

## A Financial Approach for Municipality Investment: A Case Study of Drinking Water and Sewerage Investment in Turkey

**Gülistan BAŞCI,**

Local Government Department,  
Vocational School of Social Science,  
Hitit University, Çorum, Turkey.  
**E-mail:** gulistanbasci@hitit.edu.tr

**Eşref Savaş BAŞCI,**

Banking and Finance Department,  
Faculty of Econ. And Adm. Sciences,  
Hitit University, Çorum, Turkey.  
**E-mail:** esavasbasci@hitit.edu.tr

---

### **Abstract**

*The main aim of this study is to determine the effect of municipality investment decisions on financial tables. For this purpose, we analyzed financial ratios which were used in investment decisions during 2006 to 2014 in Turkey. Financial relationships are between the municipality's financial decisions on both drinking water investment and sewerage investment and their financial ratios that were calculated from financial statements. In Turkey, there are 81 municipalities in the local government status. We analyzed all municipalities' consolidated financial statements, such as balance sheets and income statements during the aforementioned period. In this study, we used a two-step analysis. Firstly, we calculated traditional financial ratios of all municipalities and secondly, we used the Structural Equation Model (SEM). We calculated all ratios, and then we analyzed any structural relationships between the dependent variables and independent variables. We designated "Drinking Water Investments" and "Sewerage Investments" as dependent variables in the study. As for independent variables, we have chosen some financial ratios that are related to literature. In the study, we have some major findings for the variables. Drinking Water Investment results showed two important things. Firstly, signs of all variables are very important. However, when Financing Ratio and Taxes to Revenues' signs are "-" negative, it means the municipality may reduce the total liabilities to increase drinking water investment. The total tax to total revenue ratio must decrease in order to invest in and establish the drinking water system. In testing for Sewerage Investment, Quick Ratio, Grants, Aids and Special Revenues (Special Rev to T-Rev) and Administrative Cost (Admin Cost) are negative "-" signs in the SEM result. It means that if the municipality wants to invest in sewerage investments, they should take into account that these variables have a negative effect on this investing in the sewerage system.*

---

**Key Words:** Municipality, Financial Performance, Structural Equation Model (SEM)

**JEL Classification:** H72, R58, C20

## **1. Introduction and Municipalities in Turkey**

The concept of the municipality was firstly used in the Greek and Roman ages before the 18th Century. The meaning of the word municipality was changed at the end of the 18th century during the Industrial Revolution. After the revolution people were moved from villages to cities for working as a part of the industry. This kind of migration leads to the start of some problems in the provinces, such as population density, urban sprawl, air pollution, etc. After these problems, the role of a municipality and its importance has changed. In addition to this, decentralization was commonly used – especially in unitary governments to redistribute the decision making authority and financial independence from the central government to the local administrative unit. Using the decentralization process took places with more economic activity related to responsibility of administrative, fiscal and local administration. Thus, municipalities are more careful about public expenditures and their responsibilities (Delcea, 2012).

With the result of decentralization, municipalities focused on their investments which are related to private finance. Most municipalities need to firstly invest their water and sewerage operations; they also need to make a contract with private sector. One of the main reasons to use the private sector's contract is because of the user registration system and illegal consumption of water. Some inefficiencies in water and sewerage support are related to the pressure of the population in municipal distance and increased infrastructure services in these areas. Municipalities need to control for all by using private sector collaboration. In Saudi Arabia high rates of population growth and urbanization has resulted in the need to expand all investments in the water system. To increase efficiency in investments, the Saudi Arabian government encouraged public and private collaboration (Bushnak, 2001).

In Turkey, the municipality concept was firstly used in Istanbul in 1857. It was the Beyoglu municipality that provided water supply to the city, cleanliness, gardening, cemetery works, enlightenment, healthcare service to the public, road and groundwork, etc. (Ahmora, 2014). The Turkish public administration system is based on the principle of a strong central government. During the early years of the Republic, municipalities and other local administrative bodies were seen as extension units of the central government. The first municipality law, passed in 1930, listed the duties and responsibilities of the local authorities and remained the basic legislation for the municipalities until mid-2005 (TMAOW, 2015).

Municipalities are basic local governmental structures in settlements with 5000 or more inhabitants – provincial and district centres are municipalities regardless of their population. According to the population, the investments of water and sewerage operations are more important for municipalities. Especially, water providing sector has founded by central government until 1980's. Since 1984, metropolitan municipalities have been set up based on the legal power provided by the Turkish Constitution, with the task to serve areas with larger

populations. There are a total of 81 provinces with only 30 of them considered as metropolitan municipalities in Turkey. The Turkish provinces can be explained by different districts. The district centre means district municipality, except for the district that contains the provincial centre (provincial municipality). Moreover, the districts may contain other municipalities with a population of up to 2,000.

In practice, the management of the municipality has three organs, or the municipal council, the municipal executive committee and the mayor. It is important to how municipalities make decisions on any investment. Ideally, municipalities initially use an appropriate source of capital for services, such as water supply, sewerage, drainage, land development, street construction, parks and recreation, health, fire, etc. They may use money for the upkeep of services by borrowing or long term investment. Although borrowing is a popular financing tool among municipalities, long term financing arrangements are also used due to financial responsibility and national economic stability (Christine 2003). In addition to this and as a result of the central government's restraints, higher investment needs for urban areas have to find other source of finance.

## **2. Literature Review**

In literature there are a lot of studies on municipalities and their financial regulations and measurement financial abilities.

Ahmaro, in 2014, analyzed the financial weakness of Jordan Municipalities from 2009 to 2012. He found that the weakness of regulation on finance has effected municipalities' decision. Ahmaro attained results with his study, such as municipalities' financial problems related to law, bad experience related to internal auditing, conflict between a municipality's rights and responsibilities, etc. (Ahmora, 2014)

Early, Feng and Kelly have investigated the education context range of different levels, including undergraduate, graduate, nonprofit accounting courses and advanced courses in their study in 2015. Early and others focused on students' education and its context for new job potential. In their study, a person who has found a new job in a municipality or as a mayor's staff member will want to make a significant impact in their job, even in the first weeks. This new position may be very boring for them, because they have to handle financial challenges, such as the city budget, expenditures associated with working in the city, public safety and managerial conflicts, pension or post-employment benefits, etc. Early and others have investigated how these problems are connected with their education. They offered some opinions on education for municipalities that have vacancies (Earley at all, 2015).

Trussel and Patrick in 2009 examined municipalities' behavior to determine financial risk factors for local governments that are in fiscal stress. They found that a municipality's financial stress is related to debt use and revenue concentration. They suggested to all municipalities that

they can manage their revenues and expenses to balance financial stress (Trussel and Patrick, 2009).

In 2013, Gomes, Alfinito and Albuquerque examined Brazilian municipalities between 2005 and 2008. They examined the Financial Performance Management Index as a dependent variable; they used population size, the mayor's age and the mayor's education and their experience as independent variables. The assumption was that there are relationships among these variables. Their first contribution is that larger municipalities are able to manage their revenues and expenses better than smaller municipalities. Secondly, good management in municipalities in the form of strong managerial skills and experience is needed (Correa et al., 2013).

In Spain, water investment and privatization are needed to overcome the high cost of human resources. All municipalities, especially in the metropolitan areas as compared to rural areas, use high salaries for workers who work on water and waste water operations. The use of a temporary work force on water operations is taken into consideration for municipalities in order to reduce all costs for municipalities. The municipality sizes in Spain are not big enough to handle all fiscal problems related to water and waste water investments according to Manuel (2003). They need to participate in the private and public sectors to overcome these fiscal problems. They also need to control their financial costs.

In 2016, Akdoğan and Çetinkaya analyzed transparency and accountability of 30 metropolitan municipalities in Turkey by investigating their web pages. They found that municipalities have a weak efficiency for sharing knowledge, lack of audit applications, and limited explanation of their financial statements, even if it is not mandatory. Their suggestion to all municipalities is to start independently auditing and explain financial reports and statements in terms of transparency and accountability (Akdoğan and Çetinkaya, 2016).

The establishment of ISKI (Istanbul Water and Sewerage Administration) in 1981 has given a role of responsibility for planning, operation, construction and design to Istanbul. It was an independent company in Istanbul before, but its status changed in terms of administration. ISKI is now public individual and subordinate of the Istanbul Municipality. ISKI's goal is to increase accountability and efficiency of operation under commercial regime, including foreign loans. ISKI can use tariffs for water and sewerage with 10 percent of all expenses. It includes all kinds of operations, maintenance, rehabilitations and other related works (Cinar, 2009).

Some municipalities have the same problems to overcome. Factors have been determined especially in the following economic and social conditions (Watson at all, 2005) (Wällstedt at all, 2005):

- a) Financial managerial problems
- b) Population problems in declining
- c) Constitutional problems
- d) Common and temporary problems
- e) Suspicious problems with the city

In addition to the list above, municipalities need to take into account: weakness of regulation on fiscal affairs, experience of investment and expenditures, managing workers, balancing income, investments and founding differences between them. According to the literature, most municipalities have these problems.

### **3. Methodology and Model**

The main aim of this study is to determine the effect of municipalities' investment decisions on financial tables. For this purpose, we were determined to find or calculate all variables related to the literature. Firstly, we started to define all municipalities in Turkey. The total count of municipalities in Turkey has increased year by year. After 2005, there were 81 municipalities in Turkey. Therefore, we analyzed all municipalities' consolidated financial tables in order to understand their financial aims and explain results in successes or failures. We have collected and consolidated financial tables, such as Balance Sheets and Income Statements from 2006 to 2014, for all municipalities in Turkey. In this study, we preferred to use firstly, financial ratios and secondly, the Structural Equation Model. Literature about financial determination and calculating financial ratios shows that the techniques are helpful to predict and evaluate results for companies. It also gives relationships between variables. Municipalities are considered the equivalent of companies because their financial tables are similar. Thus, it can be easily analyzed for our goal.

For the financial ratios, we are convinced that the traditional ratio analysis can be used for analyzing the financial performance of municipalities. It is known that a municipality can be classified as a non-profit aimed company. Hence, all companies need to prepare financial tables to regulate previous performance and to plan their futures. Municipalities also need to prepare financial tables for their fiscal rules. The financial tables can be used as a performance measurement tool. We started at this point and collected all municipalities' financial tables for performance testing. In this stage, we used Trussel and Patrick's variables (Trussel and Patrick, 2009) to determine the performance of municipalities using Quick Ratio, Cash Ratio, Finance Ratio, Leverage Ratio, Tax to Total Revenue Ratio, Grants and Aids and Special Revenues to Total Revenues and Administrative Cost Ratio. These ratios can be calculated as follows:

$$\text{Quick Ratio} = \frac{\text{Total Current Assets}}{\text{Short Term Liabilities}}$$

$$\text{Cash Ratio} = \frac{\text{Liquid Assets} + \text{Marketable Securities}}{\text{Short Term Liabilities}}$$

$$\text{Finance Ratio} = \frac{\text{Shareholders Equity}}{\text{Total Liabilities}}$$

$$\text{Leverage Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

$$\text{Tax to Total Revenue Ratio} = \frac{\text{Tax Revenues}}{\text{Total Revenues}}$$

$$\text{Grants, Aids and Special Revenues} = \frac{\text{Grants, Aids and Special Revenues}}{\text{Total Revenues}}$$

$$\text{Administrative Cost Ratio} = \frac{\text{Personnel Cost}}{\text{Total Cost}}$$

In addition to these, we also calculated Debt Level, Debt to Revenue, Size of Total Revenues and Revenue Growth Ratio as showed below:

$$\text{Debt Level} = \text{Ln}(\text{Short Term Liabilities} + \text{Long Term Liabilities})$$

$$\text{Debt to Revenue} = \frac{(\text{Short Term Liabilities} + \text{Long Term Liabilities})}{\text{Total Revenues}}$$

$$\text{Size of Total Revenues} = \text{Ln}(\text{Total Revenues})$$

$$\text{Revenue Growth Ratio} = \frac{(\text{Total Revenues}_{t2} - \text{Total Revenues}_{t1})}{\text{Total Revenues}_{t1}}$$

These variables are used in the Structural Equation Model (SEM) as independent variables. This is also the second step in the analysis. The SEM is a data analysis approach that combines causal modelling and covariance structure between variables. This method can be a well-known technique that includes the general linear regression model and common factor analysis. This model is the combination of factor analysis and multiple regression analysis, and it is used to analyze the structural relationship between the measured variables and latent construction. The Structural Equation Model expresses two substantial elements, described as follows (Byrne, 2013):

- a) Causal processes under study are represented by a series of structural equations.
- b) These structural relations can be modeled pictorially to enable a clearer conceptualization of the theory under study.

In this study we need dependent variables. For this purpose, we used the municipality's common and main investments. They are "Drinking Water Investments (*Water Invest*)" and

“Sewerage Investments (*Sewerage Invest*)”. We used these variables as dependent variables in the SEM. All municipalities in Turkey need to invest in drinking water and sewerage for several years. In this paper, we used all investment amounts for the total base from 2006 to 2014. Therefore, we have figured out the relationships in the model separately between the dependent variable and the independent variables. Results of the model estimation give us two important things to suggest that all municipalities throughout the decision making for investing in drinking water and sewerage. Firstly, signs of the estimation parameters are important to understand and for the prediction of future decisions. The positive sign means municipalities must take into account their investing in the same way. If the variable’s sign is “+”, municipalities may increase these variables depending on the investment. Secondly, standardized parameters of the estimated results have a power effect on the variable related to investment. Municipalities may take into account these parameters to increase or decrease ratios for investment decisions.

#### 4. Results and Discussion

In this study, we obtained municipalities’ ratios that were calculated from their balance sheets and income statements and drinking water investment and sewerage investment, according to the total amount in Turkey from 2006 to 2014 on a yearly basis. The ratios referring to independent variables and investment of drinking water and sewerage are both replaced in a separate model as dependent variables. The relationship of all variables are very important for estimation in the model. For this purpose we used the Structural Equation Model with the SPSS v21 AMOS software for calculating these causal models with the Path Analyses.

In this study we started with descriptive statistics for all variables that are shown below:

**Table 1: Descriptive Statistics**

	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Dev.</b>
Quick Ratio	0,74895	1,51449	0,98162	0,24742
Current Ratio	0,72407	1,44995	0,94529	0,23042
Cash Ratio	0,07002	0,21902	0,14263	0,04643
Financing Ratio	2,04869	3,59860	2,92597	0,49757
Financial Lev	0,19681	0,30553	0,23726	0,03422
Taxes to Rev	0,15240	0,23606	0,18332	0,02415
Special Rev to T-Rev	0,01430	0,02369	0,01841	0,00322
Admin Cost	0,19638	0,29075	0,24347	0,03567
Debt Level	16,84190	17,80594	17,43180	0,31577
	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Dev.</b>
Debt to Rev	0,86722	1,58717	1,15278	0,23603
Size	16,65304	17,94840	17,30746	0,44499
Rev Growth	-0,16195	0,47676	0,14676	0,18939

Water Invest	406.670,06	861.142,00	667.419,33	156.006,80
Sewerage Invest	30.278	371.126,93	156.038,86	116.622,35

In Table 1, we tested the descriptive statistics for all variables using the SPSS. There are 12 variables as independent variables and 2 variables as dependent variables – in total 14 variables are represented in Table 1. According to the result of the descriptive statistics, we used mean and standard deviation. It can be said that Financing Ratio, Debt Level and Size have a high standard deviation level compared to the other variables.

**Figure 1: Municipalities’ Total Investment on Water and Sewerage**

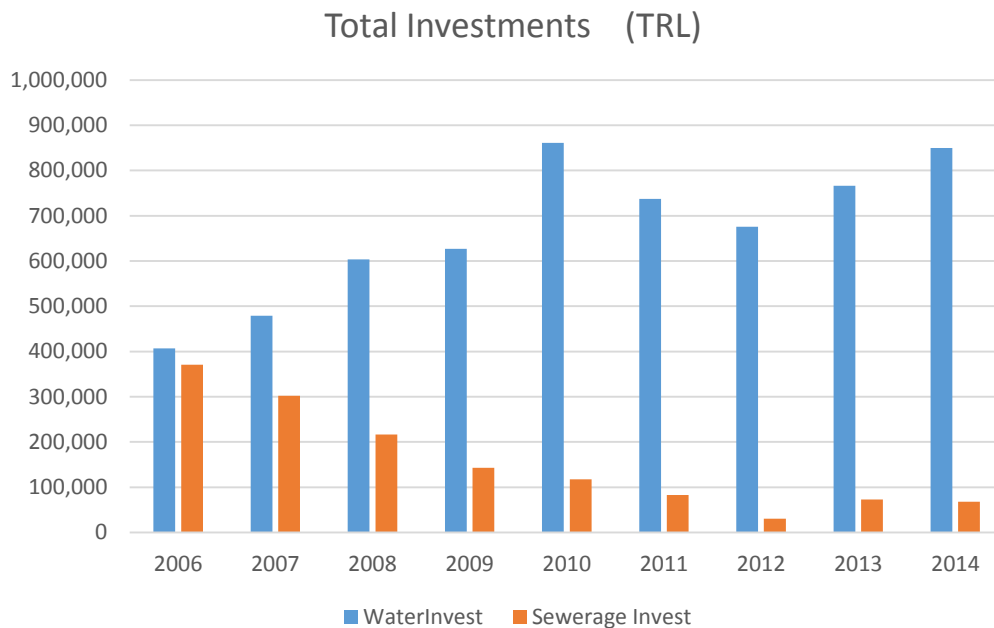


Figure 1 represents the total amount of each investment between 2006 and 2014 in Turkey. Also shown is the consolidated amount of the total 81 municipalities for this period. It can be understood from the figure that sewerage investments dramatically dropped during this period, but water investments rose during the period. All municipalities may take into account the amount of increasing rising investment depending on the year.

Figures 2 and 3 represent all of the variables that were used in the model. On one hand Figure 2 shows the dependent variables which are calculated from the financial statements, and on the other hand Figure 3 shows the independent variables, such as drinking water investment and sewerage investments. It can be easily understood that the Financing Ratio in Figure 2 dramatically increased from 2006 to 2014.



Figure 2: Spider's Web Graph for Dependent Variables

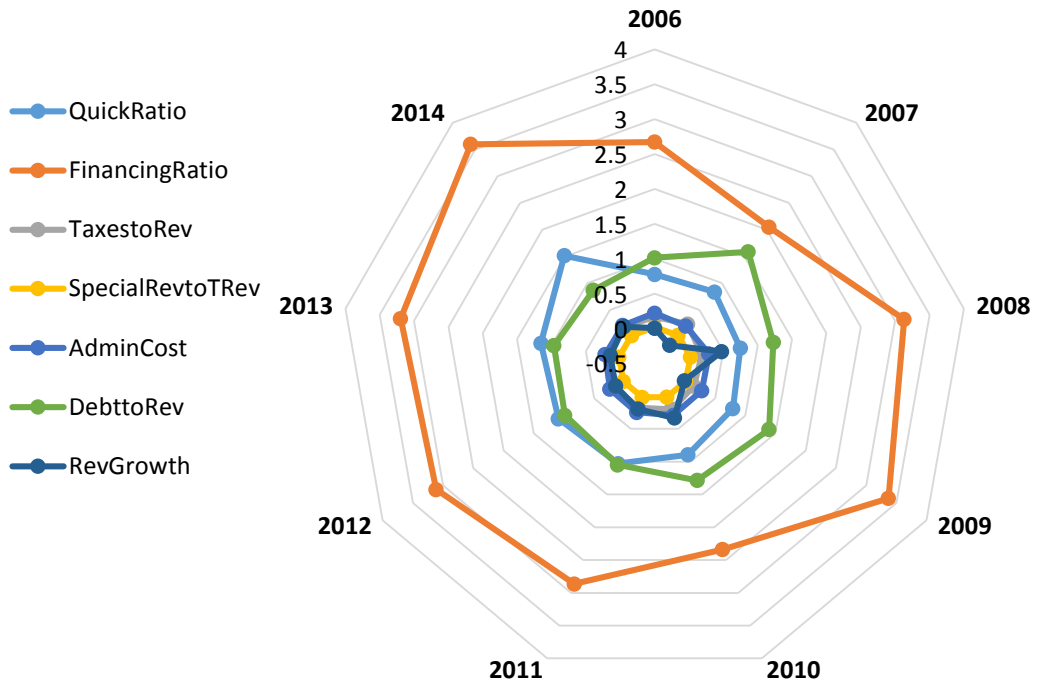
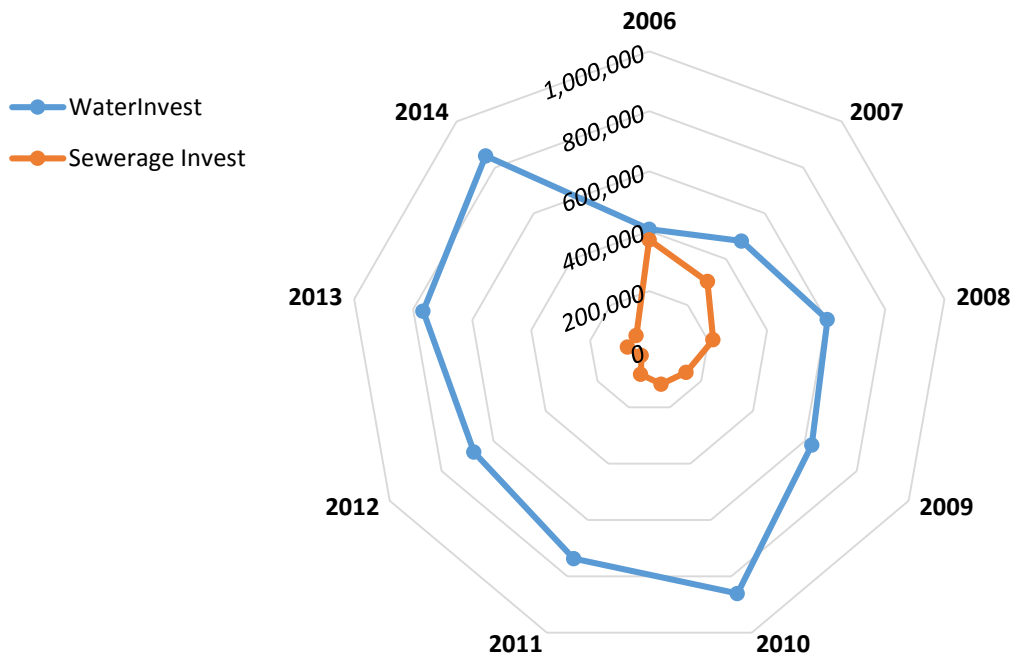
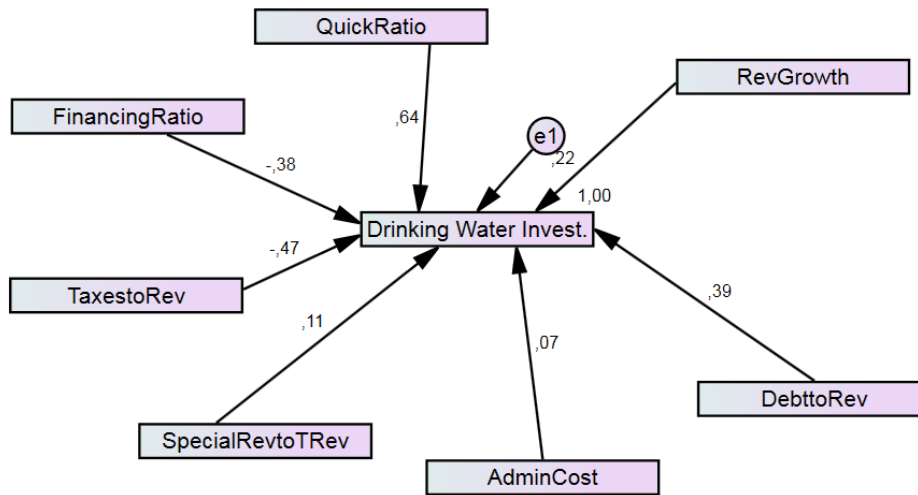


Figure 3: A Spider Web Graph for the Independent Variables



**Figure 4: Structural Equation Model Result for Drinking Water Investments**

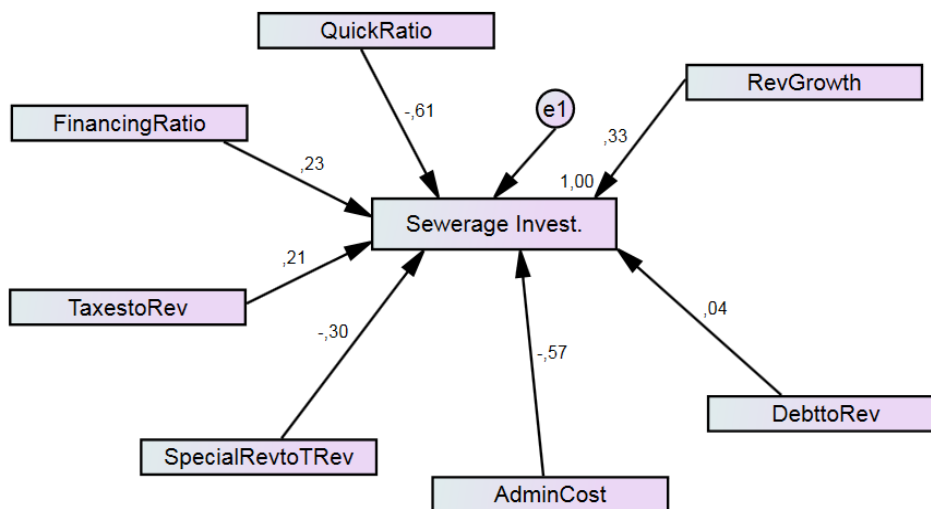


**Table 2: Standardized Regression Weights: (Group number 1 - Default model)**

Dependent Variable <-- Independent Variables			Estimates*
Water Invest	<---	Quick Ratio	,641
Water Invest	<---	Financing Ratio	-,380
Water Invest	<---	Taxes to Rev	-,474
Water Invest	<---	Special Rev to T-Rev	,109
Water Invest	<---	Admin Cost	,067
Water Invest	<---	Debt to Rev	,391
Water Invest	<---	Rev Growth	,225

\* All variables are at a 1% significant level, except for Admin Cost which is at a 10% significant level

**Figure 5: Structural Equation Model Result for Drinking Sewerage Investments**



**Table 3: Standardized Regression Weights: (Group number 2 - Default model)**

Dependent Variable <-- Independent Variables			Estimate**
Sewerage Invest	<---	Quick Ratio	-,610
Sewerage Invest	<---	Financing Ratio	,226
Sewerage Invest	<---	Taxes to Rev	,212
Sewerage Invest	<---	Special Rev to T-Rev	-,304
Sewerage Invest	<---	Admin Cost	-,570
Sewerage Invest	<---	Debt to Rev	,042*
Sewerage Invest	<---	Rev Growth	,332

\*\* All variables are at a 1% significant level, except for Debt to Rev that is at a 5% significant level

**Table 4: Comparison of All SEM Results**

Variables	Drinking Water Invest	Sewerage Invest
Quick Ratio	+	-
Financing Ratio	-	+
Taxes to Rev	-	+
Special Rev to T-Rev	+	-
Admin Cost	+	-
Debt to Rev	+	+
Rev Growth	+	+

## 5. Conclusions and Recommendations

In this study we examined the financial relationships between municipalities' financial decisions on both drinking water investment and sewerage investment and their financial ratios that were calculated from their financial statements. In Turkey there are 81 municipalities in the local government status. We analyzed their financial statements, such as balance sheets and income statements from 2006 till 2014; we preferred to use variables from these financial statements. In addition to this, we found the total investments of drinking water and sewerage during these years. As we explained in the methodology and model section of this paper, we calculated each variable and they were estimated using the Structural Equation Model. According to the first results, all variables are statistically significant and at an accepted level. Besides drinking water investment, related variables were tested using the Structural Equation Model, and the result gave us two important things. Firstly, signs of all variables are very important. Indeed, Financing Ratio and Taxes to Rev's signs are "-" negative; it means municipalities may reduce the total liabilities to increase drinking water investment. Total tax to total revenue ratio must decrease to invest in and to establish the drinking water system. But

other variables are at a positive “+” sign, and it’s means if the municipality increases these variables, it can easily support investment in drinking water system. Secondly, the important thing is the coefficient of each variable in the model. Quick Ratio especially has a higher coefficient than others. It means cash and equivalent items in the Current Assets of Balance Sheets are more important to investing in the drinking water system.

For sewerage investments, we also tested these independent variables using the SEM. As a result of this test, Quick Ratio, Grants, Aids and Special Revenues (Special Rev to T-Rev) and Administrative Cost (Admin Cost) resulted in negative “-” signs. It means that if municipalities want to invest in sewerage investments, they have to take into account these variables and negative effects of investing in sewerage systems. Besides, other variables resulted in positive “+” signs in the test result. Consequently, we found that if any municipality had decided to invest in drinking water systems, they would run out of their own money as equities. Yet if they wanted to invest in sewerage systems, they would employ borrowing money as a debt. So they need to implement extra taxes as a percentage of revenues and they also need extra money acquired outside of the municipality. For further work on this subject, linkage between the other expenses and financial effectiveness with time series base is suggested. A relation between the development of cities and their municipalities’ decision on investment is also suggested to potential academicians.

### **Acknowledgment**

Corresponding Author is Dr. E. Savaş BAŞCI, Hitit University, Faculty of Economics and Administrative Sciences, Banking and Finance Department, Çorum, Turkey,  
esavasbasci@hitit.edu.tr

### **References**

- Ahmaro, I. H. 2014, Controlling the Financial Performance of Jordanian Municipalities by Improving Financial Regulations an Analytical Study. *Journal Of Business Studies Quarterly*, 6(2), 67-84.
- Akdogan, N. Çetinkaya, N. 2016, Türkiye’de Bulunan Büyükşehir Belediyeleri’nin Şeffaflık Ve Hesap Verebilirlik Açısından İncelenmesi. *Muhasebe Bilim Dünyası Dergisi*. 2016; 18 (Özel Sayı-1); 897-917
- Bushnak, A. Adil, 2001, Investment Needs and Privatization of Water Services in Saudi Arabia, *Water Resources Development*, 17(2), 257 – 260
- Byrne, B. M. (2013). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Routledge.
- Christine R. Martell 2003, Municipal Investment, Borrowing, and Pricing under Decentralization: The Brazilian Case, *International Journal of Public Administration*, 26:2, 173-196, DOI: 10.1081/PAD-120018301
- Cinar, Tayfun, 2009, Privatisation of Urban Water and Sewerage Services in Turkey: Some Trends, *Development in Practice*, 19(3), 350-364
- Correa Gomes, R., Alfinito, S., & Melo Albuquerque, P. H. 2013, Analyzing Local Government Financial Performance: Evidence from Brazilian Municipalities 2005-2008. *RAC - Revista De Administração Contemporânea*, 17(6), 704-719.
- Delcea, L. S. 2012, The Expenditures Analysis Of Oradea Municipality's Local Budget. *Annals of the University Of Oradea, Economic Science Series*, 21(2), 410-415.

Earley, C. E., Nancy Chun, F., & Kelly, P. T. 2015, The City of Providence, RI: A Case Examining the Financial Condition of a U.S. Municipality. *Issues in Accounting Education*, 30(2), 127-139. doi:10.2308/iace-51042

Manuel, A.S. Manuel, 2003, Water Privatization in Spain, *International Journal of Public Administration*, 26(3), 213-246

TMAOW, Turkey Municipalities Association Official Web, Türkiye Belediyeler Birliği, [ww.tbb.gov.tr](http://ww.tbb.gov.tr), 16.11.2015

Trussel, J. M., and A. P. Patrick. 2009, A Predictive Model of Fiscal Distress in Local Governments. *Journal of Public Budgeting, Accounting & Financial Management* 21 (4): 78–616

Wällstedt, N., Grossi, G., & Almqvist, R. 2014, Organizational Solutions for Financial Sustainability: A Comparative Case Study from the Swedish Municipalities. *Journal of Public Budgeting, Accounting & Financial Management*, 26(1), 181-218.

Watson, D. J., Milam, D. M., & Hassett W. L 2005, Financial Distress and Municipal Bankruptcy: The Case of Prichard, Alabama. *Journal of Public Budgeting, Accounting & Financial Management*, 17(2): 129-151.