THE IMPACT OF CRISIS AND RECESSIONS ON EXCESS EQUITY RETURN

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Abstract

This study examines the equity excess return and the effect of financial crisis and financial recession probabilities on the excess return. In the paper, we observed the relationship of equity excess return and six different variables, which include: economic sentiment, economic growth, risk-free rate, inflation rate, recession year, and U.S. recession probability, in U.S, Canada, Brazil, Russia, and UK.

The Capital Asset Pricing Model and the Arbitrage Pricing Theory are two of the models that used most often to price the expected return of the equities. The statistical analysis in our study use the modification of the Arbitrage Pricing Theory with the purpose to explain the equity excess return in different countries that involved in our study.

The result of our study shows that after adding the new variables, which are recession probability and recession years, they actually do not have a significant effect on the equity excess return on most of the countries.

Keywords: Capital Asset Pricing Model, Arbitrage Pricing Theory, Equity Excess Return, Recession Probability, Inflation Rate, Economic Growth, Economic Sentiment, Composite Leading Indicator, Consumer Sentiment Index

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1. Introduction

This research paper discusses the excess equity returns of the United States, the United Kingdom, Canada, Australia, Brazil, and Russia. Our purpose of this study was to explore the effect of financial crises, and future recession probability of the United States on the excess equity returns of the United States and other countries in our scope. There has been a long-time scepticism about the upcoming recession in a couple of years. A few papers in the past have studied and tried to determine the factor contributing to the equity returns in the United States. But the world has become more interconnected and so have the countries' economies. Any country's economy is not just dependent on internal consumption, but also on trade with their trading partners. As we saw during 2008-09 where the financial catastrophe originated with the United States subprime mortgage crisis and soon had a spill over effect on other economies. This contagion was very widespread and all types of countries, be it developed or developing were affected equally.

Our paper adds to the existing literature that determines the factors affecting excess equity returns in the United States and a few other countries. We expanded the research by including three developed countries; the United Kingdom, Canada, Australia and two developing countries; Brazil and Russia as defined by the IMF. This thesis discusses the quantitative macroeconomic and recession factors which are quite relevant to today's theme of financial environment. A few hypotheses are tested to see if these macroeconomic and recession factors behave in an intuitive way in defining excess equity returns and how significant these factors are.

2. Literature Overview

2.1 Overview of Capital Asset Pricing Model

The CAPM was introduced by William Sharpe (1964) and John Lintner (1965), resulting in a Nobel Prize for Sharpe in 1990 and it is built on the "mean-variance" model developed by Harry Markowitz (1959). The model is used to determine the theoretical return of a specific security. The other function of the model is that it measures the risk of a single security relative to the portfolio. The main idea of CAPM is that all the unsystematic risk can be diversified and the only part that left were the undiversifiable risk. In the following session, we will discuss what is CAPM including its assumptions, derivations, and performance.

2.1.1 The Assumptions of CAPM

Sharpe and Lintner add two main assumptions to the Markowitz model, which are the homogeneity of investor expectations and all investors have no restrictions on borrowing or lending at the risk-free rate. Following is the explanation of the assumptions:

1) Risk-averse investors. The Capital Pricing Theory assume that all those investors in the market are risk-averse. For Risk Seeking Investor, each increase in their wealth prompts them to acquire more wealth. While for Risk Neutral Investor, each unit of increase in their wealth is equally attractive to them.

2) Maximize the utility. An investor aims to maximize its “Utility” since they are assumed to be Risk-averse. It assumes that each unit of increase in wealth is less important to an investor than the last one in satisfying the needs of an individual. Each investor will select a portfolio that is on the efficient frontier and will only focus on related return (mean) and risk (variance). The exact point of the investor’s portfolio depends on its utility function and the trade-off between the risk and return.

3) There are risk-free assets and there are no restrictions on borrowing and lending at the risk-free rate. In other words, it also means that investors can take a long or short position in any size of any assets, including the riskless asset.

4) Similar expectations of risk and return. All investors should have the same expectations of risk and return, which means all of them to have homogeneity expectations to the returns and have all estimated the same distribution for the future rates of returns.

5) Identical time horizon. The core of this assumption is that all investors buy and construct their portfolios at the same time and will together liquidate their portfolios in an undefined time in the future. The horizon of each investor is based on their view and own needs.

6) Investors are only able to buy or sell portions from their shares of any security or a portfolio they held.

7) There are no transaction costs or taxes on purchasing or selling assets.

8) Investors are price takers. In other words, this means that the capital markets are in equilibrium and all investments are fairly priced and there is no information discrepancy. If the information is not the same for all, no common efficient frontier can be drawn, and investors will have different expectations on risk and return.

2.1.2 Derivations of Capital Asset Pricing Model

This subsection will introduce you the derivation of the Capital Asset Pricing Theory. There are several methodologies to derive CAPM, but here we will follow the idea that based on Markowitz portfolio theory. We consider a market portfolio (M) and the risky asset (Ai). The overall portfolio consists of the M and Ai, each has the weight of 1-y and y respectively. Investing the fraction of y in M and 1-y in the risky asset, the return and variance of the portfolio can be written as:

$$E(r_p) = yE(r_i) + (1-y)E(r_M) \tag{1}$$

$$\sigma_P{}^2 = \ y^2\sigma_i{}^2 + (1-y)^2\sigma_M{}^2 + 2y(1-y)\sigma_{iM} \tag{2}$$

Taking the derivative of $E(r_p)$ and σ_P with respect to y, we obtain:

$$\frac{\partial E(r_P)}{\partial y} = E(r_i) - E(r_M), \tag{3}$$

$$\frac{\partial \sigma_P}{\partial y} = \frac{2y\sigma_i{}^2 - 2(1-y)\sigma_M{}^2 + 2(1-2y)\sigma_{iM}}{2\sqrt{y^2\sigma_i{}^2 + (1-y)^2\sigma_M{}^2 + 2y(1-y)\sigma_{iM}}}. \tag{4}$$

Since all the investors use the identical analysis of the universal assets, in general, equilibrium market, the market portfolio already included the risky asset. Under this situation, we set y to 0. Hence the partial derivation rewrites as:

$$\frac{\partial E(r_P)}{\partial y}|_{y=0} = E(r_i) - E(r_M), \tag{5}$$

$$\frac{\partial \sigma_P}{\partial y}|_{y=0} = \frac{\sigma_{iM} - {\sigma_M}^2}{\sigma_M}. \tag{6}$$

Then, we can express the risk-return trade off under the equilibrium market condition as:

$$\frac{\frac{\partial E(r_P)}{\partial u}}{\frac{\partial \sigma_P}{\partial y}} = \frac{[E(r_i) - E(r_M)]\sigma_M}{\sigma_{iM} - {\sigma_M}^2} \tag{7}$$

Consider that now investors are in the market where there are no restrictions on lending or borrowing the risk-free asset (F). Due to the Capital Market Line (CML), the relationship for the expected return of our portfolio can be written as:

$$E(r_P) = r_F + \frac{E(r_M) - r_F}{\sigma_M}\sigma_P \tag{8}$$

In the equation above, the market return of the risk (risk-return trade off) can be written as:

$$\frac{E(r_M) - r_F}{\sigma_M} \tag{9}$$

As mentioned above, the market is the equilibrium market, so the marginal price for risk should be the same (or you can arbitrage). From this, we have the equation of:

$$\frac{E(r_M) - r_F}{\sigma_M} = \frac{[E(r_i) - E(r_M)]\sigma_M}{\sigma_{iM} - {\sigma_M}^2} \tag{10}$$

From this relationship, we can obtain that:

$$E(r_i) = r_F + \frac{\sigma_{iM}}{{\sigma_M}^2}[E(r_M) - r_F] \tag{11}$$

Based on the equation (11), we define the coefficient $\beta_i = \frac{\sigma_{iM}}{{\sigma_M}^2}$ and rewrite the equation (11) as:

$$E(r_i) = r_F + \beta_i[E(r_M) - r_F] \tag{12}$$

This linear relationship between risk and return is called the Security Market Line (SML) and it is the original version of CAPM which is developed by Sharpe (1964). The beta of the asset measures the quantity of risk that the specific asset exposed to, while the $[E(r_M) - r_F]$ measures the market price of the risk. Both of them together determine the risk premium.

As shown in the equation, beta measures the sensitivity of a specific security or portfolio's return relative to the benchmark. In other words, beta is the measurement of undiversifiable risk, which is the systematic risk. Often, the stocks with the big names, which are highly related to the market, tend to have a higher value of beta.

2.1.3 Performance of Capital Asset Pricing Model

The CAPM is still widely used in recent academic papers and is highly influential. Many papers have pointed out that, assumptions of CAPM are not realistic in the real world, but also not testable in some empirical tests.

The four of the assumptions that are used to derive CAPM include:

1) All investors have the same opinions about the possibilities of various end-of-period values for all assets.

2) The common probability distribution that describes the possible returns on the available assets is joint normal.

3) Investors choose portfolios that maximize their end-of-period utility of wealth, and all investors are risk-averse and all investors are risk-averse.

4) An investor is able to take a long or short position in any type of assets, including riskless assets.

Among these four assumptions, Lintner has proved that removing assumption one does not have an obvious effect on the model, and assumption two and three are considered as acceptable approximations for many investors. Only the last one is the most unrealistic and the model will change a lot if removed it. There is also other evidence in the empirical studies.

Friend and Blume (1970) used a cross-section regression to explore the relationship between the risk-adjusted performance and risk during the 1960-68 period and observe that the portfolios with high risk seem to have worse performance than those portfolios with lower risk. But in their studies, there also have biases. In other empirical studies, Black et al. (1972) did the time series regression of the portfolio excess returns on the market portfolio excess returns using all securities listed on NYSE at any time in the interval between 1926-66. The results indicated that high-beta securities have significantly negative intercepts and low-beta securities had significantly positive intercepts, which were contrary to the predictions of the traditional CAPM.

Although the Capital Asset Pricing Model has been one of the most frequently used and useful financial theory, many of the empirical studies published pointed out that evidence suggests the existence of additional factors which are relevant for asset pricing.

The empirical results in Banz (1979) studies suggested that CAPM was mis-specified. The risk-adjusted return for the Small Cap stocks in NYSE are higher on average than the risk-adjusted returns for the Large Cap stocks; Basu (1981) pointed out that the effect of earnings yield and size on expected returns is more complicated and both of the variables are the proxies for the fundamental determined of expected returns for common stocks.

Similarly, Farmer and French (1992) documented that value stocks measured by high book-to-market price ratios stocks tend to have a higher risk-adjusted return than growth stocks, which were measured by low book value-to-market price ratios. And this appeared in an efficient market. The empirical problems for CAPM reflect theoretically failures as a result of ideal assumptions and raise the needs for an alternative asset pricing theory.

2.2 Overview of Arbitrage Pricing Model

Created by Stephen Ross (1976), the APT had been considered as an alternative to the mean-variance capital asset pricing model developed by Sharpe and Lintner, whose main conclusion is that the market portfolio is mean-variance efficient. The arbitrage pricing theory is a theory of asset pricing that holds that an asset's returns can be forecast using the linear relationship between the asset's expected return and a number of macroeconomic factors that affect the asset's risk.

2.2.1 Basics of Arbitrage Pricing Theory

Both the APT and CAPM agree that, although there are many firm-specific risks can affect the return of the security, but these idiosyncratic risks can be cancelled out in a large and well-diversified portfolio. This cancellation is called, the Principle of Diversification. It suggests that even large and well-diversified portfolios are not risk-free

since they are all exposed to some common economic factors that undoubtedly affecting the returns of all the stocks and that cannot be cancelled out. In APT, these economic factors are called systematic or pervasive risks.

The model is a multi-factor technical model based on the relationship between a financial asset's return and its risk and is designed to capture the sensitivity of the asset's returns to changes in certain macroeconomic variables. For example, these risk factors in the model may include commodity price, inflation, corporate bond premiums, shifts in yield curves, changes in interest rates, economic growth, consumer sentiment, currency exchange rates and economic events, which theoretically have either negative or positive effect on different types on assets. Although in the APT, there is no definition on what exactly those systematic risks are, there are several sources of risk which consistently affect the returns of the stocks according to Burmeister et al. (2003). These risks arise from unanticipated changes in the following fundamental economic variables, which are Investor Confidence, Interest Rates, Inflation, Real Business Activity, and a Market Index.

Basically, APT follows from two basic postulations. The first postulation concluded that asset returns are generated by a linear factor model. It assumed that, in every time period, the difference between the actual realized return and the expected return is equal to the sum of the risk exposure multiplied by the realization of each risk factor plus an asset specific error term. It can be written as:

$$r_i(t) - E[r_i(t)] = \beta_{i1} f_1(t) + \ldots + \beta_{ik} f_k(t) + \varepsilon_i(t), \quad (13)$$

where:

$r_i(t)$ = the total realized return of the specific asset i at the end of period t,

$E[r_i(t)]$ = the expected return of the specific asset at the begin of the period,

β_{ij} = the risk exposure of the specific asset to risk factor j for j = 1 … K,

$f_j(t)$ = the realization of j – th risk factor, and

$\varepsilon_i(t)$ = the value of the end-of-period asset specific risk.

At the meantime, it is assumed that each of the price of the correspondent risk factor and for the asset specific risk are zero, which

$$[E[f_1(t)] = \ldots = E[f_k(t)] = E[\varepsilon_i(t)] = 0 \quad (14)$$

Besides, it is also assumed that the asset specific risk in uncorrelated with the factor risk price.

$$cov[\varepsilon_i(t), f_i(t)] = 0 \; for \; all \; j = 1 \ldots K \quad (15)$$

Finally, it is assumed that all of the risk factors' realization and asset specific risk are uncorrelated.

$$cov[f_i(t), f_i(t')] = cov[\varepsilon_i(t), \varepsilon_i(t')] = 0 \; for \; all \; j = 1 \ldots K \; and \; for \; all \; t \neq t' \quad (16)$$

The second postulation of APT is that no arbitrage pure arbitrage profits tend to zero. That is, it assumed that because the market is efficient, it is impossible for the investors to earn a positive expected rate of return on any combination of assets without undertaking risks and making a net investment of the assets. In this way, we can say that the expected rate of return of the specific asset is equal to:

$$E[\, r_i(t)] = \; P_0 + \; \beta_{i1} P_1 + \ldots + \beta_{iK} P_K. \tag{16}$$

Here, the P_j is the price of risk factor and it determines the risk-return tradeoff we are seeking.

Then it comes to the full APT, obtained by substituting (16) into (13), which after rearranging yields:

$$r_i(t) - \; P_0 = \; \beta_{i1}[P_1 + f_1(t)] + \ldots + \beta_{ik}[P_K + f_k(t)] + \; \varepsilon_i(t) \tag{17}$$

2.2.2 Assumptions of the Model

Except the assumptions mentioned in the above section, there is still another important assumption for APT. Unlike the Capital Asset Pricing Model which only considers the single factor of the risk, the Arbitrage Pricing Theory looks at several macroeconomic

factors that theoretically affect the risk and return of a type of financial assets and it does not assume that investors hold efficient portfolio.

2.3 Other Multiple Factor Models

2.3.1 Macroeconomic Factor Models

Selecting a set of appropriate macroeconomic factors involves a large amount of work given the practitioner requires factors that are easy to interpret and explain as much as possible of the variation in stock returns. One of the macroeconomic factor models built by Burmeister et al. (2003) suggested one set of five factors that meet these criteria is the following:

1) Confidence Risk. This is the unanticipated changes in investors' willingness to undertake risky investments. The proxy that was used in this measurement was the difference between the rate of return on risky corporate bonds and the rate of return on government bonds, both with 20-year maturities. If in any months during the sample period, the return on corporate bonds exceeds the return on government bonds by more than the long-term average, this measure the Confidence Risk is positive. The reason is that, when the returns of the corporate bonds were higher than the returns of government bonds, the required yield of the corporate debts decreased. Stocks that are positively exposed to this risk then will rise in price.

2) Time Horizon Risk. This was measured as the difference between the return on 20-year government bonds and 30-day Treasury Bills. A positive realization of Time Horizon Risk means that the price of long-term bonds has risen relative to the 30-day T-bill price, which means investors require a lower compensation for holding an investment with a longer period to payout.

3) Inflation Risk. A positive realization of inflation risk happened when the expected inflation for the specific month that measured at the beginning of the month is lower than the actual inflation. Since most stocks have a negative relationship with inflation, that means, a positive realization of inflation risk causes a negative contribution to return while a negative one causes a positive contribution to return.

4) Business Cycle Risk. This risk is calculated as the difference between the end-of-month value and beginning-of-month value. A positive realization in this risk means the expected growth rate of the economy has increased.

5) Market Timing Risk. This is computed as that part of the S&P 500 total return that is not explained by the first four factors and the intercept term. By including this factor, the CAPM becomes a special case: if the risk exposures to all of the first four macroeconomic factors were zero, then Market Timing Risk would be proportional to S&P 500 total return and the stock's exposure to Market Timing Risk would be equal to it CAPM beta. Most stocks are positively related to this risk factor.

During the sample period, the relationship can be written as (18): During the sample period, the relationship can be written as (18):

$$E(r_i) - TB = \beta_{i1}(2.59) + \beta_{i2}(-0.66) + \beta_{i3}(-4.32) + \beta_{i4}(1.49) + \beta_{i5}(3.61) \quad (18)$$

2.4 Difference between CAPM and APT

Firstly, CAPM has only one factor and it captures the sensitivity of a specific stock's return to its benchmark while the AOT formula has multiple factors that include non-specific risks. Besides, APT did not provide clues into what these factors should be, which needs the user of the APT model to decide analytically but also subjectively.

Secondly, comparing to APT, CAPM is a snapshot and appears to be more accurate in the short period of time than it is in the long term. While for APT, it might be more informative over a medium term to long term but might not be considered to be as accurate as CAPM in the short term.

2.5 Hypotheses

The sections above implied some of the hypotheses. As Burmeister et al. (2003) mentioned that some macroeconomic factors did influence the returns for stocks in S&P 500. But the countries involved in the study is also an important consideration when selecting the macroeconomic factors that have the potential to affect the country's stock market. Hence, based on the countries we selected and Burmeister et al. (2003) study, we

derived the hypotheses of the macroeconomic factors effect on the selected countries stock market:

1) Excess Return on Equity is positively related to the confidence of investors. When investors are confident about the overall economy or have positive expectations towards the economic development, they are more willing to invest in an asset that has more risk and will provide a potentially higher return. This will drive up the prices of risky assets and therefore, provide with a higher return. This can also be observed from the bond market. When the economy is running well, investors are less willing to pour their capital into government bond since government debts are the safest, among which the yield of the 1-year T-Bill is usually recognized as a proxy of the risk-free rate.

2) Excess Return on equity is negatively related to risk-free interest rates. One most important factor that drives up the company's share price is its financial statement. With a higher interest rate, the cost of debt will be higher if the company needs the money to invest in the projects that cannot immediately provide cash flow. Hence, the company without stable fundamentals will forgive the projects that might provide a potential strong cash flow and further deteriorate the company's performance. Besides, investors' opportunity cost for investing also go up if the interest rate increase. This will lead to a lower demand for stocks and hence, the stock prices will go down. So is the excess return. When the rates are low, the stocks prices will go up and lead to an increase in the bond yield. But since the increment in the yield of the bond will be far less than the increment in the equity prices, the overall excess return still goes up.

3) Excess return on equity is negatively related to inflation. When a country suffers from inflation, it can affect equity returns in at least two ways. First, it may lead to a weaker economic performance in the future, and, thus, reduced the corporate profits. Second, an increase in the inflation will increase the risk of assets, and thus raise the rate of required return on them since it is associated with an increase in inflation uncertainty. An increase in future expected returns means the stock price must drop now, leading to a negative impact on the current return (John Ammer, 1994).

4) Excess return on equity is positive to the real GDP level. When the level of real GDP growth increase, the profitability of the corporates in this country will be higher with no doubt and, thus, the return will become higher.

5) Financial crises and recession negatively affect the level of excess equity return. During the times of financial recession of a country or when the probability of recession in the United States goes up, investors rebalance their portfolio and move away from risky asset class like Equity. Thus, the equity prices fall, and equity returns go down.

6) Composite leading indicators have a positive relationship with excess equity returns. When the CLI goes up, it is due to its underlying indicators suggesting a high economic activity in the near future. This boosts confidence amongst capital markets investor to buy a risky security like equity to capture the upside. Thus, equity returns go up.

3. Data

The Burmeister et al. (2003) paper only tests the hypothesis with the regression for the United States. Therefore, we keep the United States as a standard for our paper. International monetary fund (IMF) categorizes United States, United Kingdom and Canada and Australia as developed countries. This study also includes Russia and Brazil which according to the International monetary fund are Emerging market countries. Long et al. (2012) paper studies the impact of United States financial crisis on different countries, five of which are in the scope of our study. Thus, the six countries covered in our study are the United States, the United Kingdom, Canada, Brazil, Australia and Russia. All the countries have a different economy, meaning their stock index is comprised and heavily weighted by different types of industries.

The 2008-09 Financial crisis affected their economy differently. Verick and Islam (2010) shows that Canada, for example, suffered mild labour impact and economic contraction, while the United Kingdom experienced medium labour impact and economic contraction. But at the same time, a high probability of recession in the United States threatens their equity markets too. The data used by us in our regression is quarterly and if while gathering the data we find monthly data, then it is converted into quarterly by taking a 3-month end of the period average.

The indices used in the study to signify the equity returns of the countries in our scope are as follows:

United States: S&P 500

It is the market capitalization weighted stock index of the largest 500 companies listed on the NYSE and NASDAQ.

United Kingdom: FTSE 100

Footsie as it is called informally is the index comprised of largest 100 companies based on their market cap listed on London Stock Exchange.

Canada: S&P/TSX Composite Index

This Canadian index includes 250 companies which signify around 70% of the total companies listed on the Toronto Stock Exchange.

Australia: AU S&P/ASX 200

It is the market cap weighted index comprising of 200 stocks listed on the Australian Stock index.

Brazil: IBOV Index

This Brazilian benchmark index comprises of 60 stock listed on B3 Exchange in Brazil.

Russia: IMOEX Index

The MOEX Russian Index is the main index of Russia.

We obtained the index data from Datastream (2018) and Bloomberg. Some countries have longer historical data than others, so the amount of observation is different for all the countries.

Next, we extract 1-year treasury bill interest rate for all the countries in scope through Datastream (2018). But for Russia, 1-year bank deposit rate was used as a proxy for the 1-year treasury bill interest rate as the bank deposit rate had more historical data. We consider this as our Risk-free Rate.

Our next variable, Economic growth is measured by the change in the country's real GDP. We gather the GDP levels for all the countries via Datastream (2018) or the country's bureau of statistics.

Recession year is a dummy variable. It takes the value of 1 if there is a recession in that country otherwise takes the value of 0. If there was a consecutive two-quarter decline in the country's GDP rate, we establish that there was a recession in that given period. National Bureau of Economic Research (NBER) the U.S. uses this same methodology to determine the presence of recession and we expand this method to other countries in our scope too.

We use Recession probability in the United States as our next variable in the regression for all the countries in this study. Long et al. (2012) discusses the impact of the US financial crisis originated with the subprime mortgage crisis and soon spread on to other countries. The paper studied various Developed and Emerging Market Countries who have different economic growth rate and are at different economic stage of development.

It found that under the financial crisis of the US, these countries were almost equally affected in different ways and their economic type was no longer significant. U.S. Recession probability data is gathered from the Federal Reserve economic data (FRED) of St. Louis' website.

For the variable, Consumer confidence we used Organisation for Economic Co-operation and Development's (OECD) Consumer confidence index (CCI). It is one of OECD's leading indicators for individual household's consumptions and savings. This index is constructed based on a certain number of questions asked to the respondents about their general view of the situation of the economy, unemployment and their ability to save. An index constructed and scaled in such a way that consumer confidence above 100 means that the respondents are optimistic about the economy and spending will increase in the next 12 months. CCI below 100 suggests that consumers have a pessimistic sentiment about the economy and they will not be making any big purchases in the next 12 months. We believe the markets price in this type of expected consumer behaviour ahead of time and decrease or increase with the change in consumer confidence indicator (CCI).

Our next variable is the inflation in the country. Our data for consumer price index for the countries in scope was extracted from Datastream (2018) whose source is the national bureau of statistics of those countries.

Another variable that we added to our regression is a Composite Leading Indicator (CLI) constructed by the OECD for all the countries in our study. Composite leading indicator tries to forecast the turning point in a business cycle 6-9 months ahead of time. The index of industrial production (IIP) is used as a proxy for the business cycle by the OECD.

OECD constructs the CLI by including different indicators like new orders, construction approvals, average hours worked, raw material prices, monetary policy and foreign economic development etc. Our rationale behind adding this variable to the regression is to see if CLI can help determine the turning point of the future business cycle which might be reflected in the equity returns ahead of time. We extracted Composite leading indicator data from Datastream (2018) for all the countries.

4. Methodology

Now we discuss the way in which we analysed our data:

Here, Equity returns for all the countries are calculated. Equity returns are calculated as Equity returns = ln (Pt+1) ln (Pt) where Pt is the equity index value at time t and Pt+1 is the value of the index at time t+1. This is done over a quarter where t+1 the end of quarter and t is the beginning of the quarter.

We then move on to calculating the excess equity returns, which is given by the following formula:

$$\text{Excess equity returns} = (\text{Equity index returns}) - (\text{Risk-free rate}) \tag{19}$$

The Risk-free rate of interest is the 1-year T-bill rate of that country which represents the theoretical rate of return of investment with zero risks. For Russia, this is represented by the 1-year bank deposit rate which is a good proxy.

The first step of our statistical analysis is to regress the Excess equity returns on the variables mentioned in the Burmeister et al (2003). The independent variables are Economic sentiment, Risk-free Rate, inflation rate and Economic growth. Following is the formulated regression:

$$R_{it} - TB_{it} = \alpha_j + \beta_{j1}f_{j1} + \beta_{j2}f_{j2} + \beta_{j3}f_{j3} + \beta_{j4}f_{j4} \quad (20)$$

Ri is the Return on the index of the country, while TBi is the interest rate on treasury bill which gives us the Risk-free Interest Rate. Factor f1 denotes the economic sentiment of the country which is given by Consumer Confidence Indicator (CCI), f2 is Risk-free Rate which is again the 1-year treasury bill rate. Factor f3 is Economic growth given by the growth in real GDP of the country.

Thus, the regression develops to:

$$\textit{Excess equity returns of a country}_j = \textit{Constant}_j + \beta_{ES\,j} * \textit{Economic Sentiment} + \beta_{RFR\,j} * \textit{Risk-free Rate} + \beta_{IN\,j} * \textit{Inflation rate} + \beta_{EG\,j} * \textit{Economic Growth} \quad (21)$$

The betas signify the sensitivity of the independent variable on our dependent variable, Excess equity returns.

We run our regression with a 95% confidence interval. After running the regression, the way we critic if the variable is significant or not is by looking at the P-value of the variable. For example, if the P-value of the variables is less than or equal to 0.05 we reject the null hypothesis that the variable is significantly different from zero.

The whole model will have an adjusted R-squared value which represents how much variation in the dependent variable is explained by the independent variable for a linear regression model. An adjusted R-squared is better than R-squared as it adjusts for the number of predictors in the model which reduces the unintended consequence of improving the model by chance.

Then additional variables are added to the regression to see if they make any significant contribution to the model in explaining the excess equity returns.

The regression model thus becomes:

$$R_{it} - TB_{it} = \alpha_j + \beta_{j1}f_{j1} + \beta_{j2}f_{j2} + \beta_{j3}f_{j3} + \beta_{j4}f_{j4} + \beta_{j5}f_{j5} + \beta_{j6}f_{j6} + \beta_{j7}f_{j7} \quad (22)$$

The first four factors are the ones described in the first regression. Next, Factor f5 is Recession year which is a dummy variable taking the value of 1 if there are a recession

and otherwise 0. Factor f6 is the recession probability of the United States and factor f7 is composite leading indicator constructed by OECD.

Thus, the regression model develops to:

$$\textit{Excess equity returns of a country}_j = \textit{Constant}_{j+} \beta_{ES\,j*}\,\textit{Economic Sentiment} + \beta_{RFR\,j*}\,\textit{Risk-free Rate} + \beta_{IN\,j*}\,\textit{Inflation rate} + \beta_{EG\,j*}\,\textit{Economic Growth} + \beta_{RY\,j*}\,\textit{Recession Year} + \beta_{RP\,j*}\,\textit{Recession Probability} + \beta_{CLI\,j*}\,\textit{CLI} \quad (23)$$

We then analyse the results of our OLS regression model to see which variables are the most significant and which regression model explains the Excess equity returns the finest.

5. Results

We now discuss the analysis of our data. The first row below all the variables is the coefficient that we get after our regression. Following the coefficient, we have its t Stat and P- value that tells us if the variable is significantly different from zero. We highlight the Coefficient and P-value of a variable for a country when the P-value is significant i.e. < 0.05.

5.1 Original Regression with Four Variables

Table 1: Excess equity return as dependent variable explained by Economic sentiment, risk-free rate, inflation rate and economic growth

EXCESS EQUITY RETURNS						
COUNTRY	**United States**	**United Kingdom**	**Canada**	**Brazil**	**Australia**	**Russia**
VARIABLE						
CONSTANT						
Coefficient	-1.99226	-1.14082	-0.97763	-4.49969	-0.00237	-0.08120
t Stat	-1.95696	-0.56600	-0.48815	-0.71852	-0.09467	-1.14022
P-value	0.05282	0.57283	0.62681	0.47453	0.92479	0.25913
ECONOMIC SENTIMENT						
Coefficient	**4.56689**	**2.92501**	**0.40755**	3.40131	**5.25777**	**5.98085**
t Stat	4.05192	2.17935	4.14035	0.83820	3.96346	4.38049
P-value	**0.00009**	**0.03198**	**0.00009**	0.40442	**0.00015**	**0.00005**
RISK-FREE RATE						
Coefficient	**-1.03970**	**-1.01275**	-0.74411	**-0.79695**	**-1.31583**	-0.42600
t Stat	-4.57785	-3.70876	-1.57025	-2.66638	-2.86846	-0.58757
P-value	**0.00001**	**0.00036**	0.12040	**0.00927**	**0.00519**	0.55923
INFLATION RATE						
Coefficient	**3.27944**	0.45868	-0.16908	0.69172	0.75916	0.65599
t Stat	2.75409	0.67790	-0.17151	1.00434	0.57166	1.26312
P-value	**0.00686**	0.49961	0.86427	0.31824	0.56904	0.21187
ECONOMIC GROWTH						
Coefficient	**3.62190**	**2.59666**	**2.97841**	1.22359	3.32812	1.75933
t Stat	3.83116	2.12347	2.36479	0.74321	1.43623	0.88996
P-value	**0.00021**	**0.03652**	**0.02053**	0.45953	0.15456	0.37737
Adjusted R-Sqaured	0.34768	0.19668	0.26166	0.06851	0.23631	0.30925

The table 1 here follows the Burmeister et al (2003) methodology of a multi factor regression model with four variables for all six countries in our scope.

Following equation is estimated:

$$\textit{Excess equity returns of a country}_j = \textit{Constant}_{j+} \beta_{ESj} * \textit{Economic Sentiment} + \beta_{RFRj*} \textit{Risk-free Rate} + \beta_{INj*} \textit{Inflation rate} + \beta_{EGj*} \textit{Economic Growth} \quad (24)$$

According to the regression, the coefficients of variable Economic Sentiment for United States, United Kingdom, Canada, Australia and Russia are significant. The coefficients are also positive which proves the hypothesis that when consumers and investors have high expectations of about the future of the economy, equity prices rise, and the equity returns go up.

We can also see that the variable Risk-free Rate of United States, United Kingdom, Brazil and Australia are also significant. The coefficients are negative which confirm our hypothesis that when Risk-free Interest Rates are going up, the return that investor is seeking for their money is going up. Thus, investors become reluctant to invest in risky securities like stocks. Due to reduced demand for stocks and a high opportunity cost to invest in risky securities the equity prices fall, and their returns go down.

The inflation rate of United States as we can see has a positive relationship between excess equity returns according to our model which goes against our hypothesis that, when there is a high inflation the input costs of the for corporation goes up. It takes a while for corporations to pass along these higher costs to consumers and thus the stocks of the corporations become risky. This results in stock price drops and lower returns.

The model shows that the variables of Economic growth for the United States, United Kingdom and Canada are significant. The regression also shows that Economic growth and excess equity returns have a positive relationship which is consistent with our hypothesis that when the real GDP of a country rises, the expected profits of companies also rises thus increasing the stock prices and equity returns.

With these four variables used in the regression, for the United States, the model does a barely passable job of predicting the excess equity returns as its Adjusted R-Squared is 34%. For other countries, the Adjusted R-Squared values are quite small which suggests that the model doesn't fit the data very well.

5.2 Regression with Original Four Variables and Dummy Variable Recession Year

Table 2: Excess equity return as dependent variable explained by Economic sentiment, risk-free rate, inflation rate, economic growth and Recession year

EXCESS EQUITY RETURNS					
COUNTRY	**United States**	**United Kingdom**	**Canada**	**Brazil**	**Russia**
VARIABLE					
CONSTANT					
Coefficient	-1.99096	-0.22526	-1.51470	-4.50369	-0.07210
t Stat	-1.66514	-0.10934	-0.67327	-0.71458	-0.91952
P-value	0.09868	0.91318	0.50279	0.47697	0.36191
ECONOMIC SENTIMENT					
Coefficient	**4.56747**	**3.27354**	**0.39757**	3.39759	**5.97206**
t Stat	3.92140	2.43999	3.95041	0.83185	4.33640
P-value	**0.00015**	**0.01672**	**0.00017**	0.40800	**0.00006**
RISK-FREE RATE					
Coefficient	**-1.03961**	**-0.93372**	-0.74786	**-0.79579**	-0.51197
t Stat	-4.48254	-3.41156	-1.57074	-2.63470	-0.64860
P-value	**0.00002**	**0.00098**	0.12034	**0.01013**	0.51934
INFLATION RATE					
Coefficient	**3.27857**	0.54607	-0.07191	0.68070	0.58460
t Stat	2.59075	0.81416	-0.07141	0.91849	1.00960
P-value	**0.01085**	0.41777	0.94326	0.36116	0.31719
ECONOMIC GROWTH					
Coefficient	**3.62062**	0.66721	**3.43322**	1.25701	1.99621
t Stat	3.20854	0.40764	2.25027	0.68397	0.92610
P-value	**0.00174**	0.68454	**0.02729**	0.49600	0.35851
RECESSION YEAR					
Coefficient	-0.00778	-7.83375	2.68857	0.26190	0.02439
t Stat	-0.00210	-1.74844	0.53350	0.04202	0.28899
P-value	0.99833	0.08391	0.59523	0.96659	0.77370
Adjusted R-Squared	0.34185	0.21503	0.25483	0.05674	0.29755

The next regression analysis is shown in Table 2. Here we kept the four Burmeister et al (2003) variables and added one of our hypothesized variables; the recession year of that country. It is a dummy variable and assumes the value of 1 when there is two-quarters of consecutive decline in the GDP and otherwise takes the value of 0. Since Australia has not had a recession since June 1991, we do not include it in table 2.

Following is the regression estimated:

$$\textit{Excess equity returns of a country}_j = \textit{Constant}_{j+} \beta_{ES} * \textit{Economic Sentiment} + \beta_{RFR} * \textit{Risk-free Rate} + \beta_{IN} * \textit{Inflation rate} + \beta_{EG} * \textit{Economic Growth} + \beta_{RY} * \textit{Recession Year} \quad (25)$$

As hypothesized, when there is a recession ie. two-quarters of consecutive decline in the GDP, investors deem investing in stocks risky as they perceive the future of the economy as bleak. This reduced demand for stocks decreases stock prices and fall in excess equity returns. None of the coefficients of the variable 'Recession year' is significant for any country in this model. The coefficient for variables of Economic Sentiment, Economic growth for the United States is still positive and significantly different from 0. The Risk-free Rate is also significant and its variable assumes a negative value just as we saw in table 1. For the United Kingdom only two variables, Economic sentiment and Risk-free Rate were significant. Canada still has a positive coefficient for the variables, Economic sentiment and Economic growth which are significant. Brazil has a negative coefficient

for the variable, risk-free rate and Russia has a positive coefficient for the variable, an Economic sentiment both of which are statistically significant in this model. But the Adjusted R-Squared for the six countries doesn't change much and is still not that high even after adding our variable 'Recession Year.'

5.3 Regression with Original Four factors and US Recession Probability

Table 3: Excess equity return as dependent variable explained by Economic sentiment, risk-free rate, inflation rate, economic growth and Recession Probability

EXCESS EQUITY RETURNS						
COUNTRY	**United States**	**United Kingdom**	**Canada**	**Brazil**	**Australia**	**Russia**
VARIABLE						
CONSTANT						
Coefficient	-0.85616	-0.53758	0.12296	-2.26653	0.00848	-0.07563
t Stat	-0.75270	-0.26546	0.06238	-0.35564	0.34696	-1.05691
P-value	0.45321	0.79129	0.95042	0.72306	0.72948	0.29526
ECONOMIC SENTIMENT						
Coefficient	**3.84929**	2.24970	**0.39322**	2.11101	**5.23432**	**5.70167**
t Stat	3.31605	1.62375	4.14331	0.51384	4.09959	4.07319
P-value	**0.00123**	0.10805	**0.00009**	0.60880	**0.00009**	**0.00015**
RISK-FREE RATE						
Coefficient	**-1.00209**	**-0.84370**	-0.57008	**-0.84388**	**-0.93189**	-0.57010
t Stat	-4.46554	-2.93218	-1.23722	-2.83330	-2.01574	-0.76793
P-value	**0.00002**	**0.00430**	0.21976	**0.00584**	**0.04699**	0.44587
INFLATION RATE						
Coefficient	**3.15474**	0.58655	0.25629	0.62440	0.14370	0.89504
t Stat	2.68642	0.87081	0.26636	0.91261	0.11081	1.54225
P-value	**0.00832**	0.38626	0.79067	0.36422	0.91203	0.12885
ECONOMIC GROWTH						
Coefficient	**2.43250**	0.93374	1.09074	1.00155	0.93299	0.68067
t Stat	2.23636	0.60111	0.77777	0.61129	0.39058	0.29651
P-value	**0.02731**	0.54933	0.43909	0.54276	0.69708	0.76798
RECESSION PROBABILITY						
Coefficient	**-0.06784**	-0.07521	**-9.02901**	-0.12687	**-0.08609**	-0.08374
t Stat	-2.11573	-1.70663	-2.67836	-1.54752	-2.79981	-0.92766
P-value	**0.03658**	0.09146	**0.00904**	0.12573	**0.00633**	0.35771
Adjusted R-Squared	0.36715	0.21377	0.31581	0.08453	0.29256	0.30749

Table 3 above shows the analysis of the same regression as Table 1, except we added another variable 'Recession probability' to the model. This variable helps predict the business cycle turning points thereby giving us a probability of expected future recession. Following is the regression estimated:

$$\textit{Excess equity returns of a country}_j = \textit{Constant}_{j+} \beta_{ES\,j} * \textit{Economic Sentiment} + \beta_{RFR\,j*} \textit{Risk-free Rate} + \beta_{IN\,j*} \textit{Inflation rate} + \beta_{EG\,j*} \textit{Economic Growth} + \beta_{RP\,j*} \textit{Recession Probability} \quad (26)$$

The coefficient for Recession probability of United States, Canada and Australia are negative. They are also significantly different from zero. Thus, confirming our hypothesis that, as the probability of recession increases, people are reluctant to invest in stocks and equity return decreases. Here, the coefficient of Risk-free Rate for United States, United Kingdom, Brazil and Australia are significant and conversely related to Excess equity returns of their respective countries. The coefficients of Economic Sentiment for the countries United States, Canada, Australia and Russia are significant here. These coefficients are also positive which was predicted in our hypothesis that a higher real GDP number which is denoted by Economic sentiment, boosts confidence in the stock market and thus stock prices and their returns increase.

5.4 Regression with original Four Variables and Composite Leading Indicators

Table 4: Excess equity return as dependent variable explained by Economic sentiment, risk-free rate, inflation rate, economic growth and CLI

	EXCESS EQUITY RETURNS					
COUNTRY	**United States**	**United Kingdom**	**Canada**	**Brazil**	**Australia**	**Russia**
VARIABLE						
CONSTANT						
Coefficient	-2.02977	-1.15810	-2.17105	-7.35650	0.00044	-0.09107
t Stat	-1.98230	-0.57028	-1.08374	-1.38175	0.01824	-1.34119
P-value	0.04989	0.56996	0.28186	0.17094	0.98549	0.18547
ECONOMIC SENTIMENT						
Coefficient	4.60586	2.46337	**0.23782**	-7.12869	**3.86037**	**3.59103**
t Stat	4.06412	0.68424	2.01158	-1.82894	2.88538	2.25214
P-value	**0.00009**	0.49564	**0.04776**	0.07118	**0.00495**	**0.02840**
RISK-FREE RATE						
Coefficient	**-1.03789**	**-1.01220**	-0.54141	**-0.59310**	**-1.20949**	-0.64399
t Stat	-4.55447	-3.68564	-1.15913	-2.32129	-2.76229	-0.92621
P-value	**0.00001**	**0.00040**	0.24998	**0.02285**	**0.00703**	0.35846
INFLATION RATE						
Coefficient	**3.30728**	0.46813	0.66399	0.81426	0.97874	0.94428
t Stat	2.76561	0.68456	0.65383	1.39579	0.77326	1.86331
P-value	**0.00665**	0.49544	0.51517	0.16669	0.44151	0.06786
ECONOMIC GROWTH						
Coefficient	**3.60513**	**2.60140**	1.74201	-1.41381	2.10875	1.94975
t Stat	3.79878	2.11464	1.31677	-0.96312	0.94186	1.03529
P-value	**0.00024**	**0.03732**	0.19182	0.33843	0.34893	0.30515
CLI						
Coefficient	-0.02895	0.41322	**5.22178**	**14.82858**	**7.02756**	**8.48241**
t Stat	-0.51549	0.13831	2.43381	5.71461	3.15497	2.58732
P-value	0.60722	0.89031	**0.01726**	**0.00000019**	**0.00222**	**0.01240**
Adjusted R-Squared	0.34341	0.18763	0.30550	0.33265	0.30832	0.37406

In the table 4, we add another variable, Composite leading indicator (CLI) constructed by OECD. The CLI is an indicator used to detect the turning points in a business cycle. As hypothesized, when the CLI goes down, there is an expected fall in business activity in the future causing the stock prices and stock returns to fall. We use this indicator to see if it helps predict the business cycle better than the variable 'Recession Probability' used in our Table 3.

Following is the regression estimated:

$$\textit{Excess equity returns of a country}_j = \textit{Constant}_{j+} \beta_{ES\,j*}\,\textit{Economic Sentiment} + \beta_{RFR\,j*}\,\textit{Risk-free Rate} + \beta_{IN\,j*}\,\textit{Inflation rate} + \beta_{EG\,j*}\,\textit{Economic Growth} + \beta_{CLI\,j*}\,\textit{CLI} \quad (27)$$

We can see from table 4 that the coefficient of CLI for the countries, Canada, Brazil, Australia and Russia are positive and significant. This is in line with our hypothesis that Equity returns and CLI have a positive relationship. They also have larger coefficients than Recession probability expressing that excess equity returns are more sensitive to CLI than Recession probability.

5.5 Regression with All Seven Variables

Table 5: Excess equity return as dependent variable explained by Economic sentiment, risk-free rate, inflation rate, economic growth, Recession Year, Recession Probability and CLI

EXCESS EQUITY RETURNS						
COUNTRY	**United States**	**United Kingdom**	**Canada**	**Brazil**	**Australia**	**Russia**
VARIABLE						
CONSTANT						
Coefficient	-0.76208	-0.61685	-2.08434	-10.02275	0.00802	-0.09801
t Stat	-0.61297	-0.48912	-0.97412	-1.81044	0.33824	-1.28708
P-value	0.54118	0.62602	0.33313	0.07413	0.33824	0.20377
ECONOMIC SENTIMENT						
Coefficient	2.24303	3.60390	0.19390	**-8.06503**	**4.10434**	**3.54609**
t Stat	1.63140	0.93582	1.68898	-2.07936	3.11400	2.17212
P-value	0.10569	0.35201	0.09538	**0.04091**	**0.00252**	**0.03443**
RISK-FREE RATE						
Coefficient	**-0.86977**	-0.00346	-0.34693	**-0.54001**	**-0.94247**	-0.59773
t Stat	-3.70380	-0.12054	-0.77007	-2.09801	-2.10113	-0.78155
P-value	**0.00034**	0.90434	0.44368	**0.03918**	**0.03863**	0.43802
INFLATION RATE						
Coefficient	2.37578	-0.01800	1.36765	**1.25652**	0.47773	1.06161
t Stat	1.81749	-1.05099	1.36221	2.00306	0.37757	1.66347
P-value	0.07189	0.29624	0.17721	**0.04869**	0.70671	0.10223
ECONOMIC GROWTH						
Coefficient	1.97815	-1.41183	0.50477	-2.83638	0.54706	1.49122
t Stat	1.62535	-0.84352	0.31789	-1.69838	0.23553	0.60532
P-value	0.10698	0.40130	0.75145	0.09347	0.81437	0.54760
RECESSION YEAR						
Coefficient	2.11879	**-11.04144**	5.35989	-8.30764	N/A	-0.02209
t Stat	0.57617	-2.22625	1.13680	-1.53927	N/A	-0.26372
P-value	0.56569	**0.02864**	0.25924	0.12784	N/A	0.79304
RECESSION PROBABILITY						
Coefficient	-0.04464	-0.00233	**-9.96871**	0.12327	**-0.06433**	-0.01888
t Stat	-1.29089	-0.94630	-3.02731	1.51474	-2.07088	-0.20328
P-value	0.19947	0.34668	**0.00338**	0.13393	**0.04144**	0.83971
CLI						
Coefficient	**3.11637**	3.60390	**5.47429**	**18.07809**	**5.71252**	**8.44672**
t Stat	2.20167	0.93582	2.67145	5.83794	2.50993	2.37149
P-value	**0.02980**	0.35201	**0.00926**	**0.00000012**	**0.01399**	**0.02145**
Adjusted R-Squared	0.38368	0.09717	0.36752	0.34899	0.33408	0.35120

Table 5 above shows the regression analysis that includes all the variables that might explain excess equity returns and show us which ones are the most significant.

The model estimated is:

$$\textit{Excess equity returns of a country}_j = \textit{Constant}_{j+} \beta_{ES\,j*}\,\textit{Economic Sentiment} + \beta_{RFR\,j*}\,\textit{Risk-free Rate} + \beta_{IN\,j*}\,\textit{Inflation rate} + \beta_{EG\,j*}\,\textit{Economic Growth} + \beta_{RY\,j*}\,\textit{Recession Year} + \beta_{RP\,j*}\,\textit{Recession Probability} + \beta_{CLI\,j*}\,\textit{CLI} \quad (28)$$

CLI, which are event forecasts and that event forecasted is a turning point in the economic activity of that particular country. When CLI goes up, it suggests that the economic activity is going to pick up and the stock prices go up due to this positive outlook. When the CLI hits its peak and goes down, the business cycle is expected to hit trough which is when the stock prices fall and excess equity decreases. In this regression, the coefficient of CLI is significant and positive for the countries, the United States, Canada, Brazil, Australia and Russia. This confirms our hypothesis showing a positive relationship between the excess equity returns and CLI. The coefficient of recession probability for the counties, Canada and Australia are significantly negative but not for the United States as it did in table 3. This supports our hypothesis that when the probability of recession goes up, the future economic activity is expected to experience a downturn leading to falling stock prices and lower excess equity returns. The recession year which is a dummy variable that takes the value of 1 in the presence of recession determined by two-quarter consecutive fall in GDP and takes the value of 0 otherwise. According to table 5, we see that only the United Kingdom shows high significantly negative coefficient for the variable, Recession Year. This is consistent with our hypothesis that, in the presence of recession, investors would shy away from risky securities like equity, thus causing excess equity returns to fall.

After adding our three new variables, Recession Year, Recession Probability and CLI to Burmeister et al. (2003) four factors and CLI to Mirjam Keizer (2016) five factors to determine excess equity returns, the Adjusted R- Squared only significantly improved for Brazil. But for other countries, the Adjusted R- Squared didn't improve much even after adding the three factors. This can be observed when we compare Table 1 and Table 5.

5. Conclusion

Our Thesis explores the variables used by Burmeister et al (2003) which is a variation of Arbitrage Pricing theory by Ross, S. A. (1976), to determine excess equity returns. We expand our scope by including other variables like Recession probability of U.S and Recession Year of the corresponding country. Additionally, CLI composed by the OECD was used as our seventh variable in the regression to help explain Excess Equity returns. The extent of these Excess equity returns was expanded to countries not only limited to the United States but the United Kingdom, Canada, Brazil, Australia and Russia.

The three factors, Economic Sentiment, Risk-free Rate, and Economic growth are significant for the U.S, but inflation for the U.S. showed an ambiguous relationship with Excess equity returns in the first Regression performed. For other countries, very few variables showed significance and their Adjusted R- Squared wasn't quite high, meaning the four variables don't explain the Excess returns very well. After adding the factors, Recession Year and U.S. Recession probability, only United States, Australia and Canada showed negative significance but the Adjusted R-Squared of the model was not

meaningfully higher than the model which did not have these two variables for the countries in our scope. This suggests that including Recession Year and Recession probability in the model has little to no effect in explaining Excess Equity Returns.

As suggested in the Mirjam Keizer (2016) paper, we added a new variable CLI which anticipate turning points in the business cycle to the model that might help explain Excess equity returns better. The result showed that CLI is positively significant with Excess equity returns for the United States, Canada, Brazil, Australia and Russia. But when combined with other variables, the Adjusted R-Squared was not quite high. This denotes that there is not a strong effect of adding CLI to the model with other variables to explain Excess equity returns. After studying the different variables that might be able to explain excess equity returns, future work includes using different variables which are specific to a particular country.

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