The Halloween indicator, "Sell in May and go Away": an even bigger puzzle

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Our simple new test for the Sell in May effect shows it not only defies stock market efficiency but also challenges the existence of a positive risk return trade off. When we examine the effect using all historical data for all stock market indices worldwide, we only find evidence of a significant positive 'risk return'-trade-off during summer (May-October) in Mauritius. Pooling all country data we find excess returns during summer are significantly negative (-1.2% based on 33,348 monthly returns). Over the full year we find a positive estimate for the equity premium of 3.7% annually (t-value 7.65).

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1. Introduction

Since 2002 when Bouman and Jacobsen published their study on the Halloween Indicator, also known as the 'Sell in May and go away' effect, in the American Economic Review their study has stirred a fierce debate both in the academic literature and the popular press. Bouman and Jacobsen (2002) find that returns during winter (November through April) are significantly higher than during summer (May-October) in 36 out of the 37 countries in their study. As it was a new market efficiency anomaly they called it: 'another puzzle'

One purpose of this paper is to rigorously re-examine the Halloween or Sell in May puzzle and address issues raised in the debate on data mining, sample selection bias, statistical problems, outliers and economic significance.[1] More importantly, we also add a simple new test for this market wisdom. We add this new test for two reasons. Firstly, one could argue that the test in Bouman and Jacobsen (2002) is not a proper test of the Sell in May effect. Bouman and Jacobsen test whether winter returns are higher than summer returns. However, all the market wisdom suggests, is that one should not invest in stock markets during the summer months. So a better test of the adage would be whether summer returns are significantly higher than short term interest rates. If excess returns are not significantly different from zero, or even negative, it makes no sense for risk averse investors to invest in the stock market during summer. This is the new test we perform.[2] The second reason for this new test is that it reveals another, mostly ignored, aspect of the Sell in May effect. Not only would the market wisdom defy market efficiency because returns vary predictably with the seasons. It would also challenge the existence of a positive risk return trade off during a substantial part of the year and predictably so.[3] This would suggest a violation of one of the most fundamental relations in finance. For that reason we want to be as thorough as we can and consider all stock markets worldwide using the full history of stock market

[1] See for instance, Maberly & Pierce, 2003; Maberly & Pierce, 2004; Lucey & Zhao, 2007; Zhang & Jacobsen, 2012; Powell, Shi, Smith, & Whaley, 2009.
[2] In the Bouman and Jacobsen test, summer returns may be lower than winter returns but if summer returns are higher than the short term interest rates it might still pay to stay in the stock market.
[3] This test is also interesting as we still lack a proper explanation on what causes the effect (see for instance, Jacobsen & Marquering, 2008) and this tests cast doubt on explanations that rely only on behavioral changes in risk aversion to explain the effect. Investors have to become systematically risk seeking to explain zero or negative equity premia in the long run.

indices available for each market.[4] We are not aware of any study to date which has done so but this seems probably the best safeguard against data mining and sample selection bias. Or, as an author on the Seeking Alpha website described our approach: “it is the lethal weapon against skepticism.”[5]

Our data consists of all 109 stock markets with stock market indices in the world for which price indices exist. The sample starts with the UK stock market in 1693 and ends with the addition of the stock market of Syrian Arab Republic which starts in 2010.[6] For our tests for the historical equity premia we rely on total return data and short term interest rates which are jointly available for 65 stock markets.[7] For each individual market we use all historical data available for that market. An additional advantage of this approach is, that we get what might be one of the most accurate cross country estimates of the equity premium. An estimate based on all historical total return data and short term interest data available world wide. On average we find an historical estimate for the equity premium based on the 33,348 observations for these 65 countries of 3.7% annually (significant with a t-value of 7.65). While lower than 4.5% estimated in Dimson, Marsh and Staunton (2011), the good news of our study is that this more extended international evidence also suggests there is an equity premium.

Results are less comforting when we consider whether excess returns in summer are significantly higher than zero. In none of the 65 countries for which we have total returns and short term interest rates available –with the exception of Mauritius - can we reject a Sell in May effect based on our new test. For no other stock market in the world do we find evidence of significantly positive excess returns during summer, or, in other words, a

[4] Another reason why we use all data in all countries is that Zhang and Jacobsen (2012) show even with an extremely large sample for just one country (the same UK data set we use here) it is hard to determine whether monthly anomalies exist. The problem is the same as put forward by Lakonishok and Schmidt (1988): To detect monthly anomalies one needs samples of at least ninety years, or longer, to get any reliable estimates. Looking at all historical data across all countries seems the best remedy. It seems fair to say that at least this makes the ‘Sell in May’ effect the most extensively tested anomaly in the world.

[5] http://seekingalpha.com/article/1183461-seasonal-patterns-in-stock-markets-319-years-of-evidence.

[6] Initially, we find 143 countries with active stock exchanges. But many newly established markets only trade a limited number of stocks and do not maintain a market index. We exclude Cambodia, Laos, Fiji and Zimbabwe as they have fewer than a year of observations.

[7] While we have the data for Brazil as well we exclude them because of long periods of hyperinflation.

positive risk return trade off. Figure 1 summarises our main result. It plots the risk premia during the summer months for 65 countries.

Please insert Figure 1 here

Unfortunately, these results are not only not significantly positive, they are in most cases not even marginally positive. In 46 countries the excess returns during summer have been negative, and in 9 significantly so. Only Mauritius shows a significant positive relation between risk and return in summer and only at the 10% level. Overall based on 33,348 observations we find that average stock market returns (including dividends) during May to October have been 1.17% (or 0.20% per month) lower than the short term interest rate and these negative excess returns are significantly different from zero (t-value of -3.36). This absence of evidence of an equity premium during summer motivated the part of ‘an even bigger puzzle’ in our title. Only in the winter months do we find evidence of a positive risk return relation. Average excess returns from November to April are 4.89% or (0.41% per month) and these are significant with a t-value of 14.52. Of course, risk would be an obvious (partial) explanation but if anything standard deviations are higher during summer.[8]

The evidence on negative risk premia we report here suggests that the Halloween effect differs from other seasonalities like for instance the same month seasonal reported by Heston and Sadka (2008, 2010) or ‘Day-of-the-week’-effect. Both seasonals are recently considered by Keloharju, Linnainmaa, and Nyberg (2013) and they find these seasonals may be risk related if risk factor loadings may not accrue evenly through the year.

Apart from this new violation of the risk return trade off, there are more reasons why the Sell in May effect seems to be the anomalous anomaly and remains interesting to study.

[8] In Appendix 3 we test this possibility in more detail using GARCH(1,1) models where we can assess risk differences in conjunction with differences in mean returns between summer and winter. In 23 out of the 57 countries (and also for the world market index) for which we have enough data to test for risk differences, we find that risk is significantly higher in summer than winter. Winter shows significantly higher risk only in 13 countries. This suggests that not only stock market returns may be lower during summer. If anything, after correcting for Sell in May mean effects and volatility clustering effects, volatility may be higher too, further increasing the puzzle on the risk return trade off.

The adage has been ‘publicly available information’ for a very long time even before the Bouman and Jacobsen (2002) sample.[9] Nevertheless, it seems to defy economic gravity. It does not disappear or reverse itself, as theory dictates it should (Campbell, 2000 and Schwert, 2002), or seems to happen to many other anomalies (Dimson and Marsh, 1999 and McLean and Pontiff 2014). In fact, a number of papers have appeared recently that find some results similar to ours with respect to the Bouman and Jacobsen (2002) out of sample evidence.[10] The fact that trading on this strategy is particularly simple makes its continued existence even more surprising.

Apart from our new test for a Sell in May effect, our comprehensive dataset allows us to revisit the old test in Bouman and Jacobsen (2002). Moreover, we deal with the important issues raised in the debate which followed their publication. In short, we find that - based on all available data - none of the criticism survives closer scrutiny. Here are our main findings.

Overall, the 56,679 monthly observations over 319 years show a strong Halloween effect when measured the way as suggested in Bouman and Jacobsen (2002). Winter returns – November through April - are 4.5% (t-value 11.42) higher than summer returns. The Halloween effect is prevailing around the world to the extent that the mean returns are higher for the period of November-April than for May-October in 82 out of 109 countries. The difference is statistically significant in 35 countries, compared to only 2 countries having significantly higher May-October returns. Our evidence reveals that the size of the Halloween effect does vary cross-nation. It is stronger in developed and emerging markets than in frontier and rarely studied markets. Geographically, the Halloween effect is more prevalent in countries located in Europe, North America and Asia than in other areas. As we show, however, this may also be due to the small sample sizes yet available for many of these newly emerged markets. The effect is even more robust in our total return and risk premium estimates. Out of the 65 markets, 58 total market returns (and 56 risk premium

[9] As we show here the market wisdom was already reported in 1935 and at that time already well known, at least in the United Kingdom.

[10] See for instance, Andrade, Chhaochharia, & Fuerst, 2012; Grimbacher, Swinkels, & van Vliet, 2010; Jacobsen & Visaltanachoti, 2009.

series) show positive point estimates for a Halloween effect, and for 34 (and 32) markets these results are statistically significant.

Using time series subsample period analysis by pooling all market indices together, we show over 31 ten-year sub-periods 24 have November-April returns higher than the May-October returns. The difference becomes statistically significant in the last 50 years starting from the 1960s. The difference in these two 6-month period returns is very persistent and economically large ranging from 5.08% to 8.91% for the most recent five 10-year sub-periods. The world index from Global Financial Data reveals a similar trend. Subsample period analysis of 28 individual countries with data available for over 60 years also confirms this strengthening trend in the Halloween effect. More specifically, measured over all these countries the Halloween effect emerges around the 1960s, with 27 out of these 28 countries revealing positive coefficient estimates in the 10 year sub-period of 1961-1970. Both the magnitude and statistical significance of the Halloween effect keeps increasing over time, with the sub-period 1991 to 2000 showing the strongest Halloween effect among countries. Consistent with country by country whole sample period results, the Halloween effect is stronger in Western European countries.

We show the economic significance of the Halloween effect by investigating the out-of-sample performance of the trading strategy in the 37 countries used in Bouman and Jacobsen (2002). The Halloween effect is present in all 37 countries for the out-of-sample period September 1998 to July 2011. The out-of-sample gains from the Halloween strategy are still higher than the buy and hold strategy in 31 of the 37 countries; after taking risk into account, the Halloween strategy outperforms the buy and hold strategy in 36 of the 37 countries. In addition, given that the United Kingdom is the home of this old market wisdom (and has shown a Halloween effect throughout its history) we examine the performance consistency of the trading strategy using long time series of over 300 years of UK data. The result shows that investors with a longer horizon would have had remarkable odds beating the market using this trading strategy: Over 80% for investment horizons over 5 years; and over 90% for horizons over 10 years, with returns on average around 3 times higher than the market.

We also address a number of methodological issues concerning the sample size, impact of time varying volatility, outliers and problems with statistical inference using UK long time series data of over 300 year. In particular, extending the evidence in Zhang and Jacobsen (2012), we revisit the UK evidence and provide rolling regressions for the Halloween effect with a large sample size of 100-year time intervals. The results show that the Halloween effect is most often significant if measured this way. Although even within this long sample there are subsamples where the effect is not always significant. Point estimates are always positive based on traditional regressions, but estimates taking GARCH effects into account or outlier robust regressions occasionally show negative point estimates halfway through the previous century.

This dataset also allows us to test an argument put forward by Powell et al. (2009). They question the accuracy of the statistical inference drawn from standard OLS estimation with Newey and West (1987) standard errors when the regressor is persistent, or has a highly autocorrelated dummy variable and the dependent variable is positively autocorrelated. They suggest that this may affect the statistical significance of the Halloween effect. This argument has been echoed in Ferson (2007). With the benefit of long time series data, we address this concern by regressions using 6 monthly, rather than monthly, returns. The bias if any seems marginal at best. We find almost similar standard errors regardless of whether we use the 6-month intervals, or the monthly data, to estimate the effect.

We feel our paper adds to the literature in a number of ways. Firstly, we provide the lethal weapon to answer the skeptics when it comes to the Sell in May effect by looking at all available data. Based on all historical returns of 109 countries the Halloween effect seems a bigger puzzle than we may have realised before.

Secondly, we introduce a simple new tests that not only shows that the Halloween effect is interesting from a market efficiency point of view but highlights how the empirical evidence systematically seems to violate the positive long run relation we would expect to see between risk and return. In this sense we reveal what may be the most puzzling aspect of this phenomenon: in no country – apart from Mauritius – do we find evidence of a significantly positive risk premium during the summer months. One could argue this seems to pose a major challenge for conventional asset pricing theory.

Thirdly, an interesting by-product and one might call this another contribution is that we provide a new estimate for the equity premium (3.7%) using probably the largest cross county data set over the most historically long period available.

Fourthly, we show how none of the arguments against the existence of the Halloween effect put forward to date survives closer scrutiny. The effect holds out-of-sample and cannot be explained by outliers, or the frequency used (monthly or six monthly) to measure it. The effect is economically large and seems to be increasing in the last fifty years. Even when in doubt of the statistical evidence, it seems that investors may want to give this effect the benefit of the doubt, as trading strategies suggest a high chance of outperforming the market for investors with a horizon of five years or more. Of course, just as with in-sample results, past out-of-sample data do not guarantee future out-of-sample results. In short the results we provide here suggest that, based on all country evidence, there is a Halloween or Sell in May effect. While it may not be present in all countries, all the time, it most often is.

Last but not least, our results help to contribute on answering what may cause the effect, it seems that given all the statistical issues it might be difficult to rely on cross sectional evidence to find a definite answer. What we can say is that any explanation should allow for time variation in the effect and should be able to explain why the effect has increased so strongly in the last fifty years. If we assume human behaviour does not change over time this seems to rule out just behavioural explanations and suggest changes in society play a role. Additionally, and maybe more importantly from a theoretical perspective, this explanation should also be able to account for the negative excess returns during the May-October period in stock markets around the world. While it seems unlikely that we will ever find a smoking gun, the circumstantial evidence we report confirms more recent empirical evidence (Kaustia and Rantapuska, 2012 and Zhang, 2014) that vacations are the most likely explanation. At least, the vacation explanation is consistent with all empirical evidence to date.

2 A short background on the Sell in May or Halloween effect

Bouman and Jacobsen (2002) test for the existence of a seasonal effect based on the old market wisdom ‘Sell in May and go away’ so named because investors should sell their stocks in May because markets tend to go down during summer. While many people in the US are unfamiliar with this saying there is a similar indicator known as the Halloween indicator, which suggests leaving the market in May and coming back after Halloween (31 October). Bouman and Jacobsen (2002) find that summer returns (May through October) are substantially lower than winter returns (November through April) in 36 of the 37 countries over the period from January 1970 through to August 1998. They find no evidence that the effect can be explained by factors like risk, cross correlation between markets, or – except for the US - the January effect. Jacobsen, Mamun and Visaltanachoti (2005) show that the Halloween effect is a market wide phenomenon, which is not related to the common anomalies such as size, Book to Market ratios and dividend yield. Jacobsen and Visaltanachoti (2009) investigate the Halloween effect among US stock market sectors. They find the effects is strongest in production related sectors.

The Halloween effect is also studied in Arabic stock markets by Zarour (2007) and in Asian stock markets by Lean (2011). Zarour (2007) finds that the Halloween effect is present in 7 of the 9 Arabic markets in the sample period from 1991 to 2004. Lean (2011) investigates 6 Asian countries for the period 1991 to 2008, and shows that the Halloween effect is only significant in Malaysia and Singapore if modelled with OLS, but that 3 additional countries (China, India and Japan) become statistically significant when time varying volatility is modelled explicitly using GARCH models.

While Bouman and Jacobsen (2002) cannot trace the origin of this market wisdom, they are able to find a quote from the Financial Times dating back to 1964 before the start of their sample. This makes the anomaly particularly interesting. Contrary to, for instance, the January effect (Wachtel, 1942), the Halloween effect is not data driven inference, but based on an old market wisdom that investors could have been aware of. This reduces the likelihood of data mining.[11] Bouman and Jacobsen investigate several possible explanations, but find none, although they cannot reject that the Halloween effect might be caused by summer vacations, which would also explain why the effect is predominantly European.

Our long-term history of UK data is especially interesting, as the United Kingdom is the home of the market wisdom "Sell in May and go away". Popular wisdom suggests that the effect originated from the English upper class spending winter months in London, but spending summer away from the stock market on their estates in the country: An extended version of summer vacations as we know them today. Jacobsen and Bouman (2002) report a quote from 1964 in the Financial Times as the oldest reference they could find at the time. With more and more information becoming accessible online we can now report a written mention of the market wisdom "Sell in May" in the Financial Times of Friday 10 of May 1935. It states: "A shrewd North Country correspondent who likes stock exchange flutter now and again writes me that he and his friends are at present drawing in their horns on the strength of the old adage 'Sell in May and go away.'" The suggestion is that, at that time, it is already an old market saying. This is confirmed by a more recent article in the Telegraph in 2005.[12] In the article "Should you 'Sell in May and buy another day?'" the journalist George Trefgarne refers to Douglas Eaton, who in that year was 88 and was still working as a broker at Walker, Cripps, Weddle & Beck. "He says he remembers old brokers using the adage when he first worked on the floor of the exchange as a Blue Button, or messenger, in 1934. 'It was always sell in May,' he says. 'I think it came about because that is when so many of those who originate the business in the market start to take their holidays, go to Lord's, [Lord's cricket ground] and all that sort of thing.'" Thus, if the Sell-in-May anomaly should be significantly present in one country over a long period, one would expect it to be the United Kingdom. Many of the early newspaper articles link the adage to vacation behaviour.

[11] For instance, an implication is that Bouman and Jacobsen (2002) need not consider all possible combinations of six month periods.
[12] http://www.telegraph.co.uk/finance/2914779/Should-you-sell-in-May-and-buy-another-day.html

Gerlach (2007) attributes the significantly higher 3-month returns from October through December in the US market to higher macroeconomic news announcements during the period. Gugten (2010) finds, however, that macroeconomic news announcements have no effect on the Halloween anomaly.

Bouman and Jacobsen (2002) find that only summer vacations as a possible explanation survive closer scrutiny. This might either be caused by changing risk aversion, or liquidity constraints. They report that the size of the effect is significantly related to both length and timing of vacations and also to the impact of vacations on trading activity in different countries. Hong and Yu (2009) show that trading activity is lower during the three summer holiday months in many countries. The evidence in these papers supports the popular wisdom, but probably the most convincing evidence to date comes from recent studies by Zhang (2014) and Kaustia and Rantapuska (2012). Zhang looks at vacation data in 34 countries and finds strong support for vacation behaviour as an explanation for the lower summer return effect, especially among European countries. Kaustia and Rantapuska (2012) consider actual trading decisions of Finnish investors and find these trades to be consistent with the vacation hypothesis. They also report evidence which is inconsistent with the Seasonal Affective Disorder (SAD) hypothesis put forward by Kamstra, Kramer and Levi (2003). Kamstra, Kramer and Levi (2003) document a similar pattern in stock returns, but attribute it to mood changes of investors caused by a Seasonal Affective Disorder. Not only, however, does the new evidence in Kaustia and Rantapuska (2012) not support the SAD hypothesis, but the Kamstra, Kramer and Levy (2003) study itself has been critisiced in a number of papers for its methodological flaws (for instance, Kelly & Meschke, 2010; Keef & Khaled, 2011; Jacobsen & Marquering, 2008, 2009). By itself this does not mean, however, that the SAD effect could not play a role in financial markets. But our evidence of the absence of such an effect in some periods, coupled with a strong increase in the prevalence of this effect in the last fifty years seems hard to reconcile with a SAD effect. If it was a mood effect one would expect it to be relatively constant over time. Moreover, increased risk aversion caused by SAD might explain lower returns but still would not explain persistent negative excess returns or negative risk premia as we report here. The same argument also applies for a mood effect caused by temperature changes, as suggested by Cao and Wei (2005), who find a high correlation with temperature and stock market returns.

The long time series data we use here allows us to address a number of methodological issues that have emerged regarding testing for the Halloween effect. In particular, there has been a debate on the robustness of the Halloween effect under alternative model specifications. For example, Maberly and Pierce (2004) re-examine the Halloween effect in the US market for the period to 1998 and argue that the Halloween effect in the US is caused by two extreme negative returns in October 1987 and August 1998. Using a similar methodology, Maberly and Pierce (2003) claim that the Halloween effect is only present in the Japanese market before 1986. Haggard and Witte (2010) show, however, that the identification of the two extreme outliers lacks an objective basis. Using a robust regression technique that limits the influence of outliers, they find that the Halloween effect is robust from outliers and significant for the period of 1954 to 2008.

Using 20-year sub-period analysis over the period of 1926 to 2002, Lucey and Zhao (2007) reconfirm the finding of Bouman and Jacobsen (2002) that the Halloween effect in the US may be related to the January effect. Haggard and Witte (2010) show, however, that the insignificant Halloween effect may be attributed to the small sample size used, which reduces the power of the test. With long time series data of 17 countries for over 90 years, we are able to reduce the impact of outliers, as well as increase the sample size in examining the out of sample robustness and the persistence of the Halloween effect in these countries. As we noted earlier, Powell et al. (2009) question the accuracy of the statistical inference drawn from standard OLS estimation with Newey and West (1987) standard errors when the regressor is persistent, or has a highly autocorrelated dummy variable, and the dependent variable is positively autocorrelated. This argument by itself may seem strange as a regression with a dummy variable is nothing else than a difference in mean test. Still, it may be worthwhile to explicitly address the issue.

3. Data and Methodology

We collect monthly price index data from Global Financial Data (GFD), Datastream[13], and individual stock exchanges for all the countries in the world that have stock market indices available. Initially, we find a total of 143 countries with active stock exchanges, but many newly established markets only trade a limited number of stocks and do not maintain a market index. We also require the countries to have at least one year of data to be included in the analysis[14]. As a result our sample size reduces to 109 countries, consisting of all 24 developed markets, 21 emerging markets, 30 frontier markets classified by the MSCI market classification framework and an additional 34 countries that are not included in the MSCI market classification. We denote them as *rarely studied markets*.[15] Our sample has of course a considerable geographical coverage: we have 16 African countries, 19 countries in Asia, 39 countries from Europe, 13 countries located in the Middle East, 11 countries from North America and 9 from South America, as well as 2 countries in Oceania. We also obtain total return indices and risk free rate data for 65 countries[16] in order to address the possible impact of dividend payments and reveal the pattern of market risk premiums. This smaller sample covers all the stock markets for which we can find total market return indices. We use Treasury bills or the nearest comparable short term instrument as the proxy for risk free rates. Appendix 1 presents the sources and sample periods of the price index, total return index and the proxy of the risk free rate for each country grouped on the basis of their MSCI market classification and geographic region. For many of the countries, the time series almost cover the entire trading history of their stock market. In particular, we have over 310 years of monthly market index prices for the United Kingdom, more than

[13] When data is available from both GFD and Datastream , we choose the one with longer sample periods.

[14] Cambodia, Laos, Fiji and Zimbabwe are excluded from our sample due to insufficient observations.

[15] Our market classification is based on "MSCI Global Investable Market Indices Methodology" published in August 2011. MSCI classifies markets based on economic development, size and liquidity, as well as market accessibility. In addition to the developed market and emerging markets, MSCI launched frontier market indices in 2007; they define the frontier markets as "all equity markets not included in the MSCI Emerging Market Index that (1) demonstrate a relative openness and accessibility for foreign investors, (2) are generally not considered as part of the developed market universe, (3) do not belong to countries undergoing a period of extreme economic or political instability, (4) a minimum of two companies with securities eligible for the Standard Index" (p.58). The countries classified as rarely studied markets in our sample are not necessarily the countries that are less developed than the frontier markets; they can be countries that are considered part of the developed markets' universe with relatively small size; for example, Luxembourg and Iceland; which are excluded from the developed market category by MSCI.

[16] We excluded Brazil from the sample even we do have the date of total returns and short term interest rates, because of the extremely high observations due to the hyper inflation from 1980s to 1994.

210 years for the United States and over 100 years data for another 7 countries. The world index is the GFD world price index and GFD world return index that goes back to 1919 and 1926 respectively[17], the information for the index is provided in the first row. For the price indices, there are 28 countries in total having data available for over 60 years. These long time series data allows us to examine the evolution of the Halloween effect by conducting sub-period analysis. Although the countries with long time series data in our sample are primarily developed European and North American countries, we do have over 100 years data for Australia, South Africa and Japan, and over 90 years data for India. We also have countries with very small sample size; for example, there are 13 countries with data for less than 10 years. All price indices are quoted at local currency, except Georgia where the only index data available is in USD.

Apart from our new test on whether excess returns in summer are significantly positive we also investigate the statistical significance of the Halloween effect using the Halloween dummy regression model the traditional way:

$$r_t = \alpha + \beta Hal_t + \varepsilon_t \qquad (1)$$

where r_t is the continuously compounded monthly index returns and Hal_t is the Halloween dummy, which equals one if the month falls in the period of November through April and is zero otherwise. If a Halloween effect is present we expect the coefficient estimate β to be significantly positive, as it represents the difference between the mean returns for the two 6-month periods of November-April and May-October.

[17] The index is capitalisation weighted starting from 1970 and using the same countries that are included in the MSCI indices. Prior to 1970, the index consists of North America 44% (USA 41%, Canada 3%), Europe 44% (United Kingdom 12%, Germany 8%, France 8%, Italy 4%, Switzerland 2.5%, the Netherlands 2.5%, Belgium 2%, Spain 2%, Denmark 1%, Norway 1% and Sweden 1%), Asia and the Far East 12% (Japan 6%, India 2%, Australia 2%, South Africa Gold 1%, South Africa Industrials 1%), weighted in January 1919. The country weights were assumed unchanged until 1970. The local index values were converted into a dollar index by dividing the local index by the exchange rate.

4. Price Returns, Risk Premiums and Dividend Yields

4.1. Overall results

We first calculate continuously compounded monthly returns for both price indices and total return indices. We also estimate the risk premiums for the countries by subtracting monthly risk free rate from the total return series. Table 1 presents summary statistics of the price returns, total returns and risk premiums.

Please insert Table 1 around here

The top section of the table shows the annualised mean returns and standard deviations for the world index and pooled countries. The statistics for the price returns are calculated from 56,679 sample observations over 109 countries from year 1693 to 2011, and the results for the total return and risk premium are computed based on 33,348 observations from 65 countries for the period 1694 to 2011. The average price returns and total returns are 9.2% and 10.8% over the entire sample, if we only consider the 65 countries that have total return data available, the mean capital gain is about 7% per annum, which lead to an estimation of the historical average dividend yield of 3.8%. This result coincides with a similar dividend yield of 3.6% inferred from the world total return and price return indices over the period 1926-2011.

Figure 2 plots 30-year moving averages of total returns, price returns, risk premiums and dividend yield from pooled 65 countries over the period 1694 to 2011. In Figure 3 we zoom in on the more recent period as for that period results are based on a larger number of countries. Figure 2 makes clear that dividend yield weights a large portion of total returns in the first two centuries, in fact, dividend is almost the sole contributor to the total returns up to around 1850s. The weight of the price returns starts catching up since 1910s. We observe a continuous trend of declining dividend yields accompanied with increased price returns over the recent 50 years beginning from 1960s. For example, the dividend yield only weights for 30% of the total return in the latest 30-year observation.[18]

Please insert Figure 2 and 3 around here

For individual countries, we observe lower mean returns with relatively smaller standard deviations for countries in developed markets than the other markets, and the emerging market tends to have the highest average returns with the largest volatility. For example, the average annualised price returns for all developed markets in our sample is 6.5%, which is only about one-third of the average return of the emerging markets (16.8%) and just over half the size of the frontier markets (11.4%) and the rarely studied markets (10.8%). Meanwhile, the volatility for the emerging markets is among the highest, with an annualised standard deviation of 35.2% comparing to 21% for the developed markets, and 29.3% and 33.5% for the frontier and rarely studied markets. Despite of a smaller sample size, total returns reveal a similar pattern, the mean returns (standard deviations) are 9.5% (20.9%), 16.4% (33.5%), 12.7% (29.4%) and 5.4% (38.8%) for developed, emerging, frontier and rarely studied markets, respectively. The highest increase in monthly index returns is 213.1%% in Uganda in October 2007 and the largest plunge in index prices in a single month is 465.7% in Egypt in July 2008 (Note that because we use log returns, drops of more than 100% are possible). The unequal sample size among the countries does, however, make direct comparison across nations difficult. We address this by applying sub-period analysis in the later sections of the paper.

Table 1 also reveals some interesting observations about the risk premium. The pooled 65 countries' result over 318-years history suggests an average and significant risk premium of 3.7%. This is a bit lower than 4.5% estimated in Dimson, Marsh and Staunton (2011) using 19 countries data over the period 1900 to 2011, but its confirms their argument that a 6% risk premium commonly used in finance text books is too high. The green line of Figure 2 depicts a 30-year moving average of the risk premiums of the pooled countries. The risk

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[18] It seems this offsetting trend between dividend yield and price returns are driven by three major markets: UK, US and Australia, the level of dividend yields tend to be quite fixed over time for other countries. In Appendix 2 we plot the 30-year moving averages for 11 countries that have data available for over 60 years.

premiums rarely excess 4% in the first 230 years. It grows up to 10% in the late 1940s, then gradually declines to about 3% in the latest observation. This confirms the widely held believe that the high risk premium in the recent past may be due to the exceptional growth in the economies around the world.

4.2 Total returns and risk premiums in summer and winter

The total return data and short term interest rates allow us to investigate the behaviour of risk premiums in summer and winter. As we discussed before "Sell in May and go away" suggests leaving the stock market altogether. Even summer returns are significantly lower than winter returns, investors might still be better off to remain in the market if these returns are greater than the risk free rate. Hence, one could argue that a better test of the Sell in May effect is whether excess returns are positive during summer. If summer returns are not significantly different from (or even significantly lower than) interest rates the market wisdom seems to holds. The results of this test will, of course, correlate positively with the Bouman and Jacobsen (2002) test. While the Bouman and Jacobsen (2002) reveals an interesting pattern, the advantages of our new test are two-fold. Firstly, this test is more in line with the actual market wisdom, and, additionally, this new test illustrates much more clearly what makes the anomaly interesting beyond a market efficiency point of view. It not only violates the notion that returns should be difficult to predict, but also that there is no risk return trade off during long predictable time periods. In Figure 4 we plot the risk premia in summer (as in Figure 1) but add the winter risk premia for comparison.

Please insert Figure 4 around here.

Table 2 compares the total return and risk premium between two 6-month periods for 65 markets. For comparison we also include the Halloween dummy based on the old test.

Please insert Table 2 around here

We observe the presence of negative summer risk premium in 45 out of 65 countries. In 8 countries these risk premia are significantly below zero. Average excess summer returns are lower than winter returns for most of the countries except for 8 markets. Summer returns tend to be insignificant even before deducting the risk free rates. This is in striking contrast with winter (excess) returns which are often significantly greater than zero, especially in developed and emerging markets. When we pool the data we find that over the entire 33348 monthly observations, the average risk premium during 6-month summer period is -1.17% (t-value 3.36) compared with 4.89% (t-value 14.52) during the winter months period. This negative excess return during summer is worrying from a risk return perspective. Why would risk averse investors invest during summer if all historical data tell them that if past returns offer any indications for future returns, these returns are likely to be negative? Note that this finding also indicates that explanations solely based on changes in risk aversion of investors might not fully explain the effect. The coefficient estimates of the Halloween dummy is statistically significant in 34 (and 32) of the 65 countries' total return indices (and risk premium indices), which is even more pronounced than the results for our price return indices as we will show below.[19] Substantial risk differences might explain a huge difference in returns between summer and winter. However, simple standard deviations do not indicate a difference. If anything risk is higher during summer. We address in more detail later in Appendix 3

5. The Halloween indicator revisited

As noted before the existence of a Halloween effect has been debated. It may be good to consider some of the arguments put forward in the debate. We do this based on the old test which allows comparison with previous results in the literature. We also use price indices as this allows us to test an even bigger sample of countries (and as we have shown above dividends hardly seem to affect results). Moreover, we include some additional tests that may help shed further light on what or what may not cause this effect.

[19] This also reinforces the finding of Zhang and Jacobsen (2013) that there is no strong seasonal effect in dividend payments.

5.1 Out of sample performance

To be relevant we must first insure that the Halloween effect still exists beyond the original Bouman and Jacobsen (2002) study. Their analysis ends in August 1998. Campbell (2000) and Schwert (2002) suggest that if an anomaly is truly anomalous, it should be quickly arbitraged away by rational investors. (Note that this argument also should have applied to the Bouman and Jacobsen (2002) study itself, as the market wisdom was known before their sample period.). Many anomalies indeed seem to follow the theoretical prediction. McLean and Pontiff (2014) investigates the performance of 95 published stock return predictors out of sample and post publication, they show that predictor's return declines 31% on average after taking statistical biases into account.

To investigate whether the Halloween effect has weakened, we start with an out of sample test of the Halloween effect in the 37 countries examined in Bouman and Jacobsen (2002). Table 3 compares in-sample performance for the period 1970 to August 1998[20] with out-of-sample performance for the period of September 1998 to November 2011. The in-sample test using a different dataset presents similar results to Bouman and Jacobsen (2002), with stock market returns from November through April being higher than from May through October in 34 of the 37 countries, and the difference being statistically significant in 20 of the countries. Although a small sample size may reduce the power of the test, the out of sample performance is still very impressive. All 37 countries show positive point estimates of the Halloween effect. For 15 countries the effect is statistically significant out of sample. The Halloween effect seems not to have weakened in the recent years. Moreover, the point estimates in the out-of-sample test of 18 countries are even higher than for the in-sample test. The average coefficient estimate in the out-of-sample testing is 8.9%, compared to 8.2% in the in-sample test. Columns 4 and 7 show the percentage of years that November-April returns beats May-October returns in the sample for each country. Most of the countries have a value greater than 50%, suggesting that the positive Halloween effect is not due to

[20] In their study, they have 18 countries' data starting from January 1970, 1 country starting in 1973 and 18 countries starting from 1988. Our in-sample test begins from 1970 for those countries with data available in our sample prior to 1970. We use the earliest data available in our dataset (refer to Table 1 for the starting data of each country) for the 7 countries for which data starts later than 1970.

outliers. It is over 10 years since Bouman and Jacobsen (2002) published their study, the Halloween effect still remain significant making it an even more puzzling anomaly.

Please insert Table 3 around here

5.2 Overall results

Using all historical data for all countries available seems the most logical way to deal with sample selection bias and data mining issues. All 56,679 monthly observations for all 109 countries over 319 years combined (reported in the first row of Table 4) give a general impression of how strong the Halloween effect is. The average 6-month winter return (November through April) is 6.9%, compared to the summer return (May through October) of 2.4%. This difference between winter and summer returns is 4.5%, highly significant with a t-value of 11.42. Despite the possibility that the statistical significance might be overstated due to cross correlations between markets, these results do provide an overall feeling of the strength of the Halloween effect. To control for these cross correlations we consider the Halloween effect using the world index returns in the second row. These reveal a similar result. The average 6-month winter return is 4.5% (t-value 3.64) higher than the 6-month summer return.

Please insert Table 4 around here

5.3 Country by country analysis

Many explanations suggest cross-country variations of the strength of the Halloween effect. This section conducts the most comprehensive cross-nation Halloween effect analysis on all 109 countries with stock market indices available. The evidence shows that the Halloween effect is prevalent around the world to the extent that the mean returns are higher for the period of November-April than for May-October in 82 out of 109 countries and that the difference is statistically significant in 35 countries, compared to only 2 countries having significantly higher May-October returns.

5.3.1 Market development status, geographical location and the Halloween effect

Figure 5(A-D) plots the November-April and the May-October price returns for all 109 countries in four charts grouped by market classification, each chart is ordered by descending summer returns. An overall picture is that the Halloween effect is more pronounced in developed and emerging markets than in the frontier and rarely studied markets. Figure 5-A compares the two 6-month period returns for the 24 developed markets; with Finland being the only exception, 23 countries exhibit higher average November-April returns than May-October returns. The differences are quite large for many countries primarily due to the low returns during May-October, with 12 countries even having negative average returns for the period May-October. The chart for emerging markets (Figure 5-B) shows a similar pattern; 19 of the 21 countries have November-April returns that exceed the May-October returns, and 7 countries have negative mean returns for May-October. As we move to the frontier and rarely studied markets, this pattern becomes less distinctive. Figures 5-C and 5-D reveal that 21 out of 30 (70%) countries in the frontier markets and 19 out of 34 (56%) countries in the rarely studied markets have November-April returns greater than their May-October returns.

Please insert Figure 5 around here

Table 4 provides statistical support for the Halloween effect across countries. The table reports average values and standard deviations for the two 6-month period returns, the coefficient estimates and t-statistics for the Halloween regression Equation (1), as well as the percentage of years that the November-April returns beat the May-October returns for each country. The countries are grouped based on market classifications and geographical regions. For the developed markets, a statistically significant Halloween effect is prevalent not only among the European countries, but also among the countries located in Asia and

North America. In fact, the strongest Halloween effect in our sample is in Japan, which has a difference in returns of 8.3% with a t-statistic of 3.37. The Halloween effect is statistically significant in 17 out of 24 (71%) developed markets. The Middle East and Oceania are the only two continents where none of the countries exhibit a significant Halloween effect. This difference in the two 6-month returns cannot be justified by risk measured with standard deviations, since we observe similar or even lower standard deviations in the November-April returns. The number of countries with a statistically significant Halloween effect reduces as we move to less developed markets. Among 21 emerging countries, 10 countries have November-April returns significantly higher than their May-October returns. The Halloween effect is more prevalent in Asian and European countries than in other regions. Brazil is the only country in North and South America where we find a significant effect. For the frontier markets, although over 70% (21/30) of the countries show higher average returns during November-April than during May-October, only 4 countries have significant t-statistics. For the rarely studied markets, the countries with a significant Halloween effect drops to 4 out of 34. At this stage we are still not able to identify the root of this seasonal anomaly, nonetheless, over the total 109 countries, we only observe 2 countries (Bangladesh and Nepal from the frontier and rarely studied markets groups) to have a statistically significant negative Halloween effect; the overall picture, so far at least, suggests that the Halloween effect is a puzzling anomaly that prevails around the world. Another interesting observation that might be noted from the table is that, among the countries with a significant Halloween effect, the difference between two 6-month period returns is much larger for the countries in the emerging, frontier and rarely studied markets than for the countries in the developed markets. The average difference in 6-month returns among countries with significant Halloween effect in the developed markets is 5.7%, comparing to 13.5% in the emerging markets, 20.6% in the frontier markets and 14% in the rarely studied markets. However, we need to be careful before making any judgement on the finding since the sample size tends to be smaller in emerging, frontier and rarely studied markets. In addition, the observations in those newly emerged markets tend to be more recent. If the overall strength of the Halloween effect is stronger in recent samples than in earlier samples, we may observe higher point estimates for the countries with shorter sample periods. We will address this issue by conducting cross sectional comparison within the same time interval using sub-period analysis in Section 5.4.

5.4 The evolution of the Halloween effect over time

5.4.1 Pooled sub-sample period regression analysis

We provide an overview of how the Halloween effect has evolved over time using time series analysis by pooling all countries in our sample together. This gives us a long time series data from 1693 to 2011. We divide the entire sample into thirty-one 10-year sub-periods[21] and compare the two 6-month period returns in Table 5. These sub-period estimates allow us to detect whether there is any trend over time in general. The second column reports the number of countries in each sub-period. There is only one country in the sample during the entire eighteenth century, increasing to 6 countries by the end of 1900. The number of countries expands rapidly in the late twentieth century and reaches 108 in the most recent subsample period. Columns 4 to 7 report the mean returns and standard deviations for the two 6-month periods. The average 6-month return over the entire sample during November-April is 6.9%, compared to only 2.4% for the period of May-October. Figure 6 graphically plots the 6-month return differences of 31 10-year sub-periods; 24 of the 31 10-year sub-periods have November-April returns higher than their May-October returns. In addition, there is not much difference between the volatilities in the two 6-month periods; if anything, the standard deviation in November-April tends to be even lower than in May-October. For example, the 6-month standard deviation over the entire sample is 17.3% for November-April and 19.9% for May-October, indicating that the higher return is not due to higher risk, at least measured by the second moment. Columns 8 and 9 of Table 5 show the Halloween coefficients of Equation (1) and the corresponding t-statistics corrected with Newey-West standard errors. Although the November-April returns are frequently higher than the May-October returns, the t-statistics are not consistently significant until the 1960s. For the most recent 50 years, the Halloween effect is very persistent and economically large. The November-April returns are over 5% higher than the

[21] To be precise, the first sub-period is 8 years from 1693-1710 and the last sub-period is about 11 years from 2001 to July 2011.

May-October returns in all of the sub-periods, and this difference is strongly significant at the 1% level.[22] We report the percentage of times that November-April returns beat May-October returns in the last column. This non-parametric test provides consistent evidence with the parametric regression test; 24 of the 31 sub-periods have greater returns for the period of November-April than for May-October for over 50% of the years.

Please insert Table 5 and Figure 6 around here

The standard errors estimated from pooled OLS regressions may be biased due to cross-sectional correlations between countries. Thus, we also reveal the trend of the Halloween effect in the Global Financial Data's world index returns from 1919 to 2011. Figure 7 plots the Halloween effects using 10-year, 30-year and 50-year rolling window regressions. The dark solid line shows the coefficient estimates of the effect, and we also indicate the upper and lower 95% confidence intervels for the estimates with lighter dotted lines. The plots reveal that the Halloween effect is quite prevelant over the previous century. For example, with a 50-year rolling window, the Halloween effect is almost always significantly positive. Even with a 10-year rolling window, which is a considerably small sample size, the coefficient estimates only appears negative in the 1940s around the World War II period. In addition, all of the plots exhibit an increasing trend of the Halloween effect starting from around the 1950s and 1960s. The point estimates have become quite stable since the 1960s.

Please insert Figure 7 around here

5.4.2 Country by country subsample period analysis

Understanding how persistent the Halloween effect is and when it emerged and became prevalent among countries is important since it may help to validate some explanations,

[22] We acknowledge that there are many problems with this simple pooled OLS regression technique. Our intention here is, however, only to provide the reader with a general indication on the trend of the Halloween effect over time. The panel data analysis using a random effects model also gives a similar conclusions.

while ruling out others. To be specific, if the Halloween effect is related to some fundamental factors that do not change over time, one would expect a very persistent Halloween effect in the markets. If the Halloween effect is triggered by some fundamental changes of institutional factors in the economy, we would expect to observe the Halloween effect emerging around the same period. Alternatively, if the Halloween effect is simply a fluke or a market mistake, we would expect arbitragers to take the riskless profit away, with a weakening Halloween effect following its discovery. Longer time series data is essential for the subsample period analysis. In this section, we divide countries with over 60 years' data into several 10-year subsample periods to test whether or not there is any persistence of the Halloween effect in the market. Despite small sample size may reduce the power of the test, we choose 10-year subsamples for the purpose to reveal the trend of the Halloween effect. Table 6 presents the sub-period results for 28 countries that meet the sample size criterion, grouped according to market classification and regions. It consists of 20 countries from the developed markets, 6 from the emerging markets and 2 from the rarely studied markets. Geographically, we have 14 countries in Europe, 2 countries in Oceania, 2 countries in Asia, 1 African country, 3 North American countries, and 5 countries from South America. The table reports coefficient estimates and t-statistics of the Halloween effect regression for the whole sample period and 11 sub-sample periods. The sub-period analysis not only enables us to investigate the persistence of the effect for each individual country, but it also allows a direct comparison of the size of the anomaly between countries within the same time frame. The Halloween effect seems to be a phenomenon that emerges from the 1960s and has become stronger over time, especially among the European countries. The coefficient estimates become positive in 27 of the 28 countries, in which 4 are statistically significant during the 10 year period from 1961 to 1970. The number of countries with statistically significant Halloween effect keeps growing with time. Sub-period 1991-2000 shows the strongest Halloween effect especially for the Western European countries. Of 27 countries, 25 have lower average May-October returns than the rest of the year, in which 14 countries are statistically significant, this group comprises of all the Western European countries except Denmark. In addition, the sizes of the Halloween effects are much stronger in European countries than in other areas. Although the most recent 10 year period reveals a weaker Halloween effect, the higher November-April returns are present in all the markets except Chile. For the five 10-year sub-periods since 1960, the point estimates are persistently positive in Japan, Canada, the United States, Australia, New Zealand, South Africa and almost all western European countries except Denmark, Finland and Portugal. Countries like Austria, Finland, Portugal and South Africa that do not have a Halloween effect over the whole sample also exhibit a significant Halloween effect in the recent sub-periods. The sizes of the Halloween effect in recent subsample periods are also considerably larger compared to the earlier sub-periods and whole sample periods. Since the data for most of the emerging/frontier/rarely studied markets that have a Halloween effect starts within the past 30 years, if we focus our comparison to the most recent 30 year sub-periods, the difference in size of the Halloween effect between the developed markets and less developed markets noted in the previous section in Table 4 is reduced substantially: The average size of the coefficient estimates for the countries with significant Halloween effect in developed markets is 12.7% for the period of 2000-2011, 15% for 1991-2000 and 16.5% for 1981-1990. The Halloween effect does not appear in Israel, India, and all the countries located in South American area.

Please insert Table 6 around here

6. Economic significance

6.1 Out-of-sample performance in 37 countries examined in Bouman and Jacobsen (2002)

Bouman and Jacobsen (2002) develop a simple trading strategy based on the Halloween indicator and the Sell-in-May effect, which invests in a market portfolio at the end of October for six months and sells the portfolio at the beginning of May, using the proceeds to purchase risk free short term Treasury bills and hold these from the beginning of May to the end of October. They find that the Halloween strategy outperforms a buy and hold strategy even after taking transaction costs into account. We investigate the out-of-sample performance of this trading strategy in this section.

Please insert Table 7 around here

Our approach is to see how investors might profit from the Halloween effect if they follow the Halloween trading strategies from November 1998 to April 2011. Table 7 shows the out-of-sample performance of the Halloween trading strategy relative to the Buy and Hold strategy of the 37 countries originally tested in Bouman and Jacobsen (2002). We use 3-month Treasury Bill Yields in the local currency of each country as the risk free rate. The annualised average returns reported in the second and the fifth columns reveal that the Halloween strategy frequently beats a buy and hold strategy. The Halloween strategy returns are higher than the buy and hold strategy in 31 of the 37 markets. The standard deviations of the Halloween strategy are always lower than the buy and hold strategy, this leads the Sharpe ratios of the Halloween strategy to be higher than the buy and hold strategy in all 37 markets except Chile. The finding indicates that after the publication of Bouman and Jacobsen (2002), investors using the Halloween strategy are still able to make higher risk adjusted returns than using the buy and hold strategy.

6.2 Long term performance of the Halloween strategy in the UK data

With the availability of long time series data for UK stock market returns, we are able to examine the performance of this Halloween strategy over 300 years. Investigating the long term performance of the strategy in the UK market is especially interesting, since the United Kingdom is the origin of the market adage "Sell in May and go away". This has been referred to as an old market saying as early as 1935, indicating that UK investors are aware of the trading strategy over a long time period.

Table 8 presents the performance of the Halloween strategy relative to the buy and hold strategy over different subsample periods.

Please insert Table 8 around here

The average annual returns reported in the second and the fifth columns reveal that the Halloween strategy consistently beats a buy and hold strategy over the whole sample period, and in all 100-year and 50-year subsamples. It only underperforms the buy and hold strategy in one out of ten of the 30-year subsamples (1941-1970). The magnitude with which the Halloween strategy outperforms the market is also considerable. For example, the returns of the Halloween strategy are almost three times as large as the market returns over the whole sample. In addition, the risk of the Halloween strategy, as measured by the standard deviation of the annual returns is, in general, smaller than for the buy and hold strategy. This is evident in all of the sample periods we examine. Sharpe ratios for each strategy are shown in the fourth and seventh columns. Sharpe ratios for the Halloween strategy are unanimously higher than those for the buy and hold strategy. Table 8 also reveals the persistence of the outperformance of the Halloween strategy within each of the subsample periods by indicating the percentage of years that the Halloween strategy beats the buy and hold strategy. Over the whole sample period, the Halloween strategy outperforms the buy and hold strategy 63.09% (200/317) of the years. All of the 100-year and 50-year subsample periods have a winning rate higher than 50%. Only one of the 30-year subsamples has a winning rate below 50% (1941-1970, 43.33%).

Most investors will, however, have shorter investment horizons than the subsample periods used above. Using this large sample of observations allows us a realistic indication of the strategy over different short term investment horizons. Table 9 contains our results. It compares the descriptive statistics of both strategies over incremental investment horizons, ranging from one year to twenty years. Returns, standard deviations, and maximum and minimum values are annualised to make the statistics of different holding periods comparable. The upper panel shows the results calculated from overlapping samples and the lower panel contains the results for non-overlapping samples.

Please insert Table 9 around here.

The two sampling methods produce similar results. For every horizon, average returns are significantly higher for the Halloween strategy: Roughly three times as high as for the buy and hold strategy. For shorter horizons the standard deviation is lower for the Halloween strategy than for the buy and hold strategy. For longer investment horizons, however, the standard deviation is higher. This seems to be the result of positive skewness, indicating that we observe more extreme positive returns for the Halloween strategy than for the buy and hold strategy. The frequency distribution plots in Figure 8 confirm this. The graphs reveal that the returns of the Halloween strategy produce less extreme negative values, and more extreme positive values, than the buy and hold strategy.

Please insert figure 8 around here.

This is also confirmed if we consider the maximum and minimum returns of the strategies shown in Table 9. Except for the one-year holding horizon, the maximum returns for the Halloween strategy of different investment horizons are always higher than for the buy and hold strategy, whereas the minimum returns are always lower for the buy and hold strategy. The last column of Table 9 presents the percentage of times that the Halloween strategy outperforms the buy and hold strategy. The results calculated from the overlapping sample indicate that, for example, when investing in the Halloween strategy for any two-year horizon over the 317 years, an investor would have a 70.57% chance of beating the market. The percentage of winnings computed from the non-overlapping sample, shown in the lower panel, yield similar results. Once we expand the holding period for the Halloween trading strategy, the possibility of beating the market increases dramatically. If an investor uses a Halloween strategy with an investment horizon of five years, the chances of beating the market rises to 82.11%. As the horizon expands to ten years this probability increases to a striking 91.56%.

As a last indication of the persistency of the Halloween strategy in the UK market over time, in Figure 9 we compare the cumulative annual return over the three centuries. The buy and hold strategy hardly shows any increase in wealth until 1950 (note that this is a price index and the series do not include dividends). The cumulative wealth of the Halloween strategy increases gradually over time and at an even faster rate since 1950.

Please insert figure 9 around here

7. Methodological issues

7.1 Sample Size and the Halloween effect

From Table 4, we observe that the Halloween effect is stronger in the developed markets than in the other markets. The sample size for the developed market tends, however, to be considerably larger than the sample size for the emerging, frontier, or rarely studied, markets. For example, the country with the smallest sample size among developed markets is Norway, which has 40 years data starting from 1970, while the sample starting date for many less developed countries is around the 1990s, or even after 2000. The difference in the strength of the Halloween effect between developed markets with large sized samples and other markets with small sized samples may not have any meaningful implication, as it may just be caused by noise. The importance of a large sample size to cope with noisy data is emphasized in Lakonishok and Smidt (1988), in that:

> *"Monthly data provides a good illustration of Black's (1986) point about the difficulty of testing hypotheses with noisy data. It is quite possible that some month is indeed unique, but even with 90 years of data the standard deviation of the mean monthly return is very high (around 0.5 percent). Therefore, unless the unique month outperforms other months by more than 1 percent, it would not be identified as a special month."*

We examine whether there is a possible linkage between the Halloween effect and the sample size among countries. Figure 10 plots each country's number of observations against its Halloween regression t-statistics. Two solid lines at $y = \pm 1.96$ indicate 5%

significance level, and two dotted lines at $y = \pm 1.65$ indicate a 10% significance level. The graph reveals that a small sample size seems to have some adverse effects on detecting a significant Halloween effect. In particular, a large proportion of countries with an insignificant Halloween effect is concentrated in the area of below 500 (around 40 years) observations, with most of the negative coefficient estimates from those countries with less than 360 (30 years) observations. As the sample size increases, the proportion of countries with a significant Halloween effect increases as well.

Please insert Figure 10 around here

If we follow the advice of Lakonishok and Schmidt (1988) to the letter and only consider countries for which we have stock market data for more than ninety years, we find strong evidence of a Halloween effect. It is significantly present in 13 out of these 17 countries and the world market index. Three countries (Australia, India and South Africa have positive coefficients that are not significant and only for Finland we find a negative but not significant Halloween effect.)

The long time series of over 300 years UK monthly stock market index returns allows us to address this issue in another way using rolling windows larger than 90 years. Figure 11 extends the evidence in Zhang and Jacobsen (2012) and shows the Halloween effect of the UK market over 100-year rolling window regressions. The dark solid line indicates the estimates of the Halloween effect, and the light dotted lines show the 95% confidence interval calculated based on Newey-West standard errors. The Halloween effect seems to be persistently present in the UK market for a long time period. Point estimates for the effect are always positive, and the size of the effect is quite stable in the eighteenth and nineteenth centuries. Even with this large sample size, however, the effect is not always statistically significant. The first half of the twentieth century shows a weakening Halloween effect. Consistent with the results of the world index in Figure 7 and the sub-sample period analysis in Table 5 and 6, the Halloween effect keeps increasing in strength starting from the second half of the twentieth century.

Please insert figure 11 around here.

7.2 Time varying volatility and outliers

To verify the impact of volatility clustering and outliers in the monthly index return we also show the rolling window estimates controlling for conditional heteroscedasticity using a GARCH model (Figure 12) and outliers using OLS robust regressions (Figure 13). We use a GARCH (1, 1) model, since this simple parsimonious representation generally captures volatility clustering well in monthly data with a window of 50 years or more (Jacobsen & Dannenburg, 2003). The model is given by:

$$r_t = \mu + \beta_{Hal} Hal_t + \varepsilon_t,$$

$$\varepsilon_t | \Phi_{t-1} \sim N(0, \sigma_t^2),$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 \sigma_{t-1}^2 \quad (2)$$

For the robust regression, we use the M-estimation introduced by Huber (1973), which is considered appropriate when the dependent variable may contain outliers.

Please insert figure 12 and figure 13 around here

The results from the GARCH rolling window are consistent with the OLS regressions. The estimates of the Halloween effect are always positive over the three centuries, and the strength of the effect reduces during the first half of the twentieth century, while it increases in the second half of the century. Although the result from the robust regressions reveals a similar trend, the point estimates become negative during the 1940s and 1950s.

7.3 Measuring the effect with a six month dummy

Powell et al. (2009) question the accuracy of the statistical inference drawn from standard OLS estimation with Newey and West (1987) standard errors when the regressor is persistent, or has a highly autocorrelated dummy variable and the dependent variable is positively autocorrelated. They suggest that this may affect the statistical significance of the Halloween effect. This argument has been echoed in Ferson (2007). However, it is easy to show that this is not a concern here. We find that statistical significance is not affected if we examine the statistical significance of the Halloween effect using 6-month summer and winter returns. By construction, this half-yearly Halloween dummy is negatively autocorrelated. Powell et al. (2009) show that the confidence intervals actually narrow relative to conventional confidence intervals when the regressor's autocorrelation is negative. This causes the standard t-statistics to under-reject, rather than over-reject, the null hypothesis of no effect. Thus, as a robustness check, it seems safe to test the Halloween effect using standard t-statistics adjusted with Newey and West (1987) standard errors from semi-annual return data. Table 10 presents the coefficient estimates and t-statistics.

Please insert Table 10 around here.

The results drawn from semi-annual data do not change our earlier conclusion based on monthly returns. If anything, these results show an even stronger Halloween effect. The periods with significant Halloween effects in our earlier tests remain statistically significant, with t-values based on semi-annual data. The first hundred years (1693-1800) period was not statistically significant using the monthly data, but now becomes significant at the 10% level. As a final test, we use a simple equality in means test. In this case, we also reject the hypothesis that summer and winter returns are different, with almost the same, highly significant, t-value (4.20).

8. Conclusion

This study investigates the Halloween effect for 109 countries market price returns and 66 market total returns and risk premium over all the periods for which data is available.

Based on 33,348 monthly returns, we find an overall historical market risk premium of 3.7%, however, this premium is solely contributed from the returns generated from November-April, overall, summer returns (May-October) is significantly lower than the risk free rate by 1.17%, 46 out of 66 market show negative average risk premium during summer time. This finding does not only challenge the notion of market efficiency but also defies traditional economic theory in an even more fundamental way.

The Halloween effect is prevailing around the world to the extent that mean price returns are higher for the period of November-April than for May-October in 81 out of 108 countries, and the difference is statistically significant in 35 countries compared to only 2 countries having significantly higher May-October returns. The results are even stronger if we consider total returns and risk premiums: 58 out of 66 (56 out of 66) countries show positive point estimates on the Halloween effect in the total return (risk premium) series, in which the effect is statistically significant in 34 (32) countries. Our evidence reveals that the size of the Halloween effect does vary cross-nation. It is stronger in developed and emerging markets than in frontier and rarely studied markets. Geographically, the Halloween effect is more prevalent in countries located in Europe, North America and Asia than in other areas. Subsample period analysis shows that the strongest Halloween effect among countries are observed in the past 50 years since 1960 and concentrated in developed Western European countries.

The Halloween effect is still present out-of-sample in the 37 countries used in Bouman and Jacobsen (2002). The out-of-sample risk adjusted payoff from the Halloween trading strategy is still higher than for the buy and hold strategy in 36 of the 37 countries. When considering trading strategies assuming different investment horizons, the UK evidence reveals that investors with a long horizon would have remarkable odds of beating the market; with, for example, an investment horizon of 5 years, the chances that the

Halloween strategy outperforms the buy and hold strategy is 80%, with the probability of beating the market increasing to 90% if we expand the investment horizon to 10 years.

Overall, our evidence suggests that the Halloween effect is a strong market anomaly that has strengthened rather than weakened in the recent years. Plausible explanations of the Halloween effect should be able to allow for time variation in the effect and explain why the effect has strengthened in the last 50 years.

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Table 1. Summary statistics for market price returns, total returns and risk premiums

The table presents starting date, ending date and number of observations, as well as some basic descriptive statistics, for 109 market price indices, 65 market total return indices, and the world index. The statistics for pooled price returns are calculated based on 109 stock market price indices, while for pooled total returns and risk premiums are calculated based on 65 stock market total return indices. Risk premium is the difference between monthly total market returns and risk free rates. Mean and standard deviation expressed as percentage are annualised by multiplying by 12 and $\sqrt{12}$, t-value shows if the mean is significantly different from zero. Countries are grouped based on the MSCI market classification and geographical regions. *** denotes significance at 1% level; **denotes significance at 5% level; *denotes significance at 10% level.

Status	Region	Country	Price Return						Total Return						Risk Premium		
			Start	End	Obs	Mean	t-value	St Dev	Start	End	Obs	Mean	t-value	St Dev	Mean	t-value	St Dev
World			02-1919	07-2011	1110	4.17	3.03 ***	13.23	01-1926	07-2011	1027	8.38	5.29 ***	14.67	-	-	-
Pooled 109 countries			02-1693	07-2011	56679	9.24	24.05 ***	26.39	-	-	-	-	-	-	-	-	-
Pooled 65 countries			-	-	-	-	-	-	09-1694	07-2011	33348	10.75	22.69 ***	24.99	3.72	7.65 ***	25.10
Developed	Asia	Hong Kong	08-1964	07-2011	564	11.52	2.44 **	32.42	01-1970	07-2011	499	15.79	3.01 ***	33.81	9.85	1.87 *	33.95
		Japan	08-1914	07-2011	1154	6.30	2.84 ***	21.77	01-1921	07-2011	1077	10.91	5.10 ***	20.27	5.82	2.86 ***	18.91
		Singapore	08-1965	07-2011	552	7.04	2.05 **	23.32	08-1973	07-2011	456	6.69	1.56	26.52	2.39	0.55	26.57
	Europe	Austria	02-1922	07-2011	1018	9.04	3.02 ***	27.52	01-1970	07-2011	499	7.43	2.44 **	19.67	1.43	0.47	19.71
		Belgium	02-1897	07-2011	1302	3.91	2.27 **	17.90	01-1951	07-2011	727	8.85	4.54 ***	15.19	2.81	1.44	15.21
		Denmark	01-1921	07-2011	1086	4.31	3.18 ***	12.87	01-1970	07-2011	499	11.51	4.28 ***	17.35	3.72	1.37	16.66
		Finland	11-1912	07-2011	1179	8.30	4.01 ***	20.51	11-1912	07-2011	1179	13.14	6.25 ***	20.84	6.36	3.02 ***	20.89
		France	01-1898	07-2011	1348	6.67	3.76 ***	18.82	01-1898	07-2011	1348	10.08	5.61 ***	19.02	4.92	2.66 ***	19.19
		Germany	01-1870	07-2011	1692	2.55	1.21	25.03	01-1870	07-2011	1692	5.71	1.88 *	36.07	0.60	0.20	36.10
		Greece	01-1954	07-2011	690	9.51	2.74 ***	26.33	01-1977	07-2011	415	14.12	2.57 **	32.37	2.47	0.45	32.29
		Ireland	02-1934	07-2011	930	5.67	3.06 ***	16.29	01-1973	07-2011	463	10.67	2.84 ***	23.35	2.81	0.75	23.31
		Italy	10-1905	07-2011	1264	5.44	2.33 **	23.95	01-1925	07-2011	1038	10.30	3.78 ***	25.34	3.86	1.42	25.36
	Europe	Netherlands	02-1919	07-2011	1086	3.65	2.05 **	16.97	01-1951	07-2011	727	10.31	4.71 ***	17.05	6.00	2.73 ***	17.11
		Norway	01-1970	07-2011	499	10.81	2.86 ***	24.37	02-1980	07-2011	378	11.71	2.54 **	25.86	3.59	0.78	25.95
		Portugal	01-1934	07-2011	897	6.09	1.70 *	30.93	02-1988	07-2011	282	3.98	0.98	19.68	-2.18	-0.53	19.81
		Spain	01-1915	07-2011	1116	5.35	2.98 ***	17.31	04-1940	07-2011	856	11.35	5.32 ***	18.01	4.70	2.20 **	18.08
		Sweden	01-1906	07-2011	1265	5.50	3.35 ***	16.86	01-1919	07-2011	1111	9.65	5.42 ***	17.13	4.39	2.46 **	17.15
		Switzerland	01-1914	07-2011	1155	3.19	2.05 **	15.24	02-1966	07-2011	546	6.92	2.85 ***	16.41	3.76	1.54	16.45
		United Kingdom	02/1693	07-2011	3817	1.44	1.86 *	13.86	09-1694	07-2011	3798	6.52	9.20 ***	12.61	2.10	2.96 ***	12.61
	Mid East	Israel	02-1949	05-2011	748	23.66	8.08 ***	23.12	01-1993	05-2011	221	9.90	1.89 *	22.49	1.93	0.37	22.52
	North America	Canada	12-1917	07-2011	1124	5.03	3.02 ***	16.12	03-1934	07-2011	929	9.41	5.50 ***	15.05	4.85	2.82 ***	15.14
		United States	09/1791	07-2011	2639	2.81	2.77 ***	15.06	02-1800	07-2011	2538	8.10	7.77 ***	15.17	4.07	3.90 ***	15.21
	Oceania	Australia	02/1875	07-2011	1638	4.99	4.31 ***	13.51	07-1928	07-2011	997	10.87	6.33 ***	15.65	5.66	3.29 ***	15.69
		New Zealand	01-1931	07-2011	967	4.33	2.73 ***	14.22	07-1986	07-2011	301	5.00	1.34	18.67	-3.01	-0.80	18.91

Table 1. (continued)

Status	Region	Country	Price Return						Total Return						Risk Premium		
			Start	End	Obs	Mean	t-value	St Dev	Start	End	Obs	Mean	t-value	St Dev	Mean	t-value	St Dev
Emerging	Africa	Egypt	01-1993	07-2011	222	-7.37	-0.28	112.88	10-1996	07-2011	177	13.91	1.71 *	31.22	4.93	0.61	31.25
		Morocco	01-1988	07-2011	279	13.49	4.36 ***	14.93	04-1994	07-2011	208	13.78	3.65 ***	15.71	8.77	2.33 **	15.69
		South Africa	02-1910	07-2011	1218	7.67	4.61 ***	16.76	02-1960	07-2011	618	15.19	5.03 ***	21.68	6.05	1.99 **	21.75
	Asia	China	01-1991	07-2011	247	14.83	1.40	48.14	01-1993	07-2011	223	0.01	0.00	36.12	-4.86	-0.58	36.23
		India	08-1920	07-2011	1080	5.88	2.89 ***	19.26	01-1988	07-2011	283	17.48	2.70 ***	31.47	4.09	0.62	28.51
		Indonesia	04-1983	07-2011	340	13.13	2.25 **	31.02	01-1988	07-2011	283	19.50	2.40 **	39.45	5.40	0.66	39.77
		Korea	02-1962	07-2011	592	13.47	2.42 **	39.03	02-1962	07-2011	592	21.53	3.83 ***	39.52	9.23	1.64	39.53
		Malaysia	01-1974	07-2011	451	7.29	1.64	27.19	01-1974	07-2011	451	9.69	2.10 **	28.24	5.40	1.17	28.30
		Philippines	01-1953	07-2011	703	2.87	0.76	28.93	01-1982	07-2011	355	15.23	2.80 ***	29.57	2.65	0.49	29.65
		Taiwan	02-1967	07-2011	534	10.16	2.04 **	33.21	01-1988	07-2011	283	8.02	1.11	34.95	4.18	0.58	34.99
		Thailand	05-1975	07-2011	435	6.70	1.38	29.14	05-1975	07-2011	435	11.60	2.27 **	30.84	6.58	1.15	30.66
	Europe	Czech Republic	10-1993	07-2011	214	7.07	0.99	30.06	12-1993	07-2011	212	10.46	1.60	27.48	5.30	0.81	27.61
		Hungary	01-1995	07-2011	199	16.01	2.10 **	30.99	01-1995	07-2011	199	16.21	2.13 **	30.92	3.72	0.49	30.80
		Poland	05-1994	07-2011	207	5.28	0.66	33.44	05-1994	07-2011	207	8.43	1.09	32.12	-3.60	-0.46	32.39
		Russia	10-1993	07-2011	213	41.72	3.42 ***	51.37	01-1995	06-2011	198	16.05	1.13	57.44	-8.42	-0.63	51.58
		Turkey	02-1986	07-2011	306	43.29	4.07 ***	53.65	02-1986	07-2011	306	47.51	4.48 ***	53.53	-5.58	-0.53	53.49
	North America	Mexico	02-1930	07-2011	978	16.21	5.70 ***	25.66	01-1988	07-2011	283	26.33	4.64 ***	27.54	6.82	1.23	26.88
	South America	Brazil	01-1990	07-2011	258	67.65	5.56 ***	56.46	-	-	-	-	-	-	-	-	-
		Chile	01-1927	07-2011	1015	27.36	8.52 ***	29.53	01-1983	07-2011	546	18.94	6.05 ***	21.13	9.28	3.01 ***	20.82
		Colombia	02-1927	07-2011	1014	9.74	4.49 ***	19.94	01-1988	07-2011	283	16.92	1.44	57.05	-2.33	-0.20	57.50
		Peru	01-1933	07-2011	943	31.15	7.05 ***	39.15	01-1993	07-2011	223	20.66	2.73 ***	32.62	10.61	1.39	32.84
Frontier	Africa	Botswana	06-1989	07-2011	266	19.29	6.18 ***	14.70	-	-	-	-	-	-	-	-	-
		Ghana	01-1996	07-2011	187	11.62	2.48 **	18.49	-	-	-	-	-	-	-	-	-
		Kenya	02-1990	07-2011	258	7.11	1.38	23.94	-	-	-	-	-	-	-	-	-
		Mauritius	08-1989	07-2011	264	13.16	3.76 ***	16.42	08-1989	07-2011	264	18.09	5.20 ***	16.33	9.34	2.67 ***	16.45
		Nigeria	01-1988	07-2011	280	20.69	4.62 ***	21.61	-	-	-	-	-	-	-	-	-
		Tunisia	01-1996	07-2011	187	3.44	0.82	16.62	-	-	-	-	-	-	-	-	-

Table 1. (continued)

Status	Region	Country	Price Return						Total Return						Risk Premium		
			Start	End	Obs	Mean	t-value	St Dev	Start	End	Obs	Mean	t-value	St Dev	Mean	t-value	St Dev
Frontier	Asia	Bangladesh	02-1990	07-2011	258	11.39	1.58	33.37	-	-	-	-	-	-	-	-	-
		Kazakhstan	08-2000	07-2011	132	24.53	2.13 **	38.13	-	-	-	-	-	-	-	-	-
		Pakistan	08-1960	07-2011	608	9.61	2.93 ***	23.34	01-1988	07-2011	280	15.08	1.97 **	36.98	5.26	0.68	37.14
		Sri Lanka	01-1985	07-2011	319	15.90	3.18 ***	25.81	06-1987	07-2011	290	16.91	2.94 ***	28.25	4.06	0.70	28.41
		Viet Nam	01-2001	07-2011	127	6.66	0.52	41.63	-	-	-	-	-	-	-	-	-
	Europe	Bosnia And Herzegowina	11-2004	07-2011	81	-8.45	-0.68	32.26	-	-	-	-	-	-	-	-	-
		Bulgaria	11-2000	07-2011	129	12.34	1.13	35.83	11-2000	07-2011	129	22.03	1.97 **	36.71	18.25	1.63	36.82
		Croatia	02-1997	07-2011	174	4.91	0.58	32.44	-	-	-	-	-	-	-	-	-
		Estonia	07-1996	07-2011	181	13.10	1.36	37.48	07-1996	07-2011	181	13.10	1.36	37.47	9.98	1.03	37.55
		Lithuania	01-1996	07-2011	187	4.65	0.64	28.57	01-1996	07-2011	187	9.34	1.10	33.62	3.01	0.35	33.84
		Romania	10-1997	07-2011	166	12.44	1.19	38.79	10-1997	07-2011	166	13.94	1.19	43.44	-18.11	-1.54	43.82
		Serbia	08-2008	07-2011	36	-18.94	-0.54	60.86	-	-	-	-	-	-	-	-	-
		Slovenia	01-1996	07-2011	187	6.66	1.04	25.32	01-1999	07-2011	151	4.73	0.90	18.57	-1.88	-0.36	18.33
		Ukraine	02-1998	07-2011	162	19.19	1.59	44.43	-	-	-	-	-	-	-	-	-
	Mid East	Bahrain	07-1990	07-2011	253	3.48	1.18	13.57	01-2004	07-2011	91	2.98	0.53	15.55	0.35	0.06	15.52
		Jordan	02-1978	07-2011	402	6.46	1.64	22.76	07-2006	07-2011	61	0.97	0.10	21.90	-3.64	-0.37	21.89
		Kuwait	01-1995	07-2011	199	10.96	2.29 **	19.53	01-2004	07-2011	91	7.09	0.83	23.43	4.37	0.51	23.45
		Lebanon	02-1996	07-2011	186	2.45	0.34	28.23	-	-	-	-	-	-	-	-	-
		Oman	12-1992	07-2011	224	8.54	1.79 *	20.56	10-2005	07-2011	70	8.11	0.88	22.27	6.02	0.65	22.27
		Qatar	10-1999	07-2011	142	15.41	1.76 *	30.03	01-2004	07-2011	91	14.34	1.05	37.59	11.15	0.82	37.65
		United Arab Emirates	01-1988	09-2008	236	12.73	2.87 ***	19.65	01-2004	09-2008	56	30.12	1.82 *	35.83	26.74	1.61	35.92
	North America	Jamaica	07-1969	01-2011	499	16.21	4.08 ***	25.60	-	-	-	-	-	-	-	-	-
		Trinidad And Tobago	01-1996	07-2011	187	12.67	3.47 ***	14.40	-	-	-	-	-	-	-	-	-
	South America	Argentina	01-1967	07-2011	535	63.70	6.86 ***	62.03	08-1993	07-2011	216	13.32	1.80 *	31.47	3.82	0.50	32.18
Rarely Studied	Africa	Cote D`Ivoire	07-1997	07-2011	169	2.99	0.65	17.38	-	-	-	-	-	-	-	-	-
		Malawi	04-2001	01-2011	114	22.63	1.83 *	38.02	-	-	-	-	-	-	-	-	-
		Namibia	03-1993	07-2011	218	11.59	1.99 **	24.88	-	-	-	-	-	-	-	-	-
		Swaziland	01-2000	04-2007	88	2.39	0.43	15.18	-	-	-	-	-	-	-	-	-
		Tanzania	12-2006	07-2011	56	5.11	1.44	7.66	-	-	-	-	-	-	-	-	-
		Uganda	02-2007	07-2011	54	3.14	0.04	148.36	-	-	-	-	-	-	-	-	-
		Zambia	02-1997	07-2011	174	25.52	3.85 ***	25.27	-	-	-	-	-	-	-	-	-

Table 1. (continued)

Status	Region	Country	Price Return						Total Return						Risk Premium		
			Start	End	Obs	Mean	t-value	St Dev	Start	End	Obs	Mean	t-value	St Dev	Mean	t-value	St Dev
Rarely Studied	Asia	Kyrgyzstan	01-2000	05-2011	137	6.68	0.53	42.52	-	-	-	-	-	-	-	-	-
		Mongolia	09-1995	05-2011	189	29.33	2.42 **	48.16	-	-	-	-	-	-	-	-	-
		Nepal	01-1996	07-2011	186	3.56	0.61	23.03	-	-	-	-	-	-	-	-	-
	Europe	Cyprus	01-1984	07-2011	331	2.98	0.46	34.04	01-1993	07-2011	223	6.14	0.66	39.90	1.75	0.19	39.91
		Georgia	11-2008	07-2011	33	32.74	0.79	68.50	-	-	-	-	-	-	-	-	-
		Iceland	01-1993	07-2011	223	2.47	0.29	36.53	07-2002	07-2011	109	-6.19	-0.37	50.17	-15.60	-0.93	50.65
		Latvia	02-1996	07-2011	186	9.89	1.11	35.18	05-1996	07-2011	183	10.74	1.18	35.57	5.87	0.65	35.51
		Luxembourg	01-1954	07-2011	691	8.17	3.69 ***	16.79	01-1985	07-2011	319	10.10	2.59 ***	20.13	4.78	1.22	20.16
		Macedonia	11-2001	07-2011	117	12.50	1.03	37.87	-	-	-	-	-	-	-	-	-
		Malta	01-1996	07-2011	187	7.51	1.57	18.89	02-2000	07-2011	138	1.40	0.28	17.24	-1.92	-0.38	17.32
		Montenegro	04-2003	07-2011	100	29.25	1.90 *	44.42	-	-	-	-	-	-	-	-	-
		Slovak Republic	10-1993	07-2011	214	4.54	0.59	32.33	-	-	-	-	-	-	-	-	-
	Mid East	Iran	04-1990	06-2011	255	25.90	6.36 ***	18.77	-	-	-	-	-	-	-	-	-
		Iraq	11-2004	07-2011	79	10.88	0.47	59.11	-	-	-	-	-	-	-	-	-
		Palestine	08-1997	07-2011	166	11.48	1.05	40.51	-	-	-	-	-	-	-	-	-
		Saudi Arabia	01-1993	07-2011	222	6.59	1.21	23.43	-	-	-	-	-	-	-	-	-
		Syrian Arab Republic	01-2010	07-2011	19	2.70	0.12	28.18	-	-	-	-	-	-	-	-	-
	North America	Bahamas	12-2002	07-2011	98	5.67	2.06 **	7.87	-	-	-	-	-	-	-	-	-
		Barbados	04-1989	02-2011	263	4.24	1.42	13.99	-	-	-	-	-	-	-	-	-
		Bermuda	09-1996	10-2010	170	1.78	0.33	20.48	-	-	-	-	-	-	-	-	-
		Costa Rica	10-1997	02-2011	161	13.90	2.37 **	21.48	-	-	-	-	-	-	-	-	-
		El Salvador	01-2004	07-2011	91	7.41	2.53 **	8.07	-	-	-	-	-	-	-	-	-
		Panama	01-1993	07-2011	223	14.08	5.43 ***	11.18	-	-	-	-	-	-	-	-	-
	South America	Ecuador	02-1994	07-2011	210	1.80	0.32	23.17	-	-	-	-	-	-	-	-	-
		Paraguay	11-1993	09-2008	176	11.15	4.06 ***	10.52	-	-	-	-	-	-	-	-	-
		Uruguay	02-1925	12-1995	848	13.10	2.65 ***	41.57	-	-	-	-	-	-	-	-	-
		Venezuela	01-1937	07-2011	891	13.51	4.94 ***	23.59	12-1996	12-2003	84	10.16	0.70	38.19	-11.72	-0.80	38.83

Table 2 Halloween effect in market total returns and risk premiums

This table provides two 6-month period (November-April and May-October) mean returns, standard deviations (at percentage), and t-values of the zero mean test of the two periods, as well as the coefficient estimates and t-statistics for the Halloween effect regression $r_t = \alpha + \beta Hal_t + \varepsilon_t$ for 65 markets and world index's total returns and risk premiums. β represents the 6-month mean returns difference between November-April and May-October. T-values are adjusted using Newey-West standard errors. The 6-month mean returns (standard deviations) are calculated by multiplying monthly returns (standard deviations) by 6 ($\sqrt{6}$).

*** denotes significance at 1% level; **denotes significance at 5% level; *denotes significance at 10% level. Countries are grouped based on the MSCI market classification and geographical regions.

			Total Return								Risk Premium							
			Nov-Apr			May-Oct			Halloween		Nov-Apr			May-Oct			Halloween	
Status	**Region**	**Country**	**Mean**	**St Dev**	**t-value**	**Mean**	**St Dev**	**t-value**	**β_{Hal}**	**t-value**	**Mean**	**St Dev**	**t-value**	**Mean**	**St Dev**	**t-value**	**β_{Hal}**	**t-value**
World			6.59	9.61	6.35 ***	1.78	11.00	1.50	4.81	3.45 ***	-	-	-	-	-	-	-	-
Pooled 65 countries			8.46	17.29	25.82 ***	2.29	17.95	6.71 ***	6.18	12.76 ***	4.89	17.39	14.52 ***	-1.17	18.01	-3.36 ***	6.06	12.28 ***
Developed	Asia	Hong Kong	9.63	23.76	2.62 ***	6.15	24.08	1.64	3.49	0.66	6.62	23.81	1.80 *	3.21	24.20	0.86	3.41	0.64
		Japan	9.74	15.29	6.03 ***	1.18	13.10	0.86	8.56	3.61 ***	6.55	14.13	4.31 ***	-0.74	12.39	-0.56	7.29	3.75 ***
		Singapore	7.89	17.06	2.85 ***	-1.20	20.17	-0.37	9.09	1.96 *	5.76	17.07	2.08 **	-3.37	20.26	-1.03	9.13	1.96 *
	Europe	Austria	8.86	12.58	4.55 ***	-1.45	14.85	-0.63	10.31	3.37 ***	5.87	12.61	3.00 ***	-4.46	14.89	-1.93 *	10.33	3.37 ***
		Belgium	8.40	10.13	6.47 ***	0.44	11.10	0.31	7.97	4.18 ***	5.38	10.09	4.14 ***	-2.57	11.15	-1.80 *	7.95	4.17 ***
		Denmark	7.45	11.68	4.12 ***	4.05	12.82	2.04 **	3.39	1.51	3.20	11.29	1.74 *	0.52	12.25	0.26	2.68	1.17
		Finland	9.81	14.89	6.53 ***	3.33	14.48	2.28 **	6.47	2.98 ***	6.39	14.89	4.25 ***	-0.03	14.53	-0.02	6.42	2.96 ***
		France	8.50	13.66	6.60 ***	1.57	13.09	1.27	6.94	3.42 ***	6.03	13.72	4.56 ***	-1.12	13.25	-0.87	7.14	3.39 ***
		Germany	7.51	21.50	4.14 ***	-1.78	28.85	-0.73	9.29	3.03 ***	4.96	21.46	2.74 ***	-4.34	28.88	-1.79 *	9.30	3.03 ***
		Greece	10.80	22.38	2.84 ***	3.30	23.34	0.83	7.49	1.27	5.06	22.27	1.34	-2.60	23.32	-0.66	7.66	1.30
		Ireland	12.28	15.39	4.96 ***	-1.64	17.13	-0.59	13.92	4.01 ***	8.23	15.33	3.34 ***	-5.45	17.15	-1.97 **	13.68	3.95 ***
		Italy	8.44	17.61	4.46 ***	1.84	18.13	0.94	6.60	2.33 **	5.36	17.56	2.84 ***	-1.49	18.20	-0.76	6.85	2.50 **
		Netherlands	9.58	11.01	6.78 ***	0.73	12.79	0.44	8.85	4.24 ***	7.43	11.05	5.24 ***	-1.45	12.84	-0.88	8.88	4.23 ***
		Norway	9.64	17.35	3.12 ***	2.08	19.10	0.61	7.56	1.68 *	5.57	17.44	1.79 *	-1.99	19.16	-0.58	7.56	1.68 *
		Portugal	6.13	13.07	2.27 **	-2.15	14.56	-0.72	8.28	1.90 *	3.06	13.23	1.12	-5.24	14.60	-1.74 *	8.30	1.90 *
		Spain	9.19	12.64	6.13 ***	2.18	12.69	1.45	7.01	3.54 ***	5.92	12.69	3.94 ***	-1.19	12.76	-0.79	7.12	3.58 ***
		Sweden	8.01	12.32	6.26 ***	1.64	11.78	1.34	6.37	3.65 ***	5.39	12.30	4.22 ***	-1.01	11.83	-0.82	6.40	3.64 ***
		Switzerland	6.42	10.34	4.19 ***	0.50	12.65	0.27	5.92	2.61 ***	4.92	10.39	3.19 ***	-1.15	12.69	-0.61	6.07	2.67 ***
		United Kingdom	4.54	8.81	9.17 ***	1.98	8.99	3.92 ***	2.56	3.71 ***	2.31	8.79	4.68 ***	-0.21	9.04	-0.42	2.52	3.65 ***
	Mid East	Israel	9.06	16.04	2.44 **	0.73	15.65	0.20	8.33	2.08 **	5.11	16.07	1.38	-3.30	15.68	-0.90	8.41	2.10 **
	North America	Canada	7.64	9.75	6.89 ***	1.78	11.35	1.38	5.87	3.59 ***	5.37	9.80	4.82 ***	-0.51	11.44	-0.39	5.88	3.58 ***
		United States	4.91	10.03	7.11 ***	3.20	11.38	4.09 ***	1.71	1.65 *	2.89	10.04	4.18 ***	1.18	11.41	1.51	1.70	1.65 *
	Oceania	Australia	6.31	9.72	5.91 ***	4.56	12.26	3.39 ***	1.74	1.04	3.70	9.72	3.47 ***	1.97	12.32	1.45	1.73	1.03
		New Zealand	1.93	11.77	0.82	3.07	14.52	1.06	-1.14	-0.33	-2.10	12.10	-0.87	-0.92	14.60	-0.32	-1.18	-0.33
Emerging	Africa	Egypt	13.38	23.64	2.18 **	0.46	20.16	0.09	12.92	2.07 **	8.96	23.64	1.46	-4.11	20.21	-0.78	13.07	2.09 **
		Morocco	12.95	11.74	4.57 ***	0.95	9.92	0.40	12.00	3.20 ***	10.46	11.78	3.68 ***	-1.57	9.85	-0.67	12.04	3.21 ***
		South Africa	10.77	14.46	5.34 ***	4.42	16.07	1.98 **	6.34	1.73 *	6.20	14.48	3.07 ***	-0.15	16.17	-0.07	6.35	1.72 *

Status	Region	Country	Total Return								Risk Premium							
			Nov-Apr			May-Oct			Halloween		Nov-Apr			May-Oct			Halloween	
			Mean	St Dev	t-value	Mean	St Dev	t-value	β_{Hal}	t-value	Mean	St Dev	t-value	Mean	St Dev	t-value	β_{Hal}	t-value
Emerging	Asia	China	-1.60	25.12	-0.28	1.63	26.05	0.27	-3.24	-0.39	-4.04	25.21	-0.69	-0.81	26.11	-0.13	-3.23	-0.39
		India	9.63	22.74	2.06 **	7.85	21.83	1.74 *	1.78	0.27	3.09	20.58	0.65	0.99	19.79	0.22	2.10	0.32
		Indonesia	18.11	25.84	3.41 ***	1.33	29.52	0.22	16.78	2.07 **	11.05	25.67	2.09 **	-5.71	30.10	-0.92	16.76	2.06 **
		Korea	17.08	29.07	4.12 ***	4.49	26.58	1.19	12.59	1.92 *	10.90	29.12	2.63 ***	-1.63	26.58	-0.43	12.53	1.91 *
		Malaysia	9.55	18.75	3.13 ***	0.12	20.99	0.04	9.43	1.98 **	7.42	18.74	2.43 **	-2.04	21.04	-0.59	9.46	1.99 **
		Philippines	9.70	18.30	2.89 ***	5.51	23.26	1.29	4.19	0.83	3.13	18.22	0.93	-0.47	23.39	-0.11	3.60	0.71
		Taiwan	14.83	23.84	3.02 ***	-6.88	24.86	-1.34	21.71	2.91 ***	12.91	23.81	2.64 ***	-8.81	24.94	-1.71 *	21.72	2.91 ***
		Thailand	8.16	19.14	2.56 **	3.47	24.16	0.87	4.69	0.87	5.38	18.79	1.53	1.27	24.18	0.28	4.12	0.75
	Europe	Czech Republic	9.56	21.35	1.89 *	0.82	17.18	0.20	8.75	1.73 *	7.00	21.41	1.38	-1.77	17.29	-0.43	8.77	1.72 *
		Hungary	14.23	20.71	2.80 ***	1.92	22.80	0.34	12.30	2.12 **	7.98	20.53	1.59	-4.31	22.76	-0.77	12.29	2.11 **
		Poland	12.61	19.81	2.63 ***	-3.95	24.86	-0.66	16.56	2.73 ***	6.72	19.72	1.41	-10.09	25.25	-1.67 *	16.80	2.76 ***
		Russia	19.51	34.85	2.29 **	-3.70	45.44	-0.33	23.21	1.54	1.00	36.35	0.11	-9.71	36.67	-1.01	10.71	0.75
		Turkey	29.61	39.76	3.76 ***	17.89	35.82	2.52 **	11.72	1.16	2.70	39.22	0.35	-8.32	36.37	-1.15	11.01	1.10
	North America	Mexico	17.25	19.24	4.36 ***	9.06	19.63	2.24 **	8.19	1.76 *	6.35	18.57	1.66 *	0.47	19.42	0.12	5.88	1.20
	South America	Chile	11.44	14.92	5.18 ***	7.48	14.94	3.37 ***	3.97	1.02	6.43	14.55	2.99 ***	2.83	14.87	1.28	3.60	0.93
		Colombia	8.24	54.02	0.74	8.69	18.42	2.29 **	-0.45	-0.04	-1.51	54.40	-0.13	-0.82	18.91	-0.21	-0.69	-0.06
		Peru	13.16	22.69	2.51 **	7.47	23.49	1.37	5.69	0.66	8.24	22.85	1.56	2.34	23.64	0.43	5.90	0.69
Frontier	Africa	Mauritius	9.09	11.72	3.64 ***	9.00	11.42	3.70 ***	0.09	0.03	4.66	11.78	1.85 *	4.68	11.49	1.91 *	-0.02	-0.01
	Asia	Pakistan	13.04	26.91	2.34 **	2.04	25.26	0.39	11.00	1.83 *	8.14	27.04	1.45	-2.88	25.33	-0.55	11.01	1.82 *
		Sri Lanka	6.30	20.07	1.54	10.58	19.91	2.62 ***	-4.28	-0.65	-0.14	20.09	-0.03	4.16	20.09	1.02	-4.30	-0.65
	Europe	Bulgaria	12.56	24.41	1.71 *	9.39	27.67	1.10	3.17	0.22	10.70	24.49	1.45	7.47	27.75	0.87	3.23	0.23
		Estonia	17.48	25.91	2.61 ***	-4.26	26.46	-0.63	21.74	2.58 **	15.95	25.94	2.38 **	-5.85	26.53	-0.86	21.80	2.58 **
		Lithuania	9.35	25.08	1.48	-0.06	22.35	-0.01	9.42	1.04	6.09	25.13	0.95	-3.08	22.63	-0.53	9.17	1.02
		Romania	12.56	31.03	1.51	1.24	30.40	0.15	11.32	1.07	-4.03	31.33	-0.48	-14.20	30.67	-1.71 *	10.18	0.94
		Slovenia	0.79	13.57	0.21	3.96	12.73	1.10	-3.16	-0.78	-3.18	13.25	-0.84	1.27	12.69	0.35	-4.45	-1.10
	Mid East	Bahrain	2.51	10.37	0.67	0.45	11.71	0.10	2.06	0.34	1.21	10.39	0.32	-0.89	11.64	-0.21	2.09	0.35
		Jordan	1.45	13.24	0.25	-0.45	17.60	-0.06	1.90	0.39	-0.80	13.23	-0.14	-2.80	17.61	-0.36	2.00	0.41
		Kuwait	1.76	17.95	0.27	5.37	15.18	0.97	-3.61	-0.66	0.37	17.98	0.06	4.04	15.21	0.73	-3.68	-0.66
		Oman	4.19	12.55	0.82	3.91	18.75	0.50	0.28	0.03	3.16	12.61	0.61	2.86	18.69	0.36	0.30	0.03
		Qatar	9.87	31.54	0.87	4.41	20.61	0.59	5.46	0.44	8.35	31.62	0.73	2.74	20.62	0.36	5.61	0.45
		United Arab Emirates	20.38	25.66	1.68 *	10.11	25.31	0.88	10.26	0.52	18.77	25.77	1.55	8.34	25.33	0.72	10.43	0.53
	South America	Argentina	12.08	24.07	2.13 **	1.24	20.14	0.26	10.84	1.36	7.27	24.64	1.25	-3.46	20.55	-0.71	10.74	1.38
Rarely Studied	Europe	Cyprus	0.53	25.09	0.09	5.63	31.13	0.78	-5.11	-0.55	-1.64	25.06	-0.28	3.43	31.13	0.47	-5.07	-0.54
		Iceland	0.82	22.67	0.11	-6.93	44.80	-0.47	7.75	0.69	-4.04	23.12	-0.52	-11.50	45.10	-0.77	7.46	0.67
		Latvia	8.21	23.24	1.37	2.62	26.95	0.38	5.59	0.56	5.81	23.27	0.97	0.15	26.87	0.02	5.67	0.58
		Luxembourg	12.05	12.17	5.11 ***	-1.99	15.56	-0.66	14.03	3.36 ***	9.37	12.20	3.97 ***	-4.64	15.58	-1.53	14.01	3.34 ***
		Malta	2.36	13.76	0.58	-0.95	10.44	-0.31	3.31	0.80	0.73	13.82	0.18	-2.64	10.53	-0.85	3.37	0.81
	South America	Venezuela	-1.27	20.84	-0.16	11.43	32.07	0.94	-12.70	-0.81	-11.96	20.97	-1.51	0.24	32.77	0.02	-12.19	-0.75

Table 3. In-sample and out-of-sample comparison of the Halloween effect

The table shows the coefficient estimates and t-statistics for the regression $r_t = \alpha + \beta Hal_t + \varepsilon_t$, as well as the percentage of times that November-April returns beat May-October returns for the in-sample period and out of sample period of 37 countries. The in-sample period refers to the sample period examined in Bouman and Jacobsen (2002) and runs from January 1970 (or the earliest date in our sample depending on data availability) to August 1998. The out-of-sample period is from September 1998 to July 2011. The coefficient β represents the 6-month return difference between November-April and May-October. T-values are adjusted using Newey-West standard errors. *** denotes significance at 1% level; **denotes significance at 5% level; *denotes significance at 10% level.

	IN SAMPLE				OUT OF SAMPLE			
Country	**β**	**t-value**		**%+**	**β**	**t-value**		**%+**
Argentina	3.64	0.28		0.66	15.26	1.51		0.57
Australia	5.39	1.49		0.59	2.91	0.89		0.50
Austria	8.79	2.72	***	0.69	14.11	2.84	***	0.71
Belgium	12.44	5.21	***	0.90	6.96	1.48		0.71
Brazil	37.43	1.72	*	0.67	9.58	1.29		0.50
Canada	7.72	2.57	**	0.69	5.98	1.54		0.50
Chile	-7.44	-0.7		0.45	1.43	0.37		0.57
Denmark	3.82	1.55		0.66	4.89	1.19		0.71
Finland	9.28	3.01	***	0.76	12.42	1.74	*	0.64
France	14.22	3.99	***	0.79	9.59	2.32	**	0.64
Germany	8.34	2.91	***	0.69	11.61	2.35	**	0.79
Greece	10.96	1.94	*	0.62	3.99	0.55		0.50
Hong Kong	5.18	0.75		0.66	0.11	0.01		0.43
Indonesia	12.60	1.5		0.56	14.60	1.89	*	0.57
Ireland	8.42	2.17	**	0.62	13.77	2.70	***	0.79
Italy	14.98	3.59	***	0.76	14.18	2.85	***	0.71
Japan	7.76	2.41	**	0.76	11.83	2.14	**	0.64
Jordan	4.52	1.08		0.52	3.06	0.72		0.43
Korea	1.67	0.43		0.55	12.82	1.70	*	0.71
Malaysia	12.86	1.9	*	0.68	5.83	1.04		0.57
Mexico	5.06	0.82		0.59	8.15	1.36		0.50
Netherlands	11.86	4.1	***	0.86	10.38	1.93	*	0.64
New Zealand	3.12	0.83		0.52	4.31	1.41		0.64
Norway	6.34	1.38		0.52	10.36	1.69	*	0.57
Philippines	13.01	1.96	*	0.62	2.56	0.36		0.43
Portugal	3.59	0.34		0.67	8.37	1.67	*	0.79
Russia	-6.37	-0.15		0.50	26.62	2.41	**	0.79
Singapore	7.78	1.52		0.62	4.74	0.78		0.50
South Africa	6.21	1.18		0.59	1.98	0.35		0.50
Spain	11.91	3.31	***	0.76	6.09	1.26		0.71
Sweden	11.70	3.44	***	0.76	13.80	2.95	***	0.79
Switzerland	6.29	2.2	**	0.72	5.03	1.30		0.71
Taiwan	20.11	3.44	***	0.72	15.00	1.69	*	0.79
Thailand	-0.29	-0.04		0.42	5.64	0.66		0.50
Turkey	0.73	0.05		0.46	18.75	1.48		0.50
United Kingdom	12.37	2.89	***	0.59	6.56	1.85	*	0.64
United States	5.82	2.45	**	0.72	4.90	1.57		0.57

Table 4. Cross country analysis – market price returns

This table provides two 6-month (November-April and May-October) mean returns and standard deviations at percentage, the coefficient estimates and t-statistics for the regression $r_t = \alpha + \beta Hal_t + \varepsilon_t$, as well as percentage of times that November-April return beats May-October return for 109 countries' market index and the world index. β represents the 6-month mean returns difference between November-April and May-October. T-values are adjusted using Newey-West standard errors. The 6-month mean returns (standard deviations) are calculated by multiplying monthly returns (standard deviations) by 6 ($\sqrt{6}$).
*** denotes significance at 1% level; **denotes significance at 5% level; *denotes significance at 10% level. Countries are grouped based on the MSCI market classification and geographical regions.

Status	Region	Start Date	End Date	Country	Nov-Apr		May-Oct		Halloween Effect			
					Mean	St Dev	Mean	St Dev	β	t-value		%+
	Pooled 109 Countries	02/1693	07-2011	-	6.88	17.34	2.35	19.86	4.53	11.42	***	58%
	World	02-1919	07-2011	-	4.35	8.75	-0.18	9.84	4.53	3.64	***	67%
Developed	Asia	11-1964	07-2011	Hong Kong	7.08	22.48	4.44	23.39	2.64	0.55		58%
		11-1914	07-2011	Japan	7.31	16.05	-1.00	14.52	8.31	3.37	***	66%
		11-1965	07-2011	Singapore	6.91	15.79	0.13	17.08	6.78	1.87	*	60%
	Europe	02-1922	07-2011	Austria	5.35	17.31	3.69	21.41	1.66	0.41		56%
		02/1897	07-2011	Belgium	3.99	12.03	-0.10	13.22	4.09	2.61	***	62%
		01-1921	07-2011	Denmark	3.74	9.15	0.56	9.01	3.18	2.59	***	64%
		11-1912	07-2011	Finland	4.08	14.14	4.22	14.87	-0.14	-0.06		50%
		01/1898	07-2011	France	7.05	13.50	-0.39	12.95	7.45	3.69	***	66%
		01/1870	07-2011	Germany	4.09	14.36	-1.53	20.44	5.63	2.42	**	59%
		01-1954	07-2011	Greece	8.65	18.50	0.84	18.63	7.81	2.10	**	55%
		02-1934	07-2011	Ireland	6.14	10.85	-0.48	12.01	6.62	3.63	***	69%
		11-1905	07-2011	Italy	6.11	16.89	-0.69	16.88	6.80	2.75	***	60%
		02-1919	07-2011	Netherlands	5.62	10.90	-1.97	12.83	7.59	4.28	***	67%
		01-1970	07-2011	Norway	9.19	16.18	1.60	18.13	7.58	2.06	**	55%
		01-1934	07-2011	Portugal	4.87	26.91	1.21	15.20	3.66	0.95		62%
		01-1915	07-2011	Spain	6.26	12.47	-0.91	11.83	7.16	4.18	***	69%
		01-1906	07-2011	Sweden	5.52	12.32	-0.03	11.41	5.56	3.34	***	63%
		01-1914	07-2011	Switzerland	3.91	9.41	-0.73	11.92	4.64	3.09	***	66%
		02/1693	07-2011	United Kingdom	2.40	9.34	-0.96	10.19	3.37	4.34	***	59%
	Mid East	02-1949	05-2011	Israel	13.56	16.74	10.09	15.93	3.46	1.43		62%
	North America	12-1917	07-2011	Canada	5.29	9.94	-0.28	12.61	5.57	3.59	***	61%
		11/1791	07-2011	United States	2.24	9.98	0.57	11.27	1.67	1.67	*	57%
	Oceania	02/1875	07-2011	Australia	3.11	8.59	1.88	10.43	1.22	1.12		53%
		01-1931	07-2011	New Zealand	2.69	9.71	1.63	10.39	1.06	0.65		51%
Emerging	Africa	01-1993	07-2011	Egypt	14.89	22.01	- 22.26	110.45	37.15	1.31		58%
		01-1988	07-2011	Morocco	12.40	10.92	1.05	9.67	11.35	3.68	***	71%
		02-1910	07-2011	South Africa	4.78	11.59	2.89	12.10	1.88	0.90		53%
	Asia	01-1991	07-2011	China	12.75	26.86	2.04	39.99	10.72	1.00		67%
		11-1920	07-2011	India	3.52	13.63	2.35	13.61	1.17	0.57		45%
		04-1983	07-2011	Indonesia	13.40	21.29	-0.18	22.27	13.58	2.30	**	55%
		02-1962	07-2011	Korea	12.25	28.77	1.26	26.24	11.00	1.71	*	62%
		01-1974	07-2011	Malaysia	8.86	18.56	-1.59	19.69	10.46	2.17	**	63%
		01-1953	07-2011	Philippines	6.23	19.59	-3.37	21.13	9.60	2.31	**	58%
		02-1967	07-2011	Taiwan	13.74	21.48	-3.58	24.87	17.31	3.76	***	76%
		11-1975	07-2011	Thailand	4.29	17.99	2.42	22.93	1.87	0.35		46%

Table 4. (continued)

Status	Region	Start Date	End Date	Country	Nov-Apr		May-Oct		Halloween Effect			
					Mean	St Dev	Mean	St Dev	β	t-value		%+
Emerging	Europe	11-1993	07-2011	Czech Republic	9.00	22.27	-2.03	20.01	11.03	2.10	**	68%
		01-1995	07-2011	Hungary	14.69	21.23	1.26	22.35	13.42	2.42	**	71%
		11-1994	07-2011	Poland	11.27	21.29	-5.75	25.35	17.02	2.56	**	72%
		11-1993	07-2011	Russian	29.49	29.42	11.99	42.11	17.50	1.17		68%
		02-1986	07-2011	Turkey	26.51	39.78	16.78	36.02	9.73	0.94		46%
	North America	02-1930	07-2011	Mexico	9.76	17.74	6.45	18.53	3.30	1.35		56%
	South America	01-1990	07-2011	Brazil	43.92	39.80	23.72	39.77	20.20	2.02	**	59%
		01-1927	07-2011	Chile	11.70	17.01	15.66	24.13	-3.97	-0.98		52%
		02-1927	07-2011	Colombia	6.29	14.43	3.45	13.76	2.85	1.32		56%
		01-1933	07-2011	Peru	13.72	23.77	17.43	31.13	-3.72	-0.81		49%
Frontier	Africa	11-1989	07-2011	Botswana	6.90	9.16	12.35	11.41	-5.45	-1.51		48%
		01-1996	07-2011	Ghana	8.46	14.12	3.13	11.91	5.33	1.08		63%
		02-1990	07-2011	Kenya	5.65	20.36	1.46	12.63	4.19	0.97		59%
		11-1989	07-2011	Mauritius	6.32	11.80	6.84	11.46	-0.52	-0.16		57%
		01-1988	07-2011	Nigeria	11.18	13.88	9.48	16.65	1.69	0.38		58%
		01-1996	07-2011	Tunisia	3.89	12.58	-0.47	10.84	4.35	1.19		81%
	Asia	02-1990	07-2011	Bangladesh	-5.45	24.43	16.84	21.89	-22.29	-2.15	**	23%
		11-2000	07-2011	Kazakhstan	23.30	26.90	1.23	26.47	22.07	1.49		67%
		11-1960	07-2011	Pakistan	8.56	16.61	1.04	16.28	7.52	2.62	***	62%
		01-1985	07-2011	Sri Lanka	6.22	18.72	9.69	17.81	-3.46	-0.62		52%
		01-2001	07-2011	Viet Nam	11.88	29.98	-5.36	28.67	17.23	1.12		64%
	Europe	11-2004	07-2011	Bosnia and Herzegowina	-0.84	26.83	-7.87	17.73	7.03	0.53		50%
		11-2000	07-2011	Bulgaria	1.91	23.63	10.64	27.07	-8.73	-0.90		33%
		02-1997	07-2011	Croatia	9.33	20.74	-4.42	24.74	13.76	2.03	**	60%
		11-1996	07-2011	Estonia	17.59	25.93	-4.38	26.45	21.97	2.62	***	81%
		01-1996	07-2011	Lithuania	5.92	17.94	-1.31	22.26	7.22	0.97		56%
		11-1997	07-2011	Romania	9.56	27.50	2.81	27.46	6.75	0.64		47%
		11-2008	07-2011	Serbia	-3.70	37.88	-15.23	48.65	11.53	0.36		75%
		01-1996	07-2011	Slovenia	1.79	19.62	4.88	16.08	-3.09	-0.63		31%
		02-1998	07-2011	Ukraine	29.22	29.26	-10.03	31.63	39.25	3.46	***	79%
	Mid East	11-1990	07-2011	Bahrain	-0.79	9.05	4.25	10.05	-5.04	-1.57		41%
		02-1978	07-2011	Jordan	5.21	15.66	1.25	16.51	3.96	1.31		50%
		01-1995	07-2011	Kuwait	4.31	13.80	6.67	13.88	-2.36	-0.48		41%
		02-1996	07-2011	Lebanon	-3.57	19.44	6.02	20.39	-9.60	-1.27		63%
		12-1992	07-2011	Oman	5.16	13.89	3.36	15.22	1.80	0.39		45%
		11-1999	07-2011	Qatar	8.13	23.11	7.27	19.28	0.86	0.10		46%
		01-1988	09-2008	United Arab Emirates	6.51	13.34	6.22	14.48	0.29	0.06		48%
	North America	11-1969	01-2011	Jamaica	11.48	18.34	4.74	17.79	6.74	1.56		56%
		01-1996	07-2011	Trinidad and Tobago	8.73	10.65	3.91	9.65	4.82	1.36		63%
	South America	01-1967	07-2011	Argentina	35.90	38.66	27.78	48.55	8.12	0.91		64%

Table 4. (continued)

Status	Region	Start Date	End Date	Country	Nov-Apr Mean	Nov-Apr St Dev	May-Oct Mean	May-Oct St Dev	Halloween Effect β	t-value		%+
Rarely Studied	Africa	11-1997	07-2011	Cote D`Ivoire	3.66	11.87	-0.65	12.69	4.31	1.08		80%
		04-2001	01-2011	Malawi	11.87	26.66	10.82	27.31	1.05	0.09		18%
		03-1993	07-2011	Namibia	10.93	15.14	0.66	19.60	10.26	1.84	*	68%
		01-2000	04-2007	Swaziland	2.15	14.14	0.15	4.96	2.00	0.38		13%
		12-2006	07-2011	Tanzania	1.30	2.95	3.91	7.22	-2.62	-0.86		17%
		02-2007	07-2011	Uganda	14.46	21.78	-11.32	147.99	25.78	1.33		80%
		02-1997	07-2011	Zambia	7.34	15.70	18.18	19.64	-10.84	-1.62		47%
	Asia	01-2000	05-2011	Kyrgyzstan	13.05	32.15	-6.80	27.34	19.84	2.12	**	75%
		11-1995	05-2011	Mongolia	13.33	31.09	16.04	37.03	-2.71	-0.25		41%
		01-1996	07-2011	Nepal	-4.54	16.90	8.11	15.30	-12.65	-2.18	**	31%
	Europe	01-1984	07-2011	Cyprus	1.07	22.59	1.91	25.53	-0.84	-0.13		61%
		11-2008	07-2011	Georgia	2.50	59.57	33.02	31.03	-30.52	-0.87		50%
		01-1993	07-2011	Iceland	4.52	17.91	-2.08	31.93	6.60	1.10		58%
		02-1996	07-2011	Latvia	8.32	23.17	1.56	26.53	6.76	0.70		69%
		01-1954	07-2011	Luxembourg	8.72	10.63	-0.56	12.74	9.28	3.78	***	71%
		11-2001	07-2011	Macedonia	4.39	27.27	8.21	26.47	-3.82	-0.30		55%
		01-1996	07-2011	Malta	6.39	15.09	1.09	11.33	5.30	1.17		69%
		04-2003	07-2011	Montenegro	13.08	29.86	16.11	33.11	-3.02	-0.19		56%
		11-1993	07-2011	Slovak Republic	6.74	28.41	-2.29	15.19	9.03	1.16		68%
	Mid East	04-1990	06-2011	Iran	11.43	10.97	14.46	15.24	-3.03	-0.71		55%
		11-2004	07-2011	Iraq	15.88	40.08	-6.41	43.71	22.29	0.65		50%
		11-1997	07-2011	Palestine	10.42	35.87	1.06	18.90	9.36	1.18		73%
		01-1993	07-2011	Saudi Arabia	3.87	16.52	2.72	16.68	1.15	0.24		53%
		01-2010	07-2011	Syrian Arab Republic	-7.26	21.16	10.92	18.89	-18.18	-1.05		0%
	North America	12-2002	07-2011	Bahamas	3.67	6.25	1.96	4.78	1.71	0.79		40%
		04-1989	02-2011	Barbados	0.37	8.52	3.85	11.08	-3.48	-1.15		43%
		11-1996	10-2010	Bermuda	1.23	15.28	0.55	13.75	0.68	0.10		60%
		11-1997	02-2011	Costa Rica	7.42	17.57	6.46	12.36	0.96	0.17		47%
		01-2004	07-2011	El Salvador	2.82	7.17	4.61	3.70	-1.78	-0.59		13%
		01-1993	07-2011	Panama	7.09	8.15	6.99	7.68	0.10	0.03		53%
		02-1994	07-2011	Ecuador	-1.95	15.05	3.74	17.61	-5.69	-1.08		56%
		11-1993	09-2008	Paraguay	3.40	7.24	7.85	7.58	-4.45	-1.48		19%
		02-1925	12-1995	Uruguay	14.86	34.28	-1.80	23.03	16.66	3.73	***	62%
		01-1937	07-2011	Venezuela	6.70	16.52	6.81	16.85	-0.10	-0.05		53%

Table 5. Pooled 10-year sub-period analysis

This table provides mean 6-month returns and standard deviations for two periods (November-April and May-October), the coefficient estimates and t-statistics for the regression $r_t = \alpha + \beta Hal_t + \varepsilon_t$, as well as the percentage of times that the November-April return beats the May-October return for 31 ten-year subsample periods. β represents 6-month mean returns differences between November-April and May-October. T-values are adjusted using Newey-West standard errors. The 6-month mean returns (standard deviations) are calculated by multiplying monthly returns (standard deviations) by 6 ($\sqrt{6}$).
*** denotes significance at 1% level; **denotes significance at 5% level; *denotes significance at 10% level.

Period	No of Countries	Sample Size	Nov-Apr		May-Oct		Halloween Effect			% of Positive
			Mean	St Dev	Mean	St Dev	β	t-value		
1693-2011	109	56679	6.88	17.34	2.35	19.86	4.53	11.42	***	58%
1693-1710	1	215	-0.07	14.13	-3.70	15.40	3.63	0.83		61%
1711-1720	1	120	8.72	12.38	-2.01	32.95	10.73	1.14		60%
1721-1730	1	120	-1.63	7.90	-0.63	8.58	-1.00	-0.40		50%
1731-1740	1	120	0.64	2.93	-2.59	4.96	3.24	2.04	**	80%
1741-1750	1	120	-0.65	4.72	2.10	3.68	-2.75	-1.75	*	20%
1751-1760	1	120	-0.75	3.12	-2.13	2.94	1.39	1.43		80%
1761-1770	1	120	2.65	5.41	-1.36	6.10	4.00	1.52		70%
1771-1780	1	120	-1.16	5.60	-0.75	3.77	-0.41	-0.14		60%
1781-1790	1	120	3.32	5.52	-1.10	5.19	4.41	1.93	*	70%
1791-1800	2	232	-0.76	7.34	0.97	7.06	-1.72	-0.85		50%
1801-1810	2	240	0.43	4.64	0.03	5.36	0.40	0.26		30%
1811-1820	2	240	0.62	3.88	-2.15	4.30	2.77	1.95	*	70%
1821-1830	2	240	2.40	17.00	-1.51	6.50	3.91	0.84		70%
1831-1840	2	240	-0.75	7.64	-0.82	7.06	0.07	0.03		55%
1841-1850	2	240	1.17	8.69	-0.16	7.09	1.32	0.46		60%
1851-1860	2	240	1.39	10.13	-3.48	10.16	4.86	1.04		75%
1861-1870	3	252	3.60	7.52	2.50	9.30	1.10	0.39		52%
1871-1880	4	431	1.06	8.96	-0.02	9.24	1.08	0.45		53%
1881-1890	4	480	-0.40	5.61	1.89	5.91	-2.29	-1.54		43%
1891-1900	6	563	2.24	6.97	0.10	7.34	2.15	1.12		62%
1901-1910	9	854	1.83	6.16	0.51	6.72	1.33	0.95		51%
1911-1920	16	1383	-0.90	11.71	-0.61	10.88	-0.29	-0.16		55%
1921-1930	22	2313	2.54	13.54	-0.36	18.76	2.90	1.34		63%
1931-1940	27	2977	1.85	13.60	0.22	14.85	1.63	0.80		54%
1941-1950	28	3182	3.12	14.85	3.09	15.87	0.03	0.02		45%
1951-1960	32	3628	4.05	10.01	4.91	10.11	-0.86	-0.77		46%
1961-1970	39	4211	4.80	13.56	-0.76	13.49	5.56	4.63	***	64%
1971-1980	42	4831	9.09	20.05	4.00	18.44	5.08	2.88	***	60%
1981-1990	57	5558	14.90	22.98	8.79	26.48	6.12	2.79	***	64%
1991-2000	96	9151	11.56	21.12	2.65	21.42	8.91	5.50	***	63%
2001-2011	108	12908	7.09	18.58	1.45	25.61	5.64	3.40	***	57%

Table 6. Country by country sub-periods analysis

This table provide the coefficient estimates and t-statistics for the regression $r_t = \alpha + \beta Hal_t + \varepsilon_t$, for 28 countries that have data available over 60 years and the world market over the whole sample period and several 10-year sub-periods. The coefficient estimate β represents 6-month mean returns differences between November-April and May-October. T-values are adjusted using Newey-West standard errors. *** denotes significance at 1% level; **denotes significance at 5% level; *denotes significance at 10% level.

Status	Region	Country	Start Date	End Date	Whole Sample β_{Hal}	Whole Sample t-value	Prior to 1911 β_{Hal}	Prior to 1911 t-value	1911-1920 β_{Hal}	1911-1920 t-value	1921-1930 β_{Hal}	1921-1930 t-value	1931-1940 β_{Hal}	1931-1940 t-value	1941-1950 β_{Hal}	1941-1950 t-value
Developed	Asia	Japan	08/1914	07/2011	8.31	3.60 ***	-	-	-3.26	-0.37	6.27	1.52	9.67	1.77 *	24.64	1.77 *
	Mid East	Israel	02/1949	05/2011	3.46	1.09	-	-	-	-	-	-	-	-	4.71	0.84
	North America	Canada	12/1917	07/2011	5.57	3.34 ***	-	-	-3.47	-0.86	4.58	1.01	3.81	0.50	-1.09	-0.27
		UnitedStates	09/1791	07/2011	1.67	1.66 *	0.85	0.70	-0.68	-0.15	6.70	1.31	-10.19	-1.08	-3.31	-0.68
	Oceania	Australia	02/1875	07/2011	1.22	1.07	-1.29	-0.92	6.64	2.28 **	-1.17	-0.31	-2.67	-0.72	-2.75	-0.98
		New Zealand	01/1931	07/2011	1.06	0.66	-	-	-	-	-	-	-1.62	-0.47	-1.09	-0.54
	Western Europe	Austria	02/1922	07/2011	1.66	0.44	-	-	-	-	-29.99	-1.26	9.31	1.09	-9.11	-0.44
		Belgium	02/1897	07/2011	4.09	2.47 **	0.43	0.11	-1.27	-0.21	-3.18	-0.42	1.88	0.23	-2.93	-0.56
		Denmark	01/1921	07/2011	3.18	2.20 **	-	-	-	-	1.08	0.27	-1.58	-0.49	0.53	0.20
		Finland	11/1912	07/2011	-0.14	-0.06	-	-	-19.35	-2.00 **	-0.77	-0.16	-6.42	-1.62	-18.20	-1.93 *
		France	01/1898	07/2011	7.45	3.87 ***	2.62	1.35	4.34	0.82	2.95	0.54	16.90	2.47 **	-8.86	-0.85
		Germany	01/1870	07/2011	5.63	2.44 **	-0.65	-0.41	-3.07	-0.39	22.54	1.05	11.54	1.98 *	12.31	0.82
		Ireland	02/1934	07/2011	6.62	3.35 ***	-	-	-	-	-	-	4.66	1.72 *	1.84	1.05
		Italy	10/1905	07/2011	6.80	2.67 ***	6.77	2.19 **	3.96	0.63	3.77	0.58	-4.06	-0.73	6.77	0.40
		Netherlands	02/1919	07/2011	7.59	4.05 ***	-	-	-13.92	-1.19	6.31	1.18	-2.04	-0.30	7.62	1.37
		Portugal	01/1934	07/2011	3.66	0.94	-	-	-	-	-	-	5.52	0.96	1.18	0.26
		Spain	01/1915	07/2011	7.16	3.75 ***	-	-	5.80	1.51	8.58	2.06 **	10.85	1.18	0.39	0.07
		Sweden	01/1906	07/2011	5.56	3.14 ***	0.47	0.09	5.11	1.23	6.81	1.52	-4.74	-0.56	1.27	0.45
		Switzerland	01/1914	07/2011	4.64	2.94 ***	-	-	9.03	1.61	0.67	0.19	4.19	0.66	-2.92	-1.10
		United Kingdom	02/1693	07/2011	3.37	4.06 ***	2.54	2.75 ***	-1.39	-0.62	1.68	0.66	1.22	0.21	-0.70	-0.20
Emerging	Africa	South Africa	02/1910	07/2011	1.88	0.97	4.29	0.80	-5.07	-1.57	-2.62	-0.97	5.57	0.97	-1.87	-0.48
	Asia	India	08/1920	07/2011	1.17	0.52	-	-	-	-	1.64	0.46	-2.33	-0.54	-3.28	-0.71
	Central/South America &the Caribbean	Chile	01/1927	07/2011	-3.97	-0.94	-	-	-	-	6.80	0.80	4.39	0.53	-5.85	-1.69 *
		Colombia	02/1927	07/2011	2.85	1.20	-	-	-	-	-3.52	-0.79	-2.66	-0.47	-5.31	-1.21
		Mexico	02/1930	07/2011	3.30	1.13	-	-	-	-	6.37	0.64	-4.37	-0.90	0.58	0.18
		Peru	01/1933	07/2011	-3.72	-0.68	-	-	-	-	-	-	-2.09	-0.61	-1.25	-0.33
Least Developed	Central/ South America & the Caribbean	Uruguay	02/1925	12/1995	16.66	3.52 ***	-	-	-	-	25.42	1.44	4.92	0.40	9.85	1.31
		Venezuela	01/1937	07/2011	-0.10	-0.04	-	-	-	-	-	-	1.97	0.33	1.54	0.62
		World	02/1919	07/2011	4.53	3.31 ***	-	-	-7.89	-1.47	6.60	2.25 **	0.50	0.10	-2.58	-0.81

Table 6. Continued

Status	Region	Country	Start	End	1951-1960		1961-1970		1971-1980		1981-1990		1991-2000		2001-2011	
			Date	Date	β_{Hal}	t-value	β_{Hal}	t-value	β_{Hal}	t-value	β_{Hal}	t-value	β_{Hal}	t-value	β_{Hal}	t-value
Developed	Asia	Japan	08/1914	07/2011	-4.32	-0.72	8.66	1.53	10.74	1.99 **	10.53	1.91 *	6.06	0.99	11.27	1.53
	Mid East	Israel	02/1949	05/2011	-0.78	-0.10	5.30	1.20	-2.07	-0.25	3.90	0.40	6.41	0.85	7.85	1.30 *
	North America	Canada	12/1917	07/2011	6.56	1.50	9.61	2.98 ***	9.27	1.66 *	8.82	1.53	5.21	1.19	6.20	1.20
		UnitedStates	09/1791	07/2011	5.02	1.40	5.54	1.47	6.66	1.50	6.62	1.42	4.20	1.38	5.65	1.17
	Oceania	Australia	02/1875	07/2011	-3.35	-0.97	4.03	0.96	5.52	0.80	6.11	0.85	7.02	1.63	1.87	0.40
		New Zealand	01/1931	07/2011	-6.51	-2.17 **	3.25	1.16	8.41	1.69 *	0.79	0.10	2.26	0.44	2.87	0.73
	Western Europe	Austria	02/1922	07/2011	-10.52	-2.11 **	6.17	1.15	4.16	1.67 *	10.91	1.56	13.40	2.25 **	14.88	1.96
		Belgium	02/1897	07/2011	-3.22	-1.09	7.50	2.54 **	10.92	2.73 ***	12.85	2.30 **	12.01	2.95 ***	8.10	1.27
		Denmark	01/1921	07/2011	3.45	1.77 *	8.96	3.07 ***	-1.85	-0.43	5.44	0.94	6.41	1.24	6.05	0.99
		Finland	11/1912	07/2011	-2.43	-0.49	-1.28	-0.39	7.88	1.50	8.38	1.56	21.11	2.52 **	5.21	0.58
		France	01/1898	07/2011	1.30	0.26	11.78	2.53 **	7.12	1.03	20.45	3.47 ***	16.77	3.65 ***	8.54	1.40
		Germany	01/1870	07/2011	-5.19	-0.97	5.17	1.10	9.80	2.04 **	5.31	0.93	13.88	2.67 ***	9.94	1.45 *
		Ireland	02/1934	07/2011	-0.88	-0.31	3.68	1.17	4.56	0.64	8.81	1.27	16.27	2.83 ***	13.08	1.77
		Italy	10/1905	07/2011	-7.44	-1.58	5.49	1.02	1.02	0.12	22.48	2.54 **	23.97	3.67 ***	11.71	1.93 *
		Netherlands	02/1919	07/2011	3.19	0.75	7.50	1.58	16.04	3.07 ***	11.72	2.54 **	12.39	2.67 ***	9.28	1.26
		Portugal	01/1934	07/2011	1.39	0.56	2.22	0.74	-2.90	-0.09	-1.63	-0.12	14.01	1.98 **	8.11	1.21
		Spain	01/1915	07/2011	3.20	0.80	1.65	0.47	10.36	1.76 *	9.88	1.19	16.95	2.86 ***	4.87	0.77
		Sweden	01/1906	07/2011	-4.33	-1.36	2.85	0.68	14.37	3.61 ***	8.79	1.26	16.76	2.37 **	11.12	1.65
		Switzerland	01/1914	07/2011	3.39	0.78	7.74	1.40	8.08	1.49	3.54	0.79	9.74	2.20 **	4.86	0.89
		UnitedKingdom	02/1693	07/2011	-2.19	-0.49	7.09	1.54	17.13	1.71 *	14.93	2.90 ***	7.34	1.99 **	6.30	1.24
Emerging	Africa	South Africa	02/1910	07/2011	-6.08	-1.66 *	9.37	1.22	2.25	0.25	0.27	0.03	14.12	2.10 **	2.69	0.40
	Asia	India	08/1920	07/2011	-1.42	-0.46	1.96	0.70	6.78	1.59	-4.52	-0.63	11.67	0.94	0.16	0.02
	Central/South America & the Caribbean	Chile	01/1927	07/2011	-11.77	-1.32	2.87	0.33	-40.24	-1.68 *	13.29	1.74 *	2.79	0.36	-1.55	-0.33
		Colombia	02/1927	07/2011	1.73	0.87	3.13	1.40	7.31	1.46	-3.35	-0.37	12.83	1.14	10.83	1.25
		Mexico	02/1930	07/2011	2.35	0.93	2.40	1.28	21.87	2.50 **	-14.49	-1.00	7.86	0.86	9.19	1.39
		Peru	01/1933	07/2011	-2.50	-1.29	0.24	0.23	-8.22	-0.92	-29.37	-0.91	-0.83	-0.06	13.63	1.29
Least Developed	Central/South America & the Caribbean	Uruguay	02/1925	12/1995	1.56	0.28	0.51	0.04	9.26	0.88	55.39	2.95 ***	-	-	-	-
		Venezuela	01/1937	07/2011	-1.97	-0.50	1.99	0.97	-3.85	-0.82	1.75	0.18	-1.30	-0.11	0.03	0.00
		World	02/1919	07/2011	2.34	0.89	5.77	1.98 **	7.27	1.58	10.66	2.16 **	5.77	1.84 *	6.49	1.18

Table 7. Out-of-sample Performance of Buy & Hold strategy versus Halloween strategy

The table presents the annualized average returns, standard deviations in percentages, and Sharpe ratios of the buy and hold strategy and the Halloween strategy, as well as the percentage of years that the Halloween strategy outperforms the Buy & Hold strategy for the sample period from October 1998 to April 2011.

Country	Buy & Hold Strategy			Halloween Strategy			Percentage of Winning
	Return	St Dev	Sharpe	Return	St Dev	Sharpe	
Argentina	18.67	32.19	0.58	21.53	24.15	0.89	38%
Australia	4.92	13.29	0.37	6.42	8.56	0.75	46%
Austria	6.68	20.59	0.32	11.43	12.15	0.94	46%
Belgium	0.46	17.78	0.03	4.50	12.09	0.37	38%
Brazil	17.25	26.54	0.65	21.52	19.37	1.11	54%
Canada	6.47	16.03	0.40	7.96	10.61	0.75	31%
Chile	15.23	14.34	1.06	10.66	10.89	0.98	38%
Denmark	6.78	18.58	0.36	6.47	12.71	0.51	23%
Finland	4.14	30.05	0.14	9.14	23.26	0.39	38%
France	2.29	19.05	0.12	6.85	12.86	0.53	38%
Germany	1.78	22.20	0.08	7.66	15.16	0.51	46%
Greece	-3.28	28.81	-0.11	1.81	19.10	0.09	54%
Hong Kong	6.79	23.59	0.29	5.74	16.42	0.35	38%
Indonesia	20.33	27.92	0.73	19.03	18.34	1.04	23%
Ireland	-2.87	22.17	-0.13	6.74	13.85	0.49	46%
Italy	-0.51	20.54	-0.02	7.30	15.09	0.48	46%
Japan	-2.56	20.73	-0.12	4.74	13.58	0.35	62%
Jordan	8.96	20.47	0.44	7.70	14.86	0.52	46%
Korea	13.54	28.44	0.48	15.90	20.99	0.76	46%
Malaysia	10.65	20.92	0.51	10.94	16.14	0.68	23%
Mexico	17.64	22.10	0.80	18.60	16.09	1.16	38%
Netherlands	-0.95	20.91	-0.05	5.59	13.36	0.42	46%
New Zealand	1.60	13.13	0.12	5.78	8.61	0.67	62%
Norway	10.71	22.97	0.47	12.50	14.69	0.85	38%
Philippines	7.21	23.57	0.31	9.59	16.05	0.60	38%
Portugal	-2.47	19.46	-0.13	3.83	13.44	0.29	46%
Russia	33.89	38.71	0.88	36.05	28.23	1.28	38%
Singapore	6.94	22.86	0.30	7.67	14.37	0.53	31%
South Africa	14.35	19.31	0.74	13.11	13.36	0.98	31%
Spain	2.90	19.69	0.15	5.57	13.64	0.41	38%
Sweden	5.90	21.57	0.27	10.74	15.46	0.69	38%
Switzerland	0.86	14.53	0.06	3.02	10.25	0.29	54%
Taiwan	1.83	26.92	0.07	9.75	18.53	0.53	54%
Thailand	9.55	27.84	0.34	10.80	18.53	0.58	54%
Turkey	27.61	45.88	0.60	38.98	38.52	1.01	46%
United Kingdom	1.85	15.15	0.12	6.23	9.79	0.64	46%
United States	1.73	16.28	0.11	5.02	11.32	0.44	46%

Table 8. Annual performance of Buy & Hold strategy versus Halloween strategy of the UK market

The table presents the average annual returns, standard deviations in percentages, and Sharpe ratios of the buy and hold strategy and the Halloween strategy, as well as the number of years, and the percentage of times that the Halloween strategy outperforms the Buy & Hold strategy for the whole sample period from 1693-2009 of the UK market index returns, three subsamples of around 100 years, six 50-year subsamples, and ten 30-year subsamples.

Sample Periods	Buy & Hold Strategy			Halloween Strategy			Obs.	Number of Winning	Percentage of Winning
	Return	Std. Dev.	Sharpe ratio	Return	Std. Dev.	Sharpe ratio			
1693-2009	1.38	14.58	0.09	4.52	10.71	0.42	316	200	63.29%
100-year interval									
1693-1800	-0.52	11.54	-0.05	2.95	8.92	0.33	107	70	65.42%
1801-1900	0.68	11.90	0.06	3.86	8.20	0.47	100	69	69.00%
1901-2009	3.91	18.71	0.21	6.69	13.68	0.49	109	61	55.96%
50-year interval									
1693-1750	-0.49	13.16	-0.04	3.19	10.82	0.29	57	32	56.14%
1751-1800	-0.56	9.45	-0.06	2.66	6.14	0.43	50	38	76.00%
1801-1850	-0.21	14.81	-0.01	4.62	10.46	0.44	50	38	76.00%
1851-1900	1.58	8.07	0.20	3.10	5.01	0.62	50	31	62.00%
1901-1950	0.20	11.07	0.02	1.59	6.00	0.26	50	28	56.00%
1950-2009	7.05	22.95	0.31	11.01	16.64	0.66	59	33	55.93%
30-year interval									
1693-1730	-0.62	15.52	-0.04	3.83	13.16	0.29	37	22	59.46%
1731-1760	-1.12	6.60	-0.17	1.71	3.50	0.49	30	20	66.67%
1761-1790	0.28	9.77	0.03	4.00	6.60	0.61	30	22	73.33%
1791-1820	-0.22	11.48	-0.02	3.04	5.75	0.53	30	21	70.00%
1821-1850	-0.39	16.82	-0.02	4.69	12.93	0.36	30	23	76.67%
1851-1880	1.45	9.03	0.16	3.45	5.57	0.62	30	18	60.00%
1881-1910	0.84	6.73	0.13	2.31	3.59	0.64	30	20	66.67%
1911-1940	-1.19	11.86	-0.10	1.12	7.01	0.16	30	17	56.67%
1941-1970	5.84	14.89	0.39	5.21	9.30	0.56	30	13	43.33%
1971-2009	7.61	25.75	0.30	13.36	18.68	0.72	39	24	61.54%

Table 9. Strategy performance over different trading horizons of the UK market

The table shows average returns, standard deviations, skewness, and the maximum and minimum values of the buy and hold strategy and the Halloween strategy for different holding horizons from one year to twenty years of the UN market index returns from 1693-2009. The average returns and the standard deviations are annualised by dividing the total returns (standard deviations) by n ($\sqrt{n}$). The No. of Winning and the % of Winning are the number of times and the percentage of times that the Halloween strategy beats the Buy & Hold strategy, respectively. The upper panel presents the results calculated using the overlapping sample, and the lower panel are the results from the non-overlapping sample.

Overlapping Sample

Holding Horizon	Buy & Hold Strategy					Halloween Strategy					Obs.	No. of Win	% Win
	Return	St. Dev.	Skewness	Maximum	Minimum	Return	St. Dev.	Skewness	Maximum	Minimum			
1-Year	1.38	14.58	0.12	86.01	-80.60	4.52	10.71	2.06	83.59	-30.96	317	200	63.09%
2-Year	1.42	14.50	-0.39	41.03	-59.11	4.56	11.16	1.60	59.91	-28.78	316	223	70.57%
3-Year	1.50	14.00	0.10	38.85	-35.39	4.61	11.09	1.75	46.05	-11.12	315	236	74.92%
4-Year	1.55	13.50	0.31	29.79	-25.50	4.63	11.40	1.58	35.02	-7.86	314	250	79.62%
5-Year	1.59	13.12	0.58	24.68	-16.06	4.64	11.92	1.59	33.33	-6.28	313	257	82.11%
6-Year	1.60	12.96	0.77	24.56	-15.91	4.65	12.34	1.66	29.53	-3.66	312	258	82.69%
7-Year	1.60	12.75	1.01	22.05	-12.75	4.65	12.76	1.76	29.35	-4.07	311	267	85.85%
8-Year	1.59	12.67	1.27	21.79	-10.89	4.66	13.21	1.81	27.33	-2.46	310	271	87.42%
9-Year	1.59	12.78	1.35	21.67	-7.98	4.66	13.73	1.87	27.15	-2.83	309	281	90.94%
10-Year	1.61	13.00	1.43	21.82	-8.16	4.67	14.23	1.91	27.06	-2.89	308	282	91.56%
15-Year	1.63	13.98	1.56	19.27	-6.52	4.67	16.27	2.04	24.81	-0.20	303	282	93.07%
20-Year	1.61	14.75	1.72	15.62	-3.56	4.64	17.82	2.04	20.57	0.18	298	281	94.30%

Non-Overlapping Sample

	Buy & Hold Strategy					Halloween Strategy					Obs.	No. of Win	% Win
	Return	St. Dev.	Skewness	Maximum	Minimum	Return	St. Dev.	Skewness	Maximum	Minimum			
1-Year	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Year	1.33	16.35	-0.59	41.03	-59.11	4.53	12.50	1.66	59.91	-28.78	158	110	69.62%
3-Year	1.46	16.12	0.15	38.85	-35.39	4.55	12.51	2.22	46.05	-11.12	105	80	76.19%
4-Year	1.33	15.87	-0.14	21.70	-25.50	4.53	11.63	1.01	23.35	-7.86	79	60	75.95%
5-Year	1.46	13.36	-0.01	16.46	-16.06	4.55	11.49	1.01	22.53	-6.28	63	51	80.95%
6-Year	1.37	16.41	0.72	24.56	-15.91	4.52	14.23	2.23	29.53	-3.01	52	42	80.77%
7-Year	1.46	13.39	0.79	18.44	-8.76	4.55	13.55	1.15	20.27	-4.07	45	41	91.11%
8-Year	1.37	11.73	1.13	14.43	-6.98	4.52	12.58	1.64	20.17	-1.70	39	36	92.31%
9-Year	1.46	13.15	0.99	15.75	-7.98	4.55	14.06	1.85	21.66	-2.40	35	32	91.43%
10-Year	1.30	11.82	1.19	12.72	-5.45	4.51	13.80	1.73	18.57	-1.51	31	29	93.55%
15-Year	1.46	15.36	0.88	12.33	-4.08	4.55	16.47	1.77	17.75	0.38	21	20	95.24%
20-Year	1.24	15.36	1.53	9.16	-2.51	4.36	18.77	2.39	17.34	0.18	15	14	93.33%

Table 10. Halloween effect semi-annual data versus monthly data

The table compares the regression results of the Halloween effect using semi-annual data and monthly data. Coefficient estimates are in percentage terms. T-statistics are calculated based on Newey-West standard errors. The sample is sub-divided into three sub-periods of approximately 100-year intervals and six sub-periods of 50-year intervals. ***denotes significance at the 1% level; **denotes significance at 5% level; * denotes significance at 10% level

Sample Periods	Semi-annual data		Monthly data	
	β	**t-value**	**β**	**t-value**
1693-2009	3.36	4.39***	0.56	4.26***
100-year Interval				
1693-1800	2.03	1.71*	0.34	1.6
1801-1900	3.14	3.03***	0.52	2.71***
1901-2009	4.87	3.04***	0.80	3.03***
50-year Interval				
1693-1750	2.83	1.47	0.48	1.29
1751-1800	1.10	0.88	0.18	0.93
1801-1850	5.06	2.88***	0.84	2.29**
1851-1900	1.22	1.33	0.20	1.46
1901-1950	0.67	0.4	0.08	0.31
1951-2009	8.43	3.59***	1.40	3.33***

Figure 1. Summer (May-October) risk premiums for 65 countries

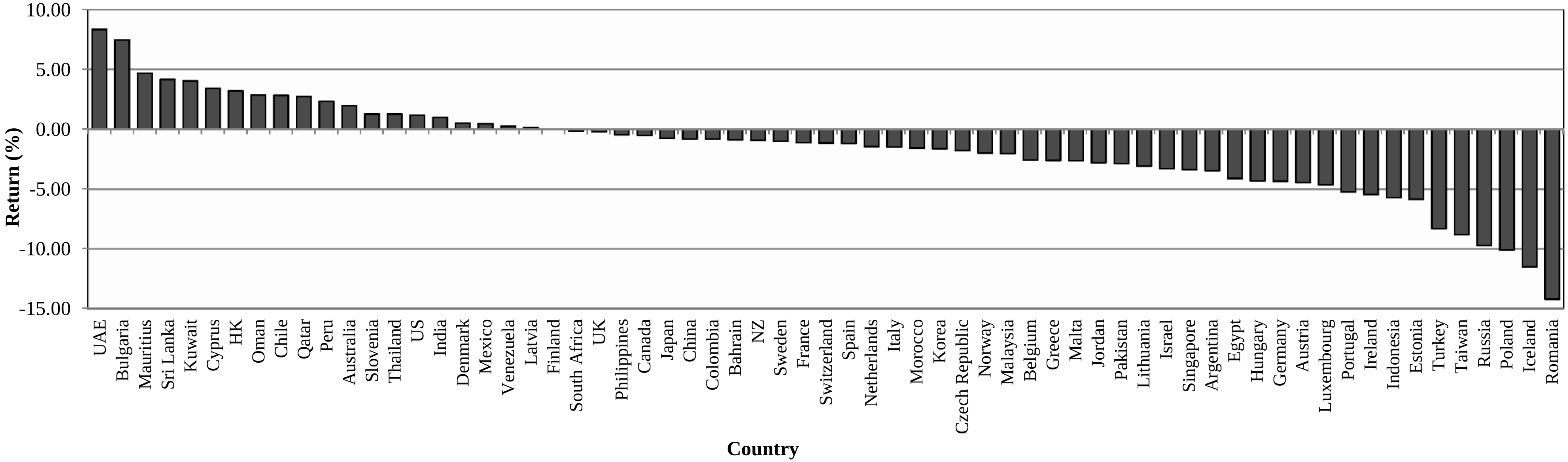


Figure 2. 30-year moving average of pooled 65 countries' price returns, total returns, risk premiums and dividend yield for the period 1694 to 2011.

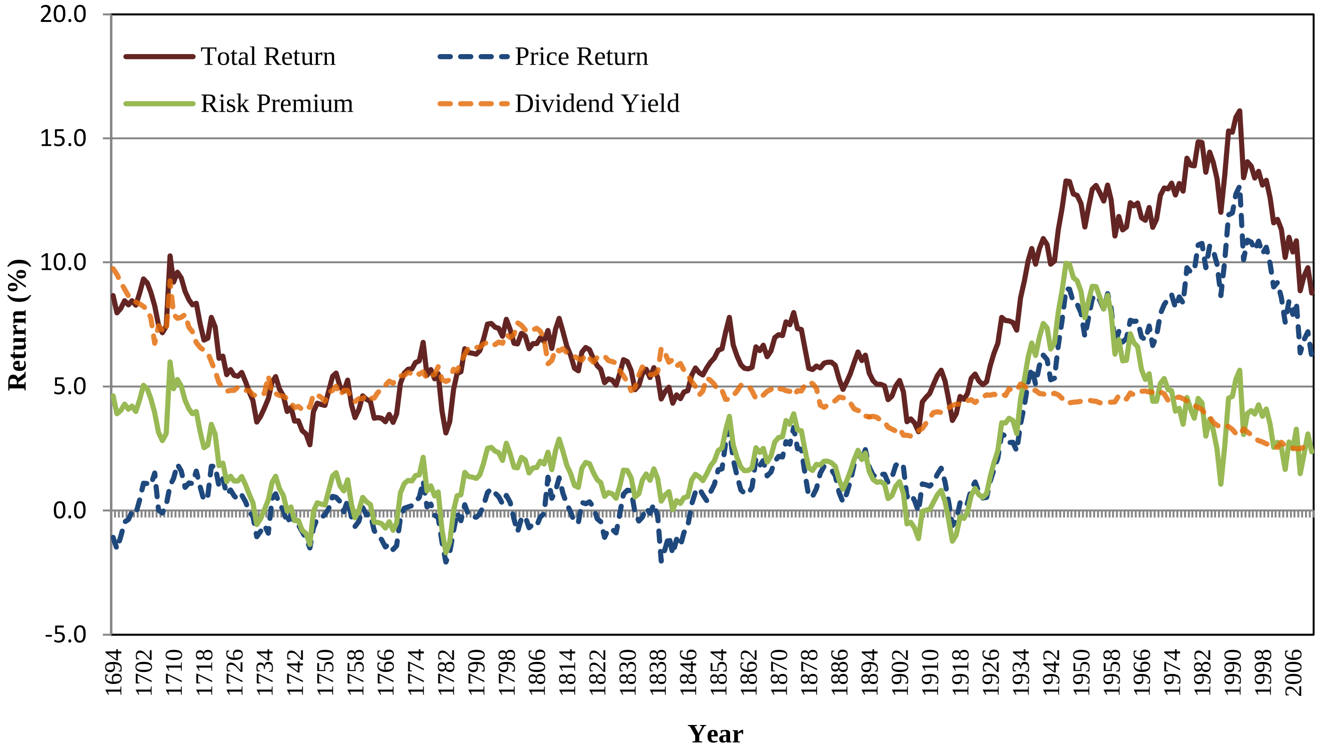


Figure 3. 30-year moving average of pooled 65 countries' price returns, total returns, risk premiums and dividend yield for the period 1951 to 2011.

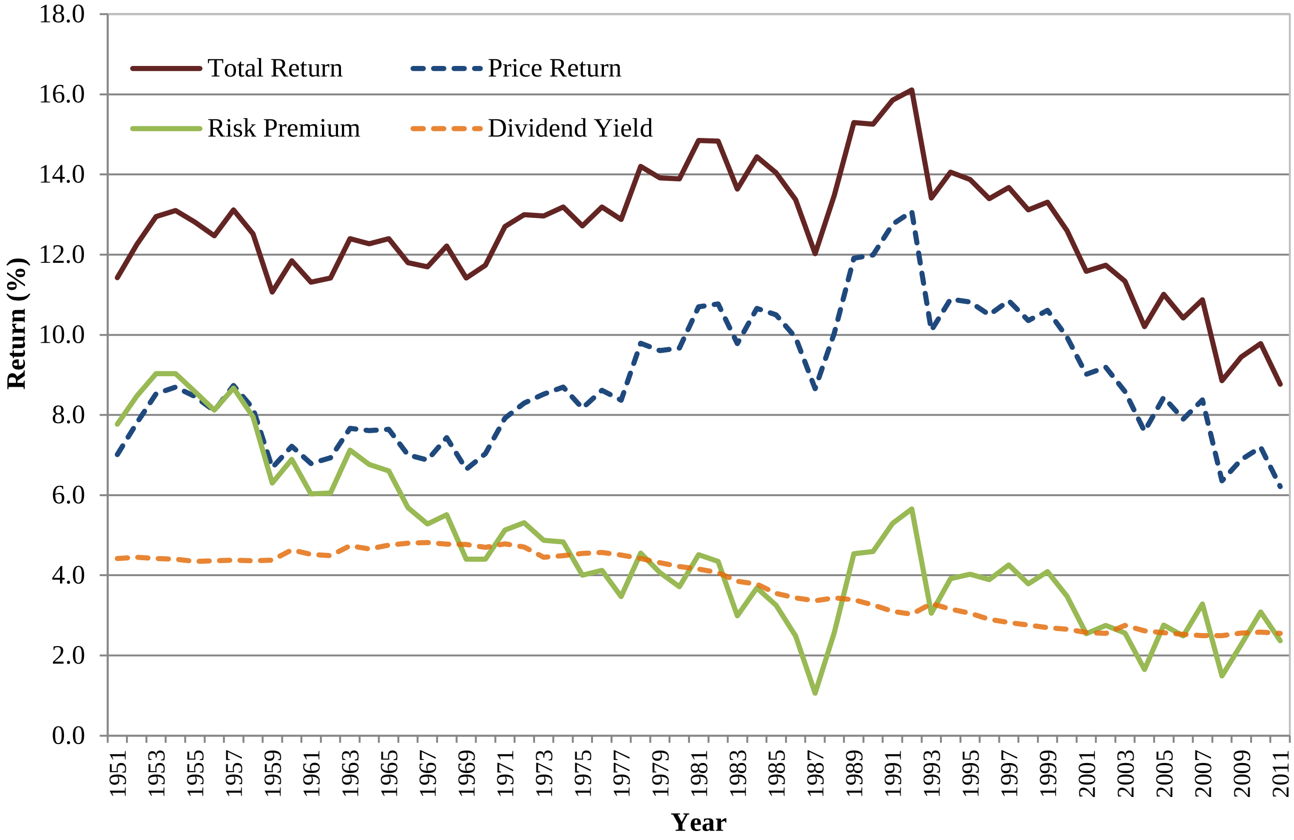


Figure 4. **Summer (May-October) and Winter (November-April) risk premiums for 65 countries**

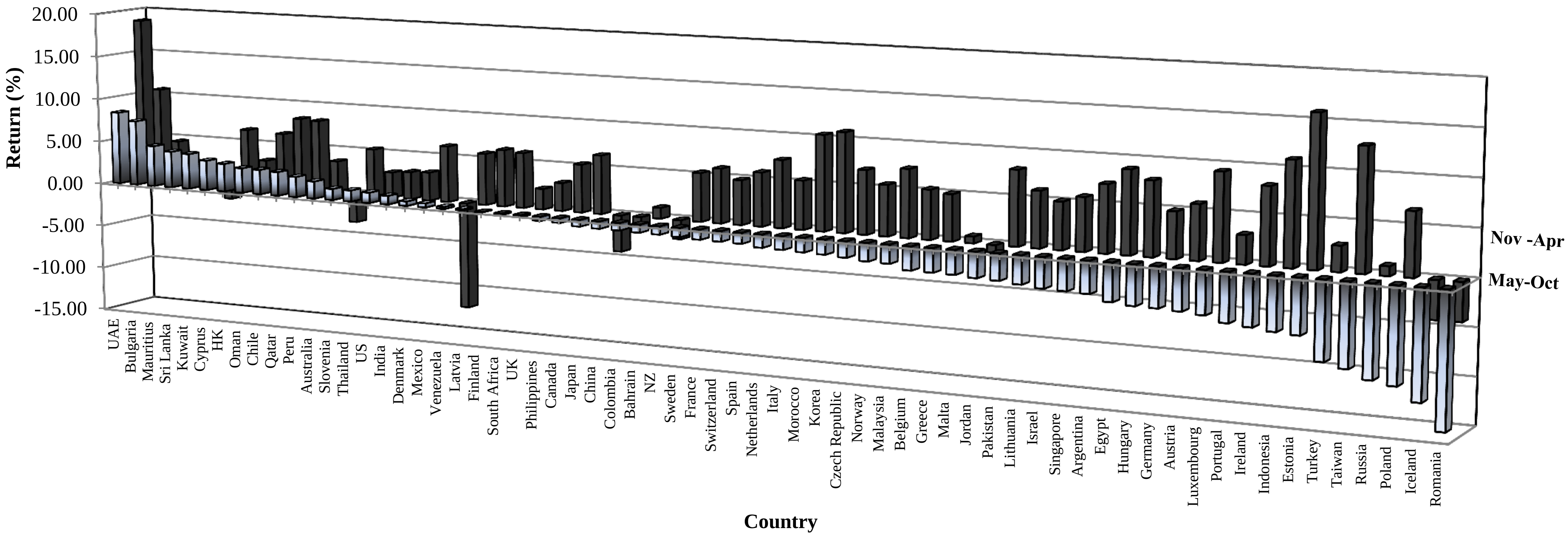
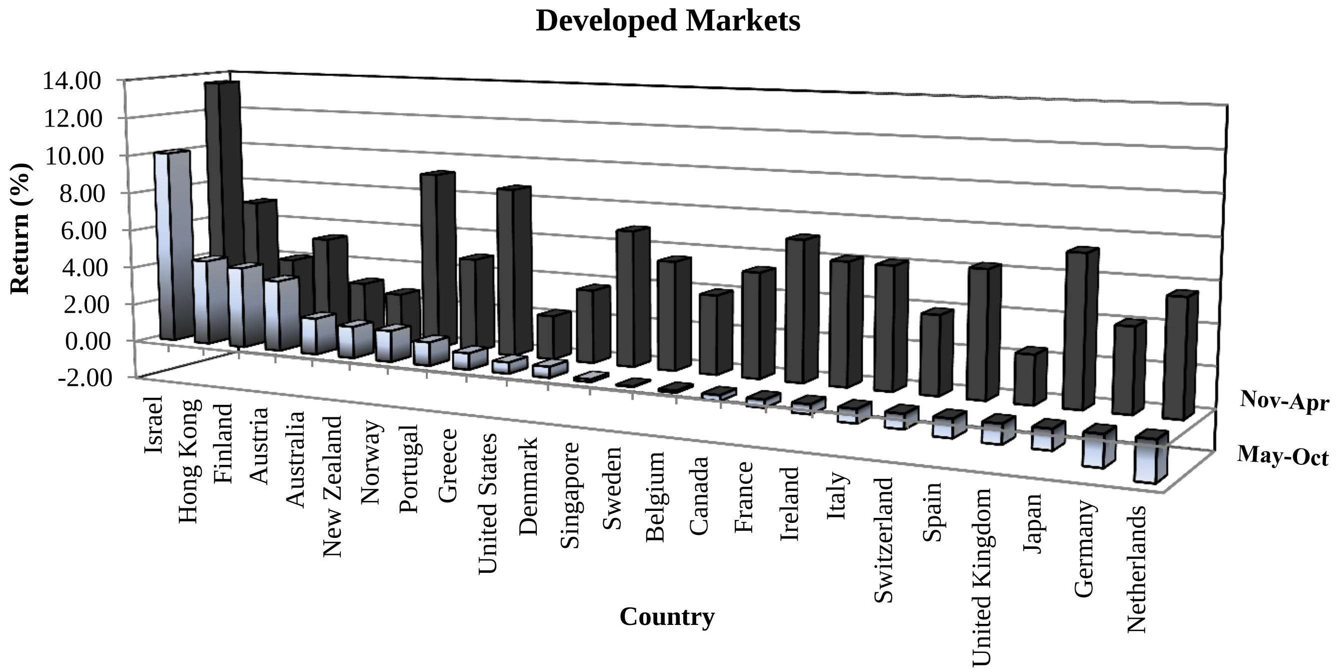


Figure 5. Two 6-month sub-period (November-April and October-May) returns comparison for the developed markets, emerging markets, frontier markets and rarely studied markets

(A)



(B)

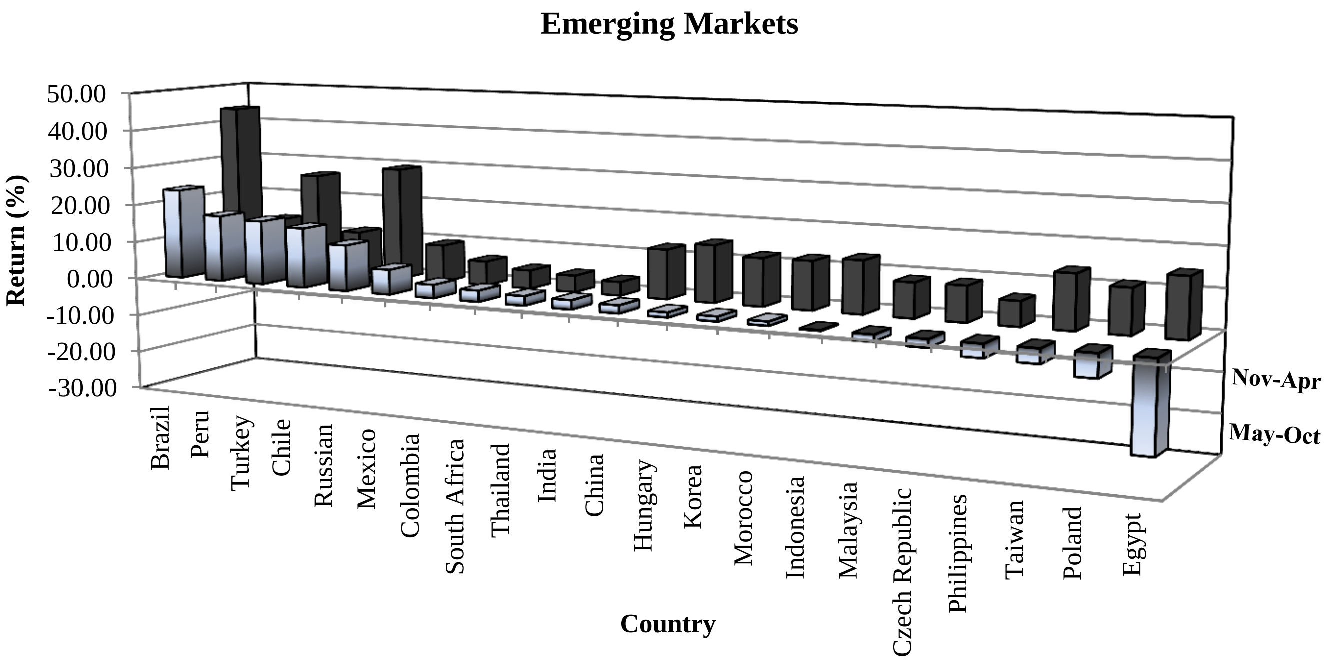
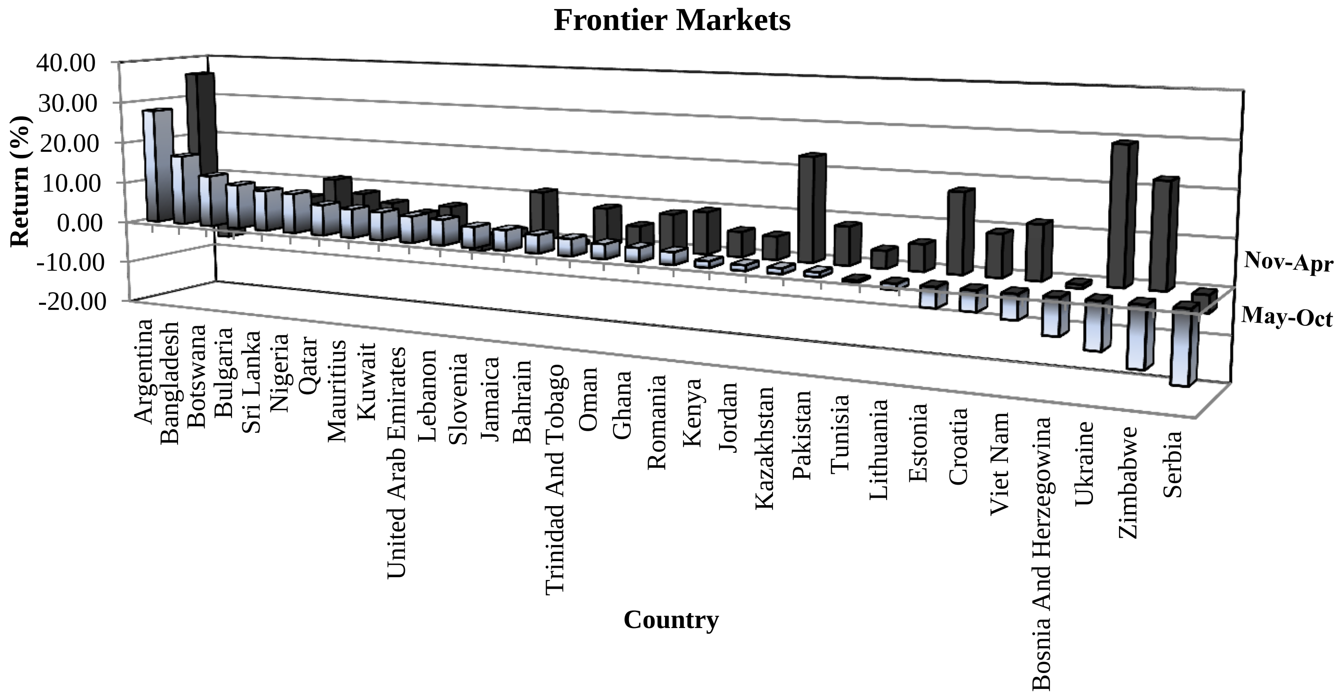


Figure 5. continued

(C)



(D)

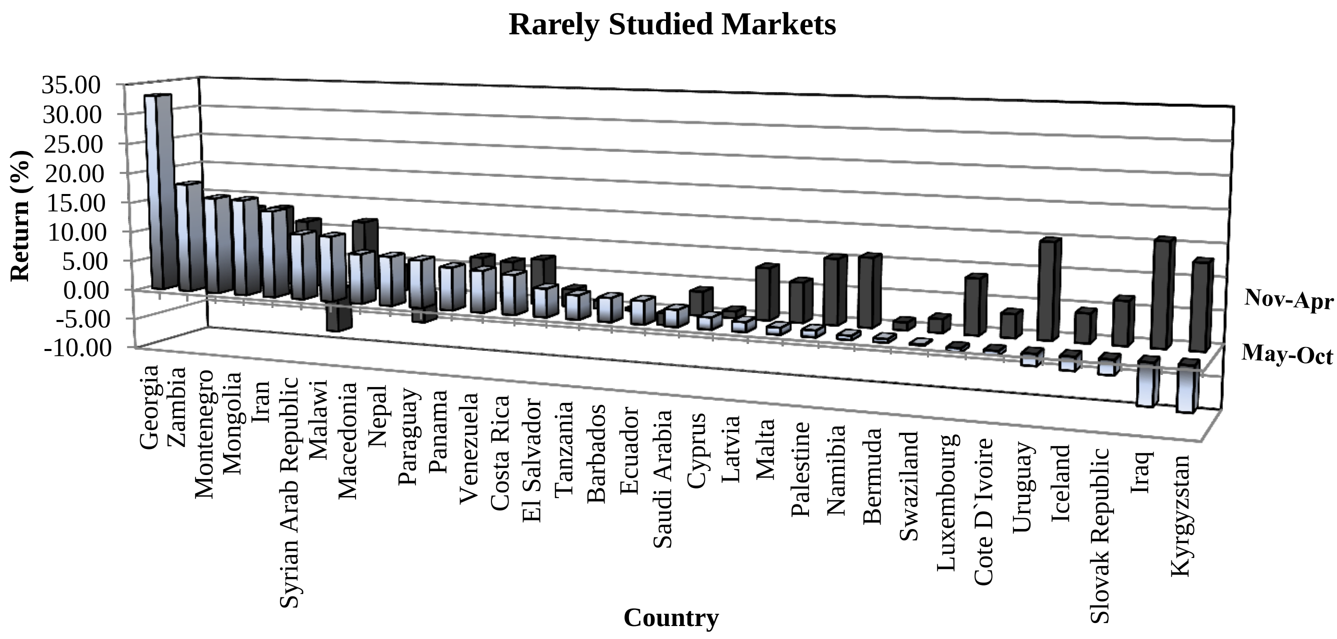


Figure 6. Size of the Halloween effect (difference between 6-month returns November-April and May-October) for 31 ten-year sub-periods from 109 pooled countries over the period 1693-2011

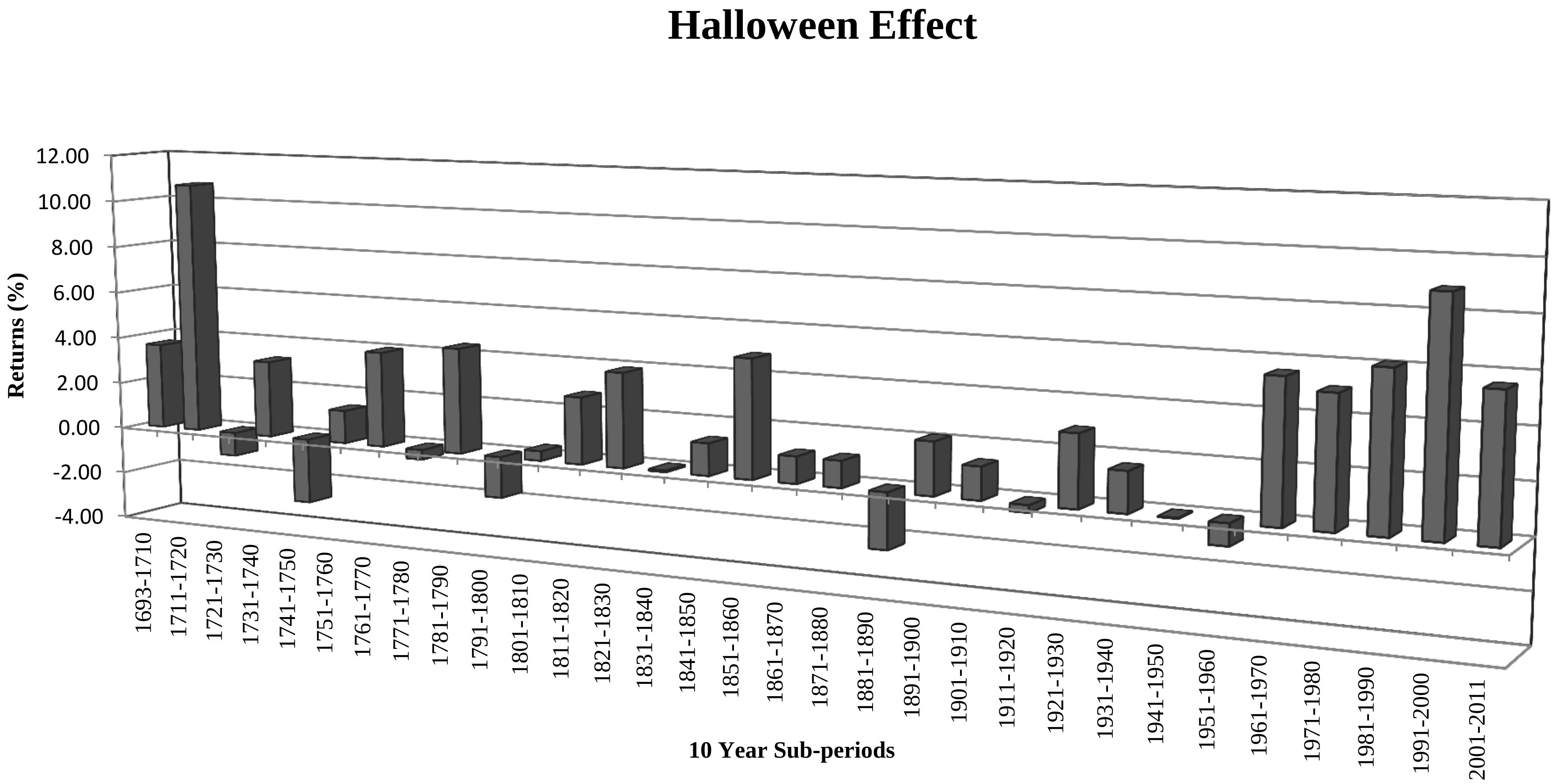


Figure 7. Rolling window regressions of the Halloween effect in the GFD world index returns (1919-2011)
The figure plots Halloween effects in the GFD world index returns from 1919 to 2011 using a 10-year rolling window, a 30-year rolling window and a 50-year rolling window. The dark solid line indicates the coefficient estimates of the effect, the light dotted lines indicates the upper and lower 95% confidence interval based on Newey-West standard errors

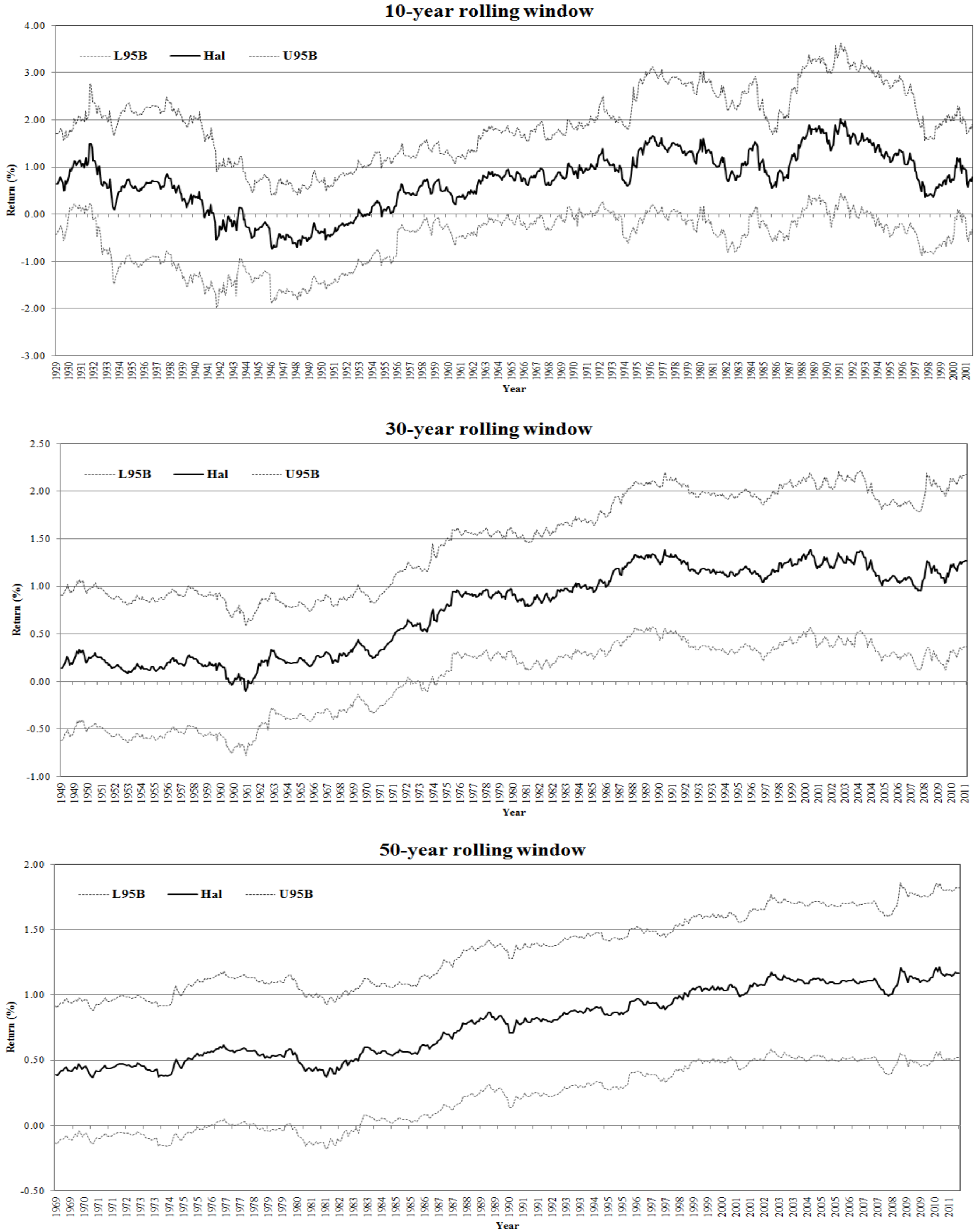


Figure 8. Return frequency distribution of Buy & Hold strategy and Halloween strategy

The figure shows the return frequencies of the Buy & Hold strategy and the Halloween strategy for the holding periods of seven years, ten years, fifteen years and twenty years. The returns are annualised and expressed in percentages.

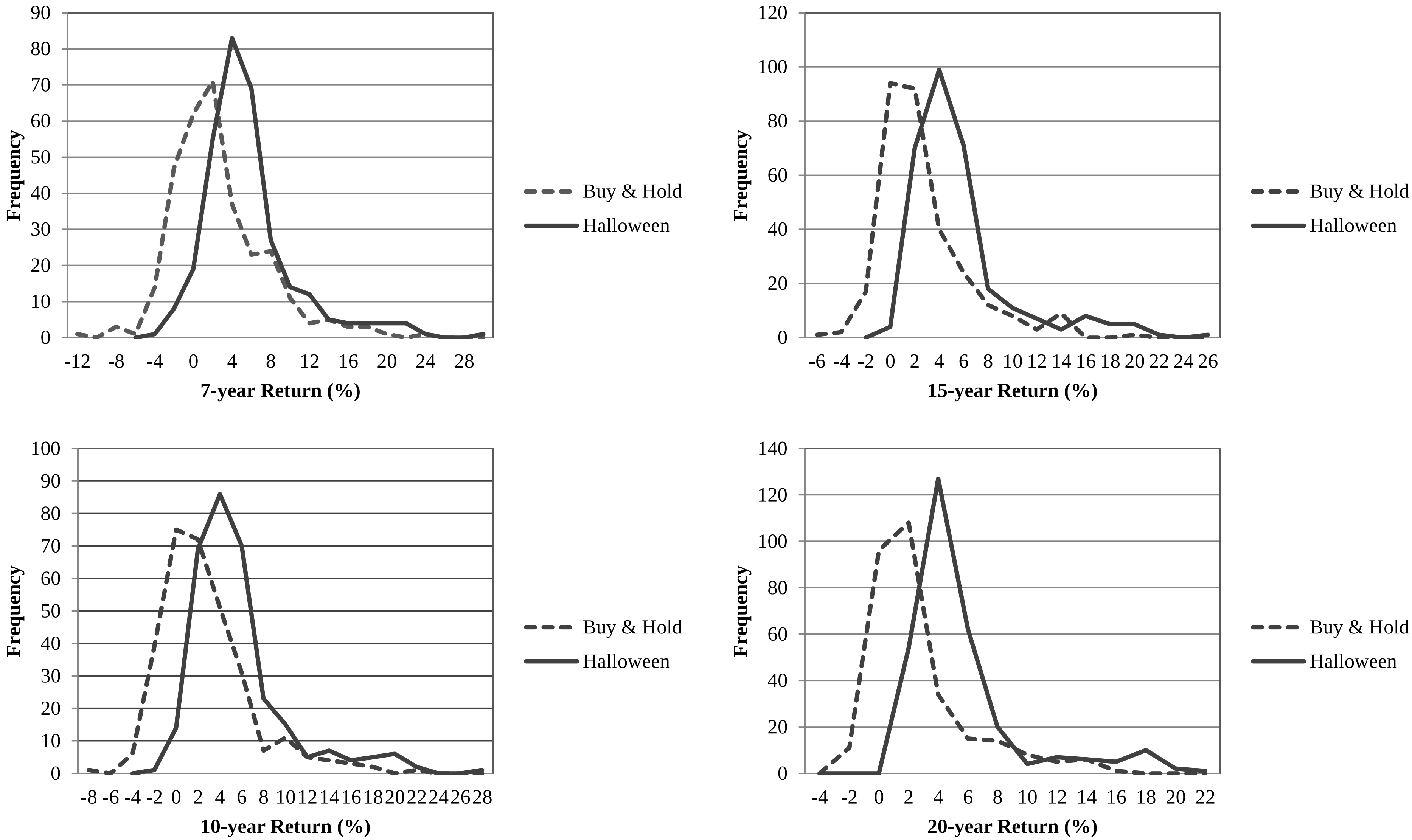


Figure 9. End of period wealth for the buy and hold strategy and the Halloween strategy for the period 1693 to 2009

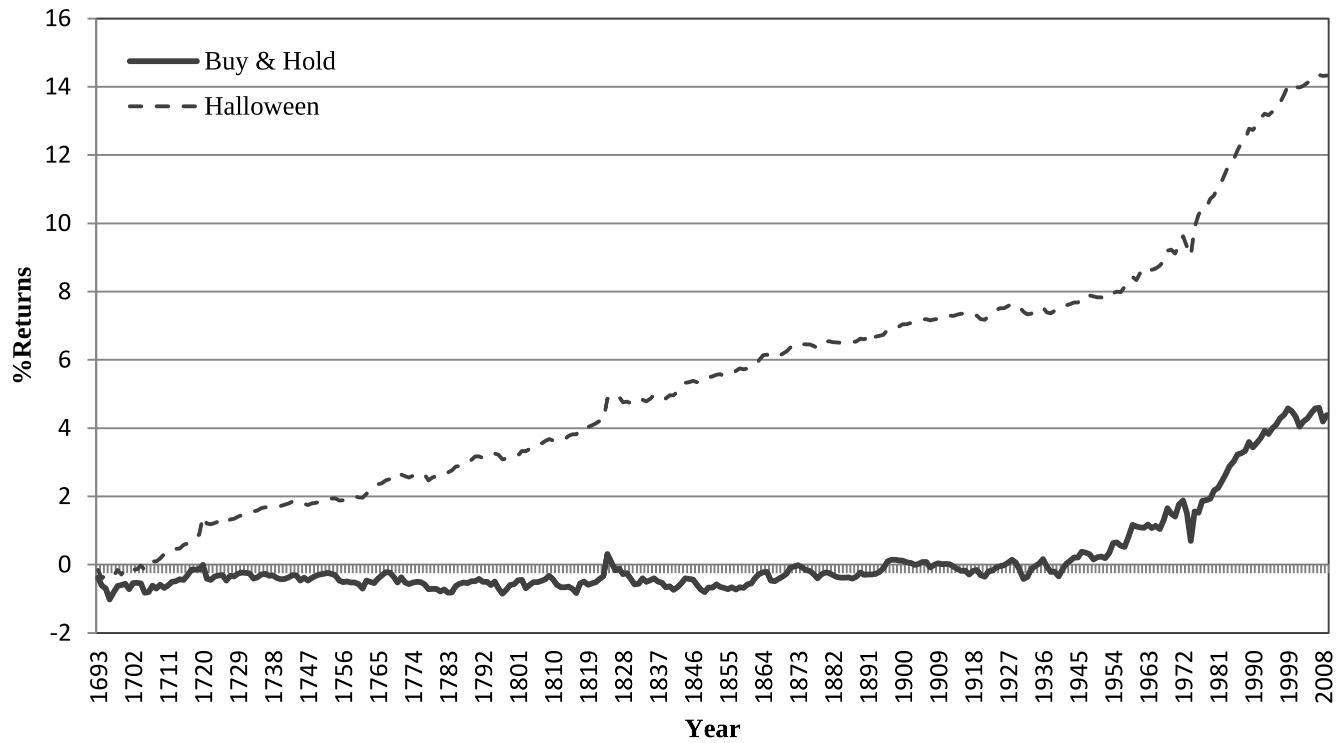


Figure 10. Halloween effect & sample size

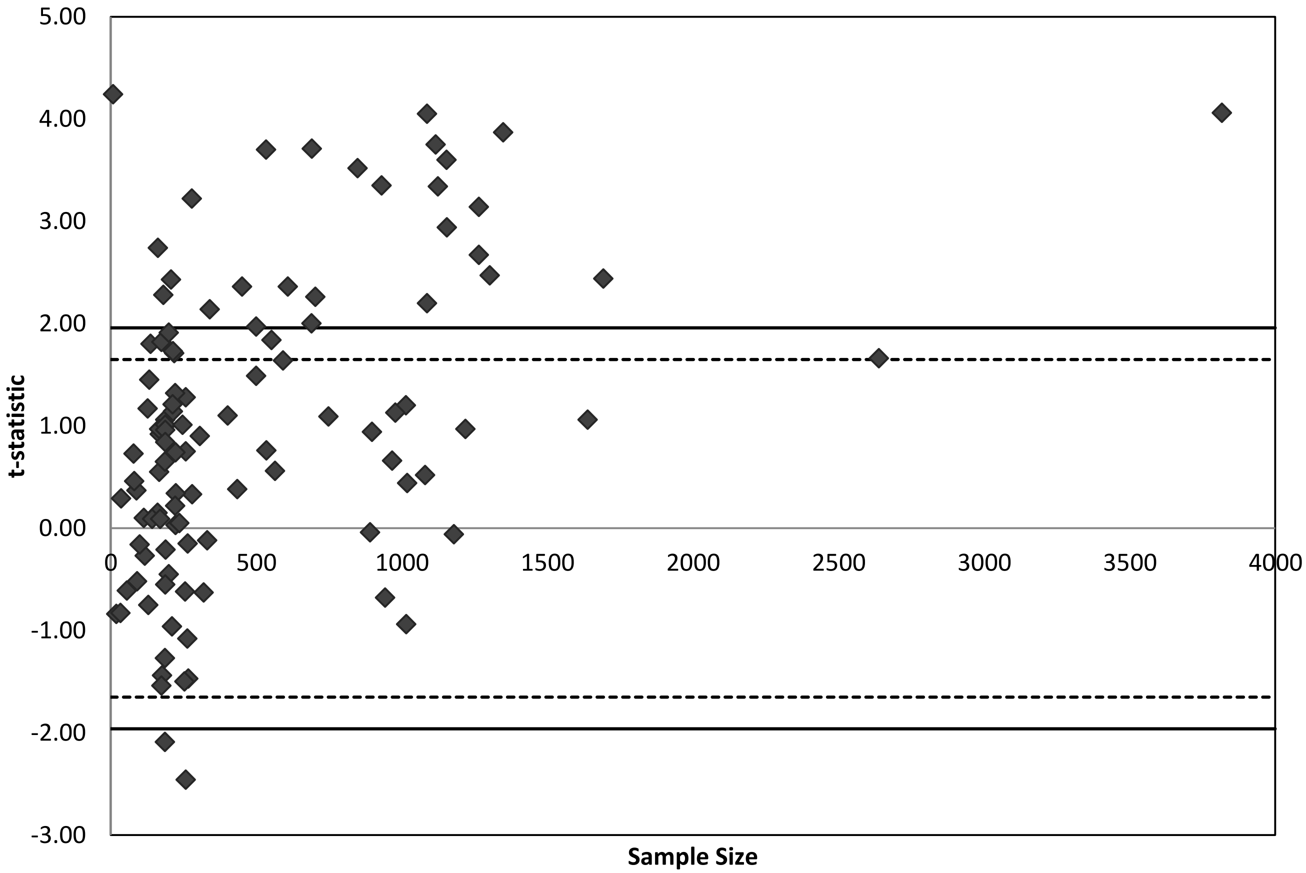


Figure 11. UK Halloween effect 100-year rolling window OLS regressions

The figure plots 100-year rolling window estimates of the Halloween effect for the UK monthly stock market index returns over the period 1693 to 2010. The dark solid line indicates the coefficient estimates of the effect, the light dotted lines show the upper and lower 95% bounds calculated based on Newey-West standard errors.

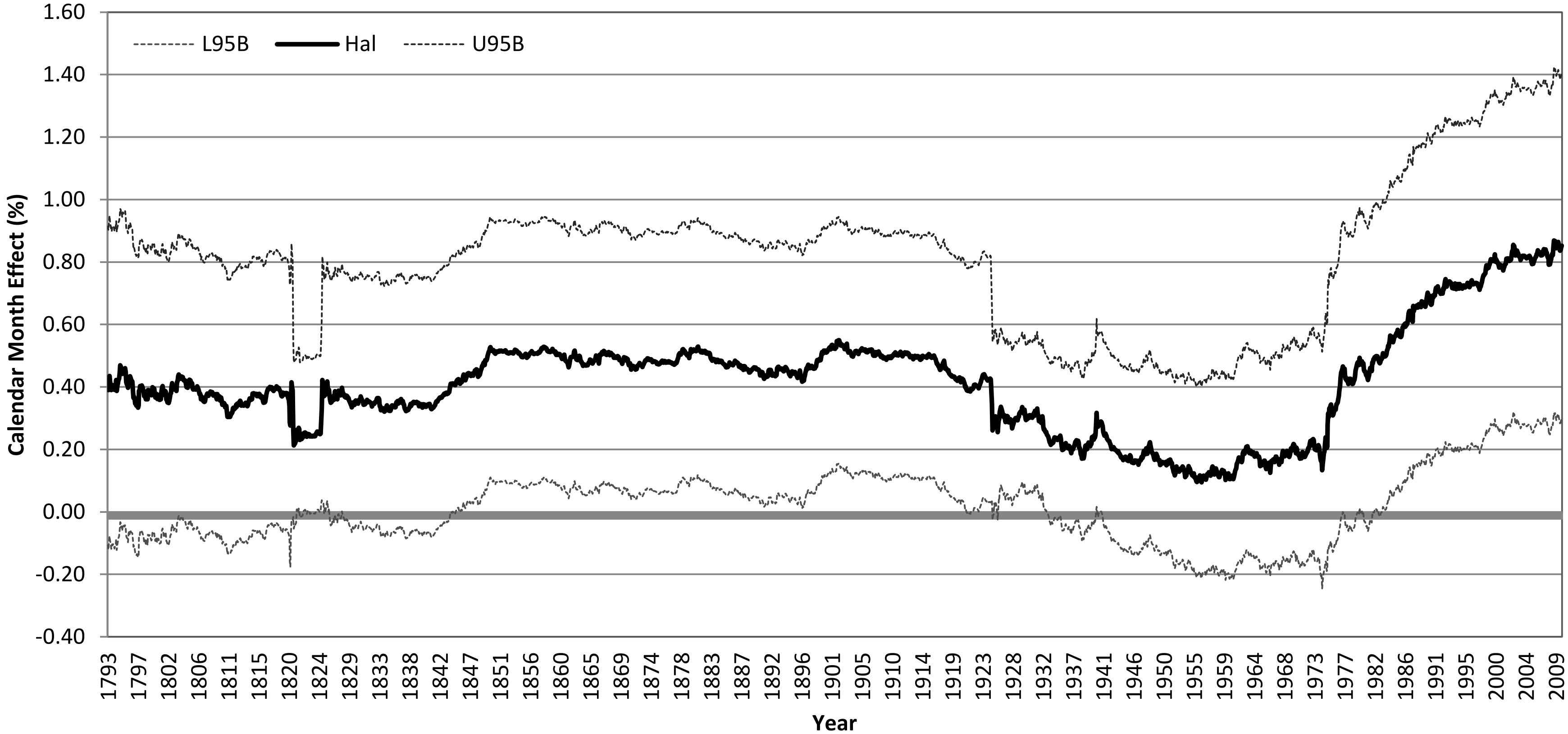


Figure 12. UK Halloween effect 100-year rolling window regressions estimated with GARCH (1,1)

The figure plots 100-year rolling window estimates of the Halloween effect based on time varying volatility GARCH (1,1) model for the UK monthly stock market index returns over the period 1693 to 2010. The dark solid line indicates the coefficient estimates of the effect and the light dotted lines show the upper and lower 95% bounds.

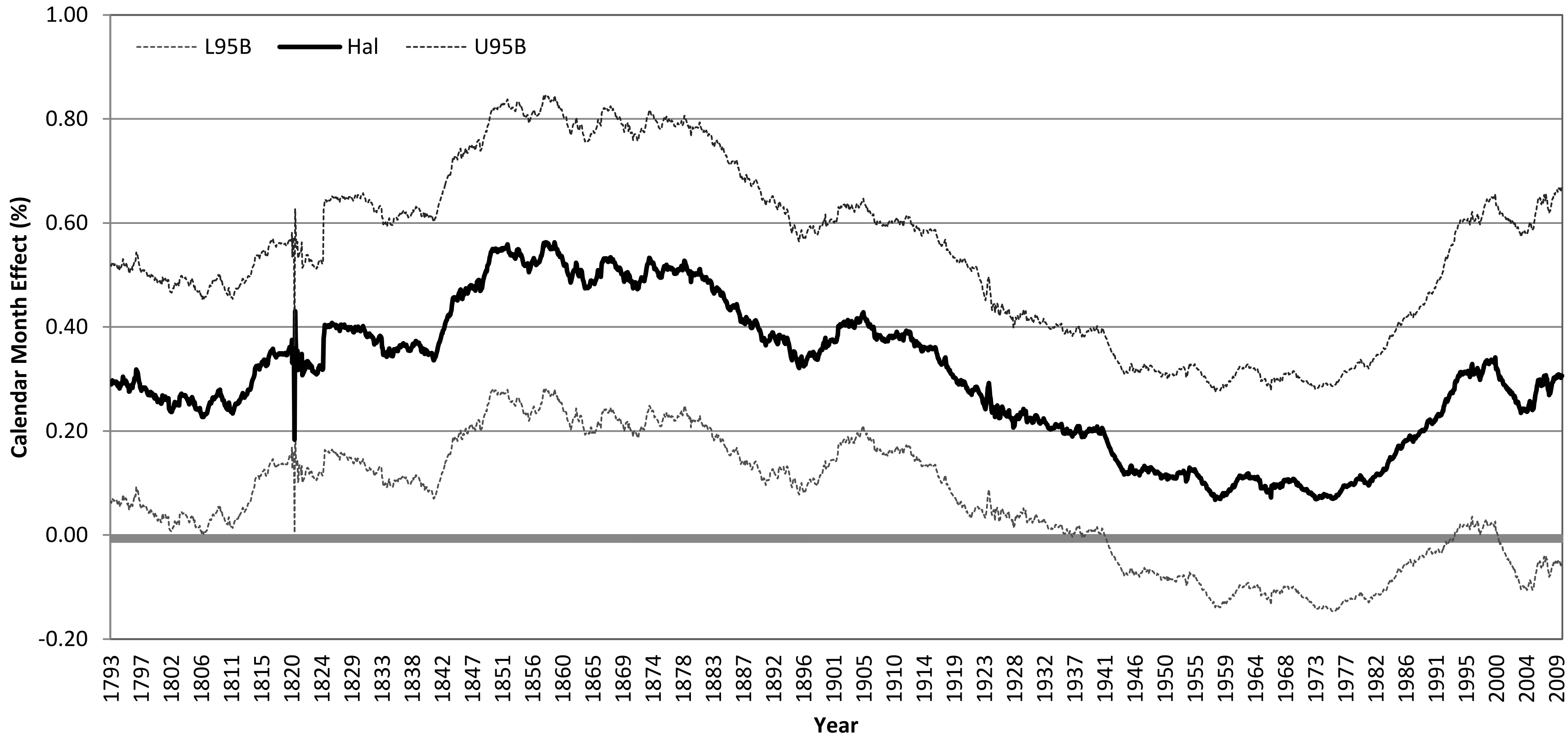
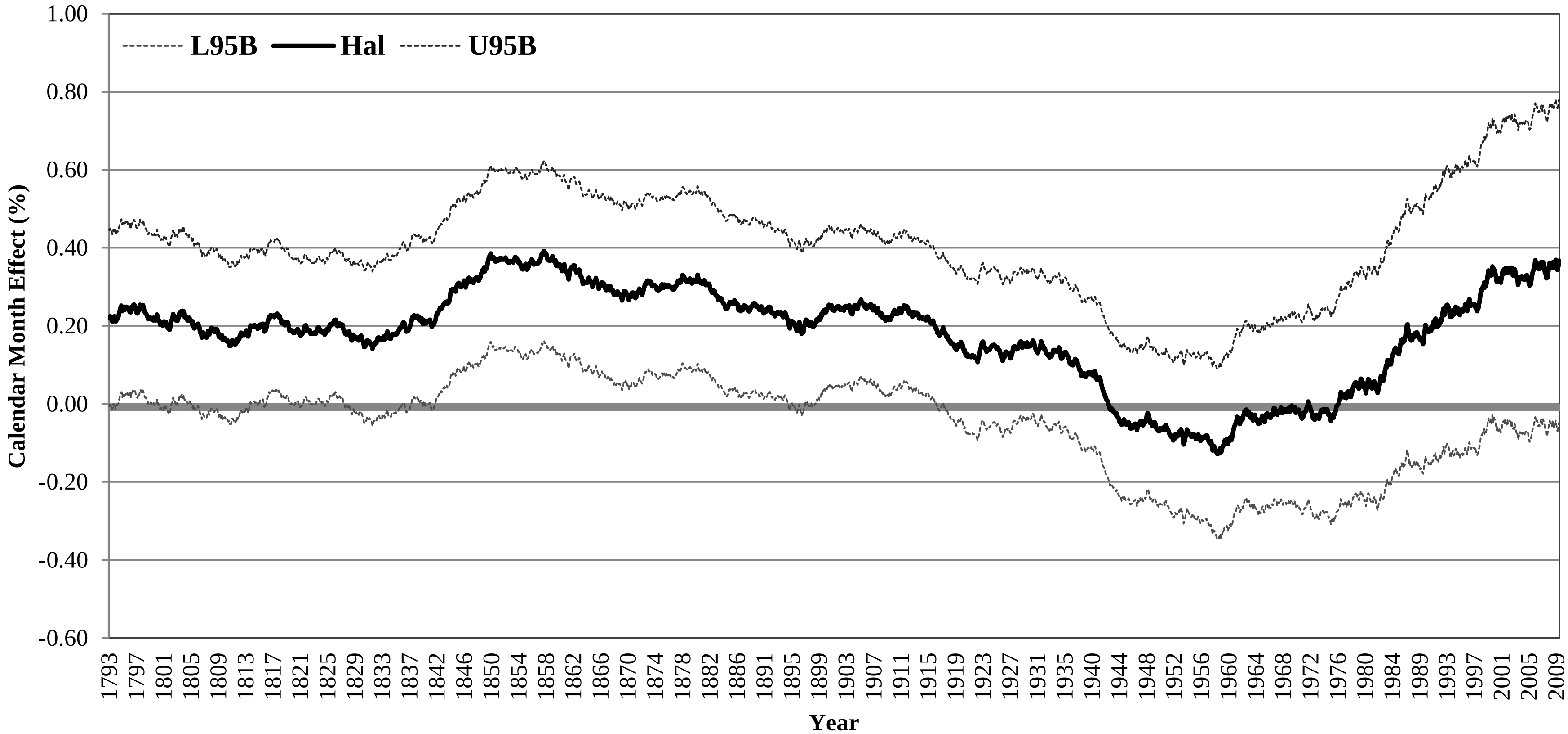


Figure 13. UK Halloween effect 100-year rolling window regressions estimated with Robust Regressions
The figure plots 100-year rolling window estimates of the Halloween effect from robust regressions based on M-estimation introduced in Huber (1973) for the UK monthly stock market index returns over the period 1693 to 2010. The dark solid line indicates the coefficient estimates of the effect and the light dotted lines show the upper and lower 95% bounds.



Appendix 1. Data sources

Status	Region	Country	Market Price Index Name	Sample Period		Market Total Return Indices	Proxy for the Risk Free Rate	Sample Period	
				Start	End			Start	End
	World		GFD World Price Index	02-1919	07-2011	GFD World Return Index	-	01-1926	12-2012
Developed	Asia	Hong Kong	Hong Kong Hang Seng Composite Index	08-1964	07-2011	Hang Seng Composite Return Index	Hong Kong 3-month HIBOR	01-1970	07-2011
		Japan	Nikkei 225 Stock Average (w/GFD extension)	08-1914	07-2011	Japan Topix Total Return Index	Japan Overnight LIBOR , Japan 3-month Treasury Bill Yield from Jan 1960	01-1921	07-2011
		Singapore	Singapore FTSE All-Share Index	08-1965	07-2011	Singapore SE Return Index	Singapore 3-month SIBOR	08-1973	07-2011
	Europe	Austria	Austria Wiener Boersekammer Share Index (WBKI)	02-1922	07-2011	Vienna SE ATX Total Return Index	Austria 3-month Treasury Bill Rate from Jan 1970, Europe 3-mth EURIBOR from Dec 1990	01-1970	07-2011
		Belgium	Brussels All-Share Price Index (w/GFD extension)	02-1897	07-2011	Brussels All-Share Return Index (GFD extension)	Belgium 3-month Treasury Bill Yield	01-1951	07-2011
		Denmark	OMX Copenhagen All-Share Price Index	01-1921	07-2011	OMX Copenhagen All-Share Gross Index	Denmark National Bank Discount Rate, Denmark 3-month Treasury Bill Yield from Jan 1976	01-1970	07-2011
		Finland	OMX Helsinki All-Share Price Index	11-1912	07-2011	OMX Helsinki All-Share Gross Index	Finland Central Bank Discount Rate, Bank of Finland Repo Rate from Dec 1977	11-1912	07-2011
		France	France CAC All-Tradable Index (w/GFD extension)	01-1898	07-2011	France CAC All-Tradable Total Return Index	Bank of France Discount Rate, France 3-month Treasury Bill Yield from Jan 1931	01-1898	07-2011
		Germany	Germany CDAX Composite Index (w/GFD extension)	01-1870	07-2011	Germany CDAX Total Return Index (w/GFD extension)	Germany Bundesbank Discount Rate, Germany 3-month Treasury Bill Yield from Jan 1953	01-1870	07-2011
		Greece	Athens SE General Index (w/GFD extension)	01-1954	07-2011	ASE Total Return General Index	Bank of Greece Discount Rate, Greece 3-month Treasury Bill Yield from Jan 1980	01-1977	07-2011
		Ireland	Ireland ISEQ Overall Price Index (w/GFD extension)	02-1934	07-2011	Datastream Global Equity Indices	Ireland 3-month Treasury Bill Yield	01-1973	07-2011
		Italy	Banca Commerciale Italiana Index (w/GFD extension)	10-1905	07-2011	Italy BCI Global Return Index (w/GFD extension)	Bank of Italy Discount Rate, Italy 3-month Treasury Bill Yield from Jan 1940	01-1925	07-2011

Appendix 1. (continued)

Status	Region	Country	Market Price Index Name	Sample Period		Market Total Return Indices	Proxy for the Risk Free Rate	Sample Period	
				Start	End			Start	End
Developed	Europe	Netherlands	Netherlands All-Share Price Index (w/GFD extension	02-1919	07-2011	Netherlands All-Share Return Index (w/GFD extensio	Netherlands 3-month Treasury Bill Yield	01-1951	07-2011
		Norway	Oslo SE All-Share Index	01-1970	07-2011	Datastream Global Equity Indices	Norway 3-month OIBOR	02-1980	07-2011
		Portugal	Oporto PSI-20 Index	01-1934	07-2011	Lisbon BVL General Return Index	Portugal 3-month Treasury Bill Yield	02-1988	07-2011
		Spain	Madrid SE General Index (w/GFD extension)	01-1915	07-2011	Barcelona SE-30 Return Index (w/GFD extension)	Bank of Spain Discount Rate, Spain 3-month MIBOR from Jun 1973 , Spain 3-month T-Bill Yield from Jul 1982	04-1940	07-2011
		Sweden	Sweden OMX Aff?rsv?rldens General Index	01-1906	07-2011	OMX Stockholm Benchmark Gross Index (GFD extension	Sweden Riksbank Reference Rate, Sweden 3-month Treasury Bill Yield from Jan 1955	01-1919	07-2011
		Switzerland	Switzerland Price Index (w/GFD extension)	01-1914	07-2011	Swiss Performance Index	Switzerland Overnight LIBOR, Switzerland 3-month Secondary Market T-Bill Yield from Jan 1980	02-1966	07-2011
		United Kingdom	UK FTSE All-Share Index (w/GFD extension)	02/1693	07-2011	UK FTSE All-Share Return Index (w/GFD extension)	UK 3-month Treasury Bill Yield, Bank of England Base Lending Rate from Jan 1900	09-1694	07-2011
	Mid East	Israel	Tel Aviv All-Share Index	02-1949	05-2011	Datastream Global Equity Indices	Israel 3-month Treasury Bill Yield	01-1993	05-2011
	North America	Canada	Canada S&P/TSX 300 Composite (w/GFD extension)	12-1917	07-2011	Canada S&P/TSX-300 Total Return Index	Canada 3-month Treasury Bill Yield	03-1934	07-2011
		United States	S&P 500 Composite Price Index (w/GFD extension)	09/1791	07-2011	S&P 500 Total Return Index (w/GFD extension)	GFD Central Bank Discount Rate Index at annual frequency (interest rates are treated as same every month within a year), USA Government 90-day T-Bills Secondary Market from Jan 1920	02-1800	07-2011
	Oceania	Australia	Australia ASX All-Ordinaries (w/GFD extension)	02/1875	07-2011	Australia ASX Accumulation Index-All Ordinaries	Australia 3-month Treasury Bill Yield from Jul 1928	07-1928	07-2011
		New Zealand	New Zealand SE All-Share Capital Index	01-1931	07-2011	New Zealand SE Gross All-Share Index	New Zealand 3-month Treasury Bill Yield	07-1986	07-2011

Appendix 1. (continued)

Status	Region	Country	Market Price Index Name	Sample Period		Market Total Return Indices	Proxy for the Risk Free Rate	Sample Period	
				Start	End			Start	End
Emerging	Africa	Egypt	Cairo SE EFG General Index	01-1993	07-2011	Datastream Global Equity Indices	Egypt 3-month Treasury Bill Yields	10-1996	07-2011
		Morocco	Casablanca Financial Group 25 Share Index	01-1988	07-2011	Datastream Global Equity Indices	Morocco Interbank Offer Rate, Morocco 3-month Treasury Bill Yield from Jan 2008	04-1994	07-2011
		South Africa	FTSE/JSE All-Share Index (w/GFD extension)	02-1910	07-2011	Johannesburg SE Return Index	South Africa 3-month Treasury Bill Yield	02-1960	07-2011
	Asia	China	Shanghai SE Composite	01-1991	07-2011	China Stock Return Index	China Central Bank Discount Rate, China 3 Month Repo on Treasury Bills from Mar 1990	01-1993	07-2011
		India	Bombay SE Sensitive Index (w/GFD extension)	08-1920	07-2011	India Stocks Total Return Index	India 3-month Treasury Bill Yield	01-1988	07-2011
		Indonesia	Jakarta SE Composite Index	04-1983	07-2011	Indonesia Stock Return Index	Indonesia Overnight Interbank Rate, Indonesia 3-month JIBOR from Dec 1993	01-1988	07-2011
		Korea	Korea SE Stock Price Index (KOSPI)	02-1962	07-2011	Korea Stocks Total Return Index	Bank of Korea Discount Rate, Korea Overnight Interbank Rate Aug 1976	02-1962	07-2011
		Malaysia	Malaysia KLSE Composite	01-1974	07-2011	Kuala Lumpur SE Return Index	Malaysia 3-month T-bill Discount Rate	01-1974	07-2011
		Philippines	Manila SE Composite Index	01-1953	07-2011	Philippines Return Stock Index	Philippines 3-month Treasury Bill Yield	01-1982	07-2011
		Taiwan	Taiwan SE Capitalization Weighted Index	02-1967	07-2011	Taiwan FTSE/TSE-50 Return Index	Taiwan 3-month T-bill Yield	01-1988	07-2011
		Thailand	Thailand SET General Index	05-1975	07-2011	Bangkok SE Return Index	Bank of Thailand 1-day Repurchase Rate, Thailand 3-month Treasury Bill Yield Jan 1977	05-1975	07-2011
	Europe	Czech Republic	Prague SE PX Index	10-1993	07-2011	Datastream Global Equity Indices	Czech Republic 3-month Treasury Bill Yield	12-1993	07-2011
		Hungary	Vienna OETEB Hungary Traded Index (Forint)	01-1995	07-2011	Budapest Stock Exchange Index (BUX)	Hungary 3-month Treasury Bill Yield	01-1995	07-2011
		Poland	Warsaw SE 20-Share Composite	05-1994	07-2011	Warsaw SE General Index (WIG)	Poland 3-month WIBOR	05-1994	07-2011
		Russia	Russia AK&M Composite (50 shares)	10-1993	07-2011	Russian Depository Total Return Index	Russia 3-month Treasury Bill Yield	01-1995	06-2011
		Turkey	Istanbul SE IMKB-100 Price Index	02-1986	07-2011	Turkey ISE-100 Total Return Index	Turkey 3-6 month Treasury Bill Yield	02-1986	07-2011

Appendix 1. (continued)

Status	Region	Country	Market Price Index Name	Sample Period		Market Total Return Indices	Proxy for the Risk Free Rate	Sample Period	
				Start	End			Start	End
Emerging	North America	Mexico	Mexico SE Indice de Precios y Cotizaciones (IPC)	02-1930	07-2011	Mexico SE Return Index	Mexico 3-month Cetes Yield	01-1988	07-2011
	South America	Brazil	MSCI Brazil	01-1990	07-2011	-	-	-	-
		Chile	Santiago SE Indice General de Precios de Acciones	01-1927	07-2011	Santiago SE Return Index	Chile Central Bank Mimimum Interest Rate, Chile Repo 7 Day from Aug 1994	01-1983	07-2011
		Colombia	Colombia IGBC General Index (w/GFD extension)	02-1927	07-2011	Colombia Stock Return Index	Colombia Bank of the Republic Discount Rate, Colombia TBS Interbank Rate from Jan 1989, Colombia 3-month Treasury Bill Yield from Jan 1998	01-1988	07-2011
		Peru	Lima SE General Index (w/GFD extension)	01-1933	07-2011	Peru Stock Return Index	Central Bank of Peru Discount Rate, Peru Interbank Offer Rate Sep 1995	01-1993	07-2011
Frontier	Africa	Botswana	Botswana SE Domestic Companies Index	06-1989	07-2011	-	-		
		Ghana	Standard and Poor's Ghana Broad Market Index	01-1996	07-2011	-	-		
		Kenya	Kenya Nairobi Stock Exchange	02-1990	07-2011	-	-		
		Mauritius	Securities Exchange of Mauritius Index (SEMDEX)	08-1989	07-2011	Mauritius Semdex Total Return Index Rupees	Mauritius Interbank Overnight Rate, Mauritius 3-month Treasury Bill Yield from Dec 1996	08-1989	07-2011
		Nigeria	Nigeria SE Index	01-1988	07-2011	-	-		
		Tunisia	Standard and Poor's Tunisia Broad Market Index	01-1996	07-2011	-	-		
						-	-		
	Asia	Bangladesh	Bangladesh Stock Exchange All Share Price	02-1990	07-2011	-	-		
		Kazakhstan	Kazakhstan SE KASE Index	08-2000	07-2011	-	-		
		Pakistan	Pakistan Karachi SE-100 Index	08-1960	07-2011	Pakistan Stock Return Index	Pakistan Overnight Repo Rate, Pakistan 3-month Treasury Bill Rate from Mar 1991	01-1988	07-2011
		Sri Lanka	Colombo SE All-Share Index	01-1985	07-2011	Datastream Global Equity Indices	Sri Lanka 3-month Treasury Bill Yield	06-1987	07-2011
		Viet Nam	Viet Nam Stock Exchange Index	01-2001	07-2011	-	-		

Appendix 1. (continued)

Status	Region	Country	Market Price Index Name	Sample Period		Market Total Return Indices	Proxy for the Risk Free Rate	Sample Period	
				Start	End			Start	End
Frontier	Europe	Bosnia And Herzegowina	Sarajevo SE Bosnian Investment Funds Index	11-2004	07-2011	-	-		
		Bulgaria	Bulgaria SE SOFIX Index	11-2000	07-2011	Datastream Global Equity Indices	Bulgaria 1-Mth Sofibor	11-2000	07-2011
		Croatia	Croatia Bourse Index (CROBEX)	02-1997	07-2011	-	-		
		Estonia	OMX Tallinn (Omxt)	07-1996	07-2011	OMX Talinn SE Total Return Index	Europe 3-mth EURIBOR	07-1996	07-2011
		Lithuania	Standard and Poor's Lithuania Broad Market Index	01-1996	07-2011	OMX Vilnius VILSE Total Return Index	Lithuania 3-month Treasury Bill Yield	01-1996	07-2011
		Romania	Bucharest SE Index in Lei	10-1997	07-2011	Datastream Global Equity Indices	Romania National Bank Refinancing Rate	10-1997	07-2011
		Serbia	MSCI Serbia	08-2008	07-2011	-	-		
		Slovenia	HSBC Slovenia Euro	01-1996	07-2011	Datastream Global Equity Indices	Slovenia 3-month T-bill Yield	01-1999	07-2011
		Ukraine	Ukraine PFTS OTC Index	02-1998	07-2011	-	-		
	Mid East	Bahrain	Bahrain BSE Composite Index	07-1990	07-2011	Datastream Global Equity Indices	Bahrain 3-month Treasury Bill Yield	01-2004	07-2011
		Jordan	Jordan AFM General Index	02-1978	07-2011	Datastream Global Equity Indices	Jordan 6-12-month Treasury Bill Yield	07-2006	07-2011
		Kuwait	Kuwait SE Index	01-1995	07-2011	Datastream Global Equity Indices	Kuwait 3-month Interbank Offer Rate	01-2004	07-2011
		Lebanon	Beirut Stock Exchange Index	02-1996	07-2011	-	-		
		Oman	Muscat Stock Market General Index	12-1992	07-2011	Datastream Global Equity Indices	Oman 3-month Interbank Rate	10-2005	07-2011
		Qatar	Qatar SE Index	10-1999	07-2011	Datastream Global Equity Indices	Qatar 3-month Interbank Rate	01-2004	07-2011
		United Arab Emirates	United Arab Emirates SE Index	01-1988	09-2008	Datastream Global Equity Indices	United Arab Emirate 3-month Interbank Rate	01-2004	09-2008
	North America	Jamaica	Jamaica Stock Exchange All-Share Composite Index	07-1969	01-2011	-	-		
		Trinidad And Tobago	Standard and Poor's Trinidad and Tobago Broad Market Index	01-1996	07-2011	-	-		
	South America	Argentina	Buenos Aires SE General Index (IVBNG)	01-1967	07-2011	Datastream Global Equity Indices	Argentina Interbank up to 15 day-term	08-1993	07-2011

Appendix 1. (continued)

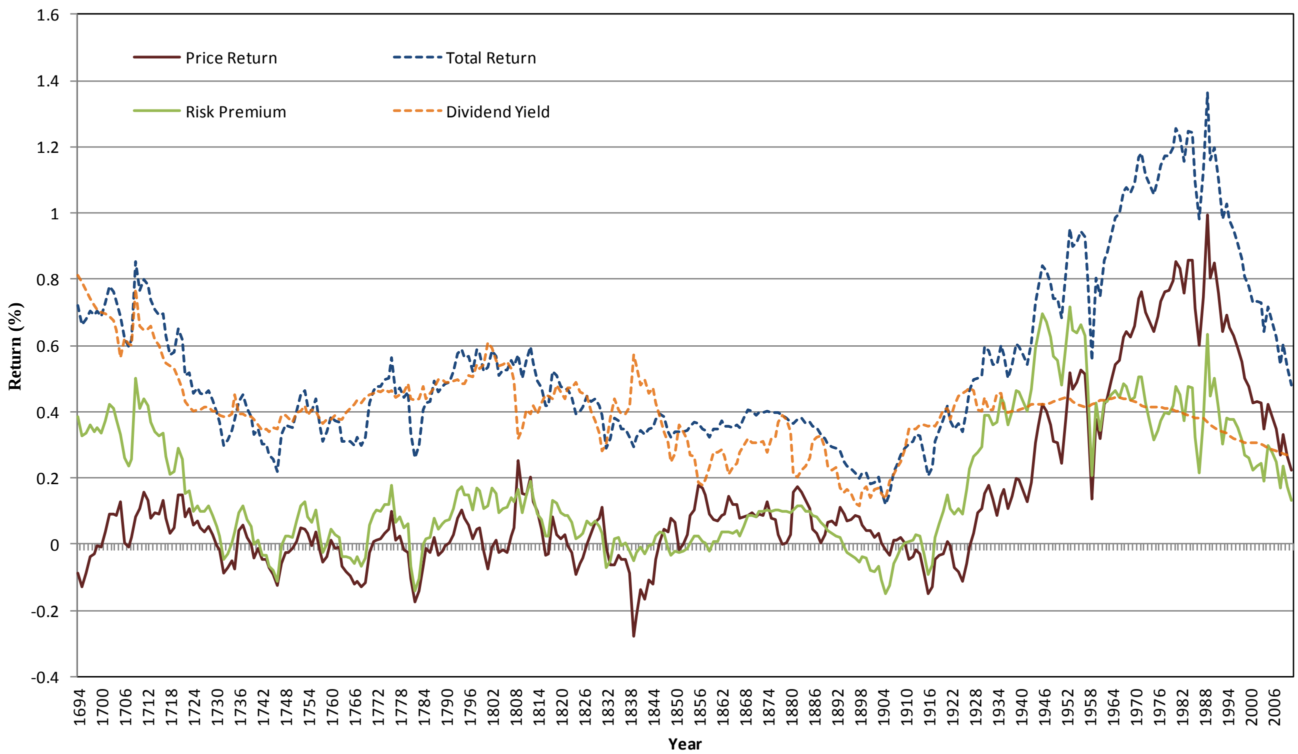
Status	Region	Country	Market Price Index Name	Sample Period		Market Total Return Indices	Proxy for the Risk Free Rate	Sample Period	
				Start	End			Start	End
Rarely Studied	Africa	Cote D`Ivoire	Cote d'Ivoire Stock Market Index	07-1997	07-2011	-	-		
		Malawi	Malawi SE Index	04-2001	01-2011	-	-		
		Namibia	Namibia Stock Exchange Overall Index	03-1993	07-2011	-	-		
		Swaziland	Swaziland Stock Market Index	01-2000	04-2007	-	-		
		Tanzania	Dar-Es-Saleem SE Index	12-2006	07-2011	-	-		
		Uganda	USE All Share Index	02-2007	07-2011	-	-		
		Zambia	Zambia Lusaka All Share (n/a)	02-1997	07-2011	-	-		
	Asia	Kyrgyzstan	Kyrgyz Stock Exchange Index	01-2000	05-2011	-	-		
		Mongolia	Mongolia SE Top-20 Index	09-1995	05-2011	-	-		
		Nepal	Nepal NEPSE Stock Index	01-1996	07-2011	-	-		
	Europe	Cyprus	Cyprus CSE All Share Composite	01-1984	07-2011	Datastream Global Equity Indices	Cyprus 3-month Treasury Bill Yield, Europe 3-mth EURIBOR from Nov 1982	01-1993	07-2011
		Georgia	Standard and Poor's/IFCG Extended Front 150 Georgia Dollar	11-2008	07-2011	-	-		
		Iceland	OMX Iceland All-Share Price Index	01-1993	07-2011	OMX Iceland All-Share Gross Index	Iceland 3-month Treasury Bill Yield	07-2002	07-2011
		Latvia	Nomura Latvia	02-1996	07-2011	OMX Riga SE Total Return Index	Latvia 3-month Treasury Bill Yield	05-1996	07-2011
		Luxembourg	Luxembourg SE LUXX Index (w/GFD extension)	01-1954	07-2011	Luxembourg SE Total Return Index	Europe 3-mth EURIBOR	01-1985	07-2011
		Macedonia	Macedonia MBI-10 Index	11-2001	07-2011				
		Malta	Malta SE Index	01-1996	07-2011	Datastream Global Equity Indices	Malta 3-month T-bill Yield	02-2000	07-2011
		Montenegro	Montenegro NEX-20 Index	04-2003	07-2011	-	-		
		Slovak Republic	Bratislava SE SAX Index	10-1993	07-2011	-	-		

Appendix 1. (continued)

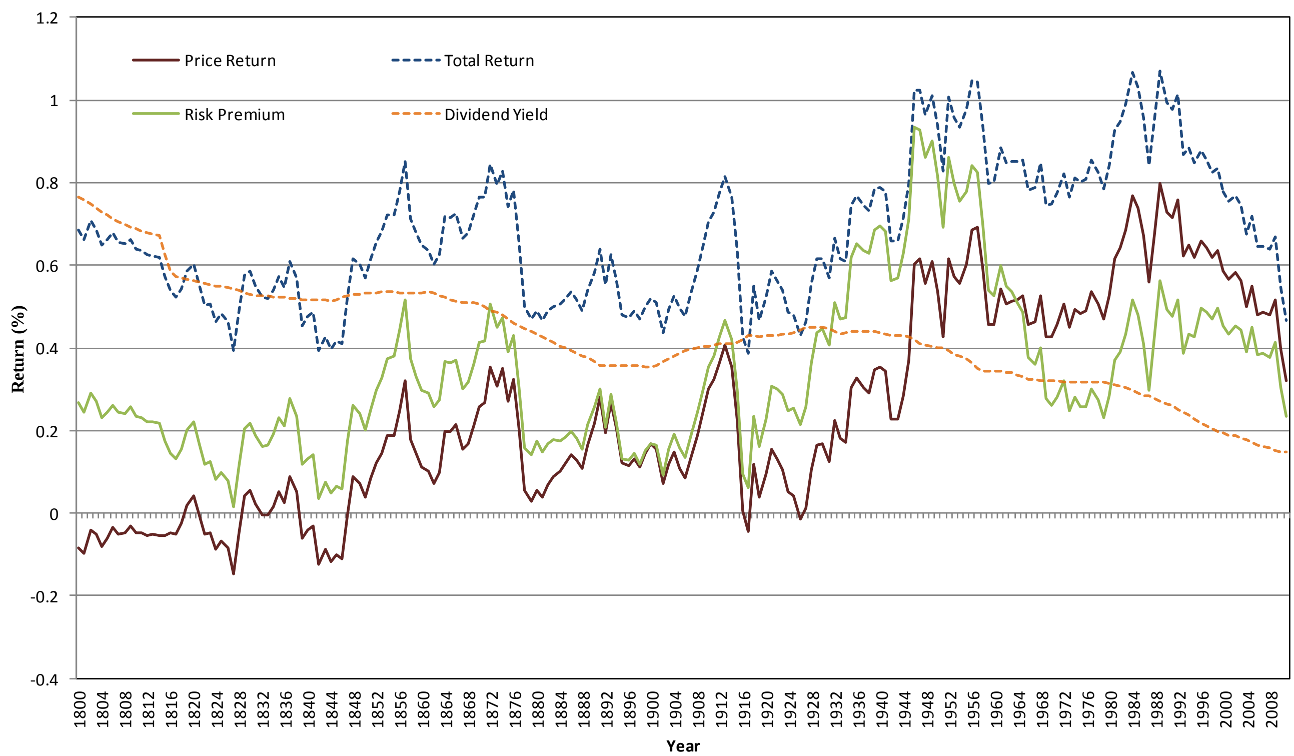
Status	Region	Country	Market Price Index Name	Sample Period		Market Total Return Indices	Proxy for the Risk Free Rate	Sample Period	
				Start	End			Start	End
Rarely Studied	Mid East	Iran	Tehran SE Price Index (TEPIX)	04-1990	06-2011	-	-		
		Iraq	Iraq SE ISX Index	11-2004	07-2011	-	-		
		Palestine	Palestine Al-Quds Index	08-1997	07-2011	-	-		
		Saudi Arabia	Saudi Arabia Tadawul SE Index	01-1993	07-2011	-	-		
		Syrian Arab Republic	Damascus Securities Exchange Weighted Index	01-2010	07-2011	-	-		
	North America	Bahamas	BISX All Share Index	12-2002	07-2011	-	-		
		Barbados	Barbados SE Local Stock Index	04-1989	02-2011	-	-		
		Bermuda	Bermuda Royal Gazette BSX Composite Index	09-1996	10-2010	-	-		
		Costa Rica	BCT Corp. Costa Rica Stock Market Index	10-1997	02-2011	-	-		
		El Salvador	El Salvador Stock Market Index	01-2004	07-2011	-	-		
		Panama	Panama Stock Exchange Index (BVPSI)	01-1993	07-2011	-	-		
	South America	Ecuador	Ecuador Bolsa de Valores de Guayaquil (Dollars)	02-1994	07-2011	-	-		
		Paraguay	Asuncion SE PDV General Index	11-1993	09-2008	-	-		
		Uruguay	Uruguay Stock Exchange Index	02-1925	12-1995	-	-		
		Venezuela	Caracas SE General Index (w/GFD extension)	01-1937	07-2011	Datastream Global Equity Indices	Venezuela 3-month Treasury Bill Yields	12-1996	12-2003

Appendix 2. 30-year moving average of price returns, total returns, risk premiums and dividend yield for individual countries that have over 60 years data available, the charts are arranged by descending order of sample size

United Kingdom



United States



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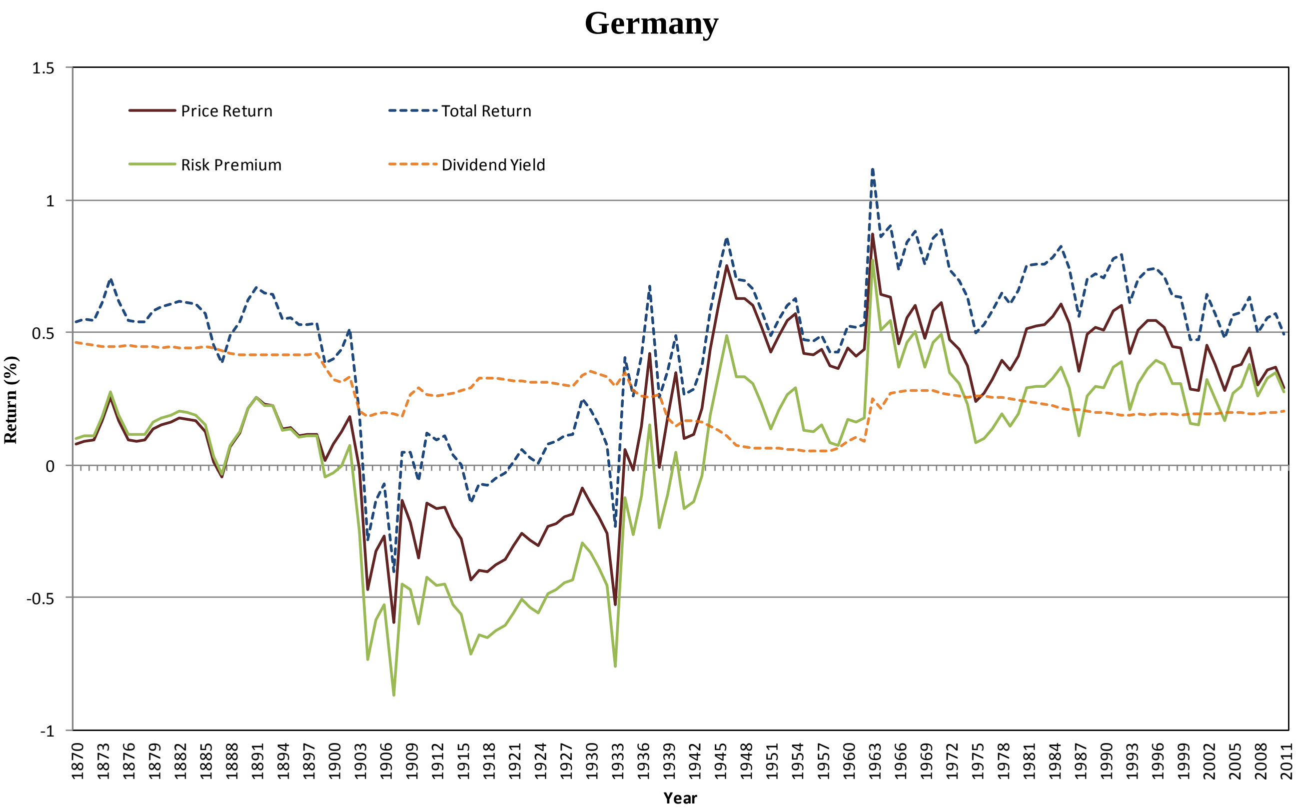
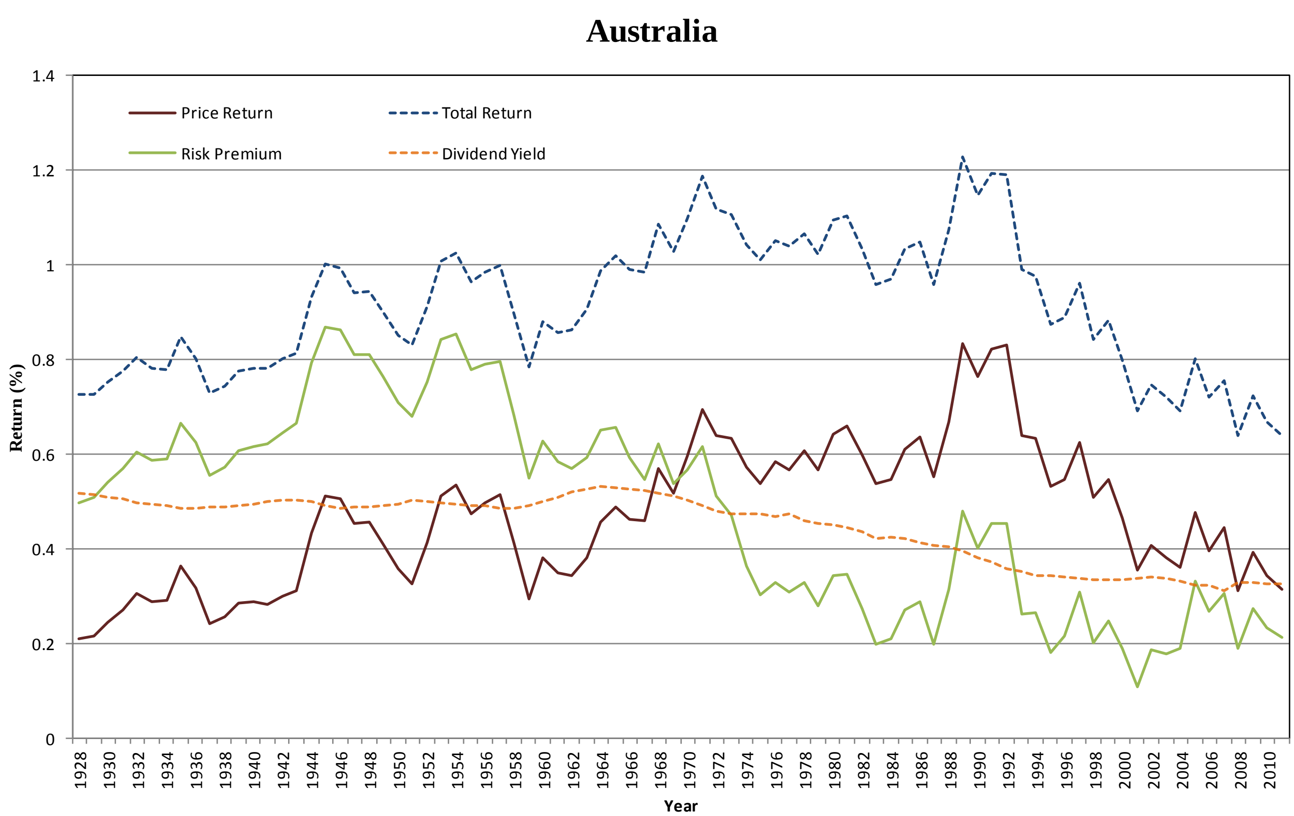
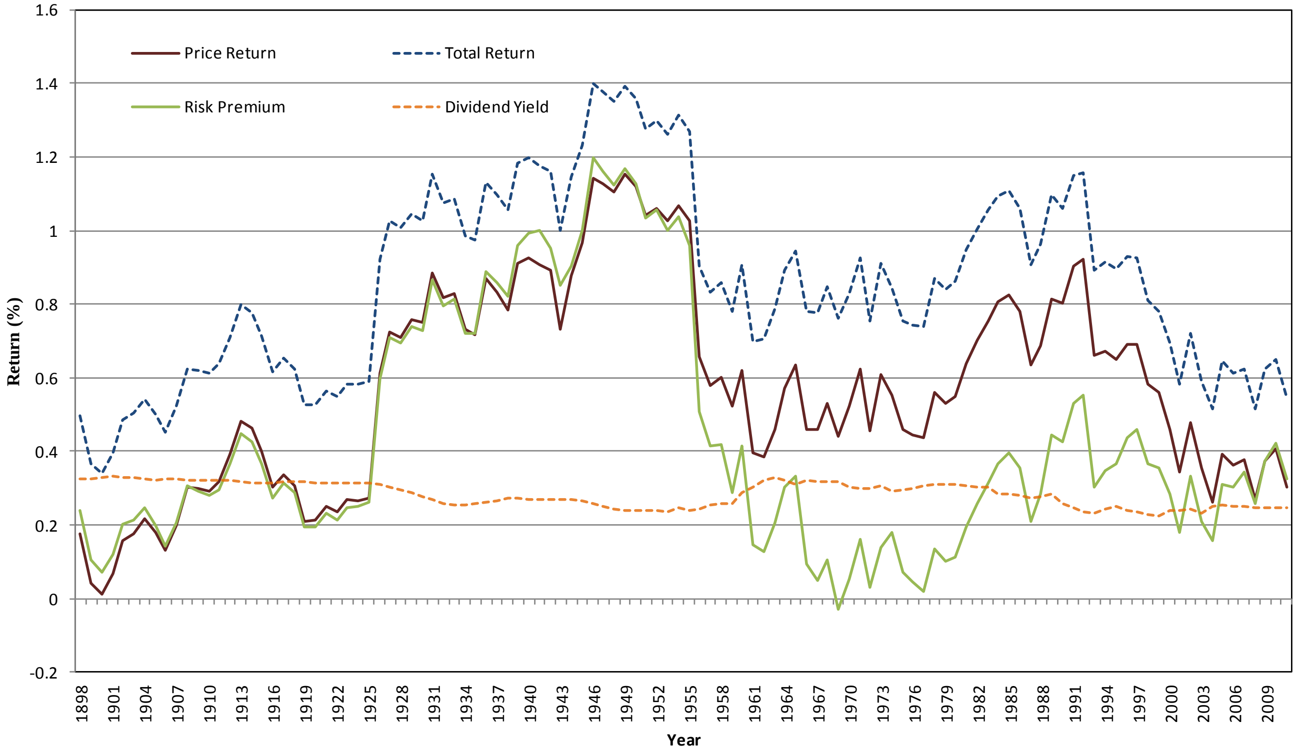


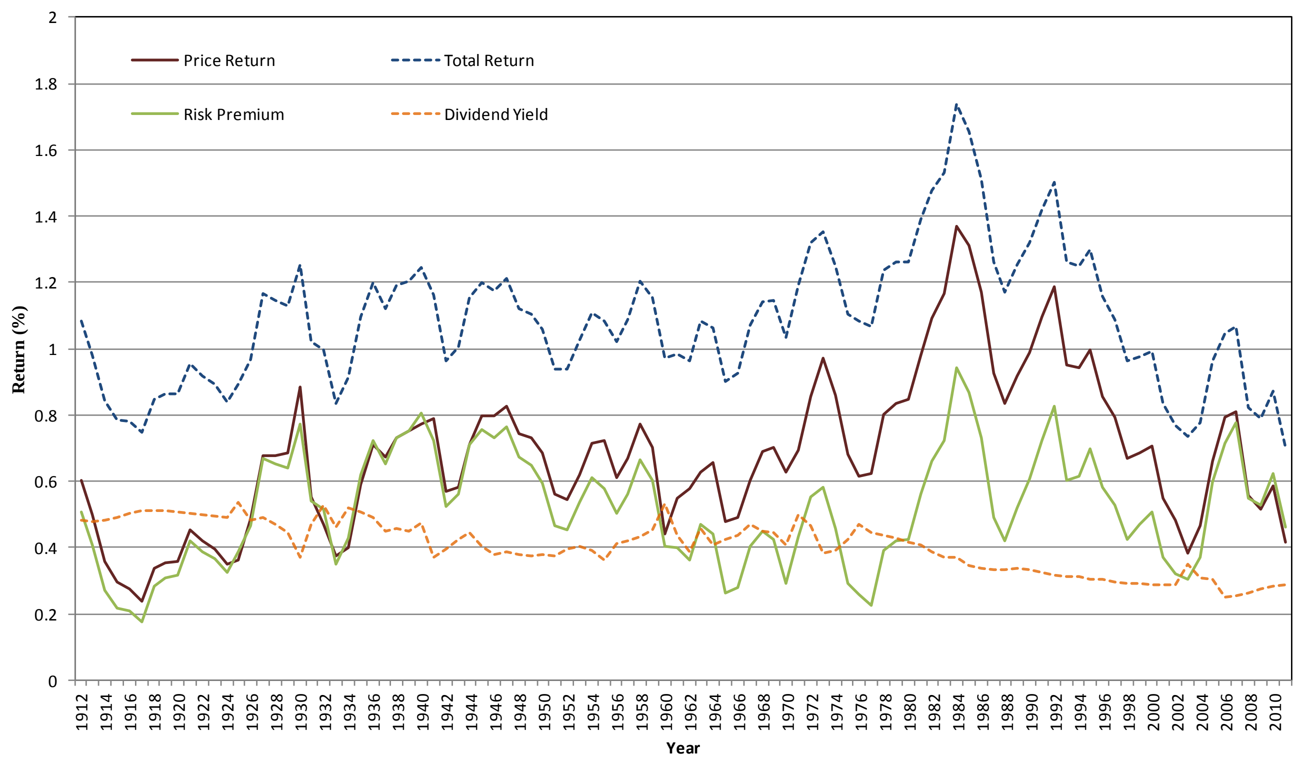


Appendix 2. Continued

France



Finland



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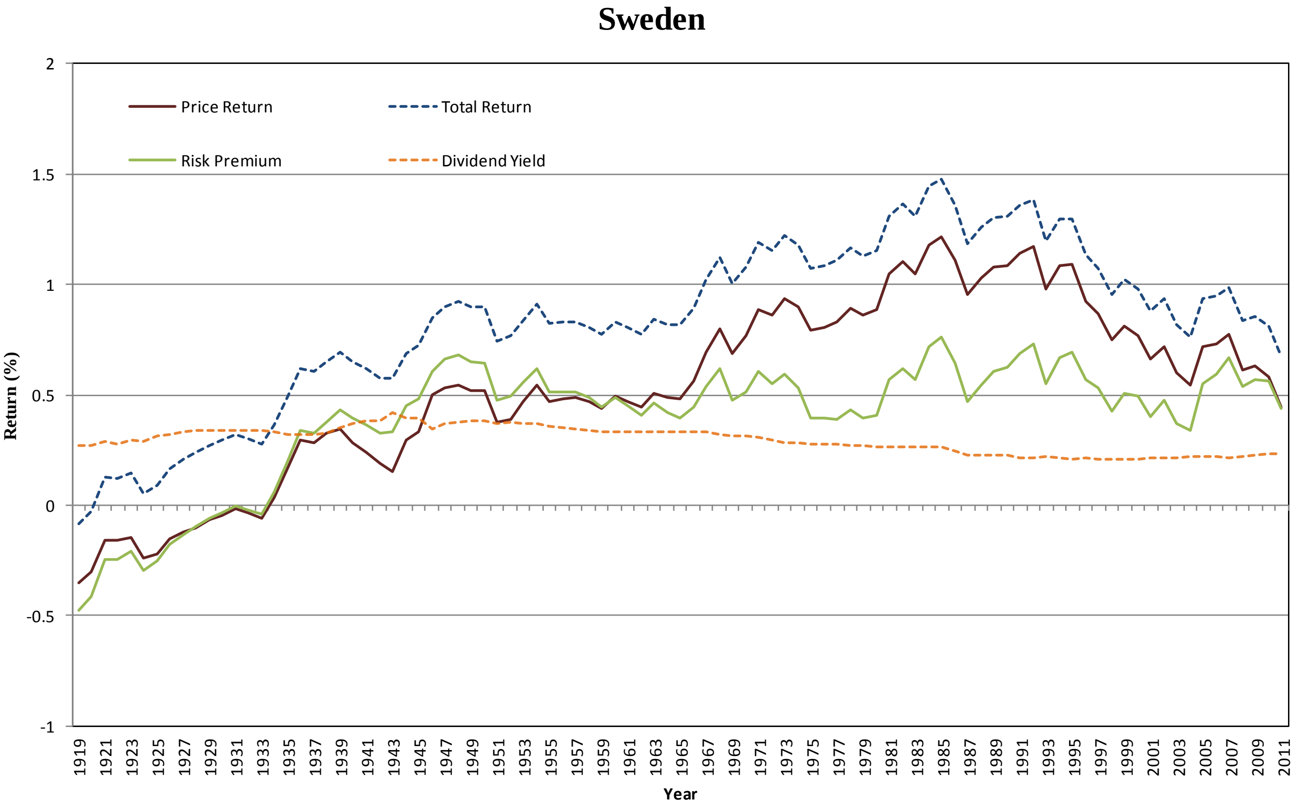

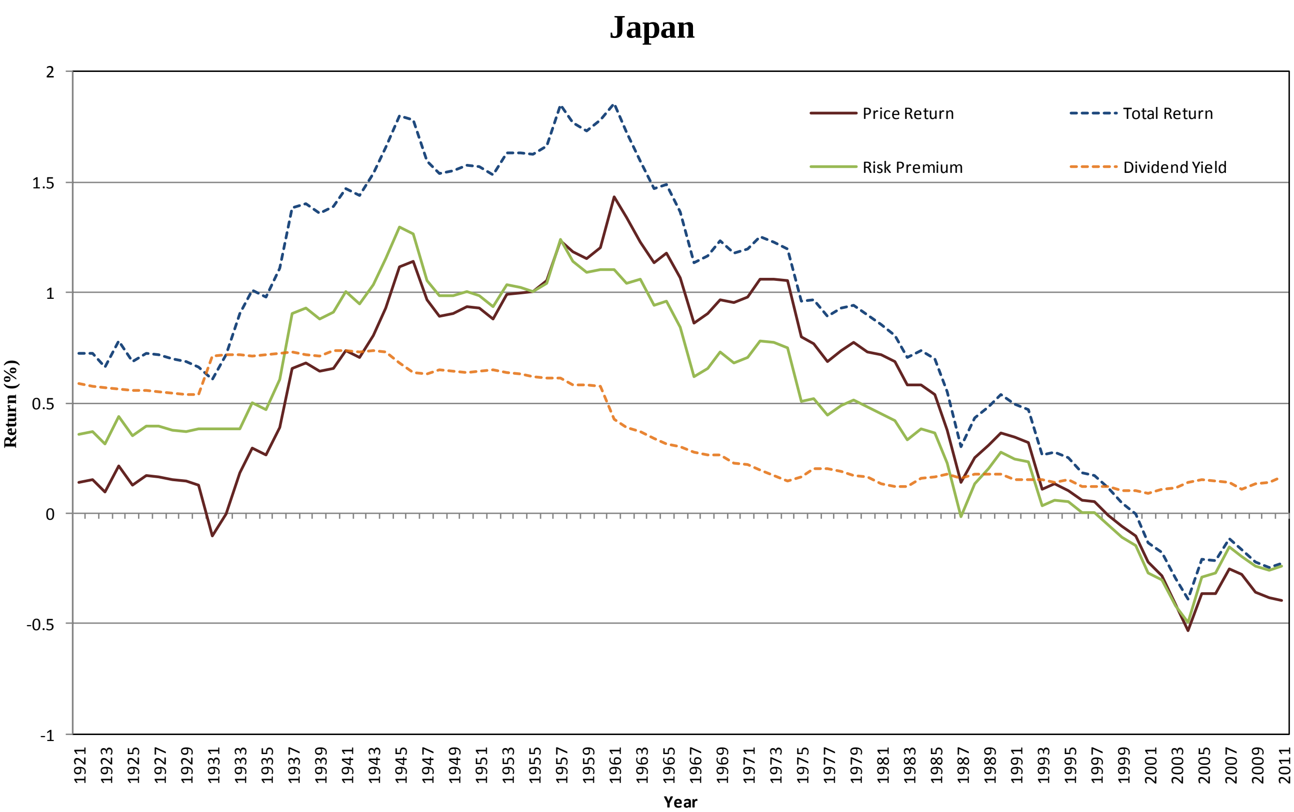

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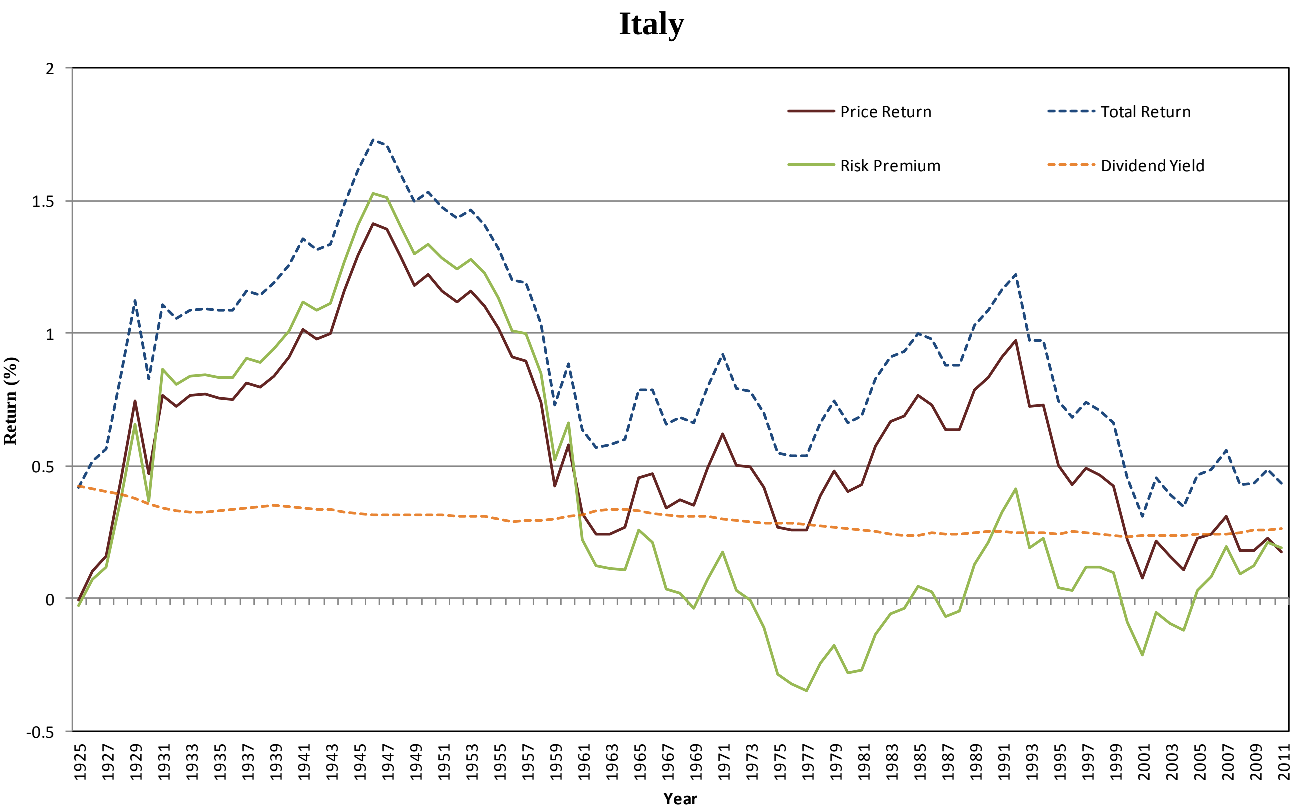
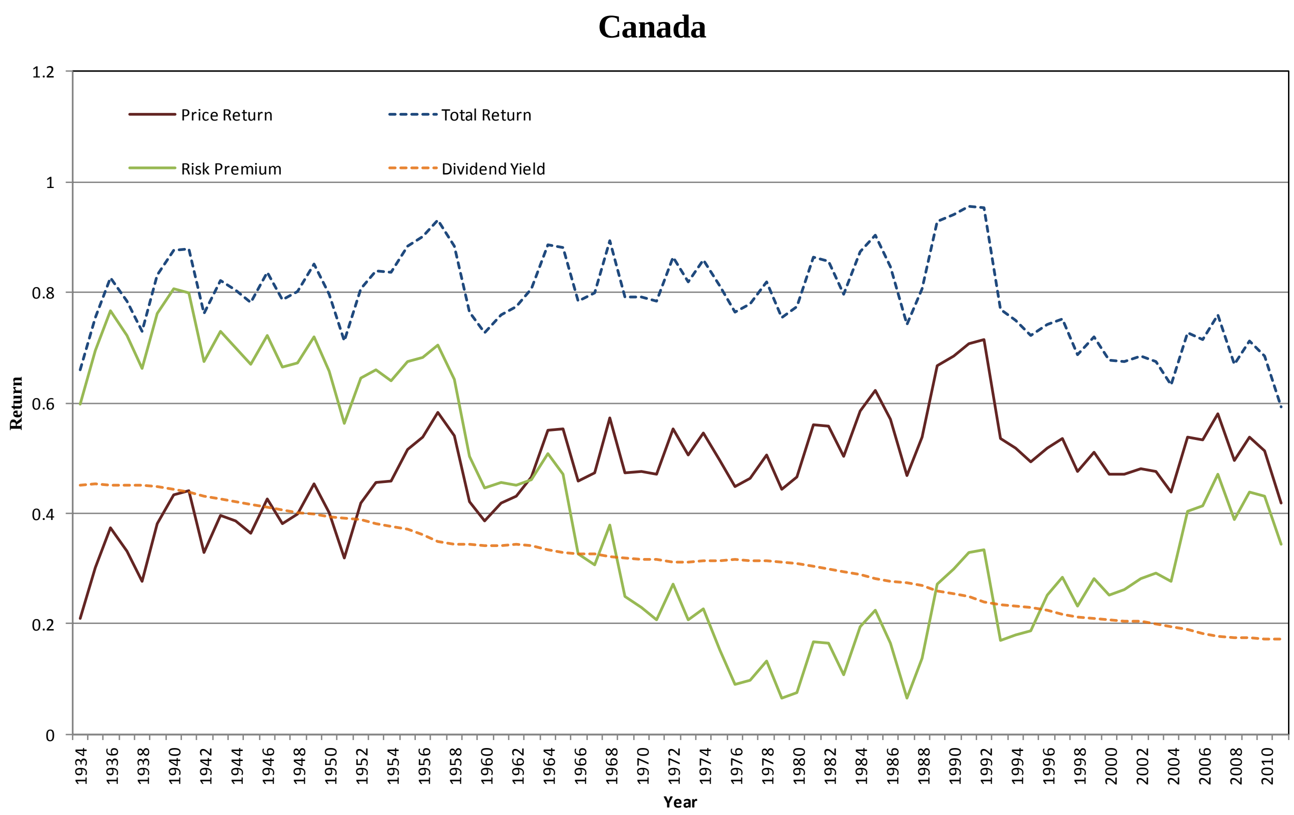
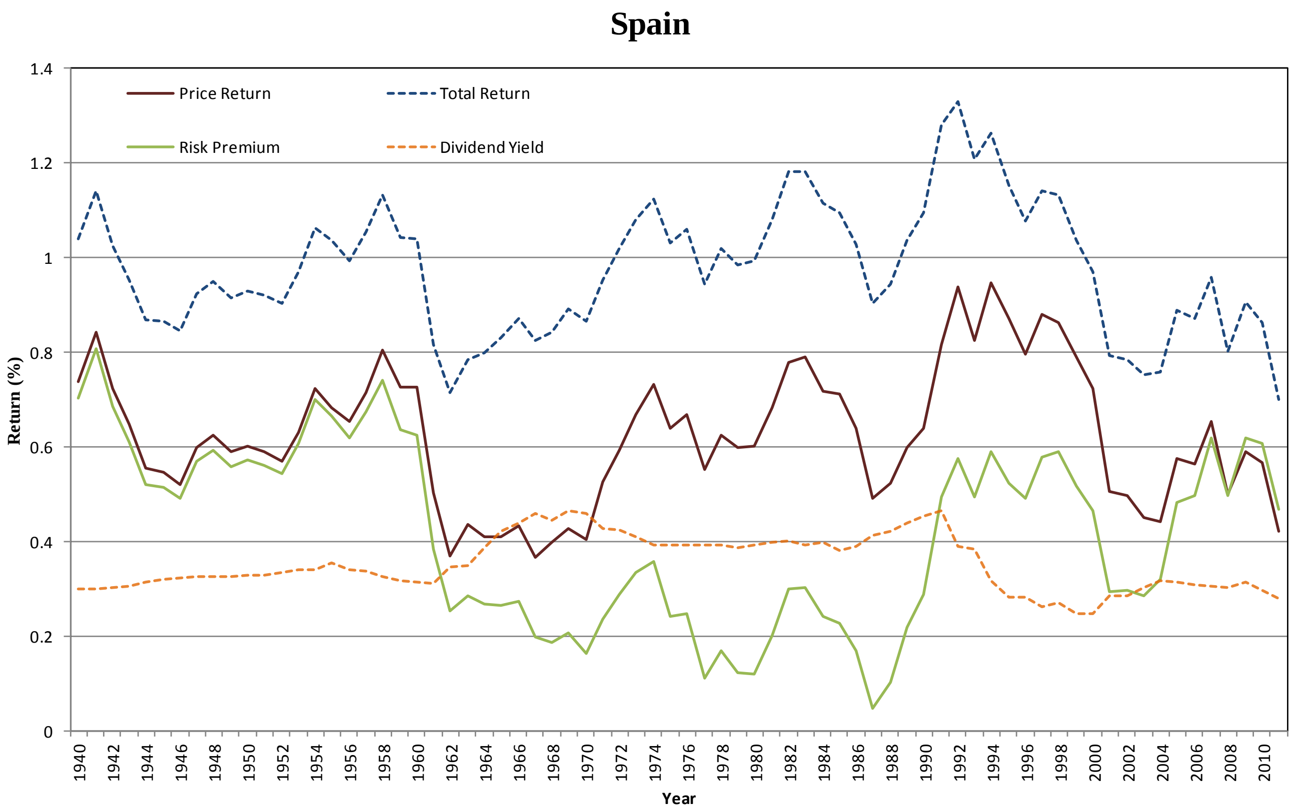
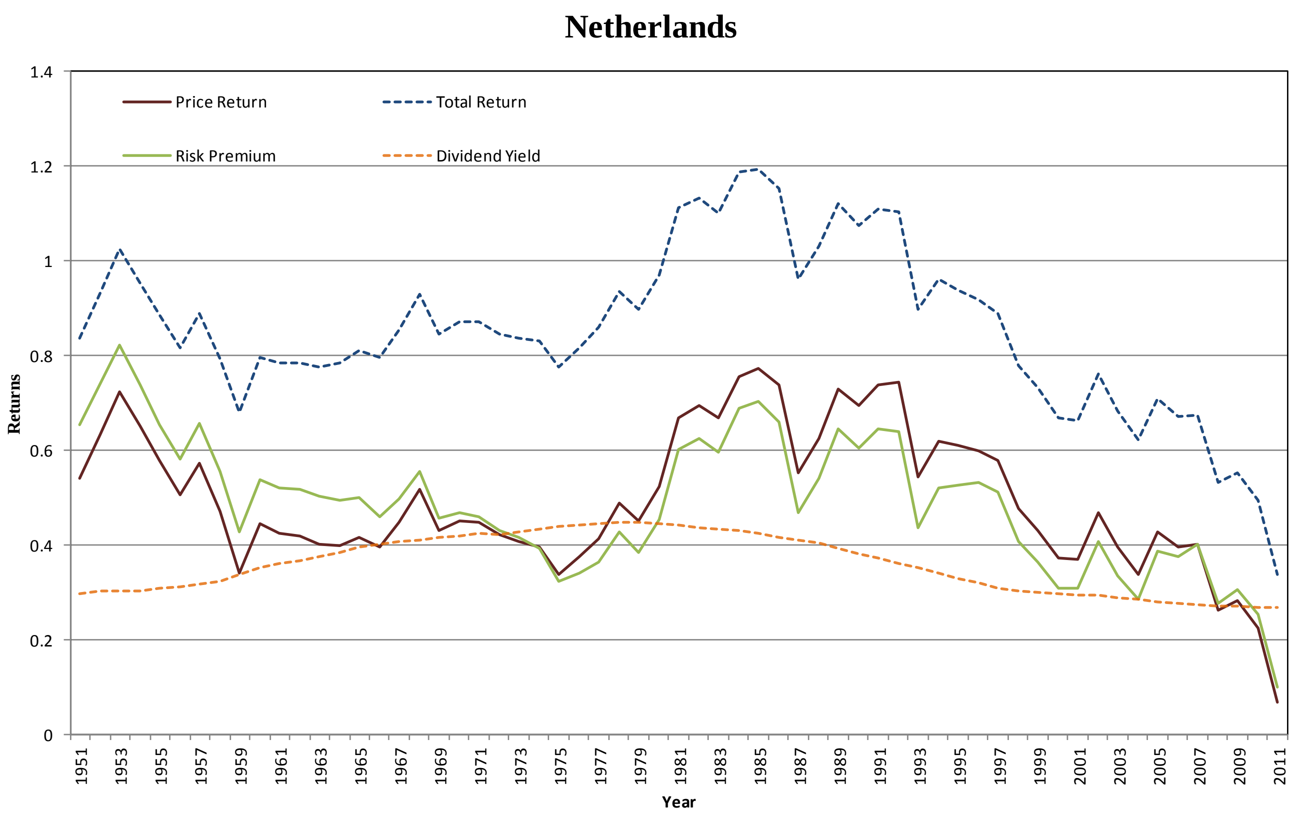


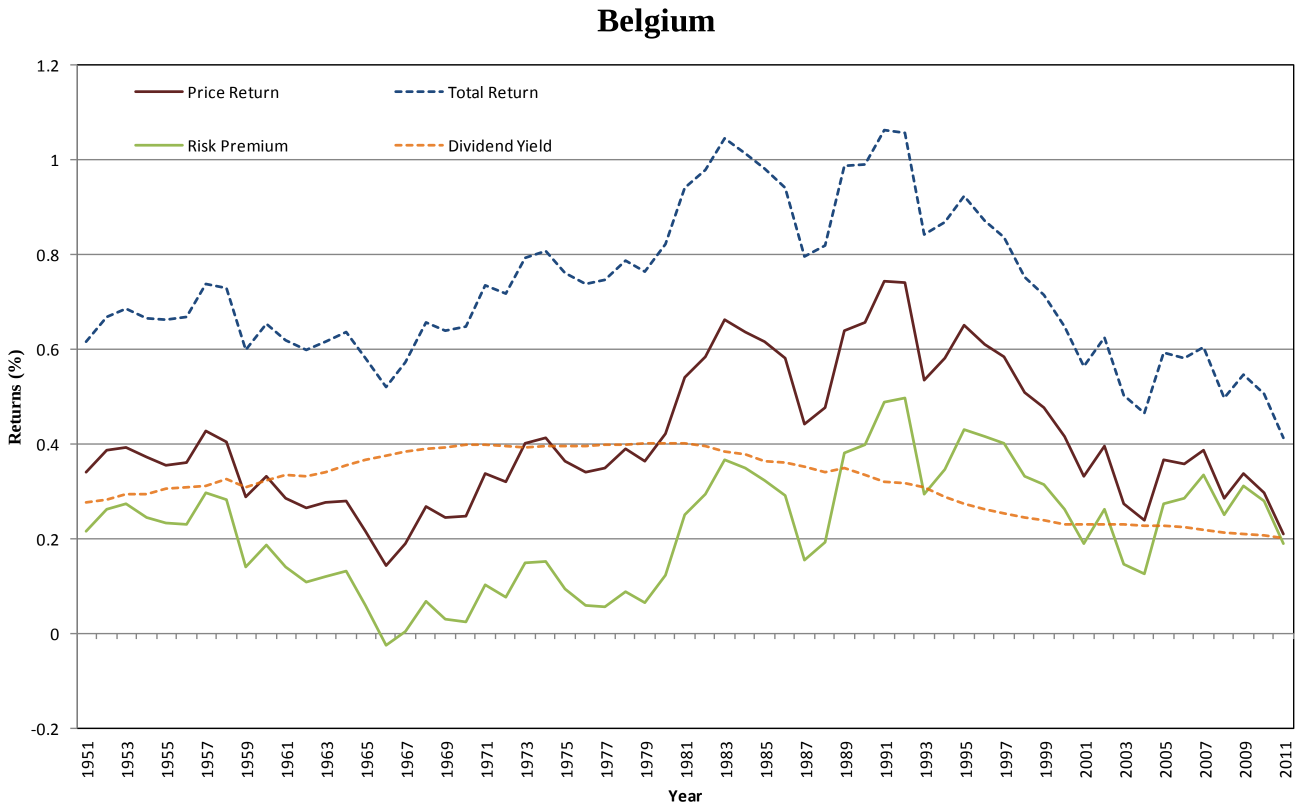


Appendix 2. Continued





Appendix 2. Continued



Appendix 3. Halloween effect in both mean and variance

We use GARCH (1,1) with a Halloween dummy in the variance equation (Equation 2) to model a Halloween seasonal in the mean and variance of returns.

$$r_t = \alpha + \beta_H Hal_t + \varepsilon_t \ ,$$
$$\varepsilon_t | \Phi_{t-1} \sim N(0, \sigma_t^2),$$
$$\sigma_t^2 = \mu_0 + \mu_1 \varepsilon_{t-1}^2 + \mu_2 \sigma_{t-1}^2 + \beta_V Hal_t \qquad (2)$$

We include world index and 57 countries that have price indices data available for over 20 years. Table 11 reports the Halloween effects in returns and in variance for the world and individual markets. In theory, if there is a significantly higher winter return, we would expect the variance to be higher in winter than in summer. However, 35 of the 57 countries actually have a smaller variance in winter than in summer, in which 23 are even significant. This evidence suggests risk difference can not explain the existence of the Halloween effect, if anything, the risk in summer months is strikingly higher than winter months.

Table 11. Halloween effect -GARCH (1,1)-M model

This table provides the results for the Halloween effect estimated with GARCH (1,1) in mean model: $r_t = \alpha + \beta_H Hal_t + \varepsilon_t$, $\varepsilon_t|\Phi_{t-1} \sim N(0, \sigma_t^2), \sigma_t^2 = \mu_0 + \mu_1 \varepsilon_{t-1}^2 + \mu_2 \sigma_{t-1}^2 + \beta_V Hal_t$ for 57 countries that have data for over 20 years and the world index. Hal_t is the Halloween dummy that equals one if the month falls in the period of November through April. T-values are adjusted using Newey-West standard errors.

*** denotes significance at 1% level; **denotes significance at 5% level; *denotes significance at 10% level. Countries are grouped based on the MSCI market classification and geographical regions.

Status	Region	Start Date	End Date	Country	Halloween Effect			Variance		
					β_H	t-value		β_V	t-value	
Developed	Asia	11-1964	07-2011	Hong Kong	1.11	1.88	*	-11.52	-3.62	***
		11-1914	07-2011	Japan	0.89	2.88	***	-2.70	-6.17	***
		11-1965	07-2011	Singapore	0.81	1.68	*	-4.36	-2.88	***
	Europe	02-1922	07-2011	Austria	1.09	3.53	***	3.82	10.13	***
		02/1897	07-2011	Belgium	0.24	1.22		-0.79	-1.42	
		01-1921	07-2011	Denmark	0.30	1.85	*	-0.32	-1.11	
		11-1912	07-2011	Finland	-0.28	-1.15		-2.52	-5.31	***
		01/1898	07-2011	France	0.60	2.92	***	-1.84	-7.59	***
		01/1870	07-2011	Germany	0.42	1.03		-23.76	-63.32	***
		01-1954	07-2011	Greece	0.74	2.11	**	0.39	0.39	
		02-1934	07-2011	Ireland	0.08	0.59		-0.19	-1.57	
		11-1905	07-2011	Italy	0.44	1.32		-2.90	-2.79	***
		02-1919	07-2011	Netherlands	1.03	3.35	***	-3.76	-5.80	***
		01-1970	07-2011	Norway	0.99	1.41		-7.93	-3.50	***
		01-1934	07-2011	Portugal	0.83	3.72	***	0.59	1.45	
		01-1915	07-2011	Spain	0.57	2.48	**	0.18	0.35	
		01-1906	07-2011	Sweden	0.23	1.06		-0.98	-2.08	**
		01-1914	07-2011	Switzerland	0.41	1.66	*	-3.38	-9.41	***
		02/1693	07-2011	UnitedKingdom	0.25	3.46	***	-0.24	-3.78	***
	Mid East	02-1949	05-2011	Israel	0.57	1.51		1.77	1.44	
	North America	12-1917	07-2011	Canada	0.55	2.37	**	-2.24	-4.36	***
		11/1791	07-2011	UnitedStates	0.10	1.00		-0.24	-2.06	**
	Oceania	02/1875	07-2011	Australia	0.08	0.66		-1.12	-6.07	***
		01-1931	07-2011	New Zealand	0.02	0.11		-0.40	-1.88	*
Emerging	Africa	01-1988	07-2011	Morocco	0.91	1.89	*	4.48	3.33	***
		02-1910	07-2011	South Africa	-0.06	-0.30		0.32	0.94	
	Asia	01-1991	07-2011	China	0.62	0.56		-3.42	-0.42	
		11-1920	07-2011	India	0.08	0.44		0.68	6.25	***
		04-1983	07-2011	Indonesia	1.35	2.25	**	-5.19	-2.57	***
		02-1962	07-2011	Korea	-0.19	-0.34		2.12	0.89	
		01-1974	07-2011	Malaysia	1.32	2.35	**	-1.58	-0.83	
		01-1953	07-2011	Philippines	0.67	1.16		-1.55	-0.69	
		02-1967	07-2011	Taiwan	1.63	2.93	***	3.94	2.52	**
		11-1975	07-2011	Thailand	0.06	0.12		-7.20	-3.72	***
	Europe	02-1986	07-2011	Turkey	-0.08	-0.05		33.68	2.51	**
	North America	02-1930	07-2011	Mexico	0.19	1.53		0.04	0.33	
	South America	01-1990	07-2011	Brazil	1.02	0.91		-12.47	-2.35	**
		01-1927	07-2011	Chile	-0.29	-0.86		-5.06	-8.56	***
		02-1927	07-2011	Colombia	0.11	0.58		0.93	4.18	***
		01-1933	07-2011	Peru	-0.15	-1.19		1.63	22.69	***

Table 11. continued

Status	Region	Start Date	End Date	Country	Halloween Effect			Variance		
					β_H	t-value		βv	t-value	
Frontier	Africa	11-1989	07-2011	Botswana	0.58	2.05	**	1.18	2.04	**
		02-1990	07-2011	Kenya	0.68	1.12		5.57	2.71	***
		11-1989	07-2011	Mauritius	0.29	0.54		-1.29	-1.01	
		01-1988	07-2011	Nigeria	-0.04	-0.11		-3.16	-2.33	**
	Asia	02-1990	07-2011	Bangladesh	-1.60	-1.54		-5.69	-1.14	
		11-1960	07-2011	Pakistan	0.64	2.00	**	-0.29	-0.39	
		01-1985	07-2011	Sri Lanka	-0.34	-0.39		-1.06	-0.21	
	Mid East	11-1990	07-2011	Bahrain	-0.44	-0.97		1.95	0.96	
		02-1978	07-2011	Jordan	0.42	1.01		0.45	0.47	
	North America	11-1969	01-2011	Jamaica	0.01	0.02		-3.23	-1.19	
	South America	01-1967	07-2011	Argentina	0.74	0.94		-8.56	-1.90	*
Rarely Studied	Europe	01-1984	07-2011	Cyprus	-0.07	-0.14		2.07	2.92	***
		01-1954	07-2011	Luxembourg	0.60	1.97	**	-2.20	-3.00	***
	Mid East	04-1990	06-2011	Iran	-0.08	-0.11		-3.71	-1.14	
	North America	04-1989	02-2011	Barbados	-0.09	-0.27		3.13	6.39	***
		02-1925	12-1995	Uruguay	0.93	1.54		86.25	22.31	***
		01-1937	07-2011	Venezuela	0.10	0.51		0.76	4.05	***
	World	02-1919	07-2011	-	0.51	2.38	**	-1.21	-3.21	***