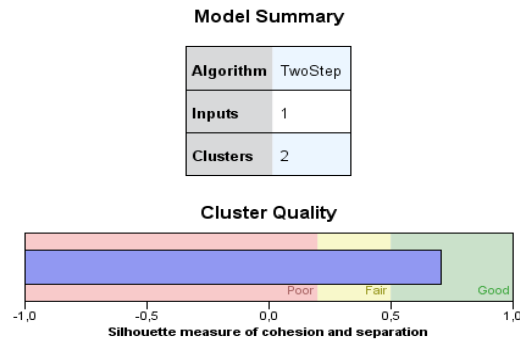


Figure 5. Gross fixed capital formation cluster approach for 2016

The unemployment is one of the greatest challenges for the Balkan economies. As a result, the unemployment rates vary a lot (see Figure 6).

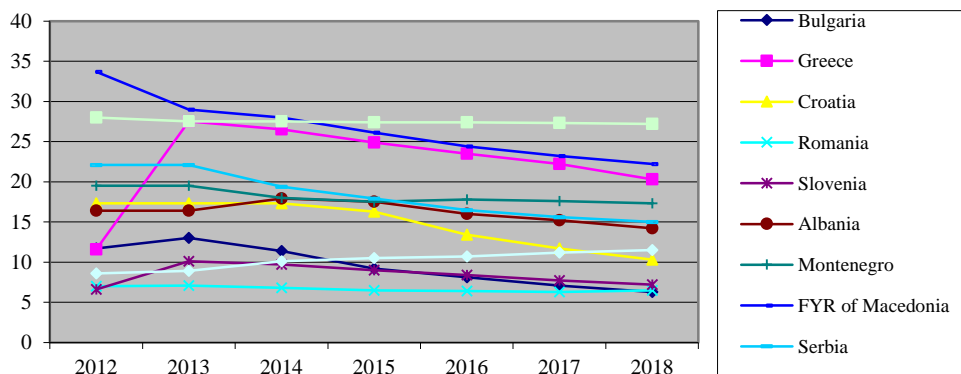


Figure 6. Unemployment rate (%)

Only three countries had unemployment rates less than 10% in 2016 (Romania, Bulgaria and Slovenia). On the other hand, Turkey faced to an increase in unemployment rates during 2012-2016.

The unemployment rates in 2016 lead to the following clusters: countries with unemployment rates less than 15% (Bulgaria, Croatia, Romania, Slovenia and Turkey) and those with unemployment rates greater than 15% (Greece, Albania, Montenegro, FYR of Macedonia, Serbia and Bosnia and Herzegovina). This new cluster structure covers 72.7% from the above cluster structure and the same good cluster quality (0.7).

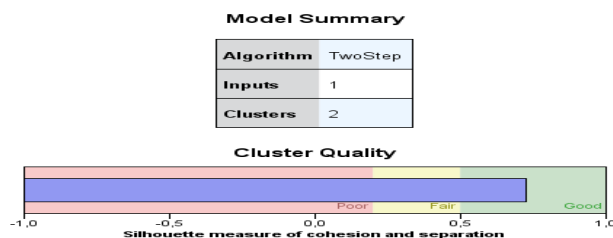


Figure 7. Unemployment cluster approach for 2016

Another important indicator is the inflation rate. All Balkan economies succeeded in decreasing their inflations rates during 2012-2016, excepting Turkey (see Figure 8). Moreover, only three Balkan economies faced to positive inflation rates in 2016.

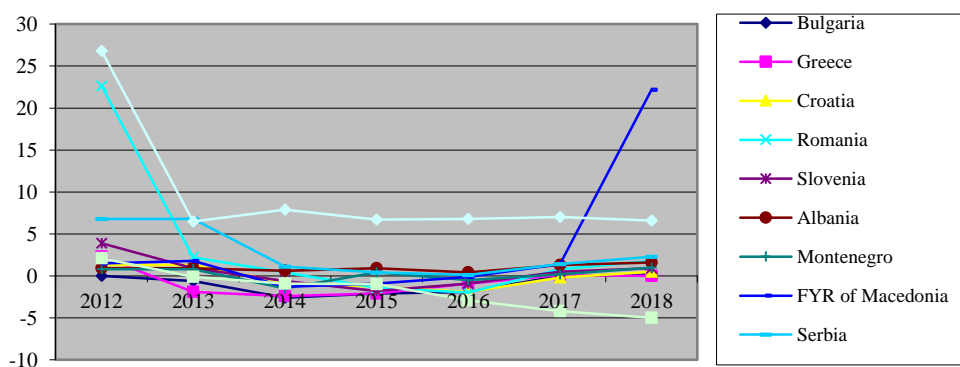


Figure 8. Inflation rate (%)

According to the inflation rate in 2016, the first possible cluster covers negative inflation rates less than -1.0 (Greece, Slovenia, Montenegro, FYR of Macedonia). The second one is built from: Bulgaria, Croatia, Romania, Albania, Serbia, Turkey and Bosnia and Herzegovina. This new cluster approach is presented in Figure 9.

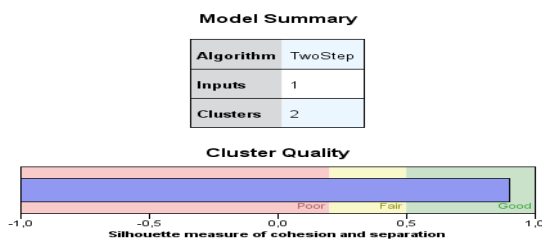


Figure 9. Inflation cluster approach for 2016

Last but not the least, the analysis of the general government gross debt leads to the following diagram:

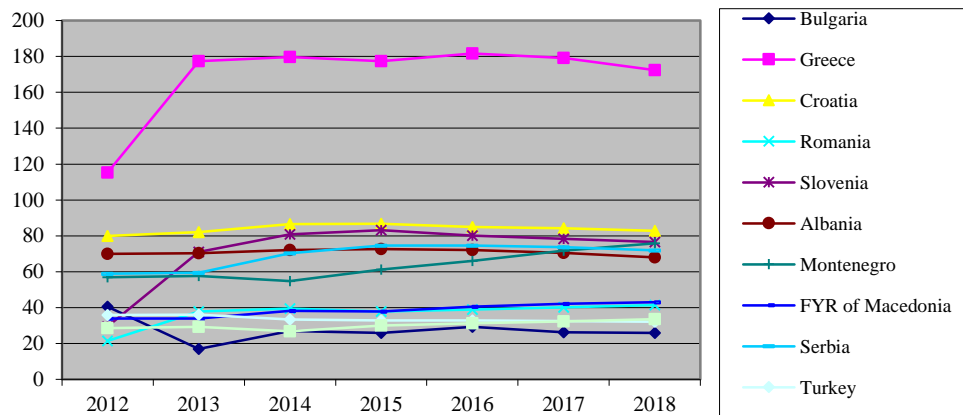


Figure 10. General government gross debt (% GDP)

As a general point of view, the government gross debt fluctuated in all Balkan economies during 2012-2016. On the other hand, the value of these debts varied from a country to another (see Figure 10).

The government gross debt in 2016 allows building two clusters. The first covers countries with government gross debts less than 50% of GDP (Bulgaria, Romania, FYR of Macedonia, Turkey and Bosnia and Herzegovina). The countries which face to government gross debts greater than 50% of GDP (Greece, Croatia, Slovenia, Albania, Montenegro and Serbia) form the second cluster. This last cluster approach has a good quality (0.8) and is represented in Figure 11.

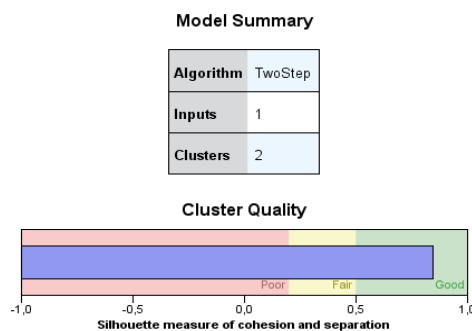


Figure 11. Government gross debts cluster approach for 2016

3. The Need of a Regional Leader

The above economic analysis points out great economic disparities between the Balkan economies. In the context of the latest EU developments, the Balkan region becomes a strategic one. 5 countries in this area are Member States. The others are candidate countries. The economic development in Balkans asks for an economic engine, able to stimulate the economic recovery and growth and to support these countries in the EU institutions.

In order to find such a leader, a synthetic table will be useful. This table quantified the economic position of each Balkan economy using the indicators from the second chapter. The analysis is based on data for 2016.

Table 1. Economic synthesis of 2016

Country	Rank for GDP growth rate	Rank for gross fixed capital formation	Rank for unemployment rate	Rank for inflation rate	Rank for government gross debt	Total
Bulgaria	4	10	2	3	1	40
Greece	11	7	9	5	11	17
Croatia	8	6	5	3	10	28
Romania	1	3	1	2	4	49
Slovenia	9	11	3	5	9	23
Albania	3	1	6	10	7	33
Montenegro	5	4	8	8	6	29
FYR of Macedonia	10	9	10	5	5	21
Serbia	5	2	7	9	8	29
Turkey	5	8	4	11	3	39
Bosnia and Herzegovina	2	5	11	1	2	39

Table used maximum values in ranking GDP growth rates and gross fixed capital formation and minimum values in ranking unemployment rate, inflation rate and government gross debt. Each economic indicator (as value) was pondered in the same manner for all Balkan economies.

According to Table 1, Romania is able to become a regional leader and to improve its position in the EU organization, as well. On the other hand, the Balkans represents an area with great disparities. The composed analysis of the above five indicators supports the disparities diagram in Figure 12.

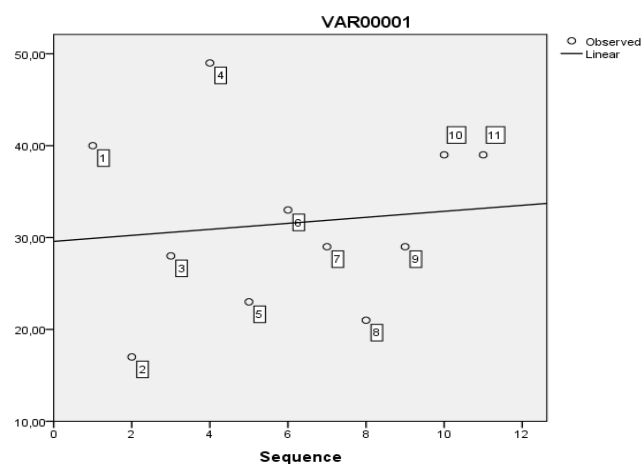


Figure 12. Economic disparities across the Balkans in 2016

1. Bulgaria; 2. Greece; 3. Croatia; 4. Romania; 5. Slovenia; 6. Albania; 7. Montenegro; 8. FYR of Macedonia; 9. Serbia; 10. Turkey; 11. Bosnia and Herzegovina.

The analysis in Figure 12 uses regression under ANOVA conditions. This figure supports the idea of dividing the Balkan economies into two clusters. The countries with better economic performances form the first cluster (Bulgaria, Romania, Albania, Turkey and Bosnia and Herzegovina). The second cluster covers countries which face to economic challenges (Greece, Croatia, Slovenia, Montenegro, FYR of Macedonia and Serbia).

4. Future Dynamics Across the Balkan Economies

Eurostat realized economic forecasts on short term (2017-2018) in order to obtain an overview on EU and Euro area, as well. There are some interesting changes in the new economic indicators compared to 2016.

In order to obtain a realistic point of view on economic disparities in the Balkans, a new regression analysis has to be used for 2018.

The GDP growth rates will spectacular increase in Greece and Bosnia and Herzegovina. Albania, Montenegro, FYR of Macedonia, Serbia and Turkey will succeed in obtaining greater rates in 2018 than in 2016. On the other hand, Bulgaria, Croatia and Romania will face lower rates in 2018 than in 2016, while Slovenia will maintain its economic growth in 2018 as in 2016. These new evolutions lead to new disparities as in Figure 13. According to this figure, the possibility to group the Balkan economies into two clusters is more than obvious.

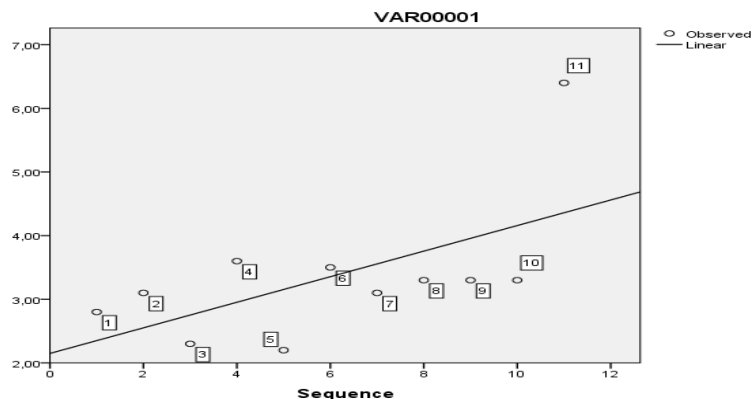


Figure 13. GDP growth rate disparities across the Balkans in 2018

1. Bulgaria; 2. Greece; 3. Croatia; 4. Romania; 5. Slovenia; 6. Albania; 7. Montenegro; 8. FYR of Macedonia; 9. Serbia; 10. Turkey; 11. Bosnia and Herzegovina.

Seven states will succeed in increasing the gross fixed capital formation in 2018 compared to 2016. Bosnia and Herzegovina will maintain the rate as in 2016, while Albania, Montenegro and Serbia will face to a decrease in 2018 compared to 2016. The result of these evolutions is presented in Figure 14.

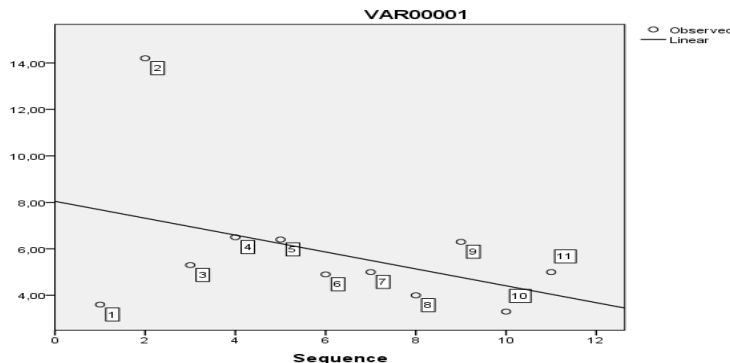


Figure 14. Gross fixed capital formation disparities across the Balkans in 2018

1. Bulgaria; 2. Greece; 3. Croatia; 4. Romania; 5. Slovenia; 6. Albania; 7. Montenegro; 8. FYR of Macedonia; 9. Serbia; 10. Turkey; 11. Bosnia and Herzegovina.

The classic cluster approach can be used again using this economic indicator.

Turkey is the only Balkan state which will face to an increase in unemployment rate in 2018 compared to 2016. On the other hand, the unemployment rate will be one of the greatest challenges for the region in 2018 at least for Greece, Croatia, Albania, Montenegro, FYR of Macedonia, Serbia and Bosnia and Herzegovina. Basically,

only Bulgaria, Romania and Slovenia will have one digit unemployment rates in 2018 (see Figure 15).

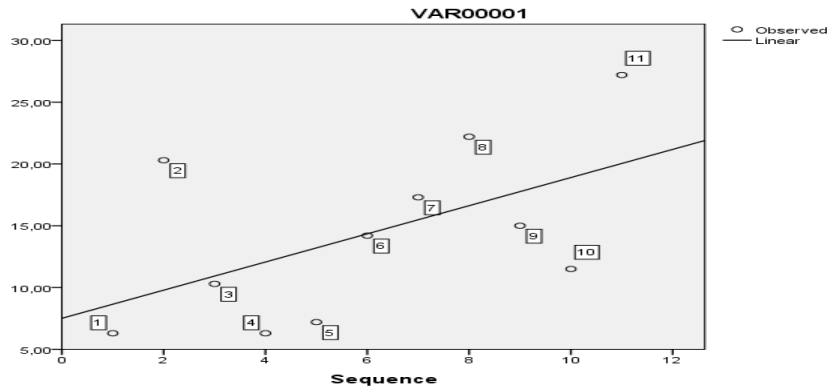


Figure 15. Unemployment disparities across the Balkans in 2018

1. Bulgaria; 2. Greece; 3. Croatia; 4. Romania; 5. Slovenia; 6. Albania; 7. Montenegro; 8. FYR of Macedonia; 9. Serbia; 10. Turkey; 11. Bosnia and Herzegovina.

Turkey and Bosnia and Herzegovina will succeed in decreasing inflation rates in 2018 compared to 2016. On the other hand, six Balkan economies will pass from negative to positive inflation rates in 2018 compared to 2016 (Bulgaria, Croatia, Romania, Slovenia, Montenegro and FYR of Macedonia). The greatest inflation rate will be in Turkey in 2018 (6.6%).

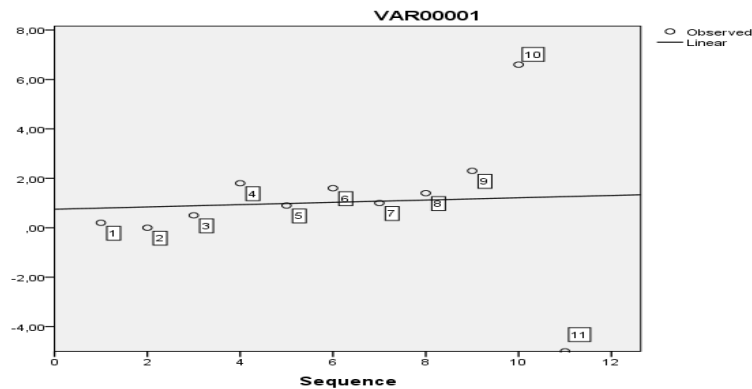


Figure 16. Inflation disparities across the Balkans in 2018

1. Bulgaria; 2. Greece; 3. Croatia; 4. Romania; 5. Slovenia; 6. Albania; 7. Montenegro; 8. FYR of Macedonia; 9. Serbia; 10. Turkey; 11. Bosnia and Herzegovina.

Finally, Romania, Montenegro and Bosnia and Herzegovina will face to an increase in their government gross debts in 2018 compared to 2016. Only Greece will face to a government gross debt greater than its GDP in 2018 (see Figure 17).

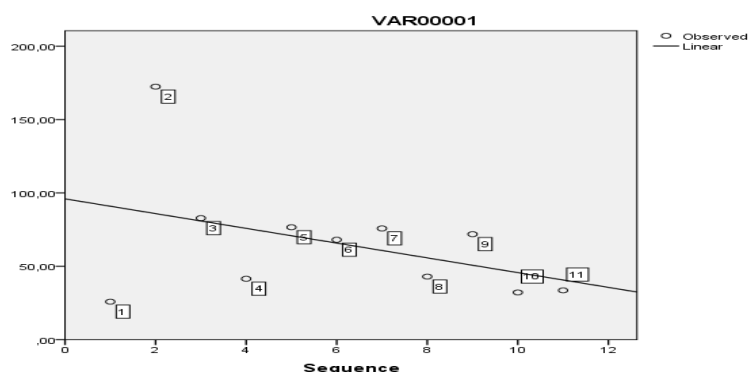


Figure 17. Government gross debt disparities across the Balkans in 2018

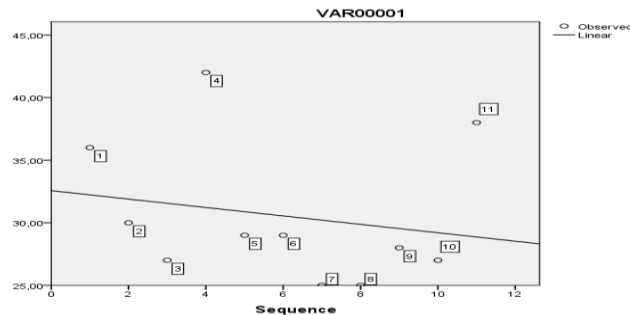
1. Bulgaria; 2. Greece; 3. Croatia; 4. Romania; 5. Slovenia; 6. Albania; 7. Montenegro; 8. FYR of Macedonia; 9. Serbia; 10. Turkey; 11. Bosnia and Herzegovina.

The above analysis in this chapter has to be followed by a cumulative one in Table 2. The same approach as in chapter 2 was used in order to realize this table.

Table 2. Economic synthesis of 2018

Country	Rank for GDP growth rate	Rank for gross fixed capital formation	Rank for unemployment rate	Rank for inflation rate	Rank for government gross debt	Total
Bulgaria	3	2	11	9	11	36
Greece	5	11	3	10	1	30
Croatia	2	7	8	8	2	27
Romania	10	10	11	3	8	42
Slovenia	1	9	9	7	3	29
Albania	9	4	6	4	6	29
Montenegro	5	6	4	6	4	25
FYR of Macedonia	8	3	2	5	7	25
Serbia	8	8	5	2	5	28
Turkey	8	1	7	1	10	27
Bosnia and Herzegovina	11	6	1	11	9	38

The economic disparities are different in 2018 compared to 2016 (see Figure 18).



1. Bulgaria; 2. Greece; 3. Croatia; 4. Romania; 5. Slovenia; 6. Albania; 7. Montenegro; 8. FYR of Macedonia; 9. Serbia; 10. Turkey; 11. Bosnia and Herzegovina.

Figure 18. Economic disparities across the Balkans in 2018

5. Conclusion

A comparative analysis between the economic disparities across the Balkan economies in 2016 and 2018 leads to interesting conclusions. For the beginning, the economic performance will improve in all these economies in 2018.

The best performance will be achieved by the Greek economy, while Montenegro and Turkey will face to greater challenges than in 2016.

However, the classic two cluster approach used in the analysis will be available in 2018 as in 2016. Moreover, 81.8% of the cluster structure in 2016 is the same to that in 2018. The positive thing is that the economic disparities in Balkans will decrease in 2018 compared to 2016.

On the other hand, Romania will keep first rank in economic performance in 2018, as in 2016. As a result, the Romanian economy has to become a stimulus for its Balkan neighbors.

At least two elements modified the EU strategy on short and medium term: the Brexit and the elections' result in USA. As a result, new other challenges can result from these. The Balkan region, which is still a very sensitive, has to be able to face to these potential challenges and to continue the economic development.

A most competitive EU is possible with the support of the Balkan dynamic economies. Some of them are Member States. The others have to adhere as soon as possible.

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