Ex-Dividend Price Behavior in Spanish speaking markets: do stocks behave differently in Spain, Mexico, and Chile?

The Honors Program
Senior Capstone Project
Kayla E. Nikosey
David C. Ketcham
April 2017

Table of Contents

Ex-Dividend Price Behavior in Spanish Speaking Markets: Do Stocks Behave Differently in Spain, Mexico, and Chile?
Senior Capstone Project for Kayla Nikosey

ABSTRACT

The main focus of this thesis is to analyze the behavior of stock price on ex-dividend day of ADRs in Spain, Mexico, and Chile. Announcement date, and ex-dividend date for each ADR is collected to be analyzed against the other ADRs. One would expect different behaviors in the different markets because of different tax treatments in Chile, Mexico, and Spain. Traditional event testing is being used to analyze the stock price behavior on and around ex-dividend days. The event test measures the impact of regulatory events and allows for abnormal changes in stock prices that occur in conjunction with dividend announcements. The final analysis indicates that stock prices do not in fact behave as expected on and around declaration dates and ex-dividend dates. This could be as a result of the small data sample, or errors in the data collected which may have clouded the results of the analysis.

INTRODUCTION

Every day the countries are continuing to be more dependent on other countries and more globally connected. As a result of this connection between countries around the world it is important to understand the differences and similarities in different stock markets as this will have an effect on business transactions. There is currently existing research that has been done in analyzing individual country markets but there is no current work which shows a comparison among different countries and their equity markets. By providing the world with insight into the similarities and differences between three distinct equity markets businesses will be able to make more informed business decisions.

The topic will be examined by analyzing the price behavior of stocks around dividend announcements for the largest 20 companies in the three selected markets over the most recent year period for which it is possible to obtain data. The data used in this research will be obtained from the NASDAQ website and will require extensive research on the tax treatment of dividends in Spain, Mexico, and Chile. Personal interests in finance, Spanish, and International Business have all informed the collection, and synthesis of information. The source selection reflects this lens as there are many sources in Spanish that must be translated into English in order for others to understand.
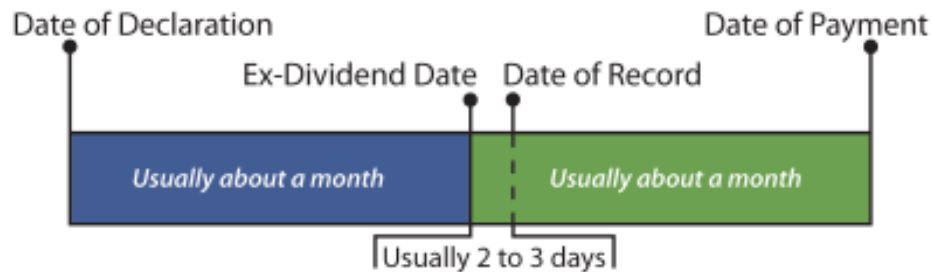
In order to best understand the research conducted in this paper, commonly used words such as various dividend dates (ex-dividend date, declaration date, record date, payment date) are defined.

Key Definitions

Source: http://www.principlesofaccounting.com/chapter-14/stock/

Declaration Date: Also known as the announcement date, is the date in which a company has made a public announcement that they will be paying shareholders an upcoming dividend. The statement includes the ex-dividend date, payment date, and the upcoming dividend's size.

Ex-Dividend Date: Typically occurs one month after the announcement date. On this day the stockholders who own the security will be awarded the announced dividend, but if the stock is purchased on or after the ex-date then that person will not receive the upcoming dividend. After the ex-date has occurred, it is expected that the stock price will drop in price by the amount of the after tax dividend paid to shareholders.

Record Date: Approximately 2-3 days post ex-date the company paying the dividend will determine which shareholders owned the stock in time and will therefore be receiving the upcoming dividend. This is also known as the date of record.

Payment Date: The day on which a declared dividend will be paid to the respective shareholders. This typically occurs one month after the ex-date.

American Depository Receipt (ADR): Dollar-denominated negotiable certificate. It represents a non-US based company's publicly traded equity which was devised in the late 1920s to help Americans invest in foreign markets. Reciprocally it assists non-US companies to have their stock traded in the American market. The idea came about as a result of the complexities involved in purchasing shares in foreign countries as there are many difficulties associated with trading at different prices and currency values/exchange rates.

Hypotheses

1. On the declaration date, stock prices will rise or fall based on whether or not the
   announced dividend is higher or lower than expected.

2. On the ex-dividend date one would expect to see a drop in the stock price equal to the
   after tax dividend paid.

The two aforementioned hypotheses help me analyze ex-dividend price behavior in Spanish
speaking markets and specifically answer my question: do stocks behave different in Spain,
Mexico, and Chile.

Methodology

      The specific methodology used in this research is a traditional event test. An event test
aims to measure the impact of regulatory events, where an event is defined as news revealed
to the investing public on a specific day. More specifically, the event test aims to measure
abnormal changes in stock prices that occur in conjunction with a specific event, in the case of
this research, dividend announcements. This announcement could influence investing
decisions being made by investors. Market adjusted excess returns will be used to measure
price behavior around the ex-dividend and declaration dates event testing is the most
appropriate and relevant test chosen to analyze changes in stock prices based on ex-dividend
events as this is what a traditional event test is meant to analyze.

Carrying Out Event Testing Methodology

      The first step to carrying out this methodology is to collect the necessary data which
includes declaration dates, ex-dividend dates, dividends paid, the stock prices for the twenty
days prior to and following the event day (either declaration or ex-dividend day), and the
market index (NASDAQ composite). Once this data has been collected for each of the twenty
ADRs under analysis the data must be formatted using Excel.

The next step to completing the analysis is using "if" statements in order to match the
declaration dates and ex-dividend dates to the proper stock date which will be used to
determine the forty day period in which the change in stock price will be analyzed.

The return of the stocks is then calculated by finding the different in the current stock price and the previous day stock price then adding the dividend paid on the current day and dividing the total by the stock price on the previous day or in other words:

$$R - Stock = (P_0 - P_1 + D_0)/P_1$$

Refer to Image 1 (below) for an example of this analysis using Chilean ADR BSAC for the dates 4/20/2016 thru 4/18/2016 where day 4/20/2016 is the current day (P_0 and D_0) and 4/19/2016 is the previous day (P_1). The same method is then used to calculate the market return by taking the current market index and subtracting the previous day index and dividing that total by the previous day index:

$$R - Market = (P_0 - P_1)/P_1$$

Refer to Image 2 (below) to see the calculation for market return for dates 4/20/2016 thru 4/18/2016 where day 4/20/2016 is the current day (P_0) and 4/19/2016 is the previous day (P_1).

Date	Stock Price	Dividend	R-Stock
4/20/2016	$ 19.54	0	-0.46%
4/19/2016	$ 19.63	$ 0.86	1.50%
4/18/2016	$ 20.19	0	-0.25%

Image 1: Chilean ADR BSAC Stock Return.

Date	P-Index	R-MKT
4/20/2016	4,945.89	-0.05%
4/19/2016	4,948.13	0.16%
4/18/2016	4,940.33	-0.40%

Image 2: Market Return.

Upon completion of this step the market adjusted excess return was then calculated. This is a matter of using a simple formula in which takes the return of the market previously calculated and subtracting the return of the stock for the same day:

$$R - Mkt\ Adj.Excess =_{Stock}R_{0} {-}_{Market\ Index}R_{0}$$

Refer to Image 3 found below to see the calculation for Market Adjusted Excess Return for dates 4/20/2016 thru 4/18/2016 where day 4/20/2016 is the current day (R_0) for both the BSAC stock and market index.

Date	R-Stock	R-MKT	MKT Adj. Excess
4/20/2016	-0.46%	-0.05%	-0.41%
4/19/2016	1.50%	0.16%	1.34%
4/18/2016	-0.25%	-0.40%	0.15%

Image 3: Market Adjusted Excess Return for Chilean ADR BSAC.

Next, the average event day return is calculated by computing the average of all of the dividends paid by a single company on the same event day where event day (declaration or ex-dividend day) is 0 and the day prior to the event day is -1 continuing to day -20 and the day post event day is 1 continuing to day 20. For example, looking at Chilean ADR BSAC all of the declaration day returns for day 0 are averaged and then used to compute the t-statistic. Refer to Image 4 (below) for an example of this computation performed.

Date	Declaration Date	5/2/2016	5/8/2015	5/2/2014	5/10/2013	Avg. ER	t
5/2/2016	0	-0.88%	1.87%	1.41%	-0.99%	0.35%	0.469225
4/29/2016	-1	-0.57%	-0.94%	0.95%	-0.92%	-0.37%	-0.82477

Image 4: Average Event Date Return and t calculation Example.

This process is completed for each of the twenty individual stocks in the three separate markets. These steps are then repeated for each of the three individual countries and again for the three countries as a whole.

LITERATURE REVIEW

Background/History

       Jules Regnault who is credited for being the first researcher to model the random nature of stock prices in 1863. Later expanding on his work in 1900 was a French mathematician Louis Bachelier. Later in the mid-1960s Eugene Fama's efficient market hypothesis became a popular theory, which states that market prices "fully reflect" all available information. Fama tests his theory and published his results in the book titled "Efficient Capital Markets: A review of Theory and Empirical Work". There are three forms of market efficiency examined by Fama, weak, semi-strong, and strong. The weak efficiency explains that all previous prices for a stock reflect its current price. Semi-strong efficiency conditions that investors are only able to benefit from non-public information because the current stock price reflects all publicly available information whereas the strong efficiency states that all information, both public and private, is represented in the current price of a stock. With this method it is impossible for an investor to beat the market.

       The current terms, definitions, and theories have been around for the last 300 years, and therefore have not changed much over time. The only thing that has changed over the years is the tax treatments of dividends, tax rates, etc. However, the current definition or usage will be defined clearly in my paper. There is also no special knowledge that must be understood or known for the reader to appreciate my study. The study is meant to be self-contained and all relevant information to the reader will be clearly outlined in the paper.

Theories of Market Efficiency

       The beginning to discussing stock price behavior is establishing a foundational knowledge about the different market hypothesis. There are three forms that are typically evaluated: weak, semi-strong, and strong. Fama (1970) summarizes the theory of efficient markets as it is concerned with whether prices fully reflect all available information at any point in time.

       Understanding the difference between the three forms, weak, semi-strong, and strong is essential to understanding the different points of view of the market. Both Fama (1970) and

Hamilton & Lorie (1973) both state that the weak form of market efficiency states that prices reflect historical sequences of prices; an investor cannot gain advantage by analyzing historical prices and their results to gain advantage. The semi-strong hypothesis says that current prices reflect all current knowledge and the strong form asserts that prices reflect all information and even those with insider knowledge cannot use this to create superior investment results (Fama (1970), Hamilton (1973)). Bennington (1970) states that (assuming the strong method) investors looking at past prices of a stock should not be able to make a greater profit than those that implement a basic buy-and-hold method. Stock prices are seen as forward looking and historical data does not reflect the future trend of a stock price. Both Fama and Hamilton would agree with Bennington on his statement that using previous stock knowledge will not help an investor gain advantage over those that use the basic buy-and-hold method because both agree that the market is highly efficient and stock prices reflect all available information.

These sources are able to provide a foundation for theory in the field of finance. Fama (1970) concludes by stating that there is extensive research to prove that market are in fact efficient and fully reflect all information available. Hamilton (1973) would agree with Fama's conclusion as they both shared similar ideas and beliefs about stock market efficiency.

Models of Market Equilibrium

Outlined by Roberts (1959) there are three main models discussed: the chance model, interpretation of the model, and methodological suggestions for financial analysis. This brings attention to financial analyst's empirical results that have not been brought to light sufficiently in the past. Similarly, to Roberts (1959) Fama (1976) analyzes models of market equilibrium. The models he has reviewed are expected returns are positive, expected returns are constant, expected returns conform to the market model, and returns conform to a risk-return relationship. While this model is simple it is sufficient to demonstrate the problems that arise in testing market efficiency and give perspective of the types of tests that are commonly completed to test market efficiency. Both Roberts (1959) and Fama (1976) would agree with the models that the other has reviewed as they both share similar views on these different models of market equilibrium and capital market efficiency.

Looking at another type of model, the basic stock valuation model, Lease (1995) explains how share value is determined by the residual dividend with perfect capital markets both in the certainty and uncertainty cases. The conclusion was that dividend policy was irrelevant, yet, when the perfect capital market assumption was relaxes, it was concluded that particular market imperfections appear to favor a managed dividend policy while others favor a residual policy. Lease (1995), Fama (1976), and Roberts (1959) share similar conclusions with different models reviewed.

The Dividend Puzzle

Dividends are a very complex, intricate topic that is not understood by many. Black (1976) aims to assist the reader in understanding the complexity of dividends and how they can affect not only a company as a whole but also the shareholders, creditors, and investors. Using the understanding that Black (1976) has provided Hagin (1979) researched dividend-reinvestment programs and dividend information including high versus low payout stocks and dividend announcements. The conclusion that was reached is that dividend changes reflect management's assessment of a company's future earnings trend (Hagin (1979)).

Another author, Miller (1961) has attempted to tackle the complex puzzle of dividends by filling the current gap in the theoretical literature on valuation of a company's current stock price. His theory is that companies with generous distribution policies tend to sell at a premium in comparison to those with lesser payouts. Hagin (1979) and Black (1976) would be curious in understanding the why behind this theory that Miller (1961) has explored in his five distinct sections: effect of dividend policy with perfect markets, rational behavior, and perfect certainty, what does the market "really" capitalize?, earnings, dividends, and growth rates, the effect of dividend policy under uncertainty, and finally dividend policy and market imperfections.

While Black (1976), Hagin (1979) and Miller (1961) believe the dividend puzzle is easier to understand Myers (1984) disagrees and states that the dividend puzzle is easier to understand than the capital market structure puzzle. His research shows that dividends have information content as stock prices respond to unexpected dividend changes. While these

researchers all have different opinions they all have similar ideas when it comes to understanding dividends and dividend policies.

International Ex-Day Events

When looking at different markets across the world we expect to see significant differences in stock prices after ex-dividend events due to different tax treatments around the world. Castillo (2006) looked into the tax and market microstructure of the Chilean market and found that ex-dividend day share prices do not fall by exactly the amount of the dividend in the Chilean exchange market. Similar to Castillo, Kadapakkam (2008) researched ex-day abnormal returns in the Mexican exchange market and assumed that they will be equal or less than zero, yet these are significantly positive. The conclusion was that none of the three market hypothesis (weak, semi-strong, strong), can offer an explanation of these positive ex-day returns in Mexico. Similarly to Kadapakkam's odd results Castillo (2008) expected that higher dividend yields should create a price drop to dividend ratios closer to 1 in Chile, yet there is no relationship found between dividend yields and this ratio. I believe that these two (Kadapakkam and Castillo) would both agree that this does not make much sense and would be interested in researching further into this anomaly.

Espita (1997) did similar research to Castillo (2006) and Kadapakkam (2008) in the Spanish exchange market. He tested to see if the decrease of the ex-dividend price is equal to the dividend amount. The research by Espita concluded that in the Spanish market the ex-dividend price decrease, on average, is lower than the dividend amount which as a result, gives a clear picture of preference for capital gains in relation to dividends. All three researchers found a similar occurrence in the different markets despite the different tax treatments in the different countries. This causes me to believe that there is something more going on and the researcher would also agree.

Castillo (2006) came to the conclusion that after evaluating evidence, arbitrageur transaction costs could be causing the friction between ex-day price adjustments in the Chilean exchange market. I believe that Kadapakkam would find this conclusion interesting and possibly change his conclusion which is very broad stating that none of the market hypothesis can offer an explanation of the unexpected results in Mexico.

<u>Understanding Tax Differing Tax Rates in Chile, Mexico, and Spain</u>
Determination of Taxable Personal Income in Chile

In Chile taxable income for residents (anyone residing in Chile for more than six consecutive months in a single calendar year or a total of six months within two calendar years) is defined as "wages, salaries, gratuities, bonuses and dividend income from all sources, local and foreign. A deduction reflecting first-category tax paid applies to dividends from domestic corporations" (The Economist Intelligence Unit). Along with that 50% of any and all investment income as a result of interest of dividends has been exempt from income taxes since 1998 under Law 19,589. As of 2015 the personal tax system had seven distinct marginal tax rates ranging between 4% and 40%. Starting in 2017 the 2014 tax reform will take affect causing Chile's personal income tax regime to change decreasing the top tax bracket to 35% from 40%.

With the new tax reform law comes changes of treatment of capital gains. Shareholders are subject to a tax of 35% on capital gains that are recognized in connection with the sale of transfer of Chilean shares on or after the first of January 2017. Before that date, capital gains were subject to a tax rate of 20% or 35% which depended on certain requirements. Under the new Law 20,780 the rate will be a flat 35% on net gain in all cases.

Personal taxation, 2016

Personal income taxes are assessed on a monthly basis using a monthly unit of account indexed for inflation (*unidad tributaria mensual*—UTM), which the central bank adjusts each month. One UTM was worth Ps44,955 in January 2016.

Range (in UTMs)	Tax rate (%)	Range	Tax rate (%)
0–13.50	0	71–90	23
13.51–30	4	91–120	30.4
31–50	8	121–150	35.5
51–70	13.5	151 and above	40

The following is the tax calculation for a resident taxpayer who earned 139 UTMs (Ps6.2m) during January 2016.

Monthly gross income (UTM)	139.0
Less tax-exempt social security (UTM)	28.5
Monthly taxable income (UTM)	110.5
Tax payable on each salary segment (UTMs)	
On the first 13.5	0.0
On 13.51–30	0.7
On 31–50	1.6
On 51–70	2.7
On 71–90	4.6
On 91–120	5.9
On 121–150	n/a
On 151 and above	n/a
Total monthly tax payable (UTMs)	15.5
Tax due as a percentage of monthly income (%)	11.15

Source: Economist Intelligence Unit calculations, based on data provided by the Internal Tax Service (Servicio de Impuestos Internos—SII).

Image 5: Personal taxation rates in Chile.

Determination of Taxable Personal Income in Mexico

In Mexico law states that Mexican citizens and foreign residents pay taxes to Mexico on worldwide income. Nonresidents of Mexico are subject to pay taxes on income source in Mexico. In this case taxable personal income is defined as payments from providing services (including salary, bonuses and special allowances), benefits, rent received, interest not from Mexican banks or Mexican government, and corporate dividends paid out of gross rather than net income.

Salaried employees of Mexico must pay a personal income tax where the top rate increased to 35% in 2014 (previously 30% in 2013) as a result of the 2014 Income Tax Law, Ley de Impuesto Sobre la Renta, which took effect January 1 2014. The reform introduced three new tax brackets. The first tax income about Ps750,000 at 32%, the second at a 34% rate for income above Ps1,000,000 and a third tax bracket for income above Ps3,000,000 at 35%. All tax bracket rates and details can be found in Table 4 below.

Personal taxation, 2016

Employers withhold personal income tax for salaried employees on a monthly basis and any additional final payments are due from the individual on April 30th of each year. Fixed rates apply to salaries/income at the lower limit; the applicable (excess) rate applies to income between the lower limit and upper limit. For example, a person making Ps$90,000 in 2016 has a tax obligation that will be Ps7,130.88 plus 16% tax on the amount exceeding Ps88,793.05 or Ps1,206.95 x 16% = Ps193.11.

Individuals' tax liability for incomes from non-employment sources must be calculated under the *impuesto sobre la renta* (ISR) regime. For the ISR, they use the same table and rates outlined below.

Lower limit (Ps per annum)	Upper limit (Ps per annum)	Fixed tax charge on base (Ps)	Tax rate on excess (%)
0.01	5,952.84	0.00	1.92
5,952.85	50,524.92	114.24	6.40
50,524.93	88,793.04	2,966.76	10.88
88,793.05	103,218.00	7,130.88	16.00
103,218.01	123,580.20	9,438.60	17.92
123,580.21	249,243.48	13,087.44	21.36
249,243.49	392,841.96	39,929.04	23.52
392,841.97	750,000.00	73,703.40	30.00
750,000.01	1,000,000.00	180.850,82	32.00
1,000,000.01	3,000,000.00	260.850,81	34.00
3,000,000.01	and higher	940,850,81	35.00

Source: Calculations provided by the Tax Administration Service (Servicio de Administración Tributaria).

Image 6: Personal Taxation Rates Mexico.

Determination of Taxable Personal Income in Spain

As of the 2015 tax year, individuals with an annual income greater than €22,000 from a single employer and those with incomes higher €11,200 from multiple sources of income must file a tax declaration. Taxable income is defined as any earned income such as salaries, wages and business or professional income and passive income which includes interest, dividends and capital gains.

In 2015 Spain's Partido Popular made an overhaul of personal tax regime before the general election that year. As of the 1st of January 2016 the top tier rate of personal income tax has been reduced to 45% previously 47% in 2015 and before that was 52%. The 45% tax rate applies to incomes about €60,000. Applying to income up to €12,450, the minimum marginal rate is 19% which is a 1% decrease from 2015 and a 5.75% decrease from previous 2014.

Tax rates for income tax is explained below in Table 3. Investment income (including dividends and interest) is not subjected to a personal income tax rate but instead to a fixed flat rate for all assets. This rate was set at 19% for January 1 2016.

Personal taxation, 2016

Range (in €)	Tax rate (%)	Range	Tax rate (%)
0-12,450.00	19	35,200.01–60,000.00	37
12,450.01-20,200.00	24	60,000.01 and above	45
20,200.01–35,200.00	30		

The following is the 2016 tax calculation for a person younger than 50, with a dependent spouse and two children (3–25 years), who earned the equivalent of €60,000 per year from a single employer.

Yearly gross income	€60,000.00
Tax-exempt social-security contribution	(2,740.91)
Employment deduction	(2,652.00)
Yearly taxable income	54,607.09
Income tax due on the first €12,450	2,365.50
On €12,450.01–20,200.00	1,860.00
On €20,200.21–35,200.00	4,500.00
On €35,200.01–60,000.00	7,180.62
Family tax deduction	(1,463.19)
Income tax due	14,442.93
Yearly after-tax income	45,557.07
Tax burden as a percentage of taxable income	26.4%

Source: Economist Intelligence Unit calculations, based on data from the Ministry of Economy and Competitiveness (Ministerio de Economía y Competitividad).

Image 7: Personal taxation rates Spain.

DATA ANALYSIS

Chile

    I was able to collect data for nine Chilean ADRs, Banco de Chile (BCH), Banco Santander Chile (BSAC), Cencosud (CNCO), Compania Cervecerias Unidas (CCU), Endesa-Empresa Nacional de Electricidad (EOCC), Enersis (ENIA), Enersis Chile (ENIC), Soc. Quimica y Minera de Chile - B Shares (SQM), and Viña Concha y Toro (VCO). There was a total of 59 dividends paid and analyzed between the companies. Refer to Chart 1 below for a breakdown of how many dividends were paid for each company.

Company Ticker	BCH	BSAC	CNCO	CCU	EOCC	ENIA	ENIC	SQM	VCO
Dividends Paid	5	4	8	8	3	3	2	9	15

Chart 1: Quantity of dividends paid per company in Chile.

Declaration Date Data

    Looking at the data results from Chile's declaration date results as shown in Graph 1 below there are positive excess returns after the declaration date in Chile for a period of approximately five days before the excess returns become negative once again. By looking at the test statistic, which corresponds to the probability of observing an extreme value by chance, we can see that these positive excess returns do not seem to be significant (refer to Table 1 in Appendix A). Typically, on the declaration date stock prices will rise or fall based on if the dividend which was announced is higher or lower than expected. We could draw the conclusion that the rise in stock prices for five days post declaration date could be a result of the fact that the dividends announced in Chile were higher than expected by investors causing the stock prices to rise.
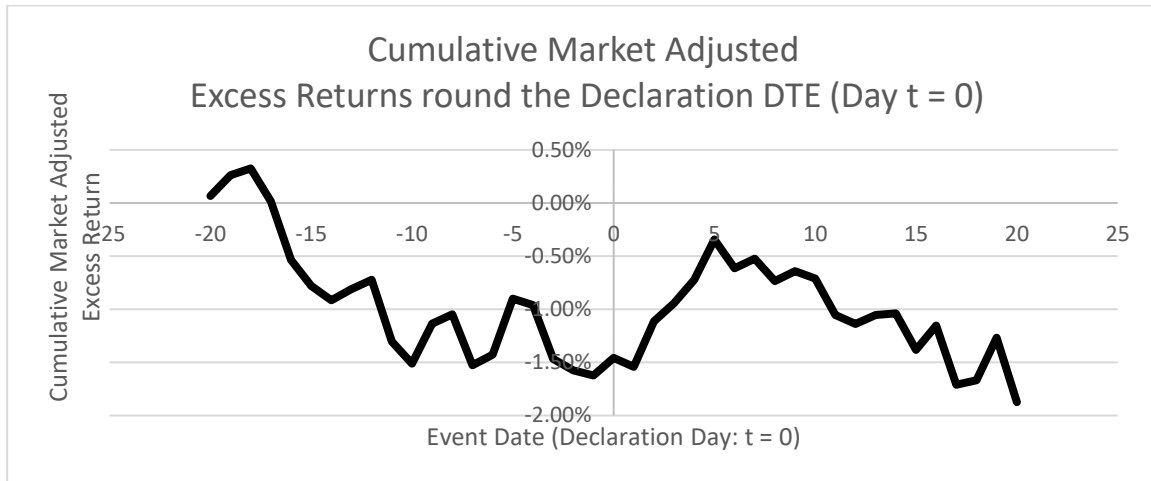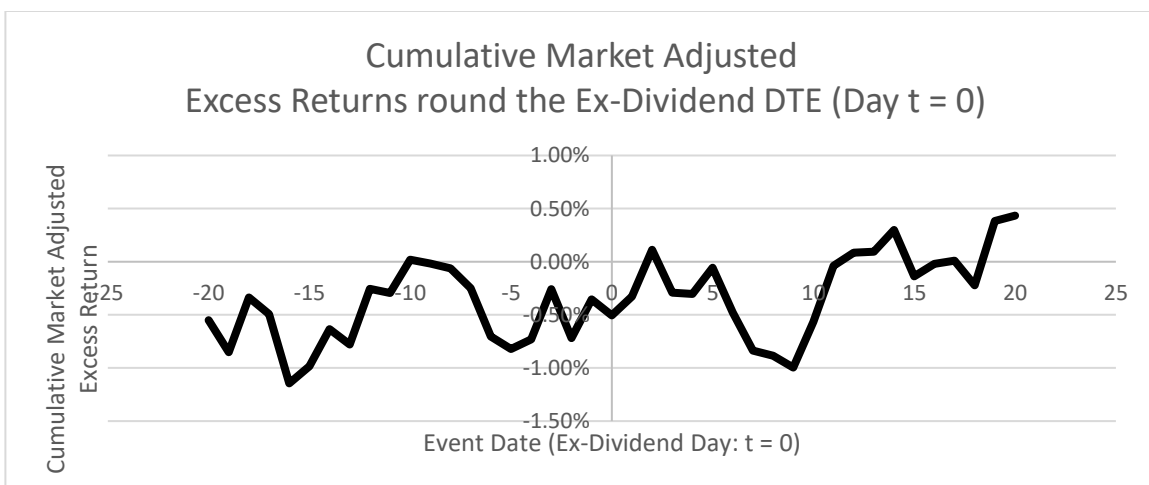
Graph 1: Cumulative Market Adjusted Excess Returns around the Declaration Date in Chile.

Ex-Dividend Date Data

In Graph 2 (shown below) we can see that in Chile's ex-dividend date data there are positive returns two days post ex-dividend date. Again we see the test statistics are not significant implying that this could be as a result of chance or from issues with the data. One would expect to see a drop in the stock price equal to the after tax dividend paid which means that the positive slope of adjusted excess returns could be a result of too small data sample or errors found in the data.

Graph 2: Cumulative Market Adjusted Excess Returns around the Ex-Dividend Date in Chile.
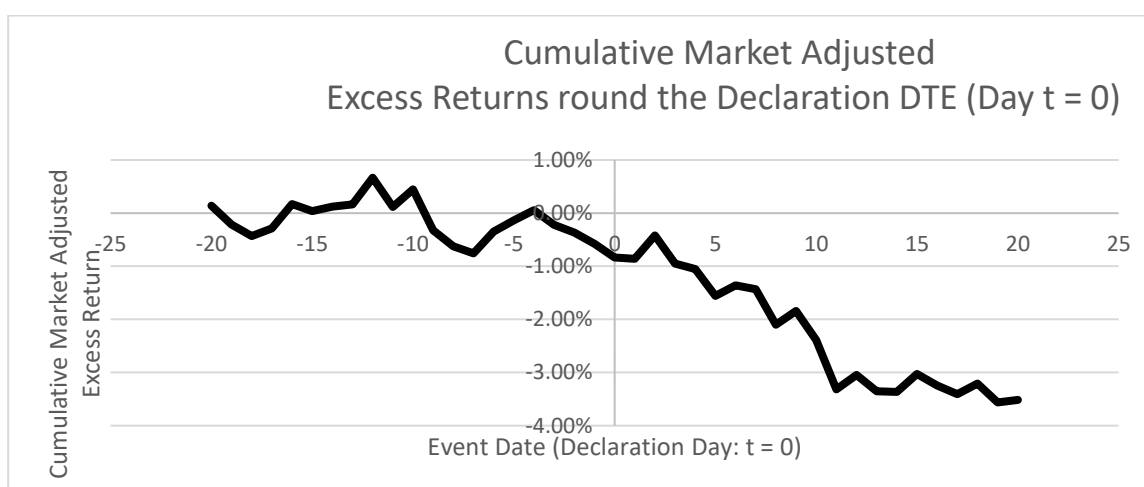
Mexico

     I was able to collect data for eight Mexican ADRs, America Movil - Series L (AMX), Grupo Aeroportuario del Sureste (ASR), Santander Mexico (BSMX), Fomento Economico Mexicano (FMX), Industrias Bachoco (IBA), Coca-Cola Femsa (KOF), Grupo Aeroportuario del Pacifico (PAC), Grupo Televisa (TV). There was a total of 53 dividends paid and analyzed between the companies. Refer to Chart 2 below for a breakdown of how many dividends were paid for each company.

Company Ticker	AMX	ASR	BSMX	FMX	IBA	KOF	PAC	TV
Dividends Paid	9	4	7	7	5	8	9	4

Chart 2: Quantity of dividends paid per company in Mexico.

Declaration Date

     Analyzing the excess returns for Mexico as shown in Graph 3 (below), we can see that there is a persistent negative excess return after the declaration date. We can conclude that the dividends annouced in Mexico are consistenly lower than shareholder expectations causing the negative excess returns.

Graph 3: Cumulative Market Adjusted Excess Returns around the Declaration Date in Mexico.
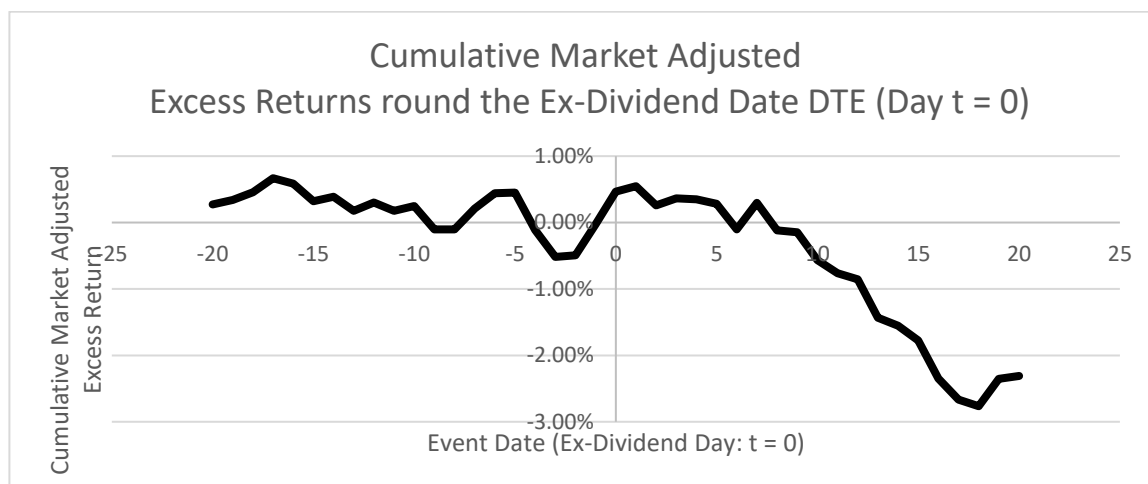
Ex-Dividend Date Data

Next, analyzing the ex-dividend date data for Mexico we can see by looking below to
Graph 4 that the ex-dividend date returns are positive but turn negative shortly after the ex-
dividend date. There are positive adjusted excess returns for a period of approximately three
days before the ex-dividend date and then the excess returns turn negative. While there is a
clear drop in cumulative market adjusted excess returns after the ex-dividend date, it does not
appear to be a significant drop until approximately seven days post dividend date. This could
be from inconsistencies in the data because at times there were declaration dates and ex-
dividend dates that appear to have been potentially reversed, however, because there was no
second source to cross-check the data with there was no way to validate and get the correct
dates.

Graph 4: Cumulative Market Adjusted Excess Returns around the Ex-Dividend Date in Mexico.

Spain

I was able to collect data for only four Spanish ADRs, Banco Bilbao Vizcaya
Argentaria (BBVA), Banco Santander (SAN), Grifols (GRFS), and Telefonica (TEF). There
was a total of 41 dividends paid and analyzed between the companies. Refer to Chart 3 below
for a breakdown of how many dividends were paid for each company.

Company Ticker	BBVA	GRFS	SAN	TEF
Dividends Paid	14	15	8	4

Chart 3: Quantity of dividends paid per company in Spain.

Declaration Date Data

Referring to Graph 5 found below, Spain shows negative returns both pre and post declaration date. Although, two days after the declaration date there are positive excess returns before returning negative again. This momentary rise in excess returns post ex-dividend date make it difficult to draw a conclusion, however, we could assume that overall in Spain the dividends being paid are lower than investors expected which is shown in the negative excess returns both pre and post ex-dividend date.
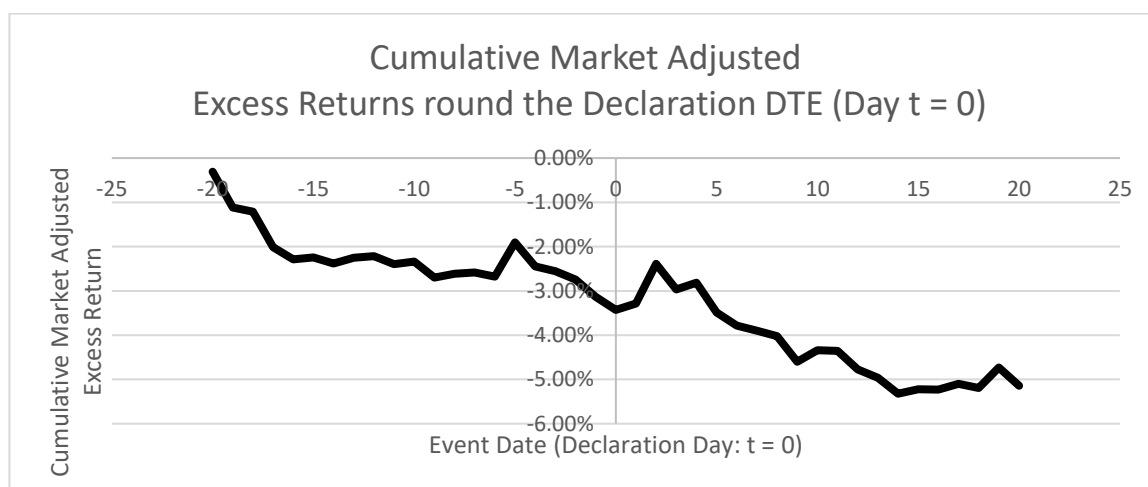
Graph 5: Cumulative Market Adjusted Excess Returns around the Declaration Date in Spain.

Ex-Dividend Date Data

In comparison to Chile and Mexico, Spain is the only country that shows negative returns after the ex-dividend date. This is consistent with what one would expect to see after the ex-dividend date. Compared to the other two Spanish speaking markets, Spain may more closely resemble what would be expected post ex-dividend date because the sample size of ADRs was smaller, the data could be more accurate than the others, and/or the leakage in time between Spain and the U.S. could be different than Mexico and Chile.
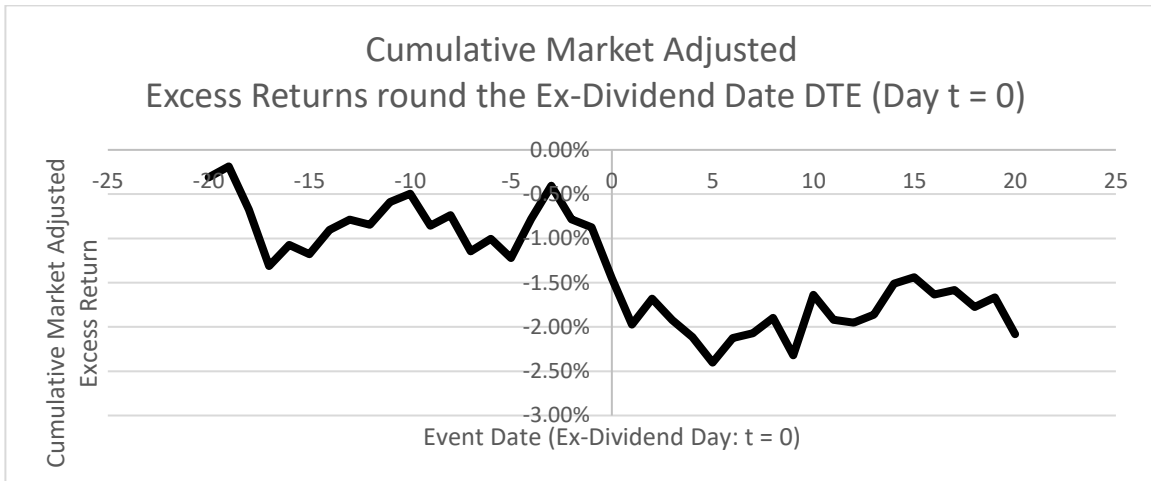
Graph 6: Cumulative Market Adjusted Excess Returns around the Ex-Dividend Date in Spain.

Overall

Declaration Date Data

Overall in the three markets we see negative excess returns around the declaration date. As shown in Graph 7 below, both pre and post declaration date there are persistent negative excess returns. Based off of this we can conclude that in the three Spanish speaking markets, Mexico, Chile, and Spain, dividends declared are consistently lower than expected. The downward drift may be due to misspecification. As mentioned before, one of the major issues with the data that could influence this conclusion is that the declaration date and ex-dividend dates appear to be switched in some instances.
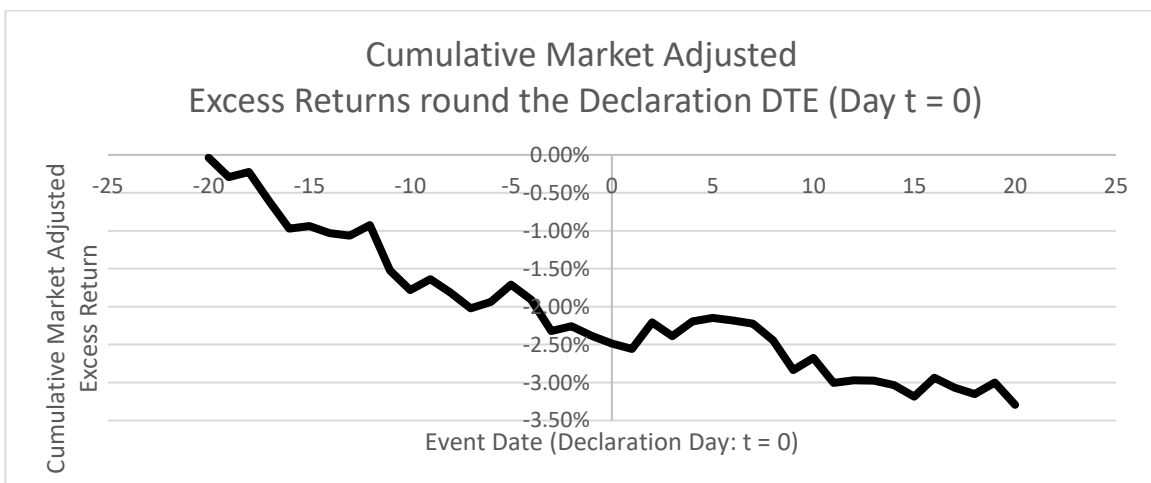
Graph 7: Cumulative Market Adjusted Excess Returns around the Declaration Date Overall.

Ex-Dividend Date Data

For all of the countries we see that there is a slightly positive excess returns after the
ex-dividend date. This result is inconsistent with what one would expect to see post ex-
dividend date. The anomaly could be due to one of many issues with the data collected.
Having a relatively small sample size and inconsistent sample size between the three countries
could attribute the inconsistency. The lack of knowledge on the leakage of time between the
in country announcements and its reflection in the U.S. markets could also be heavily
influencing the rise and fall of stock prices of the ADRs. Another possibility is that the
markets are able to correctly anticipate the dividends but this is mere speculation as there is
no way to know for sure without more information on ADRs.
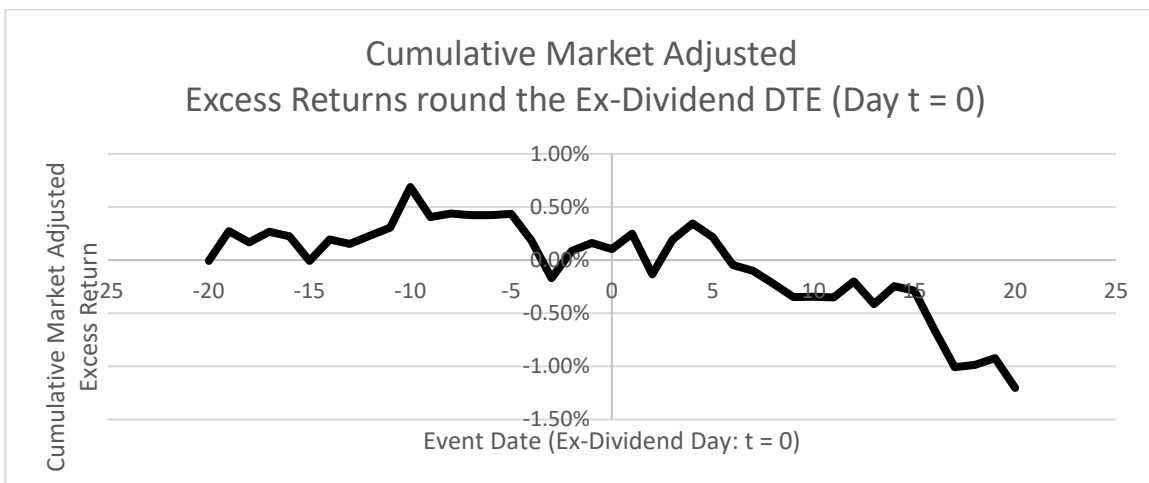
Graph 8: Cumulative Market Adjusted Excess Returns around the Ex-Dividend Date Overall.

CONCLUSIONS

In each market of the three markets (except Spain), excess returns were positive on the ex-dividend date, which is inconsistent with theory. Given the positive returns, it is meaningless to try to estimate marginal tax rates.

In general, excess returns are negative around the declaration date, suggesting that there is no positive information contained in the dividend announcement.
There are some possible explanations which include:

1. The market adjusted excess returns approach assumes that the average beta of the stocks studied equals 1. The downward drift suggests that the model used may be mis-specified (perhaps a mean-adjusted excess returns approach would yield better results)

2. We used the NASDAQ index as the market proxy. Perhaps an in-country index would yield different results.

3. We are unsure of the mechanics of dividend announcements on ADRs and the potential lag between the in-country announcement and the domestic announcement.

4. Are the marginal investors US investors, or foreign investors?

CHALLENGES

During the completion of this research many challenges have occurred. The first major challenge was obtaining the data for the research. The initial idea was that the stock and dividend data required to complete the process would be obtained from FactSet data source. However, after further research this information was not available using FactSet. A series of other reputable finance sources, such as Bloomberg Terminals and Yahoo Finance, were having the same outcomes and not providing the necessary data. The outcome of the situation was that there was in fact no way as a Bryant University student to obtain the desired data. As a result, the scope of the project shifted. It was then decided that American Depository Receipts (ADRs) would then need to be used. This information was obtained using the official NASDAQ website.

Once the data was collected and analysis began it became clear that there may be some errors in the data as discrepancies were beginning to pop up. Some of these discrepancies included the record date being before the ex-dividend date and there being more ex-dividend dates than declaration dates. Since there was no way for this data to be cross-checked these discrepancies may have an effect on the results of this research but at this time it is not possible to confirm this.

MOVING FORWARD

To further the current research, one could look at the American personal tax rates and how that has an effect on the ADRs rather than using the individual countries tax rates. It would also be interesting to re-estimate excess returns using a mean-adjusted returns approach, which assumes that the riskiness of the stocks stays constant.

In order for this research to continue it would be best if the data could be cross-referenced by another data source to determine if the data has skewed the current results of this research. It would also change the scope of the project and the results if I were able to get in-country data! This would provide a more clear view of the actual market reactions to dividend announcements and payments.

It would also be ideal to get a better understanding of the mechanics of dividend announcements and dividend payments on ADRs and their relationship to in-country dividend announcements and payments.

APPENDICES

Appendix A- Chile Data

Declaration Date

Event Day	Market Excess Return	t-statistic	Cumulative Excess Return
20	-0.61%	-2.499	-0.61%
19	0.40%	1.533	-0.21%
18	0.04%	0.142	-0.16%
17	-0.56%	-2.199	-0.72%
16	0.23%	0.749	-0.49%
15	-0.34%	-1.282	-0.84%
14	0.02%	0.046	-0.82%
13	0.08%	0.267	-0.74%
12	-0.08%	-0.294	-0.82%
11	-0.34%	-1.245	-1.16%
10	-0.07%	-0.251	-1.23%
9	0.09%	0.289	-1.14%
8	-0.21%	-0.825	-1.35%
7	0.09%	0.336	-1.26%
6	-0.27%	-1.000	-1.53%
5	0.38%	1.315	-1.15%
4	0.22%	0.924	-0.93%
3	0.17%	0.717	-0.76%
2	0.43%	1.664	-0.33%
1	-0.09%	-0.332	-0.42%
0	0.17%	0.520	-0.25%
-1	-0.05%	-0.184	-0.30%
-2	-0.11%	-0.346	-0.41%
-3	-0.51%	-1.438	-0.91%
-4	-0.06%	-0.211	-0.97%
-5	0.53%	1.605	-0.45%
-6	0.10%	0.421	-0.35%
-7	-0.48%	-1.799	-0.83%
-8	0.08%	0.374	-0.74%
-9	0.38%	1.616	-0.36%
-10	-0.21%	-0.601	-0.57%
-11	-0.58%	-1.876	-1.15%
-12	0.09%	0.295	-1.06%
-13	0.11%	0.418	-0.96%
-14	-0.14%	-0.501	-1.09%
-15	-0.24%	-1.197	-1.34%
-16	-0.55%	-2.108	-1.89%
-17	-0.31%	-1.120	-2.20%
-18	0.06%	0.201	-2.14%
-19	0.19%	0.748	-1.94%
-20	0.07%	0.236	-1.87%

Table 1: Declaration Data Chile

Ex-Dividend Date

Event Day	Market Excess Return	t-statistic	Cumulative Excess Return
20	0.05%	0.236	0.05%
19	0.60%	2.248	0.66%
18	-0.23%	-0.802	0.42%
17	0.03%	0.126	0.45%
16	0.12%	0.459	0.57%
15	-0.44%	-1.587	0.14%
14	0.20%	0.992	0.34%
13	0.01%	0.034	0.35%
12	0.12%	0.416	0.47%
11	0.53%	1.625	1.00%
10	0.43%	1.312	1.43%
9	-0.11%	-0.529	1.32%
8	-0.05%	-0.174	1.27%
7	-0.36%	-1.380	0.91%
6	-0.42%	-1.364	0.49%
5	0.25%	1.020	0.74%
4	-0.01%	-0.043	0.72%
3	-0.40%	-1.584	0.32%
2	0.44%	1.611	0.76%
1	0.18%	0.633	0.94%
0	-0.15%	-0.469	0.79%
-1	0.37%	1.149	1.15%
-2	-0.46%	-1.658	0.69%
-3	0.48%	1.513	1.17%
-4	0.09%	0.300	1.25%
-5	-0.12%	-0.550	1.14%
-6	-0.45%	-1.904	0.68%
-7	-0.19%	-0.715	0.50%
-8	-0.04%	-0.169	0.45%
-9	-0.04%	-0.111	0.42%
-10	0.31%	1.193	0.73%
-11	-0.04%	-0.129	0.69%
-12	0.52%	1.711	1.21%
-13	-0.14%	-0.499	1.07%
-14	0.35%	1.302	1.42%
-15	0.16%	0.566	1.58%
-16	-0.65%	-2.419	0.93%
-17	-0.16%	-0.550	0.77%
-18	0.52%	1.950	1.29%
-19	-0.30%	-1.124	0.98%
-20	-0.55%	-2.122	0.43%

Table 2: Ex-Dividend Data Chile.

Appendix B- Mexico Data

Declaration Date

Event Day	Market Excess Returns	t-statistic	Cumulative Excess Return
20	0.05%	0.140	-3.52%
19	-0.35%	-1.241	-3.56%
18	0.20%	0.636	-3.21%
17	-0.17%	-0.590	-3.41%
16	-0.21%	-0.951	-3.24%
15	0.34%	1.102	-3.03%
14	-0.01%	-0.046	-3.37%
13	-0.30%	-1.493	-3.35%
12	0.27%	0.959	-3.05%
11	-0.92%	-3.428	-3.31%
10	-0.55%	-2.288	-2.39%
9	0.26%	1.054	-1.84%
8	-0.67%	-2.446	-2.10%
7	-0.08%	-0.300	-1.43%
6	0.20%	0.824	-1.36%
5	-0.50%	-1.618	-1.56%
4	-0.11%	-0.306	-1.05%
3	-0.53%	-2.189	-0.95%
2	0.44%	1.783	-0.42%
1	-0.02%	-0.077	-0.86%
0	-0.26%	-1.324	-0.84%
-1	-0.22%	-0.856	-0.58%
-2	-0.14%	-0.579	-0.36%
-3	-0.28%	-1.187	-0.22%
-4	0.19%	0.651	0.06%
-5	0.21%	0.662	-0.13%
-6	0.41%	1.284	-0.35%
-7	-0.13%	-0.446	-0.76%
-8	-0.30%	-0.953	-0.62%
-9	-0.77%	-2.237	-0.32%
-10	0.33%	1.145	0.45%
-11	-0.55%	-2.170	0.12%
-12	0.50%	1.838	0.67%
-13	0.04%	0.142	0.17%
-14	0.09%	0.316	0.13%
-15	-0.13%	-0.512	0.04%
-16	0.46%	1.460	0.17%
-17	0.14%	0.592	-0.29%
-18	-0.21%	-0.725	-0.43%
-19	-0.36%	-1.355	-0.22%
-20	0.14%	0.538	0.14%

Table 1: Declaration Data Mexico

Ex-Dividend Date

Event Day	Market Excess Returns	t-statistic	Cumulative Excess Return
20	0.04%	0.180	-2.31%
19	0.41%	1.400	-2.35%
18	-0.10%	-0.378	-2.77%
17	-0.32%	-1.359	-2.67%
16	-0.57%	-2.587	-2.35%
15	-0.22%	-0.763	-1.78%
14	-0.12%	-0.431	-1.55%
13	-0.58%	-2.517	-1.43%
12	-0.09%	-0.414	-0.85%
11	-0.20%	-0.797	-0.76%
10	-0.42%	-1.361	-0.57%
9	-0.03%	-0.083	-0.15%
8	-0.41%	-1.517	-0.12%
7	0.40%	1.376	0.30%
6	-0.39%	-1.489	-0.10%
5	-0.07%	-0.293	0.28%
4	-0.02%	-0.068	0.35%
3	0.11%	0.410	0.37%
2	-0.29%	-1.348	0.26%
1	0.09%	0.256	0.55%
0	0.49%	1.494	0.46%
-1	0.47%	1.689	-0.03%
-2	0.02%	0.084	-0.50%
-3	-0.40%	-1.296	-0.52%
-4	-0.56%	-1.639	-0.11%
-5	0.01%	0.034	0.45%
-6	0.23%	0.723	0.44%
-7	0.31%	1.213	0.21%
-8	0.00%	0.001	-0.10%
-9	-0.35%	-1.237	-0.10%
-10	0.07%	0.279	0.25%
-11	-0.12%	-0.475	0.18%
-12	0.13%	0.484	0.30%
-13	-0.22%	-0.658	0.17%
-14	0.07%	0.254	0.39%
-15	-0.26%	-1.132	0.32%
-16	-0.08%	-0.309	0.58%
-17	0.21%	0.706	0.67%
-18	0.12%	0.482	0.46%
-19	0.07%	0.266	0.34%
-20	0.27%	1.071	0.27%

Table 2: Ex-Dividend Data Mexico

Appendix C- Spain Data

Declaration Date

Event Day	Market Excess Returns	t-statistic	Cumulative Excess Return
20	-0.41%	-0.719	-0.41%
19	0.47%	1.099	0.05%
18	-0.09%	-0.300	-0.04%
17	0.13%	0.435	0.09%
16	-0.01%	-0.020	0.08%
15	0.10%	0.309	0.18%
14	-0.36%	-0.980	-0.18%
13	-0.19%	-0.632	-0.37%
12	-0.42%	-1.318	-0.79%
11	-0.01%	-0.034	-0.80%
10	0.26%	0.875	-0.54%
9	-0.58%	-1.904	-1.12%
8	-0.12%	-0.365	-1.24%
7	-0.12%	-0.347	-1.35%
6	-0.29%	-0.945	-1.65%
5	-0.67%	-2.320	-2.32%
4	0.15%	0.422	-2.17%
3	-0.57%	-1.482	-2.75%
2	0.89%	2.291	-1.85%
1	0.15%	0.557	-1.71%
0	-0.29%	-0.783	-2.00%
-1	-0.40%	-1.246	-2.40%
-2	-0.18%	-0.686	-2.58%
-3	-0.11%	-0.311	-2.69%
-4	-0.54%	-1.410	-3.23%
-5	0.77%	2.320	-2.46%
-6	-0.10%	-0.332	-2.56%
-7	0.03%	0.099	-2.52%
-8	0.08%	0.265	-2.44%
-9	-0.36%	-1.158	-2.80%
-10	0.06%	0.218	-2.74%
-11	-0.18%	-0.602	-2.93%
-12	0.04%	0.121	-2.88%
-13	0.13%	0.400	-2.75%
-14	-0.14%	-0.540	-2.90%
-15	0.05%	0.119	-2.85%
-16	-0.27%	-0.764	-3.12%
-17	-0.80%	-2.242	-3.93%
-18	-0.10%	-0.197	-4.02%
-19	-0.81%	-1.998	-4.83%
-20	-0.31%	-0.873	-5.14%

Table 1: Declaration Data Spain

Ex-Dividend Date

Event Day	Market Excess Returns	t-statistic	Cumulative Excess Return
20	-0.31%	-0.927	-2.08%
19	0.13%	0.489	-1.77%
18	-0.49%	-2.283	-1.89%
17	-0.63%	-1.803	-1.40%
16	0.24%	0.649	-0.77%
15	-0.10%	-0.392	-1.01%
14	0.27%	0.971	-0.90%
13	0.12%	0.344	-1.18%
12	-0.06%	-0.252	-1.29%
11	0.26%	0.776	-1.23%
10	0.09%	0.372	-1.49%
9	-0.36%	-1.216	-1.58%
8	0.12%	0.363	-1.22%
7	-0.41%	-0.937	-1.34%
6	0.14%	0.495	-0.94%
5	-0.22%	-0.794	-1.08%
4	0.44%	1.542	-0.86%
3	0.38%	1.276	-1.30%
2	-0.38%	-1.357	-1.67%
1	-0.09%	-0.244	-1.30%
0	-0.58%	-1.629	-1.21%
-1	-0.52%	-1.702	-0.63%
-2	0.29%	1.258	-0.11%
-3	-0.24%	-0.887	-0.40%
-4	-0.19%	-0.564	-0.16%
-5	-0.29%	-0.936	0.03%
-6	0.28%	0.844	0.32%
-7	0.05%	0.210	0.05%
-8	0.18%	0.504	-0.01%
-9	-0.42%	-1.520	-0.18%
-10	0.68%	2.249	0.24%
-11	-0.28%	-0.896	-0.44%
-12	-0.03%	-0.108	-0.16%
-13	0.09%	0.358	-0.13%
-14	0.35%	1.264	-0.22%
-15	0.07%	0.243	-0.57%
-16	-0.20%	-0.642	-0.64%
-17	0.05%	0.151	-0.45%
-18	-0.19%	-0.620	-0.50%
-19	0.11%	0.284	-0.31%
-20	-0.41%	-1.114	-0.41%

Table 2: Ex-Dividend Data Spain

Appendix D- Overall Data

Declaration Date

Event Day	Market Excess Returns	t-statistic	Cumulative Excess Return
20	-0.29%	-1.462	-3.29%
19	0.15%	0.850	-3.00%
18	-0.08%	-0.474	-3.15%
17	-0.13%	-0.863	-3.07%
16	0.25%	1.354	-2.94%
15	-0.15%	-0.948	-3.19%
14	-0.06%	-0.306	-3.03%
13	0.00%	-0.018	-2.98%
12	0.03%	0.190	-2.97%
11	-0.33%	-1.962	-3.00%
10	0.16%	0.962	-2.68%
9	-0.39%	-2.045	-2.83%
8	-0.22%	-1.283	-2.44%
7	-0.04%	-0.255	-2.23%
6	-0.04%	-0.200	-2.18%
5	0.05%	0.275	-2.15%
4	0.19%	1.161	-2.20%
3	-0.18%	-1.125	-2.39%
2	0.35%	2.076	-2.21%
1	-0.07%	-0.478	-2.56%
0	-0.10%	-0.593	-2.49%
-1	-0.13%	-0.805	-2.38%
-2	0.06%	0.397	-2.26%
-3	-0.41%	-2.226	-2.32%
-4	-0.20%	-1.042	-1.91%
-5	0.23%	1.181	-1.71%
-6	0.08%	0.578	-1.94%
-7	-0.20%	-1.262	-2.02%
-8	-0.18%	-1.158	-1.82%
-9	0.15%	0.966	-1.64%
-10	-0.26%	-1.471	-1.78%
-11	-0.60%	-3.458	-1.52%
-12	0.14%	0.791	-0.92%
-13	-0.03%	-0.216	-1.06%
-14	-0.10%	-0.567	-1.03%
-15	0.03%	0.209	-0.94%
-16	-0.36%	-2.283	-0.97%
-17	-0.39%	-2.232	-0.61%
-18	0.07%	0.332	-0.22%
-19	-0.26%	-1.438	-0.29%
-20	-0.04%	-0.197	-0.04%

Table 1: Declaration Data Overall

Ex-Dividend Date

Event Day	Market Excess Returns	t-statistic	Cumulative Excess Return
20	-0.28%	-1.759	-1.20%
19	0.06%	0.398	-0.92%
18	0.02%	0.135	-0.99%
17	-0.35%	-2.087	-1.01%
16	-0.37%	-2.241	-0.66%
15	-0.04%	-0.268	-0.29%
14	0.17%	1.054	-0.25%
13	-0.21%	-1.293	-0.42%
12	0.15%	0.985	-0.20%
11	-0.01%	-0.039	-0.35%
10	0.00%	0.021	-0.35%
9	-0.13%	-0.650	-0.35%
8	-0.12%	-0.748	-0.22%
7	-0.05%	-0.278	-0.10%
6	-0.26%	-1.751	-0.05%
5	-0.13%	-0.954	0.21%
4	0.15%	0.982	0.34%
3	0.32%	1.901	0.19%
2	-0.38%	-2.540	-0.14%
1	0.14%	0.726	0.25%
0	-0.06%	-0.294	0.10%
-1	0.08%	0.455	0.16%
-2	0.26%	1.697	0.08%
-3	-0.36%	-2.214	-0.17%
-4	-0.25%	-1.312	0.18%
-5	0.01%	0.084	0.43%
-6	0.00%	-0.003	0.42%
-7	-0.02%	-0.100	0.42%
-8	0.03%	0.190	0.44%
-9	-0.28%	-1.916	0.41%
-10	0.38%	2.182	0.69%
-11	0.07%	0.420	0.30%
-12	0.08%	0.462	0.23%
-13	-0.04%	-0.250	0.15%
-14	0.20%	1.404	0.19%
-15	-0.23%	-1.473	-0.01%
-16	-0.04%	-0.259	0.22%
-17	0.10%	0.583	0.26%
-18	-0.10%	-0.637	0.17%
-19	0.28%	1.631	0.27%
-20	-0.01%	-0.063	-0.01%

Table 2: Ex-Dividend Data Overall

REFERENCES

Bennington, G., & Jensen, M. 1970. Random walks and technical theories: some additional evidence. The *Journal of Finance, XXV, No. 2,* 469-82.

Black, F. 1976. The dividend puzzle. *The Journal of Portfolio Management, Vol. 2.*

Black, F. & Scholes, M. Effects of dividend yield and dividend policy.

Castillo, A. & Jakob, K. 2006. The Chilean ex-dividend day. Global Financial Journal, 17(1), 105-118.

"Common And Preferred Stock - Principlesofaccounting.Com". principlesofaccounting.com. *N. p., 2017. Web. 5 Apr. 2017.*

Espita, M. & Ruiz, F. 1997. Ex-dividend day stock price falls on the Spanish stock market. Applied Financial Economics, 7(5), 481-492. DOI: 10.1080/096031097333349

Fama, E. 1970. Efficient capital markets: a review of theory and empirical work. *The Journal of Finance, XXV, No 2,* 383-417.

Fama, E. 1976. Efficient capital markets. *Foundations of Finance,* 133-167.

Fama, E., Fisher, L., Jensen, M., & Roll, R. 1969. The adjustment of stock prices to new information. *International Economic Review, X, No. 1,* 1-21.

Hagin, R. 1979. The efficient market hypothesis. *Modern Portfolio Theory,* 59-64.

Hamilton, M., & Lorie, J. (1973). The efficient market hypothesis. *The Stock Market Theories and Evidence,* 70-99.

Kadapakkam, P., & Martinez, V. 2008. Ex-dividend returns: the Mexican puzzle." *Journal of Banking and Finance 32.11,* 2453-461. *Econlit*. Web. 26 Apr. 2016. DOI: http://dx.doi.org/10.1016/j.bankfin.2008.05.001

Lease, R. & Loewenstein, U. 1995. Dividend policy: its impact on firm value. *Issues and Readings in Managerial Finance, Vol. 4,* 367-385.

Miller, M., & Modigliani, F. 1961. Dividend policy, growth, and the valuation of shares. *Journal of Business.* 411-433

Myers, S. (1984). The capital structure puzzle. *The Journal of Finance,* 512-592.

NASDAQ. NASDAQ.com. *W*eb. 20 Mar. 2017.

Roberts, H. 1959. Stock market "patterns" and financial analysis: methodological suggestions. *The Journal of Finance, XIV, No. 1,* 1-10.

The Economist Intelligence Unit. "Country Commerce: Chile." *Country Analysis, Industry Analysis – Market Risk Assessment*. The Economist Intelligence Unit Limited, 1 Jan. 2016. Web. 06 Nov. 2017.

The Economist Intelligence Unit. "Country Commerce: Mexico." *Country Analysis, Industry Analysis – Market Risk Assessment*. The Economist Intelligence Unit Limited, 1 Jan. 2016. Web. 06 Nov. 2017.

The Economist Intelligence Unit. "Country Commerce: Spain." *Country Analysis, Industry Analysis – Market Risk Assessment*. The Economist Intelligence Unit Limited, 1 Jan. 2016. Web. 06 Nov. 2017.