A Predictive Model to Forecast Mergers and Acquisition Activity

Summary/ Main Objectives

Mergers and acquisitions (M&A) are a large part of the corporate finance world. M&A transactions bring separate companies together to form larger ones. They can dictate the fortunes of the companies involved for years to come. It is a known and proven fact that when one firm is acquiring another firm, they tend to pay a premium. Being able to predict mergers or acquisitions before they take place could lead to an investor earning a premium on his or her initial investment. This study aims to use publically available mergers and acquisition data from Bloomberg Terminal to come up with a forecasting model to predict M&A activity in various industries using various time series forecasting models.

Introduction

Researchers in finance have spent the last five decades trying to perfect a model that is able to predict Mergers and Acquisitions. When forecasting this it is important to understand the definition of a typical acquisition prove environment. Some aspects of this environment are the following: a booming stock market, higher than usual valuations, the amount of liquid cash available, and competitor M&A activity to name a few. This project will therefore use a series of explanatory variables that impact this prone environment to build time series forecasting models that aid in forecasting mergers and acquisition transactions.

Needs/Problems

For this project, there are needs and potential problems that should be identified. In terms of the need, this project is intended to provide a robust predictive forecasting model for Mergers and Acquisition activity using historical M&A data available through the Bloomberg Terminal. This model can then be used by individuals like investors and economists to aid them with their particular needs, such as the investor wanting to maximize their investment, or the economist with their research. Companies can also take advantage of the forecasting model to assist with their own business models.

In terms of problems, there are several that need to be taken into account when carrying out financial forecasting. The first problem is the accuracy of the historical data. This data may be affected by external market conditions or errors in collection. This, in turn, can adversely affect the forecasting model being constructed. Data cleaning and preparation can help address some of these errors. The second problem is the time frame. If the time frame is too long, it can lead to

inaccurate forecasting. This is why the group chose to only include 10 years of data, beginning right after the economic crisis. This should minimize any potential unwanted factors that could affect the model. The third problem is unexpected or unique events can't really be factored into the model. Assumptions can fail as well. This problem simply needs to be kept in mind, as there is not much that can be done about external events not under our control. A fourth and final problem would be problems with input data. Errors can be made in collecting the data, interpreting the data, and incorporating the data into the model. Confirmation bias can also start to creep in. As such, care needs to be taken to ensure the data is comprehensively collected, processed, and integrated into the model in such a way as to create the most accurate and complete forecasting model possible.

Procedure

Historical data for the number of M&A in the United States will be retrieved from the appropriate data source. Data will be loaded into R and any preparation, cleaning, processing, etc., will be completed as necessary. Autoregressive Integrated Moving Average (ARIMA), which seems like the most commonly used method for time series forecasting, can be used to complete the forecasting. ARIMA is available in R through the stats package.

Below is a screenshot of the data that has been collected from Bloomberg Terminal. The data has been extracted to excel which allows for easier access onto our own laptops. The data consists of the 5000 largest M&A transactions in the last 10 years (since the economic crisis). The group added an industry section to see if certain industries are more prone to mergers and acquisition activities.

	Deal Type	Announce Date	Target Name	Acquirer Name	Announced Total Value (mil.)	Payment Type	TV/EBITDA	Deal Status	Target Industry Sector
2	M&A	11/23/2015	Pfizer Inc	Allergan PLC	183831.5	Stock	10.69	Terminated	Consumer, Non-cyclical
3	M&A	3/10/2017	BP PLC	Exxon Mobil Corp	181516.34	Undisclosed	15.63	Withdrawn	Energy
4	M&A	1/26/2017	Charter Communi	Verizon Communicat	169097.16	Cash	16.48	Withdrawn	Communications
5	M&A	2/17/2017	Unilever PLC	Kraft Heinz Co/The	163350.91	Cash and Stock	17.15	Withdrawn	Consumer, Non-cyclical
6	M&A	9/2/2013	Cellco Partnershi	Verizon Communicat	130040	Cash, Stock & Debt		Completed	Communications
7	M&A	5/2/2014	AstraZeneca PLC	Pfizer Inc	124564.07	Cash and Stock	9.93	Withdrawn	Consumer, Non-cyclical
8	M&A	10/13/2015	Anheuser-Busch I	Anheuser-Busch InB	122966.08	Cash	6.72	Completed	Consumer, Non-cyclical
9	M&A	2/14/2017	Bristol-Myers Squ	Potential Buyer	119079.94	Cash	23.76	Withdrawn	Consumer, Non-cyclical
10	M&A	10/22/2016	Time Warner Inc	AT&T Inc	109885.7	Cash and Stock	13.87	Completed	Communications

Exploratory data analysis will be conducted to sub-categorise and cluster the data. The group will use data visualization techniques to assess industry trends and simplify datasets into communicable information. This will also serve as a basis to connect results from our forecasting algorithm to real world information and ensure that the proper datasets are being processed. The value of this project therefore has potential applications in private equity (PE) especially in venture capital (VC) acquisitions.

Timetable

Below is a summary of some of the major milestones with tentative due dates for this project:

Data Collection →October 10, 2018

Data Preparation →October 20, 2018

Data Cleaning →October 30, 2018

Data Analytics →November 15, 2018

Final Project →December 4, 2018

Final Project Presentation →December 4, 2018