

## CREDIT RISK OF ICELANDIC MUNICIPALITIES

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**Abstract:** *In this article the results of an extensive research on the credit risk of Icelandic municipalities are presented. The methodology named after Altman was applied and the credit risk of Icelandic municipalities was assessed according to his model. In addition the relationship between financial health and the size of municipalities was examined. Finally a small study was conducted where the financial health of municipalities around the capital area was different from other. The results are that this methodology is useful when evaluating the credit risk of Icelandic municipalities. The findings indicate that Icelandic municipalities have been able to continue functioning financially even though being very weak financially. Smaller municipalities were on average much financially stronger than the larger ones. But there was not a statistical significant difference in the financial strength of municipalities around the capital to other municipalities around the country.*

**Keywords:** Iceland, municipalities, credit risk, Altman Z.

**JEL classification:** G01, G31, G33, G38.

### 1. Introduction

Icelandic municipalities are an important part of the society. Their importance has increased considerably and their part of public service has increased markedly. Therefore their operations, financial position and ability to do their functions is of critical importance for the Icelandic public. The fiscal health or financial situation of Icelandic municipalities has come into public scrutiny in late years. A few municipalities have come under severe financial strain and have had to seek assistance. There are examples of this in the capital area and also in the north and southeast of Iceland. When municipalities run into financial difficulties the negative effects on their inhabitants are profound. Services are cut, taxes are increased and the community is negatively affected. Thus making it a worse place for living (Eftirlitsnefnd með fjármálum sveitarfélaga, 2015).

In this article the results of an extensive study on the credit risk of Icelandic municipalities is presented. The Altman Z is applied for the first time on the annual reports of Icelandic municipalities. This model was recently applied to determine the credit risk of counties in Texas (Fischer, Marsh and Bunn, 2015). This model calculates the Z coefficient and in this paper the Z values of Icelandic municipalities are examined. In addition the development of the Z coefficient is examined in municipalities which have come under extreme financial difficulties and had to ask for assistance. Finally small and large municipalities are compared as well as those in and around the capital compared to other municipalities.

### 2. The legislative framework

The laws which cover the finances of Icelandic municipalities are municipal laws 138/2011. In the 8 article it says that the governing body of the municipality controls the municipality and makes decisions regarding revenue and expenses of the municipality. In the 7 article the financial affairs of the municipality are explained. There it is stated that the municipality's

revenues should not exceed its expenses. Therefore the underlying assumption is that the municipality should be not running a budget deficit (Alþingi, n.d.).

According to the 71 article creditors of Icelandic municipalities are unable to force them into bankruptcy even though they run out of cash to cover day to day operations. Creditors are therefore unable to confiscate assets when faced with non-payment of debts (Alþingi, n.d.). This weakens the bargaining position of creditors when negotiating with distress municipalities and increases their willingness to agreement.

The Ministry of the interior, which manages the finances of Icelandic municipalities introduced a directive in 2012. The purpose of this directive was to clarify further the proper metrics regarding municipal finance. Also, to ensure proper monitoring of their finances. According to this directive the expenses of the A part, which is the core operation of the municipality, and the B-part, which is the consolidated accounts, should never be higher than the revenue on average every three years. In addition it set a limit on the total debt of the municipality which is that the total debts both for the A and B parts of the accounts should be less than 150% of total revenues (Innanríkisráðuneyti, 2012). It is still unclear if these measures are sufficient and enough to prevent future financial difficulties for Icelandic municipalities.

### **3. Financial development**

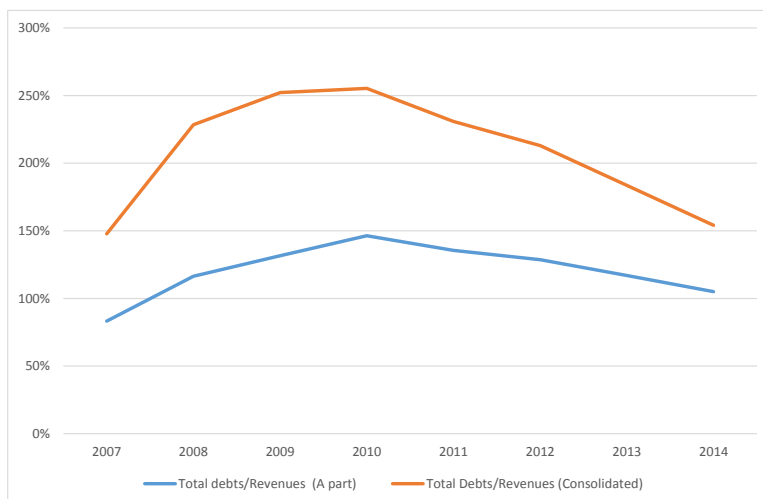
There has been a great variability in revenues and profitability of Icelandic municipalities in recent years. Their revenues reached a peak in 2007 when the Icelandic economy was overheating and growing more than 9%. Then when the financial crises hit the country in 2008-2010 and the economy contracted their finances suffered badly. Their revenues plummeted and what was even more devastating were increased in the debt burden. Some municipalities had a considerable part of their debt in loans denominated in foreign currencies. Thus, when the Icelandic krona lost around half of its value in 2008 those loans skyrocket when measured in the Icelandic krona. Since 2010 the financial situation has improved gradually and their operations have been aided by considerable growth in the Icelandic economy which has been growing significantly in recent years.

Figure 1 shows the development of profitability, financial costs, and extraordinary charges for Icelandic municipalities 2007-2014. All the numbers on the picture are at constant prices. The numbers presented here are the sum of the total of all of Icelandic municipalities and do represent the consolidated accounts. The figure shows that the municipalities were running a healthy profit in 2007. Their total combined profit that year amount to 65 billion Icelandic kronas (ISK). The negative turnaround was gigantic the following year and the total loss of 138 billion ISK. The loss that year was mainly because of negative financial charges on loans denominated in foreign currencies. Since then there has been a minor loss in 2009 and again in 2011 but there has been good profit since 2012.



**Figure 1:** The development of the profit, financial charges, and exceptional charges of the consolidated accounts of Icelandic municipalities in billion ISK 2007-2014.  
Source: Union of Icelandic municipalities (2016).

But how has the development of debt been for Icelandic municipalities? In Figure 2 the development of total debts as a percentage of revenues is charted both for the A part and the consolidated accounts. The picture shows that the debt burden worsened considerably 2008-2010 and it peaked in 2010 when this ratio reached 250% for the consolidated accounts and 150% for the A part. It is worth noting that the one company, Reykjavik Energy, which is the public utility company which provides electricity and geothermal water for the capital and surrounding areas has more than half of the total debt of the consolidated accounts of Icelandic municipalities. Reykjavik Energy invested heavily in 2005-2007 which increased its debts considerably. Its debt was almost solely in foreign currencies and thus the fall of the Icelandic krona in 2008 affected it profoundly. Since the peak in 2010 the situation has improved gradually and total debts were around 154% for the consolidated accounts and 105% for the A part in 2014.



**Figure 2:** The development of total debts/revenues for the A part and the consolidated accounts of Icelandic municipalities 2007-2014.  
Source: Union of Icelandic municipalities (2016).

#### 4. Literature review

There is little consensus in the literature about the relationship between the size of municipalities and their financial effectiveness. When examining Australian municipalities the main findings were that the merger and the subsequent increase in their size lead to lower cost and more effectiveness. The reason was mostly economics of scales and the results of merger were that fixed costs were distributed on more people and operations become cheaper (Dollery and Crase, 2004). Other studies have found little relationship between the size of municipalities and costs. In an extensive research on Canadian municipalities the main conclusion was that there was little relationship between costs and size. One could even argue for lower average cost in smaller communities (Bodkin and Conklin, 1971). Even though it is an accepted consensus that there are economics of scales in the cost of municipalities. But there are limits and the economics of scale disappear and the size becomes uneconomical. Where these limits are is questionable. Some research put the mark on 20-25 thousand inhabitants (Gabler, 1969; Southwick, 2012). Other have argues that the optimum low cost is reached at around 100 thousand (Bodkin and Conklin, 1971) (Mabuchi, 2001). Those numbers are high considering that the median size of Icelandic municipalities is a bit below 1 thousand inhabitants. And only one, i.e. the capital, having more than 100 thousand.

But what is the resound for these contradictory findings? One reason often mentions is a difference in the density of the population. In a research of US municipalities the outcome was that if controlled for the density of the population there was no economics of scales in municipalities (Southwick, 2012). Another explanation is a difference in the service that the community provides. Often smaller municipalities provide inferior service which leads to lower costs (Dollery and Crase, 2004).

#### 5. Methodology

The credit risk of companies and probability of bankruptcy has been studied toughly. Since 1930 modes have been constructed which aim to predict corporate default (Ohlson, 1980) (Mossman, Bell, Swartz and Turtle, 1998) (Bellovary, Giacominio and Akers, 2007). The most prestigious model is though Altman's equation which he put forward to predict the bankruptcy of corporations in the production industry. This model is based on variables where liquidity, profitability, debt levels, etc., are applied to predict corporate default. Altman estimated that the model predicted bankruptcy within a year with 95% accuracy. In two years the accuracy was down to 72% and it was only 52% three years before default (Altman, 1968). Altman introduced a new model in 2002 intended to predict the default of companies in the service industry (Altman, 2002). That model calculates a Z coefficient and is as follows:

$$Z = 6,56 X_1 + 3,26 X_2 + 6,72 X_3 + 1,05 X_4 \quad (1)$$

Where:

$X_1$  is (current assets-current liabilities)/assets. This part of the equation measures liquidity in proportion of assets. If the current ratio (current assets/current liabilities) is under 1.0 then the coefficient  $X_1$  is negative.

$X_2$  is profit/assets and measures profitability in relation to assets.

$X_3$  is EBIT (earnings before interest and taxes)/assets.

Finally  $X_4$  is equity/total debts. This part of the equation measures leverage and equity. The higher the Z coefficient the better the credit score. Therefore higher Z coefficient leads to lower risk of bankruptcy. Altman stated that if the Z coefficient is under 1.1 the financial situation is very difficult and a significant risk of default. Between 1.1 and 3.0 the situation

was difficult. But if the Z coefficient was above 3.0 the financial health was sound and insignificant risk of bankruptcy for the next 3 years (Altman, 2002). In a recent study in municipalities in Texas this model was applied. The main findings were that the financial health of Texan municipalities was sound and only 1 of 85 had a Z coefficient under 1.1 (Fischer et al., 2015).

## 6. Results

But how is the financial health of Icelandic municipalities? What is their outcome when Altman Z is calculated? In this research the Z coefficient for all Icelandic municipalities was calculated using equation 1. Data from the annual reports of all Icelandic municipalities for the year 2014 was obtained from the Union of Icelandic Municipalities (Samband íslenskra sveitarfélaga, 2016). The Z coefficient was calculated both for the A part of the accounts and for the consolidated accounts. The findings are in the appendix where the Z coefficient of all Icelandic municipalities is presented. There the municipalities are ranked after the Z coefficient of the consolidated accounts. The results are surprising, i.e. the financial health of Icelandic municipalities is often very weak. There are 73 municipalities in Iceland. Of them, 27 had a Z coefficient below 1.1 in 2014 for the consolidated accounts. Even worse 6 municipalities had a negative Z coefficient for the consolidated account, but 11 had negative values for the A part.

### 6.1. Smaller vs. larger

In addition a study was conducted to test if there was a relationship between the financial health and size of Icelandic municipalities. It consisted of testing if there was a difference in the Altman Z coefficient between smaller and larger municipalities. Because both the size of population of Icelandic municipalities and the Altman Z coefficients are not normally distributed a nonparametric test, i.e. the Kruskal Wallis test was applied. The methodology used consisted of dividing all of the municipalities in two equally large groups based on the number of inhabitants and comparing the two groups. The municipalities which had less than 917 inhabitants were classified as small and those with more than that as large. Table 1 does show the results of this analysis.

**Table 1:** The Z coefficients of smaller and larger Icelandic municipalities 2014.

	<b>Smaller</b>	<b>Larger</b>
Average	6.34	1.45
Median	3.32	1.05
Standard deviation	9.34	1.56
P-value	0.000108	

Source: Union of Icelandic municipalities (2016) and author's calculations.

The results are conclusive. Small municipalities got considerably higher score than the larger ones. The median value of smaller municipalities was 3.32 but it was only 1.05 for the larger. Therefore, one can conclude that the financial health of smaller municipalities was much better than the larger. The average is higher than the median, especially for the smaller municipalities. It is interesting that the standard deviation is significantly higher for the smaller group, indicating a great variety in their financial position. The P-value indicates that the null hypothesis that median value of the two groups is the same is rejected. Therefore, one can conclude that the financial health of the smaller municipalities in Iceland was significantly better in 2014 than of the larger ones.

### 6.2. The capital area vs. other municipalities

But is there a difference in the financial health of municipalities in and around the capital from other municipalities around the country. A study was performed to find out if there was a difference in their Z coefficients. The definition of municipalities in the capital area would apply to all municipalities within a 1 hour driving range from Reykjavik. This applied to 24. Other "rural" municipalities were therefore 49. The results are presented in table 2. The other municipalities were on average in a better position, but there was not a statistically significant difference in the median based on Kruskal Wallis test as the P-value indicates.

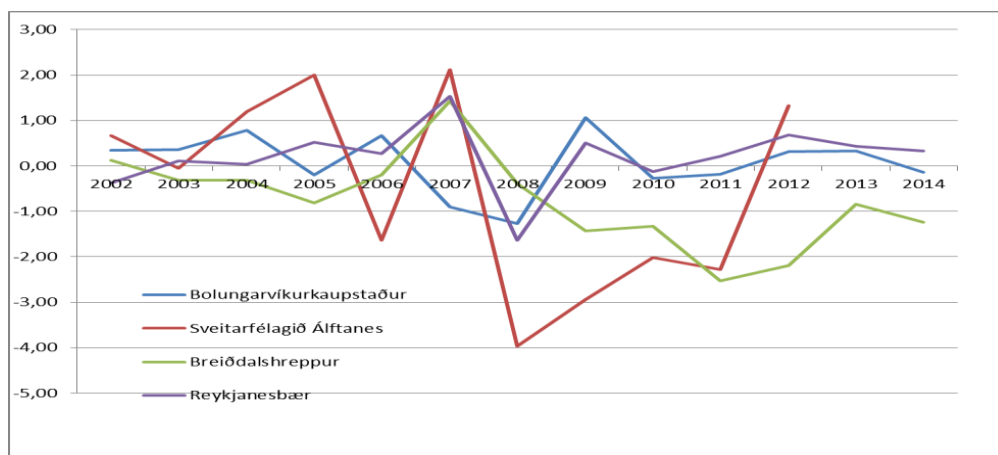
**Table 2:** The Z coefficients of consolidated accounts of municipalities around the capital and other municipalities 2014.

	Other	Capital area
Average	4.17	3.44
Median	1.88	1.46
Standard deviation	7.86	5.46
P-value	0.851	

Source: Union of Icelandic municipalities (2016) and author's calculations.

### 6.3. "The point of no return"

Finally, a study was conducted to chart the "point of no return" i.e. when the financial situation of Icelandic municipalities was so bad that they had to seek assistance. That would include negotiations with creditors and an intervention by the Ministry of the interior. There are four cases of this in recent years. The development of the Z coefficient of these municipalities from 2002 until 2014 is shown in Figure 3. When the figure is examined it shows that for all of these municipalities their Z coefficients touched or went below -1.0. Even though this is not a sophisticated analysis, which is impossible to conduct because of so few cases, it gives an indication.

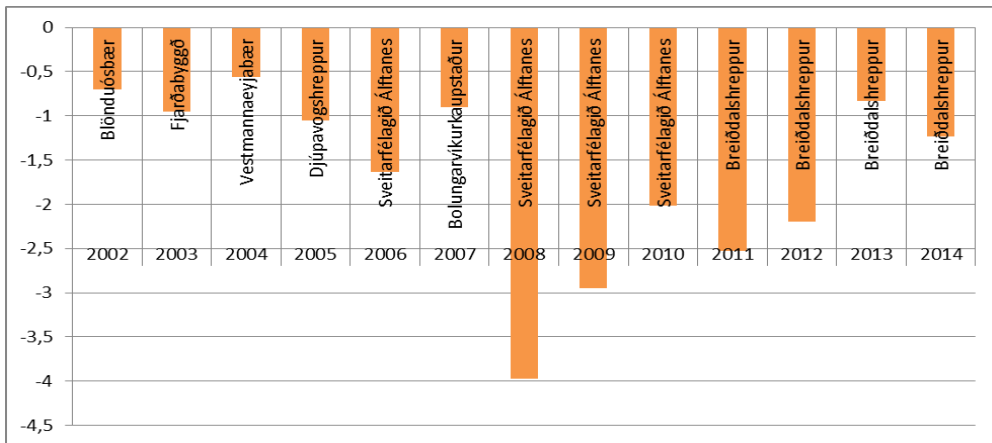


**Figure 3:** The development of Z coefficients of the consolidated accounts of four municipalities 2002-2014.

Source: Union of Icelandic municipalities (2016) and author's calculations.

Figure 4 does show every the worst municipality and its Z coefficient from 2002 until 2014. The municipalities which were in the worst position 2002-2005 managed to recover unaided. What they have in common is that for none of them, except for one, the Z conflict went below -1.0. The worst situation was in 2008 for Sveitarfélagið Álftanes when its Z coefficient

touched -4.0. That indicated that this municipality was in a hopeless financial situation. A significant part of its debt was then written off and it was merged to a neighbouring municipality and thus ceased to exist.



**Figure 4:** Lowest Z coefficients of Icelandic municipalities 2002-2014.  
 Source: Union of Icelandic municipalities (2016) and author's calculations.

This limited analysis suggests that the critical value of the Z coefficient has been around -1.0. Then the situation has become so bad that the municipality has had to seek assistance and negotiate with creditors. That is considerably lower than expected, with 1.1 being the expected value, and indicates a surprising resilience.

## 7. Conclusion

The methodology presented here, i.e. to calculate the Altman Z coefficient does give an important information regarding the financial position of Icelandic municipalities. It gives a good indication of their relative financial strength of but is less clear about the risk of severe financial distress or bankruptcy. The findings indicate that the financial health of the biggest municipalities is on average weak and worse than was expected. But smaller municipalities are often in a much better position and they are often debt free.

It is surprising how few municipalities have had to seek assistance from the Ministry of the interior given how weak their financial situation often is. For that there are probably many reasons. One possible explanation is that Icelandic municipalities are able to cut costs when times are tough. That's because a significant portion of their expenses goes into funding nonobligatory expenses. They are able to cut those expenses and avoid financial distress. Another likely explanation is that the creditors, i.e. Icelandic financial institution which lend the municipalities are willing to extend loans and change terms when the municipalities face financial hardship. Their bargaining power is weak, as they are not allowed to confiscate assets of the municipality or force them into bankruptcy. This is though difficult to state without further research.

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## Bio-note

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**Appendix**  
**Z-coefficient of Icelandic municipalities 2014**

Municipality:	Consolidated	A-part	Municipality:	Consolidated	A-part
Árneshreppur	49,70	51,04	Grýtubakkahreppur	1,68	4,33
Eyja- og Miklaholtshreppur	26,56	26,56	Sveitarfélagið Vogar	1,60	1,18
Fljótshreppur	17,79	22,94	Vopnafjarðahreppur	1,50	0,01
Svalbarðsstrandarhreppur	15,93	17,87	Strandabyggð	1,37	2,80
Svalbarðshreppur	15,54	15,54	Garðabær	1,31	1,33
Akrahreppur	10,93	10,93	Hrunamannahreppur	1,30	1,65
Kaldrananeshreppur	10,90	12,44	Seyðisfjarðarkaupstað	1,17	1,31
Hvalfjarðarsveit	7,49	7,34	Pingeyjarsveit	1,12	1,84
Ásahreppur	6,64	6,68	Akueyrarkaupstaður	1,08	0,79
Tjörneshreppur	6,16	6,16	Djúpavogshreppur	1,08	-1,38
Súðavíkurbær	6,08	9,56	Rangárþing ytra	1,06	1,60
Grindavíkurbær	5,84	6,88	Reykjavíkurborg	1,04	1,42
Sveitarfélagið Garður	5,50	5,51	Akraneskaupstaður	0,90	1,37
Borgarfjarðahreppur	5,29	30,89	Stykkishólmshreppur	0,83	1,67
Skeiða- og Gnúpverjahreppur	5,21	6,96	Fjarðabyggð	0,75	-0,66
Sveitarfélagið Skagastígur	5,13	8,28	Grundarfjarðarbær	0,69	0,38
Húnavatnshreppur	5,12	5,30	Hveragerðisbær	0,68	0,41
Flóahreppur	4,96	11,85	Grímsnes-og Grafningssveit	0,67	2,95
Seltjarnarneskaupstaður	4,62	4,99	Sandgerðisbær	0,55	0,98
Kjósahreppur	4,39	4,39	Skútustaðahreppur	0,48	0,30
Reykholahreppur	3,77	4,99	Vesturbyggð	0,42	0,90
Skagabyggð	3,32	7,98	Reykjanesbær	0,33	-1,19
Helgafellssveit	3,28	3,28	Langanesbyggð	0,33	-1,35
Eyjafjarðarsveit	3,14	4,79	Blönduósibær	0,31	1,34
Skaftárhreppur	3,10	3,54	Kópavogsbær	0,31	0,26
Rangárþing eystra	2,87	4,51	Sveitarfélagið Árborg	0,28	-0,22
Sveitarfélagið Hornarfjarður	2,86	3,15	Ísafjarðarbær	0,25	0,99
Húnaþing vestra	2,82	6,13	Borgarbyggð	0,11	0,28
Vestmanneyjabær	2,80	4,56	Fljótshreppur	0,05	-0,22
Hörgársveit	2,49	2,77	Mosfellsbær	-0,08	-0,44
Bláskógabyggð	2,21	2,21	Norðurþing	-0,11	-0,44
Snæfellsbær	2,17	1,98	Bolungarvíkurkaupstaður	-0,13	0,03
Dalabyggð	2,01	2,53	Sveitarfélagið Skagafjörður	-0,15	-0,25
Fjallabyggð	1,93	2,00	Hafnarfjarðarkaupstaður	-0,50	-0,84
Dalvíkurbyggð	1,88	1,83	Breiðdalshreppur	-1,23	-2,08
Sveitarfélagið Ölfus	1,83	1,39			
Tálknafjarðahreppur	1,77	0,95	Average	3,93	4,86
Mýrdalshreppur	1,69	3,33	Median	1,77	2,00
			Standard deviation	7,13	8,23