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Rating spillover effects on the stock markets



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ABSTRACT

This paper studies the impact of a sovereign rating change of a particular country on the stock markets of those countries to which it is closely related in individual pairs. We equally test the impact of other countries rating changes on the stock market of one particular country using a sample of ten countries for the period January 1989 to December 2010. While, there is a pre-announcement case for upgrades and post announcement case for downgrades, we find that collectively as a group the countries may potentially have a spillover effect, while on an individual basis, it does not appear to be the case.

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1. Introduction

Following the recent turbulences occurring in the global financial markets, it is very essential to assess any potential spillover effects from one country's financial market to another. One well-known

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risk of globalization is various financial crises that the world markets have been through in recent years. The cases of the 1997–1998 Asian and Russian crises, as well as those in Brazil in 1999, Ecuador in 2000, Turkey in 2001, Argentina in 2001, Uruguay in 2002 and more recently the Global Financial Crisis in 2007 (GFC) are just some examples that captured worldwide interest. A vast existing literature provides evidence that national markets have become more inter-connected with one another with respect to cross-border and capital flows during the past few decades, see for example, [Forbes and Chinn \(2004\)](#), [Ehrmann et al. \(2011\)](#) assess the contagion between countries and find that there is substantial evidence of international spillovers. Further, even though the co-movement for some markets may be different for some countries, it is important to highlight that in periods of crisis, there is a high degree of inter-dependence in the stock market returns, see for example, [Bonfiglioli and Favero \(2005\)](#) and [Angkinand et al. \(2009\)](#). Hence, it is reasonable to assume that these cross border linkages have increased the likelihood that shocks in one country spill over to another country. Moreover, international market imperfections, such as herding, panics, boom-bust cycles, and the fluctuating nature of capital flows can lead to crises and contagion, even in countries with good economic fundamentals. Hence it becomes very important for national authorities to consider the spillovers from institutions or other countries to their jurisdiction. As such the objective of this paper is to assess any potential spillover effects on financial markets following ratings news, both positive and negative, relating to another market.

The focus of this paper is to consider one of the so-called major culprits of the GFC, see for example [Crotty \(2009\)](#) and [Brunnermeier \(2009\)](#), the rating agencies, known to provide financial markets with relatively important information relating to the credit risk assessment, in terms of upgrades and downgrades. In particular, this paper considers the significance that sovereign rating announcements have on financial markets. Over various financial crises, the reliability and the credibility of the rating agencies have been questioned by many organisations including the International Monetary Fund, OECD as well as by investors. Recently, with the global financial crisis, rating agencies have been regarded as the major culprits, given the rate at which there has been a spillover from the US economy to the rest of the world. As such, the aim of this paper is to test the impact of sovereign rating change on the stock market returns of a group of countries. Our contributions to the literature are as follows: (1) we test the impact of sovereign rating change of a single country, for example, Country A, on the stock market returns on other countries; (2) we equally test the impact of other countries changes on a single market, that is on Country A; (3) we undertake the analysis by considering countries in pairs; markets can be linked in various ways including assessing the correlation between the financial markets, or the relationship between economies on the basis of trade, regional or economic links; as such we use a new approach to identify the potential set of spillovers.; (4) we use data that covers both pre and post GFC periods.

While some researchers (see [Reisen and Von Maltzan, 1999](#); [Ferri et al., 1999](#)) have tried to identify whether the rating agencies can add, intensify or attenuate to the dynamics of financial crises, there have been other studies, undertaken on how far the ratings have an impact on the financial crises or whether the ratings caused any spillover effect following the change in one country, see for example [Gande and Parsley \(2005\)](#) and [Ferreira and Gama \(2007\)](#). [Gande and Parsley \(2005\)](#) studied the impact of the sovereign bond rating changes announced in one country towards the sovereign credit spreads in other countries from 1991 to 2000 and used an ordered probit model. They focus on the transmission of news concerning sovereign credit rating, to sovereign bonds issued by other countries, that is they concentrate on the spillover of sovereign rating of one country, known as the event country, to interest rate spreads for other countries, known as home countries. In general, they found that there is a reaction on the credit spread during the downgrade announcement but no evidence during upgrades. Our research focus in this paper is different, in that we are considering the impact of the sovereign rating changes on the stock market returns of a group of countries. In particular, we undertake the analysis on a two way basis, that is assessing the impact of a rating change of one country, say Australia, on other countries, as well as assessing how the Australian market behaves when other countries rating changes. In addition our dataset considers the recent GFC, given the recent crisis has been the driving force behind the regulatory changes that rating agencies have been through. Hence, we contribute by assessing whether rating announcements in the financial markets have been acting as crisis amplifiers.

Ferreira and Gama (2007) extend the work of Gande and Parsley (2005), and focus on the spillover effect during the sovereign debt rating revision in 29 emerging and developed countries for a period from 1989 to 2003. In their analysis, they pool the data for all countries excluding the event country at each event and estimate a benchmark regression separately for downgrades and upgrades. They found that the rating revision announcements in one country can signal certain information to other countries, which influence the stock market during the downgrade announcements. However, no similar evidence is found during upgrade announcements. They also found that there is an inverse relationship between the geographical distance and the effect of a spillover. Further, the impact of spillover is more pronounced in emerging markets.

With the Eurozone crisis, there are recent studies which have focussed on the spillover effects on European markets following sovereign ratings changes. For example, Arezki et al. (2011), study the European financial markets during the period 2007–2010, also find evidence of contagion, of sovereign downgrades of countries near speculative grade, on other Eurozone countries. Do et al. (2014) equally assess the effect of sovereign rating drifts on financial return distribution in the European countries and find that the impact of sovereign ratings on the first four realised moments of return distribution can be different to their effects on individual moments. Alsakka and ap Gwilym (2013) study the foreign exchange market in Europe and central Asia to assess if ratings have a spillover impact pre and post crisis and conclude that market reactions and spillover are stronger during the financial crisis period than the pre crisis period. Similarly, Afonso et al. (2014) use an EGARCH approach to assess if the ratings agencies announcement impact on stock and bond market volatilities. Using a sample of emerging markets, Christopher et al. (2012) analyse if sovereign ratings influence regional stock and bond market interdependence. They find that there are positive rating spillovers in the stock market while sovereign ratings and outlook tend to be negatively related to regional bond market that is a negative spillover effect.

While our paper contributes to the literature on spillover effects following rating changes, our analysis in this paper differs from these existing studies in that we take a completely different approach to update the spillover assessment. Our approach allows closer look at the linkage between countries in pairs. Specifically, we consider a sample of only 10 countries which includes both developed and emerging markets. In analysing spillover effect, we examine the countries in different pairs, and this is why we restrict the number of countries to only 10 countries which, in fact implies 90 possible combinations of potential spillover. For example, Australia has been linked with of the remaining nine countries in order to assess the impact of the rating changes of each of the countries on the Australian stock market returns, which when extended to all country pairs makes for a total for the entire sample of countries of 45 possible combinations. In addition another key aspect of this study is to equally assess how country rating changes impact on the other markets which makes up another 45 combinations of countries.

Kraussl (2003) studied the impact of sovereign credit ratings on financial crises. The sharp adjustments of sovereign ratings for many emerging markets during the Asian crisis of 1997/98 have raised concerns about the accuracy and stability of the rating process. Although major credit rating agencies accurately identified weaknesses in the financial systems of a number of Asian countries before the crisis started in July 1997, the maintenance of investment-grade ratings for many countries right up to the brink of the crisis and the subsequent sharp downgrades during the Asian crisis were interpreted by many observers as imparting a pro-cyclical element into global capital flows. The objective of Kraussl's study is to shed light on the role of the rating agencies during the financial turmoil of the 1990s. By using a vector-autoregressive model (VAR), the results in Kraussl (2003) suggest that sovereign credit ratings do not necessarily intensify financial crises during a bust phase. The issue of whether sovereign ratings and outlook changes contribute to the instability in emerging markets has been further analysed by Kaminsky and Schmukler (2002). It has been argued that globalisation is at the heart of volatility of financial markets, with highly diversified investors paying little attention to economic fundamentals and following the herd in the presence of asymmetric information. Governments have been held responsible to some extent for the financial instability. Another culprit of financial excesses is said to be the rating agencies. As discussed by Ferri et al. (1999), their pro-cyclical behaviour, upgrading countries in good times and downgrading them in bad times, may have contributed to magnify the boom-bust pattern in stock markets. Even if ratings agencies do not behave

pro-cyclically, their announcements might still trigger market jitters. This is because many institutional investors can only hold investment grade instruments. Thus changes in ratings, downgrading (upgrading) sovereign debt below (above) investment grade, may have a drastic impact on prices because these rating changes can potentially affect the pool of investors. [Kaminsky and Schmukler \(2002\)](#) expand the data set to assess the effects of sovereign ratings and outlook changes on financial markets. The data also enables a test of the spillover effects across securities and countries to provide a more complete characterisation on the relation between credit ratings and financial markets. The event studies undertaken by [Kaminsky and Schmukler \(2002\)](#) suggest that the rating agencies act pro-cyclically, downgrading countries in bad times and upgrading them in good times. Hence, rating agencies might add to financial instability in emerging markets. The results explain why the effects of upgrades and downgrades do not appear to be large in economic terms. Rating agencies provide bad news in bad times and good news in good times, just reinforcing investors' expectations. This type of information is not very informative to investors and hence the markets do not react very strongly to this information.

In this paper, we test the spillover effect following sovereign rating changes from Standard and Poor's by using individual pairs of countries. Hence, our focus is to assess whether a change in the rating of one country impacts on the stock market of another country. This paper considers a sample period which includes both the pre and post GFC periods, specifically we use data from Standard and Poor's for a period of January 1989 to January 2010. Our results suggest, we do have some spillover effect following rating changes of other countries to a single market, that is for example as the rating of all other countries in the sample change, what the impact on the Australian stock market is. Interestingly, this happens for both upgrades and downgrades. However, our results are split between the sample of countries, except for Singapore where there is some reaction following upgrades as well as downgrades. The upgrades effect, on a day -2 to 2 window, seems to be for India, Malaysia, Singapore, Taiwan and Thailand, while the downgrades effect on a day 0 to day 4 window, seems to happen in Australia, Singapore, Hong Kong, Indonesia. For the impact of a single country rating change on other country, however, the general conclusion is that there is no spillover effect both in the case of upgrades and downgrades. This paper is organised as follows. Section 2 provides details of the data and modelling framework employed in this study. Section 3 presents the results of the paper and Section 4 provides some concluding remarks.

2. Data and modelling framework

Standard and Poor's is among the largest and oldest providers of ratings to the market. Hence being a National Recognised Statistical Rating Organisation (NRSRO) of high credibility, they have been the leaders in this industry for years. Standard and Poor's provides sovereign ratings for a period of January 1975 to date in terms of foreign currency ratings as well as local currency ratings. The objective of this study is to assess spillover effects; hence to be able to capture good data, the choice of the sample will include those countries where the rating activity has been very active. There are numerous countries, in particular, the developed countries, where the ratings do not change over time and if they do this will happen only once or twice over the period that they have been rated. As such, the sample of countries in this study includes the ratings from the countries where there has been many changes and reviews of the ratings. Hence we use a sample of Asia Pacific countries for the period 1 January 1990 through to January 2010. The choice of the sample captures the South East Asian Crisis, the GFC and a subset of countries (mostly emerging markets where there has been a larger number of sovereign rating changes.) The choice of the countries equally reflects the results obtained by [Gande and Parsley \(2005\)](#) who suggest that the spillover effect is more pronounced in the case of emerging markets rather than developed markets. The countries included in this study are Australia, Korea, India, Indonesia, Taiwan, Philippines, Malaysia, Singapore, Hong Kong and Thailand. The rating event has been summarised over time for both upgrades and downgrades in [Fig. 1](#). The period of January 1997–December 1998 indicates the highest number of downgrades, which is a reflection of the South East Asian Crisis, while for upgrades, the highest number of upgrades in a month occurs in October 2003. The choice of these ten countries also reflects the fact that they are all in the Asia Pacific region, and hence the markets do carry to some extent some similarities as far

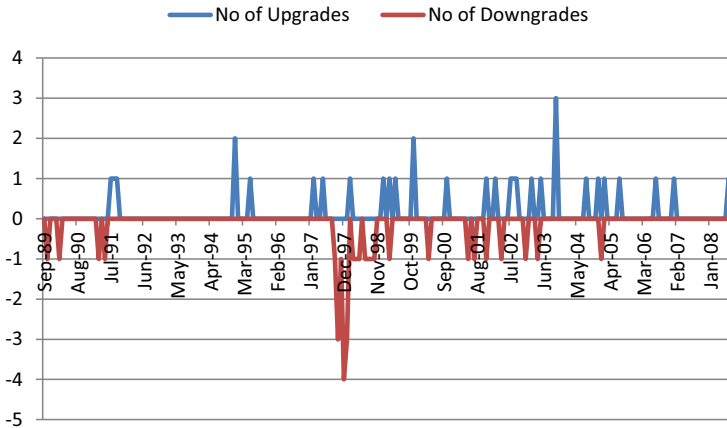


Fig. 1. Summary of rating events for the sample period on a monthly basis. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of the article.)

Source: Data is sourced from Standard and Poor's and the sample period is from January 1990 to January 2010. The number of upgrades is plotted in blue while the number of downgrades is plotted in red.

as investors, operations of the financial markets and the general economic conditions are concerned. The country with the highest number of events is Indonesia with 8 upgrades and 11 downgrades, then followed by Korea with 7 upgrades and 4 downgrades. Out of the sample, there are only 3 developed markets which include Australia Hong Kong and Singapore. Australia has 2 upgrades and 1 downgrade, Hong Kong with 5 upgrades and 2 downgrades, Singapore has only 2 upgrades with no downgrades events.

In order to decide on the set of possible combinations of countries to assess potential spillovers, there are numerous possibilities, for example, assessing the financial market correlation, trade flows and gravity type effects. In this study we consider the countries in different pairs, and this is why we restrict the number of countries to only 10 countries which in fact implies 90 possible combinations of potential spillover. Table 1 shows the number of events impacting on each market. Panel A highlights the number of rating upgrades and panel B includes the number of downgrades and focuses on the assessment of a rating change of another country on a single country. For instance, in the case of Australia, it has been associated with the other 9 countries, which totals to 35 upgrades from the other countries and 31 downgrades. On an aggregate basis, the number of events that has been analysed includes 314 upgrades and 262 downgrades. We equally analyse the reverse in our study that is how the Australian rating changes impact on each of the individual countries.

In contrast to the study undertaken by Gande and Parsley (2005) and Ferreira and Gama (2007), the modelling framework used in our study is an event study. Given that rating events do not happen on a daily and regular basis, there tends to be many missing observations when analysing using the approach taken by Gande and Parsley (2005) and Ferreira and Gama (2007). Hence we believe event study approach is appropriate in our case. Event studies have been widely used in finance studies. The objective of an event study is to assess whether there are excess or abnormal returns following the announcement of a particular event, which can be earnings announcements, stock splits or merger announcement. Previous research uses an event study approach to assess the impact of the bond rating revision on the stock price (see, for example, Ederington and Goh, 1998; Ederington et al., 1987; Goh and Ederington, 1993, 1999). Event studies have also been applied in studies which focus on the assessment of the impact of sovereign rating changes in the market, see for example, Brooks et al. (2004). To calculate the abnormal returns, data on the daily market returns for each country were collected from *DataStream International*. The DataStream World Index was used to proxy for a world

Table 1
Summary of number of rating events in pairs for each country.

	Australia	Hong Kong	India	Indonesia	Korea	Malaysia	Philippines	Singapore	Taiwan	Thailand
Assessing impact of other countries on single country										
<i>Panel A: No of events in pairs: upgrades</i>										
Australia		5	2	8	7	5	2	2	1	3
Hong Kong	2		2	8	7	5	2	2	1	3
India	1	3		5	3	2				2
Indonesia	2	5	2		7	5	2	2	1	3
Korea	2	5	2	8		5	2	2	1	3
Malaysia	2	5	2	8	7		2	2	1	3
Philippines	2	5	2	8	7	5		2	1	3
Singapore	2	5	2	8	7	5	2		1	3
Taiwan	2	5	2	8	7	5	2	2		3
Thailand	2	5	2	8	7	5	2	2	1	
<i>Panel B: No of events in pairs: downgrades</i>										
Australia		2	3	11	4	4	2		2	3
Hong Kong	1		3	11	4	4	2		2	3
India				2			2		2	
Indonesia		1	2		4	4	2		2	3
Korea	1	2	3	11		4	2		2	3
Malaysia	1	2	3	11	4		2		2	3
Philippines	1	2	3	11	4	4			2	3
Singapore	1	2	3	11	4	4	2		2	3
Taiwan	1	2	3	11	4	4	2			3
Thailand	1	2	3	11	4	4	2		2	

Note: The above table summarises the number of rating events that each country has been associated with and for which the abnormal returns have been estimated. Panel A indicates the number of upgrades and panel B indicates the number of downgrades. Data is obtained from Standard and Poor's and cover the sample period January 1990 to January 2010.

Table 2
Summary of descriptive statistics for stock market returns.

Country	Source	Mean	Median	Std. dev.	Variance	Kurtosis	Skewness	Minimum	Maximum
Australia	Datastream	0.0004	0.0006	0.0141	0.0002	35.8928	-1.9576	-0.3031	0.0840
Hong Kong	Datastream	0.0005	0.0004	0.0177	0.0003	54.7843	-2.5454	-0.4263	0.1557
India	MSCI	0.0005	0.0005	0.0200	0.0004	8.4379	-0.0915	-0.1416	0.1971
Indonesia	Datastream	0.0000	0.0004	0.0278	0.0008	79.1621	-0.7231	-0.5294	0.5223
Korea	Datastream	0.0003	0.0001	0.0231	0.0005	13.5956	0.2045	-0.2166	0.2687
Malaysia	Datastream	0.0004	0.0002	0.0167	0.0003	63.0115	-1.5463	-0.3675	0.2299
Philippines	Datastream	0.0003	0.0001	0.0165	0.0003	10.2541	0.5098	-0.1201	0.1955
Singapore	Datastream	0.0004	0.0004	0.0136	0.0002	26.2655	-1.1637	-0.2627	0.1403
Taiwan	Datastream	0.0002	0.0001	0.0201	0.0004	2.9266	-0.0300	-0.1229	0.1374
Thailand	Datastream	0.0004	0.0002	0.0201	0.0004	7.6357	0.0576	-0.1778	0.1637

Note: This table summarises the stock market returns for each of the countries in the analysis.

benchmark return³ for the period 1989 through to January 2010. Table 2 provides with a summary of the descriptive statistics for the return data. Even though we have three developed markets in the sample, the returns on average do not vary largely with the average daily return being between 0.02 per cent and 0.06 per cent.

Daily risk adjusted returns are derived from the conventional market model:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (1)$$

where R_{it} is the return on market i at day t , R_{mt} is the corresponding return on the World Index at day t , and α_i and β_i are the market model parameters obtained from an ordinary least squares regressions.

³ The use of DataStream return indices with the world index as being the market return has been used in previous studies (see for example, Brooks et al., 2004). The correlation coefficient between the return index for each country and the world index varies from -0.1 to 0.8.

The market model parameters are based upon approximately six months of daily return observations beginning 120 days through to 21 days before the sovereign rating change. The event period ranges from 10 days before to 10 days after the rating change.

The next step is to estimate the average abnormal return (AAR), which is based on the sum of all the daily abnormal return (AR) for the whole event period and dividing them by the number of observations.

$$AAR_t = \sum_{i=1}^N \frac{AR_{it}}{N_t} \quad (2)$$

where N_t is the number of observations on event day t . These average abnormal returns are summed over event time ($t = -10, \dots, 0, \dots, +10$) to obtain cumulative average abnormal return (CAR). The significance of the abnormal returns is assessed using the t -statistic following [Dodd \(1980\)](#).

$$t\text{-statistic} = \frac{AAR_t}{\sigma_{AR}} \quad (3)$$

where AAR_t is the average abnormal return for day t , and

$$\sigma_{AR} = \sqrt{\frac{1}{20} \cdot \sum_{\substack{T = -10 \\ T \neq t}}^{+10} (AAR_T - \overline{AAR})^2} \quad (4)$$

with

$$\overline{AAR} = \sum_{\substack{T = 10 \\ T \neq t}}^{+10} \frac{AAR_T}{20} \quad (5)$$

3. Results

3.1. Assessing the impact of the rating changes of all of the other countries on a single country

The initial analysis undertaken in this study is to assess whether the rating change of all of the other countries has an impact on a single market stock returns. We estimated the average abnormal returns for each individual pairs of events and we present the results on an aggregate basis in [Table 3](#). For example, for Australia, we have 35 upgrades that can possibly affect the Australian stock markets; hence we estimated the model and calculated the average abnormal returns for each of the 35 upgrades. We repeat this for each country for each of the events that we have. The results presented in this table are the aggregate results of the 10 countries with a total of 314 upgrades and 262 downgrades. The literature on the impact of sovereign rating changes on own stock market returns indicates that upgrades do not have a great wealth impact while downgrades do reveal some impact on the stock returns. The results presented in [Table 3](#) indicate that when assessing the spillover effect from the announcement of a rating change of other countries on a single market, we have a pre-announcement effect for upgrades and a post announcement effect for downgrades. For the upgrades, the market seems to anticipate the good news with having a statistically significant market reaction on day -5 and -2 with the average abnormal return being positive at 0.21 per cent and 0.32 per cent respectively. For the downgrades, there appears to have a delayed spillover effect from the announcement of the downgrades of other countries on a single country. While the impact of downgrades on own markets appears to be on the announcement day, (as documented by [Brooks et al., 2004](#) with an abnormal return of -1.97 per cent one day return), the market absorbs the bad news of other countries a few days after the initial announcement. We find significant results on day 3 and day 7 with the average abnormal returns being at -0.01 per cent and 0.68 per cent. Prior to the downgrade announcement,

Table 3

Summary of aggregate results – assessing the impact of other countries rating changes on a single country.

Day	Upgrades 314			Downgrades 262		
	AAR	CAR	T Stats	AAR	CAR	T Stats
-10	0.0010	0.0010	0.8445	0.0038	0.0038	0.9598
-9	0.0003	0.0013	0.2231	0.0023	0.0061	0.5860
-8	-0.0001	0.0012	-0.0770	0.0012	0.0074	0.3124
-7	-0.0001	0.0012	-0.0506	-0.0011	0.0063	-0.2828
-6	0.0007	0.0019	0.5935	-0.0009	0.0054	-0.2218
-5	0.0021	0.0040	1.7470*	-0.0032	0.0022	-0.8078
-4	0.0008	0.0048	0.6366	-0.0036	-0.0014	-0.9068
-3	-0.0007	0.0041	-0.6024	-0.0013	-0.0027	-0.3207
-2	0.0032	0.0073	2.5847**	-0.0022	-0.0049	-0.5570
-1	0.0005	0.0078	0.4118	-0.0011	-0.0060	-0.2838
0	-0.0003	0.0074	-0.2577	-0.0052	-0.0113	-1.3218
1	0.0021	0.0096	1.7243*	0.0000	-0.0113	-0.0094
2	0.0015	0.0110	1.1953	-0.0010	-0.0124	-0.2631
-	-0.0014	0.0097	-1.1145	-0.0104	-0.0228	2.6310**
4	-0.0001	0.0096	-0.0584	0.0054	-0.0175	1.3488
5	-0.0002	0.0094	-0.1577	0.0044	-0.0131	1.1069
6	0.0005	0.0099	0.3782	0.0010	-0.0120	0.2626
7	-0.0004	0.0094	-0.3570	0.0068	-0.0052	1.7248*
8	0.0007	0.0101	0.5558	0.0022	-0.0030	0.5493
9	-0.0010	0.0092	-0.7767	-0.0023	-0.0053	-0.5701
10	-0.0008	0.0083	-0.6733	-0.0031	-0.0084	-0.7799

Note: The above table summarises the results for all countries in the analysis of the impact of a rating change of other countries on a single country. The results are aggregated over the 10 countries with the total number of 314 upgrades and 262 downgrades; we report average abnormal returns (AAR) and cumulative abnormal returns (CAR). AAR and CAR are generated using a standard mean adjusted event study methodology.

* Statistical significant at 5%.

** Statistical significance at 10%.

we detect a negative trend in the average abnormal returns, but the markets seem to be indifferent to the rating downgrades on a pre-announcement basis. This suggests that collectively as a group the rating changes of other countries have an impact on the stock returns of a single country for upgrades on a preannouncement basis and a delayed reaction in the markets on a post announcement basis for downgrades.

To provide further insight to the results, we present the results for each individual country in Table 4. The results are reported using a -5 to +5 days average abnormal returns (AAR) for each country. The statistically significant results are highlighted in bold. Panel A reports the results for the upgrades and panel B highlights the results of downgrade events. An overall assessment of Table 4 indicates that the upgrade and downgrade effects seem to be different between the samples of countries. Focussing on panel A highlighting the upgrades, in particular when we consider the impact of the upgrades announcement of other countries on a single country stock market, on a -2 to +2 days window, we find that stock markets where other countries upgrades have an impact include Indian, Malaysian, Philippines, Singaporean, Taiwanese and Thai markets. Of these markets, the markets that seem to have a more significant impact are Malaysia and Philippines. The Philippines market has a pre-announcement effect on day -2 and day -1 with an average abnormal return of 0.4 per cent and -0.41 per cent respectively. It should be noted that the Philippines market is the smallest in the sample, based on the market capitalisation, valued at USD 229,316 millions. The results of Malaysia highlight an announcement day effect following the announcement of upgrades of other countries with an average abnormal return of 0.48 per cent on day 0 and an average abnormal return of 0.44 per cent on day 1. While there are limited studies on the Malaysian stock market and rating announcements, the results are consistent with Doma and Omar (2006) which is based on Malaysia for a 10-year rating observations beginning January 1993 and shows initial findings of negative stock price reaction both the rating upgrade and downgrade announcements during the South East Asian financial crisis of the 1997/98. While majority of the literature highlights no market reaction following an upgrade

Table 4
 Results of individual countries – assessing the impact of other countries on a single country.

Country/days	No of events	-5	-4	-3	-2	-1	0	1	2	3	4	5
Impact of other countries on a single country												
<i>Panel A: Upgrades</i>												
Average abnormal return												
Australia	35	0.0024	0.0024	0.0005	-0.0020	0.0004	0.0008	-0.0002	-0.0001	-0.0032	-0.0005	0.0009
Hong Kong	32	0.0020	-0.0005	0.0023	-0.0018	0.0005	-0.0019	0.0006	0.0028	-0.0008	0.0004	0.0032
India	16	0.0012	-0.0029	0.0015	-0.0009	0.0039	-0.0007	0.0032	0.0075	0.0061	0.0000	0.0011
Indonesia	29	0.0014	-0.0011	-0.0061	-0.0068	-0.0003	-0.0045	0.0019	0.0008	-0.0018	0.0031	-0.0014
Korea	30	0.0077	0.0029	-0.0012	-0.0007	0.0025	0.0028	0.0045	0.0047	-0.0001	0.0007	-0.0028
Malaysia	32	0.0009	-0.0002	0.0000	0.0020	0.0028	0.0048	0.0044	0.0031	-0.0027	0.0003	-0.0015
Philippines	35	0.0029	0.0001	0.0018	0.0040	-0.0041	0.0000	-0.0006	0.0008	-0.0028	-0.0018	-0.0010
Singapore	35	0.0026	-0.0007	0.0012	-0.0011	0.0027	0.0009	0.0009	0.0008	-0.0010	-0.0001	-0.0013
Taiwan	36	-0.0024	0.0028	-0.0033	-0.0051	-0.0020	-0.0015	0.0042	0.0010	-0.0012	0.0007	-0.0034
Thailand	34	0.0030	0.0028	-0.0009	0.0062	0.0008	-0.0040	0.0033	-0.0031	-0.0022	-0.0031	0.0048
<i>Panel B: Downgrades</i>												
Average abnormal return												
Australia	31	-0.0052	-0.0023	0.0010	-0.0014	-0.0017	-0.0018	-0.0046	-0.0010	-0.0065	0.0045	0.0031
Hong Kong	30	0.0008	-0.0072	-0.0072	-0.0101	-0.0085	0.0065	-0.0013	-0.0120	-0.0107	0.0039	0.0022
India	6	-0.0177	0.0039	-0.0027	0.0023	-0.0007	-0.0034	-0.0028	0.0013	0.0026	-0.0061	0.0025
Indonesia	18	-0.0095	-0.0122	0.0025	-0.0009	0.0098	-0.0281	0.0018	-0.0036	-0.0300	-0.0289	-0.0098
Korea	28	0.0055	0.0017	0.0051	0.0026	-0.0061	-0.0085	0.0057	0.0057	0.0238	0.0030	-0.0025
Malaysia	28	-0.0055	-0.0138	-0.0039	0.0001	0.0090	-0.0061	0.0022	0.0079	0.0106	-0.0057	0.0210
Philippines	30	-0.0033	-0.0104	-0.0024	-0.0059	-0.0005	-0.0015	0.0081	-0.0035	0.0070	0.0109	0.0026
Singapore	32	-0.0020	-0.0004	-0.0033	-0.0036	-0.0022	-0.0039	-0.0004	-0.0016	-0.0058	0.0045	0.0077
Taiwan	30	-0.0038	-0.0098	-0.0045	-0.0058	0.0000	-0.0063	-0.0055	-0.0025	-0.0001	0.0013	-0.0017
Thailand	29	-0.0052	0.0020	0.0034	0.0055	-0.0055	-0.0076	-0.0045	0.0007	0.0105	0.0077	0.0122

Note: The above table summarises the results of each individual country highlighting the impact a rating change of other countries on a single change. The results are reported using a –5 to 5 days window and indicates the average abnormal returns (AAR). The statistical results are highlighted in bold. Panel A reports the results for the upgrades and panel B highlights the results of a downgrade event.

announcement, some papers document the contrary findings. [Hsueh and Liu \(1992\)](#) argued that the impact of rating changes on stock prices should be the same irrespective of whether it is downgrade or upgrade. They found that during both downgrades and upgrades, firms with high dispersion of equity ownership experienced significant changes of share price compared to firms that have highly concentrated ownership. During rating downgrades, the low-information companies will experience a significant negative share price and when it is bond upgrade, a significant positive of share price response can be observed. [Elayan et al. \(2003\)](#) also report that the rating agencies provide valuable information during the bond rating revision announcements in New Zealand. They find significant market reaction during upgrade as well as downgrade announcements. The findings of [Elayan et al. \(2003\)](#) on stock reaction during upgrade and downgrade events are quite similar to findings in Australia by [Creighton et al. \(2007\)](#) – indicating that markets are less efficient that is the stocks returns do not instantaneously adjust to the information arrival in the market; thus, allowing for the abnormal return for both rating upgrades and downgrades.

Panel B of [Table 4](#) summarises the reaction on the stock market returns of a single country following the downgrade announcement of other countries. If we consider a day 0 to day 4 window, the countries with a post announcement spillover include Australia, Hong Kong, Indonesia, Philippines and Singapore. We find weaker results in Philippines and Singapore. It should be noted that out of these, Australia, Hong Kong and Singapore are the developed markets. The Australian market reacts negatively following the downgrade announcement of the other countries. Our findings are quite consistent with the literature on ratings undertaken for Australia. [Matolcsy and Lianto \(1995\)](#) examined the rating changes announcements by S&P for the period 1982–1991. Using the weekly share price data, they found that only bond rating downgrades hold additional information content, and not bond rating upgrades. In our study, the market reacts mainly post the announcement day. On day 1, we have a significant market reaction of negative 0.46 per cent and on day 3 with a negative average abnormal return at 0.65 per cent. The Australian market reverts to normal with returns being positive and significant on day 4 with the average abnormal return 0.45 per cent. The results obtained for the Australian stock market reaction following downgrades are consistent with the spillover literature whereby downgrades have a spillover effects ([Kaminsky and Schmukler, 1999](#)). Similar to the Australian market, the Hong Kong market reacts on stock market returns post announcement of the downgrade rather than on the announcement day itself. The market has a negative reaction on day 2 and 3 with a significant average abnormal return being at 1.2 per cent and 1.07 per cent respectively on these days. Again, similar to the Australian market, the Hong Kong market seems to revert to normal from day 4. There are no significant results obtained following the upgrade announcement in the Hong Kong market, which is once again consistent with the literature of developed market. For Indonesia, the findings obtained here are consistent with the findings of [Gande and Parsley \(2005\)](#), who argue that the spillover effects are more pronounced in emerging markets. Out of the sample of countries that we use, Indonesia is a market which has had the highest number of rating revisions by Standard and Poor's. The downgrade announcements of the other countries seem to have a very substantial impact on the Indonesian market on the announcement day 0 itself, with significant results at a very high average abnormal return of negative 2.81 per cent (one day return). Further, following the announcement, the Indonesian market does not seem to revert to positive returns with the average abnormal returns being significantly negative in the market on day 3 and 4 at 3.0 per cent and 2.89 per cent.

The results obtained for these countries indicate that there is a potential spillover following the rating downgrade announcement of other countries on the stock market returns of individual countries, mainly on a post announcement basis. The results obtained for Australia, Hong Kong and Indonesia in particular are consistent with the results obtained in the previous spillover literature on ratings.

3.2. Assessing the impact of the rating changes of a single country on other countries

In this section, we assess the rating change of an individual country on the other countries. For instance, how the rating change of Australia will impact on other countries stock market returns. We present the results for each country in [Table 5](#). [Table 5](#) summarises the results of each individual country, thus highlighting the impact a rating change of a single country on stock market in other

Table 5
Results of individual countries – assessing the impact of a single country rating change on other countries.

Country/days	No of events	-5	-4	-3	-2	-1	0	1	2	3	4	5
Impact of a single country event on other countries												
<i>Panel A: Upgrades</i>												
Average abnormal return												
Australia	17	-0.0003	-0.0044	-0.0003	-0.0118	0.0043	0.0041	0.0053	-0.0039	-0.0036	-0.0030	0.0025
Hong Kong	43	0.0077	0.0023	-0.0044	-0.0039	0.0005	0.0049	-0.0024	0.0039	-0.0001	0.0002	0.0061
India	18	-0.0001	0.0014	0.0010	-0.0023	-0.0059	0.0001	-0.0008	-0.0032	0.0085	0.0018	0.0017
Indonesia	69	0.0004	0.0054	0.0018	-0.0036	-0.0004	0.0010	0.0020	0.0018	0.0012	-0.0001	-0.0028
Korea	59	0.0023	-0.0052	-0.0024	-0.0060	0.0043	-0.0104	0.0084	0.0013	-0.0075	0.0067	-0.0007
Malaysia	42	-0.0008	0.0003	0.0000	0.0004	0.0020	0.0017	-0.0013	0.0022	-0.0015	-0.0046	-0.0042
Philippines	16	0.0027	0.0009	-0.0041	0.0016	0.0055	-0.0021	0.0021	0.0049	-0.0011	0.0001	0.0030
Singapore	16	0.0042	0.0056	0.0006	-0.0025	-0.0084	-0.0017	-0.0007	-0.0068	-0.0020	-0.0029	-0.0021
Taiwan	9	0.0071	0.0024	0.0051	-0.0032	-0.0061	0.0136	0.0008	0.0001	-0.0017	-0.0119	0.0025
Thailand	26	0.0017	-0.0003	-0.0012	0.0013	-0.0014	0.0013	0.0032	0.0062	-0.0012	-0.0022	-0.0007
<i>Panel B: Downgrades</i>												
Average abnormal return												
Australia	7	0.0386	-0.0253	0.0125	0.0015	0.0075	0.0087	-0.0134	0.0012	-0.0081	-0.0020	0.0041
Hong Kong	15	-0.0185	-0.0006	0.0040	0.0193	-0.0038	0.0192	-0.0152	0.0062	0.0045	0.0126	0.0325
India	27	0.0013	0.0193	-0.0027	-0.0031	0.0073	-0.0092	0.0006	0.0087	0.0041	-0.0082	0.0027
Indonesia	90	-0.0018	-0.0073	-0.0054	-0.0014	0.0011	-0.0026	0.0027	0.0044	0.0090	0.0028	0.0022
Korea	32	-0.0103	-0.0093	0.0037	0.0049	0.0051	-0.0191	-0.0056	-0.0326	0.0105	0.0076	0.0136
Malaysia	32	-0.0047	0.0141	0.0132	-0.0082	-0.0062	-0.0049	0.0049	0.0112	0.0112	0.0005	0.0029
Philippines	18	-0.0074	0.0046	-0.0024	-0.0014	-0.0034	-0.0028	-0.0080	-0.0004	0.0126	0.0004	-0.0005
Singapore	-											
Taiwan	17	-0.0020	-0.0009	0.0092	0.0035	-0.0094	0.0007	0.0018	0.0028	0.0035	0.0021	0.0037
Thailand	24	0.0008	-0.0350	-0.0234	-0.0249	-0.0135	-0.0181	0.0073	-0.0138	0.0355	0.0357	-0.0100

Note: The above table summarises the results of each individual country highlighting the impact a rating change of a single country on other countries. The results are reported using a -5 to 5 days window and indicates the average abnormal returns (AAR). The statistical results are highlighted in bold. Panel A reports the results for the upgrades and panel B reports the results of a downgrade event.

countries. The results are reported using a –5 to 5 days window and indicates the average abnormal returns. The statistical significant results are highlighted in bold. Panel A reports the results for the upgrades and panel B reports the results of a downgrade event. An overall assessment of the results for both panel A and panel B indicates that none of these countries are large enough in the world economy to impact on each other.

Considering Panel A of [Table 5](#), the only two countries with an announcement day effect are Korea and Taiwan. Taiwan reports an average abnormal return of 1.36 per cent on announcement day. However, we should highlight that for Korea the average abnormal return is negative on announcement of the upgrade at 1.04 per cent. This finding is consistent with the wealth distribution effect. [Zaima and McCarthy \(1988\)](#) contribution to the ratings literature has been to examine a possible wealth distribution effect between stockholders and bondholders for firms with rating classifications. For an upgrade, an information content hypothesis implies that both securities (bond and stock) increase in value, whereas a wealth redistribution hypothesis implies that stock value decreases while bond value increases. For a downgrade, an information content hypothesis implies that both securities decrease in value, whereas a wealth redistribution hypothesis implies that the stock value increases while bond value decreases. Hence, in summary, according to the wealth redistribution hypothesis, when the bond downgrade occurs, the bond will decrease in value, but the share price of the respective issuer may increase, thus, transferring the wealth from the bondholder to shareholder. If the bond is upgraded, the value of bond will increase, thus the share price will decrease and result in shifting of wealth from shareholder to bondholder. Similarly, panel B of [Table 5](#) summarises the downgrade effect of a single country on other country. The results clearly indicate that there is no spillover effect following the rating downgrade of a single country on other countries. Hence the general conclusion drawn is that there is no spillover effect following the announcements of the rating change of a single country on other countries.

4. Conclusion

The focus of the analysis in this paper is on understanding sovereign rating spillover effects on national stock markets. We test the spillover effect following sovereign rating changes from Standard and Poor's by using individual pairs of 10 countries for a period of 1989–2010. Specifically, this study assesses whether a change in the rating of one country impacts on the stock market of another country by analysing the spillover relationships at the level of pairs of countries. Using 10 countries in our sample results in a total of 90 combinations of spillover analyses undertaken in this study.

Our main conclusion is that out of the sample of the countries that we study, mainly Asia-Pacific countries, collectively the rating changes of other countries has an impact on a single market. However, none of these countries are large enough in the world market that they can individually have a spillover effect. We find that contrary to the literature on the impact of sovereign rating changes on stock markets, where on average there is no impact following an upgrade announcement and mainly an announcement day effect following downgrades. We have pre-announcement effects following the upgrades announcement of other countries on a single country and a post-announcement effect following the downgrade announcement. Hence we conclude that there is some evidence of significant spillover effects for both upgrade and downgrades when assessing the impact of rating changes of other countries on a single country. In general, our results demonstrate the importance of a greater understanding of cross-market linkages.

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