

# Cold Winters' Influence on Insurance Claims

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## Abstract

The winter 2010-2011 was a cold and very expensive winter for the insurance companies in the Nordic countries. The winters the past two decades have been quite warm in comparison to the winters in the past century. The question was raised whether there is a correlation between a quantified exposure to freezing temperatures and insurance claims. In that case, are the insurance companies prepared for the increase in insurance loss if the winters would be as cold as they have been the past century; how large can the losses be expected to be in the three regions of Sweden (Norrland, Svealand and Götaland) within each sector (Private, Agricultural and Commercial)? Data was gathered from a Swedish insurance company regarding the insurance claims between 1985-2011. The temperatures were gathered from SMHI (Sveriges Meteorologiska och Hydrologiska Institution) and ECAD (European Climate Assessment Dataset project). The temperatures were used to construct temperature indexes for the winter period. We tested two different indexes based on the daily minimum and daily mean temperatures, showing that the minimum temperature index was generally not as strongly correlated with the insurance claims as was the mean temperature index, why the mean temperature index was used for the remainder of the analysis. In order to investigate the relationship between the temperature index and insurance claims, a correlation analysis and then a simple linear regression analysis were performed demonstrating a strong correlation between mean temperature index and insurance claims. Prediction analysis was made regarding the years between 1930-1985. When we examined the results, we could see that a winter as cold as the winter 1941-42 would generate big insurance claims in comparison with an average winter from the past two decades. However, the prediction from this model is very uncertain, which is demonstrated with a wide 95 % prediction interval. The report ends with a discussion on the performed analysis and results, where limitations and other sources of insecurities are mentioned.

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## Abstract

The winter 2010-2011 was a cold and very expensive winter for the insurance companies in the Nordic countries. The winters the past two decades have been quite warm in comparison to the winters in the past century. The question was raised whether there is a correlation between a quantified exposure to freezing temperatures and insurance claims. In that case, are the insurance companies prepared for the increase in insurance loss if the winters would be as cold as they have been the past century; how large can the losses be expected to be in the three regions of Sweden (Norrland, Svealand and Götaland) within each sector (Private, Agricultural and Commercial)? Data was gathered from a Swedish insurance company regarding the insurance claims between 1985-2011. The temperatures were gathered from SMHI (Sveriges Meteorologiska och Hydrologiska Institution) and ECA&D (European Climate Assessment Dataset project). The temperatures were used to construct temperature indexes for the winter period. We tested two different indexes based on the daily minimum and daily mean temperatures, showing that the minimum temperature index was generally not as strongly correlated with the insurance claims as was the mean temperature index, why the mean temperature index was used for the remainder of the analysis. In order to investigate the relationship between the temperature index and insurance claims, a correlation analysis and then a simple linear regression analysis were performed demonstrating a strong correlation between mean temperature index and insurance claims. Prediction analysis was made regarding the years between 1930-1985. When we examined the results, we could see that a winter as cold as the winter 1941-42 would generate big insurance claims in comparison with an average winter from the past two decades. However, the prediction from this model is very uncertain, which is demonstrated with a wide 95% prediction interval. The report ends with a discussion on the performed analysis and results, where limitations and other sources of insecurities are mentioned.