

## **Institutional Reforms and Investor Reactions to CSR Announcements: Evidence from an Emerging Economy**

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**ABSTRACT** This study contributes to the limited established empirical research on the impact and relevance of corporate social responsibility (CSR) in the capital markets of emerging economies. We conducted an event study to demonstrate how the timing of CSR announcements by firms that have aligned their strategies to newly instituted social regulations in South Africa influenced stock prices. Using a unique dataset of publicly listed South African enterprises that undertook CSR initiatives during the ten year period from 1996 to 2005, we found that investor reactions to CSR announcements concluded during the late phase of institutional reforms are viewed positively by investors. Furthermore, CSR announcements of substantive monetary value result in significantly higher shareholder returns.

### **INTRODUCTION**

An examination of the vast body of corporate social responsibility (CSR) literature reveals that corporations adopt socially responsible policies in order to secure legitimacy or competitive differentiation (Bansal and Hunter, 2003; Waddock and Graves, 1997). Some management scholars have turned their attention to investigating the role of institutions in enabling and constraining socially responsible behaviour (Campbell, 2007). This research suggests that governments that enact CSR laws are effective in establishing social expectations about responsible corporate behaviour and in promoting the idea that corporations play an important role in addressing social problems (Aguilera et al., 2007).

Business organizations operating in different nations are embedded in distinct institutional environments and experience different degrees of coercive pressures to engage in CSR (Maignan and Ralston, 2002). Developed economies such as France, Germany and Finland and emerging economies such as South Africa have enacted specific CSR regulations (Buhmann, 2006). In developed economies, sociologists have documented the varying degrees of compliance with which US corporations implemented equal

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opportunity policies enacted in the 1960s (Edelman, 1992). In emerging economies, the institutional environment changes dramatically as governments introduce a variety of new laws (Chung and Beamish, 2005; Dieleman and Sachs, 2008). In the early stages of institutional reforms, political, legal and societal changes in institutions create significant institutional volatility and uncertainty (Wright et al., 2005). Given the uncertainty associated with the promulgation of CSR regulations, it can be expected that diverse organizational responses to social reform policies would be observed. With the passage of time, as the new institutional regime becomes the predominant driver of social change, normative and mimetic institutional pressures are likely to promote greater isomorphism in corporate social strategies to achieve legitimacy.

With few exceptions (McWilliams and Siegel, 2001), scholars in the CSR literature have directed limited attention to examining the impact of CSR on the market value of firms. Conceptual research by Mackey et al. (2007) suggests that in order to understand the relationship between CSR and firm market value, it is critical to examine the supply and demand conditions for investment opportunities in firms that embrace social change. Their work notes that time can affect the supply and demand for socially responsible investment opportunities. For example, new CSR laws in an economy are likely to influence the number of firms making social policy changes, which will bring about a shift in the supply for socially responsible investment opportunities. Marketing campaigns highlighting the social responsibility successes of firms can increase the investor demand for investments in such firms. However, no study to date, that the authors are aware of, has investigated how timing impacts shareholder response to CSR initiatives in general, and in a dynamic emerging economy context, in particular.

This study explores the performance effects of CSR initiatives in response to institutional reforms in South Africa. Despite being the third largest emerging economy in terms of stock market capitalization (Jefferis and Okeahalam, 1999), little is known about how the numerous CSR laws enacted since 1994 are driving enterprises to contribute to the government goals of economic inclusion of the poor. Historic apartheid policies in South Africa created a racially skewed economy, and there are increasing expectations that the private sector has a vital role to play in the process of social transformation. One feature of the CSR laws introduced to catalyse the economic inclusion of previously disadvantaged South Africans requires the transfer of equity stakes in white owned South African companies to black investors. For the purposes of this study, we *define CSR initiatives as equity transfer transactions designed by white owned South African companies that put enterprise shares in the hands of new black owners to contribute to the correction of historic socio-economic imbalances in the economy.*

In this paper, we investigate whether *CSR initiatives* by early mover South African corporations have a positive or negative impact on their stock prices, compared with late reformers. We argue that during the early phase of institutional reforms, uncertainty regarding the impact of such initiatives will lead investors to react negatively to CSR announcements. As institutions evolve, however, shifting societal views of the corporate role in addressing social problems increases the likelihood that investors will interpret CSR announcements as a move in a desirable direction. To address this question, we analyse stock price reactions to CSR announcements by white owned South African firms. Using secondary data on equity transfer transactions of publicly listed South

African firms during the ten year period from 1996 to 2005, we examined whether the timing and monetary value of *CSR initiatives* influence stock prices.

South Africa represents a unique context to test investor reactions to CSR announcements in response to institutional change for the following reasons. First, institutional reforms in South Africa enabled black investors to take equity stakes in white owned corporations. Since 1994, equity transfer transactions worth 160 billion Rand (about US\$26 billion) have been concluded (BusinessMap Foundation, 2005). Second, earning announcements have been shown to significantly increase trading activity for Johannesburg Stock Exchange (JSE) listed firms (Prather-Kinsey, 2006). A semi-strong efficient stock market permits a meaningful analysis of investor response to CSR announcements. Third, equity transfer transactions were concluded through the so-called 'Two Waves' (Empowerdex, 2006), making it possible to analyse whether proactive social change by enterprises that participated in the first wave was advantageous or disadvantageous for their economic prosperity, compared to the companies of the second wave.

### **INSTITUTIONAL REFORMS IN CONTEMPORARY SOUTH AFRICA**

South Africa's institutional environment in 1994 was quite unique, compared with other emerging economies, as it had several features of a capitalist, market economy but simultaneously faced monumental problems of social exclusion due to historic apartheid policies. Apartheid became institutionalized law in South Africa in 1948 (Butler, 2004) and prohibited black people from owning property or businesses. Moreover, apartheid promulgated skilled labour shortages, imposed inequalities in access to education for black South Africans, and reduced the mobility of the working-force population, creating barriers to a well-functioning labor market (OECD, 2006).

Political and financial sanctions instituted by United Nations member countries kept international institutions out of the domestic capital market in South Africa (Malherbe and Segal, 2000). At the same time, economic sanctions truncated the access of South African mining houses to international capital markets, precluding their transformation into global mining specialists. Initially, large South African mining houses began diversifying by producing mining equipment and commodities. With the divestment of many foreign multinationals in the 1980s, South African conglomerates further diversified into consumer goods and food products (Chabane et al., 2006).

To redress past socio-economic imbalances, numerous CSR laws that cover various elements of empowerment, namely, equity ownership, affirmative action, training, small business support, and procurement of goods and services, have been enacted since the African National Congress was elected in 1994 (Visser, 2005). Widespread policy changes by the South African government put pressure on enterprises operating in this economy to initiate major social changes, such as transferring equity stakes to black investors (Pacek and Thorniley, 2004). The greater openness of the economy caused by the fall of apartheid reduced the appeal of conglomerate holdings, which were pursued in the absence of alternate investment options (Malherbe and Segal, 2000). Some South African corporate giants quickly began undoing past horizontal and vertical integration strategies, while other white owned corporations were slow to adopt corporate social reform.

With the intent of providing implementation guidelines, the Mineral and Resources Development Act of 2002 and the Broad-Based Black Economic Empowerment (BBBEE) Act of 2003 were enacted. Effective agreements between the government and several industries such as construction, financial services, ICT (information, communications and telecommunications), mining, and tourism led to the development of industry-specific Charters. *Charters are legally binding commitments made by the industry to extend equal opportunities and benefits from the industry to previously disadvantaged South Africans.* Charters place substantial CSR requirements on firms, with targets linked to specific timeframes (BusinessMap Foundation, 2006).

Thus, it appears that the institutional environment in South Africa evolved through two phases since the enactment of CSR regulations in 1994. The first phase from 1994 to 2001 can be viewed as the early phase of institutional reforms, because the government sought to encourage corporate participation in the process of incorporating the socially disfavoured into the mainstream. Calitz (2001) notes that although South African reforms were gradualist, it was evident by 2001 that first generation reforms needed to be supplemented with incremental second generation reforms, in order to develop institutional capacity for reform. We believe that normative levers such as the Mineral and Resources Development Act of 2002, followed by the BBBEE Act of 2003 (Visser, 2005), heralded the late phase of institutional reforms.

## **THEORETICAL DEVELOPMENT AND HYPOTHESES**

### **Corporate Social Responsibility in Emerging Economies**

Visser (2008) notes that emerging economies present a distinctive set of CSR agenda challenges, which are collectively quite different from those faced in the developed world. This is because social and environmental crises are usually most acutely felt in emerging countries. At the same time, CSR research demonstrates a wide variability in the CSR issues being tackled by emerging economies in Asia (Chapple and Moon, 2005) and Latin America (Araya, 2006). Since institutional context and culture can play an important role in determining appropriate CSR priorities and initiatives, Visser (2006) notes that models such as Carroll's (1991) widely cited CSR Pyramid, developed in an American context, may not be relevant for emerging economies. The CSR Pyramid identifies and speculates that each of the four components of CSR, namely, economic, legal, ethical and discretionary responsibilities, would be prioritized differently by corporations. It proposes that firms generally prioritize economic aspects (profitability), while less emphasis is put on the legal aspects (obeying the law) of CSR. The ethical (being fair) and discretionary (contributing resources to the community) aspects of CSR have even lower priority.

Visser et al. (2006) note that this model would not be a useful indicator of the relative emphasis assigned to various social responsibilities by corporations operating in Africa. For example, initiatives to medically treat employees with HIV/AIDS can reflect equal importance to economic, ethical and philanthropic, or discretionary responsibilities. Other scholars concur with Visser et al.'s view that such models fail to capture the complexity of CSR in emerging economies, which face unique challenges (Hamann,

2006). They emphasize that CSR in emerging economies cannot purely be about voluntary business initiatives. Instead, the government has an important role in motivating socially responsible behaviour in corporations. However, because government enforcement is often constrained in emerging economies, CSR commits businesses to comply with not only the letter, but also with the spirit, of the law.

In the past decade, many emerging economies have passed national legislations on CSR related issues. Although CSR is understood as doing more than what is required by law, legal scientists contend that government regulation of CSR plays a considerable part in formulating the substance of social initiatives, and providing guidance for CSR implementation (Buhmann, 2006). Such legislation allows governments in emerging economies to demand or encourage corporate actions that move socio-economic development goals up the CSR agenda. In fact, Blowfield and Frynas (2005) argue that even though CSR is viewed as a bridge connecting the arenas of business and development in emerging economies, its contribution to poverty alleviation and other development goals depends on the values promoted by the government.

### **Corporate Social Responsibility in South Africa**

CSR in Africa has attracted increasing interest, debate, and investment over the past decade (Hayes, 2006). Some scholars describe CSR initiatives in this continent as a 'transplant from the developed world', since multinational enterprises and African corporations trying to position themselves as global players continue to implement policies adopted by their subsidiaries in developed economies to their operations in Africa (Gruner, 2002). Others note that the effectiveness of African corporation-sponsored CSR activities should not be judged in terms of what is acceptable in developed economies, since the contexts in which companies in Europe/North America operate are dramatically different from those in Africa (Hamann, 2003).

CSR is particularly pertinent in South Africa, where apartheid has created pressing development challenges. Government laws have sought to involve corporations in promoting social cohesion and addressing problems of the historical exclusion of black communities from the mainstream economy. In fact, South Africa has been at the forefront among countries in the African continent in terms of incorporating CSR issues into legislation. Since standards established by laws have a strong influence on establishing the social expectations around which firms structure their behaviour (Buhmann, 2006), CSR laws can shape corporate social action.

Initially, the core business practices, framed by South Africa's colonial and apartheid history, were relatively resistant to socially motivated change, despite the enactment of CSR policies (Hamann and Kapelus, 2004). Moreover, government capacity for enforcement was seriously limited, which reduced the effectiveness of legislation as a driver for CSR (Visser, 2006). The weak influence of law during the early stages of reform created a wide variation in the strategies implemented by South African firms in response to CSR legislation. Over the past decade, however, the South African government has made significant progress in strengthening the enforcement of the human rights and CSR aspects of its legislation (Visser, 2005). Specifically, it has encapsulated its transformation agenda in a scorecard to measure company performance against a range

of CSR criteria (Hamann and Kapelus, 2004). Since performance on these issues is a prerequisite for companies to obtain a number of state-issued licences, South African firms have undergone significant transformation with regard to the definition and management of CSR. A recent case study of the ABSA Group Limited, one of the top four banks in South Africa, indicates that with the strengthening of state apparatus, CSR-related issues are considered much higher in the management hierarchy and firms are using a variety of techniques to ensure a greater fit with the new institutional requirements (Arya et al., 2008).

The above discussion highlights the importance of viewing the institutional environment in emerging economies as a dynamic context where institutional risk and volatility fluctuates and shifts (Chung and Beamish, 2005). Hence, adding a dynamic or temporal component might be crucial to gaining a deeper understanding of the consequences of CSR strategies in such economies.

### **Market Value and Timing of CSR Initiatives**

According to recent conceptual research seeking to identify the boundaries of CSR, only corporate initiatives that increase social welfare and improve a firm's relationship with relevant stakeholder groups should be interpreted as CSR activities (Barnett, 2007). Prior research indicates that corporate resource allocations that aid social welfare are instrumental in improving a firm's relationships with a variety of key stakeholders, such as customers (Brown and Dacin, 1997) and potential employees (Turban and Greening, 1997). Corporations that provide evidence of the gains to social welfare brought about by their CSR initiatives may be able to shape shareholder perceptions over time. At the same time, the failure of CSR processes to produce ample results can lead to negative stakeholder reactions.

The new institutional environment in emerging economies intensifies the pressure for change in enterprises (Hoskisson et al., 2000). However, most firms are likely to prefer staying committed to the status quo for three main reasons. First, inadequate enforcement of laws, due possibly, among other factors, to a lack of sufficiently qualified personnel (Child and Tsai, 2005), will diminish the influence of coercive pressures. Second, since corporate involvement in national socio-economic transformation in emerging economies is still nascent, new norms and beliefs are neither embedded nor well understood, which makes it less compelling for firms to proactively adopt social reform policies. Third, the difficulty in assessing the societal impact of compliance at this stage also makes responsiveness to new social legislation a less salient issue. Since issues of low salience are unlikely to threaten firm legitimacy (Hoffman, 1999), one strategic choice for corporations is non-compliance with social reform policies.

The second strategic response of firms is the proactive adoption of new CSR policies. Some firms may adopt social reform policies in order to gain legitimacy. For example, firms with historically low social responsiveness legitimacy may view proactive change as an opportunity to reorient their image by signalling to stakeholders their new commitment to social issues (Bansal and Roth, 2000). Others, such as large, reputable corporations, may be ethically motivated to adopt CSR reform policies because they believe it is the right thing to do.



In South Africa, CSR adoption became an unavoidable imperative for enterprises seeking to do business with the government and others that depended on licenses issued by the state (BusinessMap Foundation, 2005). Proactive firms made a business decision to invest in equity transfer transactions to position themselves at the forefront of CSR, in order to retain and expand their business. Yet, in the early stages of institutional transitions, institutional uncertainty, compounded with uncertainty regarding the impact of CSR initiatives, is likely to raise investor scepticism regarding sustenance and growth of corporate revenues and profits. For example, a widely held perception in South Africa when the African National Congress came into power in 1994 was that black managerial talent is sparse (BusinessMap Foundation, 2005). Hence, investors may interpret the transfer of equity to black groups by South African firms as replacing well-qualified white managers with lesser-qualified black managers. The greater the fear of firm mismanagement due to skills gaps after such initiatives, the greater the likelihood that investors will react negatively to CSR announcements.

Institutional theory states that social norms diffuse through populations over time (DiMaggio and Powell, 1983). In emerging economies, Child and Tsai's (2005) study notes that relational frameworks, such as joint business–governmental committees that involve the active engagement of strategic decision-makers from regulatory agencies and corporations, greatly aid in conveying expectations about the social policies firms are expected to follow. An important channel through which organizations learned acceptable CSR norms in South Africa were industry-specific Charters. As a result, normative pressures for CSR initiatives became relatively stronger compared to those encountered during the early phases of institutional reforms.

As institutions evolve, the belief that the private sector must help in the national imperative of socio-economic transformation is likely to become increasingly internalized by managers. Such cognitive processes can exert increasingly strong pressure on corporations promoting CSR initiatives. Also, as emergent institutions enter their mature phase, they gain a cognitively based legitimacy that weakens institutional risks for all investors (Henisz and Zelner, 2005). Moreover, as public awareness regarding new CSR standards of firms is heightened (through active publicity efforts and institution of rewards for corporations that successfully address problems of social exclusion), the demand for investment in firms that have aligned corporate strategies to social regulations is likely to increase. The market's perception of CSR initiatives should be associated with a positive change in future firm performance. Particularly, announcements in the late phases of reforms should be viewed positively by the market. Thus:

*Hypothesis 1:* In emerging economies undergoing institutional reforms, early adopters of CSR initiatives will realize lower shareholder returns compared with late adopters.

### **Market Value and Monetary Value of CSR Initiatives**

Early studies that draw on neo-institutional theory view the legal environment as a coercive threat that pushes organizations to conform to laws and imposes sanctions for non-compliance (DiMaggio and Powell, 1983; Scott, 2002). Other scholars argue that the initial ambiguity of new laws reduces perceptions of such coercive threats, making it

unlikely that instantaneous changes in organizational behaviour will appear with the enactment of new laws (Edelman, 1992). Studies in developed economies have shown how some organizations may adopt outwardly compliant structures to demonstrate their attentiveness to legal mandates, while decoupling structural symbols from substantive practices (Oliver, 1991).

Given the higher levels of ambiguity associated with new CSR laws in emerging economies, not only are firms unlikely to invest in social reforms at the same pace, but it is also likely that the efforts of early CSR adopters will be largely symbolic in nature. For example, Mellahi's (2007) study of the impact of new human resource management laws in Saudi Arabia reveals that private sector organizations engaged in window-dressing activities by recruiting local Saudis in order to meet legal quotas but did not involve them effectively in organizations. In South Africa, after the promulgation of CSR laws, early mover white owned companies that transferred equity to black investors were criticized by some as benefiting only a few black elite groups and by others as merely being a *front* for white investors. Fronting practices include window-dressing (in which case black people were introduced to enterprises on the basis of tokenism) and other initiatives where economic benefits gained as a result of the black economically empowered status of the enterprise did not flow back to the black people as specified in the relevant legal documentation (DTI, 2006). Since ceremonial action marginalizes the role of law on organizational behaviour (Edelman and Suchman, 1997), the disclosure of symbolic corporate behaviour should reduce public trust (Barnett, 2007) in CSR initiatives. The negative effect of symbolism is likely to cause adverse market reactions to announcements of early CSR initiatives.

During the late phase of institutional reforms, as organizations try to understand what the new regulations require through interactive processes, such as participation in inter-organizational communities, a taken-for-granted definition of compliant behaviour emerges (Edelman and Suchman, 1997). Emergent institutional norms regarding CSR should amplify the impact of CSR laws on organizational responses. Moreover, as societal expectations regarding CSR increase, the value of the status quo for organizations declines (Barnett, 2007). To avoid losing ground, corporations must aggressively allocate resources to promote social reform.

Substantive initiatives directed at social reform may allay earlier public fears that corporations might be pursuing symbolism over substance, while credibly demonstrating corporate commitment to social change. For example, Chabane et al. (2006) illustrated how early CSR initiatives in South Africa that transferred small stakes to black investors sidelined historically disadvantaged black people in business structures and confined them to non-operational, public relation positions. In contrast, the transfer of a large stake by a white owned corporation to black investors is more likely to be viewed as genuine effort by current management to contribute to social reform. Since such assessments improve the trustworthiness of the firm and enhance its relationships with key stakeholders, it can be expected that CSR announcements of greater monetary value will promote a positive stock market reaction.

As success stories highlight how substantive CSR initiatives have helped society and aided the national goals of the social inclusion of disadvantaged groups, a larger proportion of investors may become interested in investing in such firms. Since there are



only finite and imperfect substitutes for a given stock's characteristics, the market value of these firms will increase as demand becomes greater than supply. This advantage will be prominent as institutions mature. Thus:

*Hypothesis 2:* In emerging economies undergoing institutional reforms, the greater the monetary value of CSR initiatives, the greater the shareholder returns for late adopters.

## DATA AND METHODS

The primary purpose of this study was to examine the abnormal equity returns around the CSR initiatives of publicly listed South African enterprises during the early and late phases of institutional reforms during the ten year period from 1996 to 2005. We used the event study method, a method typically applied in finance, to this end. This method has also been used in the field of management: Alexander and Buchholz (1978), Arthur and Cook (2004), and Carow et al. (2004), to name a few. The event study is based on the assumption that new information introduced to the market will trigger immediate reaction from investors. In this study, an event is a firm's announcement of equity transfer transactions or corporate social responsibility adoption, labelled *CSR adoption*. To the extent that market participants expect the announcement to increase (decrease) future cash flows of the firm or reduce (increase) the risk of the firm's stock, positive (negative) equity returns are expected for the firm.

As the first step, we identified CSR events by collecting information on CSR initiatives between 1996 and 2005 from the BusinessMap Foundation *BEE Database*, a unique database of black economically empowered companies and their deals. Only announcements that translated into action were defined as CSR events and included in our study. To calculate abnormal equity returns, we required the firms to be actively traded on the Johannesburg Stock Exchange (JSE). The multivariate test also required the availability of firm characteristics, such as age, size, long-term debts, and industry.

Short window lengths for the event study have been recommended by researchers in order to minimize the influence of other factors on the relationship being analysed (McWilliams and Siegel, 1997). Even within short windows, however, confounding events may occur. As noted, we examine a 3-day window in this analysis (the day before, the day of, and the day after the event). Examining the day before and the day after the event allows for the inclusion of possible leaks of information or lag time in investors' reactions, respectively, while minimizing the potential for confounding events. If another announcement by the same firm was released the day before, the day of, or the day after the announcement, the event was excluded. As the longest event window in our empirical analysis is five days before and five days after the announcement date, we kept only those events where 'event' firms had no other informative corporate news during the [-5,5] window around the CSR announcement. This provides the cleanest examination of the announcement and equity returns relationship. The final sample consisted of 71 events.

Table I describes the distribution of events by year and by industry. Generally, the events were fairly spread out over 10 years. However, 10 events occur during 1999 and

Table I. Distribution of 71 firms undertaking corporate social reform (CSR) initiatives (1996–2005) by year and industry

<i>Industry</i>	<i>Number of events by industry</i>	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Construction	3									2	1
Financial: bank	8	1			3					4	
Financial: others	11		1		2	1		2		3	2
Industrial: general	15	2		4	2	1		2		3	1
Industrial: others	8				1	1				5	1
Information technology	9				2	1	1	2		3	
Mining	12					1	5	2		2	2
Pharmaceutical	5		1					1		1	2
Number of events by year	71	3	2	4	10	2	9	5	4	23	9

23 during 2004, indicating the two peaks of CSR adoption waves. Chabane et al. (2006) noted that unbundling deals by white owned corporations increased dramatically from 1997 to peak in 1999. The first peak of CSR adoptions in this study coincides with this observation.

The second phase of CSR adoption was characterized by additional normative levers. The implementation of the BBEE Act in 2003 provided much needed clarity for corporations seeking to transfer equity to black investors. Chabane et al. (2006) observed that the number of BEE deals in 2004 increased 29 per cent from the year before. This coincides with the second peak of CSR adoptions in 2004. A wide range of industries have adopted CSR over the past 10 years, among which financial firms, industrial firms, and mining corporations account for a majority of the deals.

To isolate the pure announcement effect on the company's stock returns, it is important to control for the market return. Following Campbell et al. (1997), we calculated the announcement abnormal returns (AR) using the market model methodology. The parameters of the market model are estimated by statistically modelling the relation between a firm's equity return over a one year period and the market equity return for the same time period. In this study, we used the return on the JSE All Share Index (ALSI), a value-weighted diversified portfolio, to proxy for the market return of the South African stock market. The one-year period is modelled with an end date of 50 days prior to the event date. Estimating the relationship between each firm's equity returns and a diversified portfolio of stocks essentially controls for any external shocks or trends in the stock market. Appendix 1 provides more details on the event study methodology.

We calculated abnormal returns for each of the 11 days surrounding the event date and cumulative abnormal returns (CAR) over the two event windows  $[-1,1]$  and  $[-5,5]$ , where the  $[-1,1]$  window indicates the 3-day period including the day before the event, the event day itself, and the day following the event. The 11-day event window  $[-5,+5]$  was used to account for the possibility of information leakage prior to the announcements and capture any price adjustments that may occur over the few days subsequent to the

announcements. A standard parametric significance test was also performed. The test statistic is for the null hypothesis that the abnormal return or cumulative average excess return is equal to zero. In addition to the statistical tests for average abnormal returns, we also report the proportion of positive abnormal equity returns.

Table II reports summary statistics for major firm and event characteristics. The average age for the firms in our sample is 26 years, with an average equity market value of 10,065 million Rand. The average leverage and volatility of firms are 22.7 and 47.3 per cent, respectively. The cumulative abnormal equity returns for the 'event' firm one year prior to the event range from -38 to 25.2 per cent. As part of the typical CSR deal, 16.44 per cent of equity was sold to black organizations, with 30 per cent of the deals (21 events) occurring in the first wave and 10 per cent of the deals involving multinational corporations. In 21 of the 71 cases, the firm has more than one event in the sample period. There are a total of 12 firms in the mining sector. The average GDP growth rate for the event year is 3.3.

Table III reports the time series average of the pair-wise correlations among the main variables. Note that *LAge* and *LEsize*, which are the natural logarithms of Age and Esize, are used in the correlation table and the multivariate regressions. Several points are noteworthy. First, *LAge* is positively correlated with *Mining* and *MNC*, but significantly negatively correlated with *Early*. Second, *Stake* is positively correlated with *Lev* at the 5 per cent level. Lastly, the correlation between *Early* and *Momentum* is negative and significant, suggesting that the cumulative abnormal returns before the announcement date tend to be lower for early adopters than late adopters. So it is important to control for the momentum of the stock price of the studied companies prior to the announcements.

## RESULTS

### The Effect of Timing on Equity Returns

The results of the study are presented in Table IV. For the full sample, we observed a positive average abnormal stock return of 0.86 per cent for the [-1,1] window, which, however, is not significant. To test our Hypothesis 1, we divided the sample into two groups according to when the firms concluded their CSR initiatives (early adopter and late adopter). Here, the differences are more apparent. For firms that undertake CSR initiatives during the initial phase of institutional reforms, we have 21 observations, with a mean abnormal stock return of -1.23 per cent for the 3-day window and -4.44 per cent for the 11-day window. The fraction of negative CAR is very high. This result suggests that shareholders perceive that CSR initiatives during the initial phase of institutional reforms reflect unfavourable information regarding the general conditions of firms. The negative sign points to a negative effect.

The market response to CSR announcements during the late phase of institutional reforms, however, sharply differs. For the sample of 50 firms that undertook the equity transfer transactions during the late phase of institutional reforms, the mean abnormal stock return is 1.65 per cent for the 3-day window, 2.30 per cent for the 11-day window, and significant at the 5 and 10 per cent levels respectively. The fraction of positive CAR is greater than 50 per cent. These results indicate that investors perceive CSR initiatives favourably in the late phase of institutional reforms.

Table II. Descriptive statistics

<i>Variable</i>	<i>Definition</i>	<i>Mean</i>	<i>Median</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>P25</i>	<i>P75</i>	<i>Maximum</i>
Early	Dummy variable equal to 1 if the event occurred before 2001 and 0 otherwise	0.3	0	0.5	0	0	1.0	1.0
Stake	Percentage of equity sold to a black organization as part of CSR deal (%)	16.4	10.1	15.7	1.0	7.7	21.0	100.0
Momentum	Cumulative abnormal equity returns (%) for one year prior to the event	-3.8	0.0	15.5	-38.0	-14.3	6.3	25.2
Age	Number of years of the event firm from its year to the year the event occurred (year)	26	20	24	1	7	35	107.0
Size	Average market value of equity 5 days prior to the announcements (Rand million)	10,065	2,260	17,964	8.0	555	11,189	95,124
Lev	Leverage ratio of the event firm over the quarter (%)	22.7	14.6	27.7	0.0	2.1	39.2	92.7
Vol	Annual equity return volatility of the event firm (%)	47.3	41.5	39.2	0.0	25.3	53.2	254.8
GDP	Real GDP growth rate for the event year (%)	3.3	3.7	1.0	0.5	2.7	3.7	4.9
Mining	Dummy variable equal to 1 if the firm is a mining company and 0 otherwise	0.2	0	0	0	0	0	1.0
MNC	Dummy variable equal to 1 if the firm is a multinational company and 0 otherwise	0.1	0	0.3	0	0	0	1.0
Multiple	Dummy variable equal to 1 if the firm has multiple events, and 0 otherwise	0.3	0	0.5	0	0	1.0	1.0

Table III. Correlation matrix

Variable	Early	Stake	Momentum	Age	Esize	Lev	Vol	GDP	Mining	MNC
Stake	0.0752 (0.5329)	1								
Momentum	-0.2762 (0.0197)	-0.2065 (0.0841)	1							
LAge	-0.3732 (0.0013)	-0.0274 (0.8205)	0.1652 (0.1687)	1						
LEsize	0.0266 (0.8255)	0.1131 (0.3476)	0.0487 (0.6870)	0.0614 (0.6110)	1					
Lev	0.0587 (0.6267)	0.2535 (0.0329)	-0.1608 (0.1804)	0.0281 (0.8159)	0.0313 (0.7958)	1				
Vol	0.1738 (0.1473)	0.0216 (0.8582)	-0.1059 (0.3796)	-0.4065 (0.0004)	-0.3241 (0.0058)	0.1094 (0.3638)	1			
GDP	-0.5191 (<0.0001)	-0.1192 (0.3220)	0.1631 (0.1741)	0.3949 (0.0007)	0.0533 (0.6589)	-0.1495 (0.2135)	-0.2887 (0.0146)	1		
Mining	-0.2099 (0.0789)	0.1235 (0.3050)	-0.1289 (0.2842)	0.3094 (0.0087)	0.0365 (0.7628)	-0.0308 (0.7990)	-0.0667 (0.5806)	0.0876 (0.4676)	1	
MNC	-0.2309 (0.0527)	-0.0570 (0.6369)	-0.0172 (0.8871)	0.2735 (0.0210)	0.1352 (0.2608)	0.0179 (0.8824)	-0.1140 (0.3439)	0.1918 (0.1091)	0.3147 (0.0075)	1
Multiple	0.1210 (0.3150)	0.0709 (0.5569)	-0.2307 (0.0530)	-0.1431 (0.2337)	0.1684 (0.1603)	0.1269 (0.2919)	0.0229 (0.8495)	-0.1153 (0.3382)	0.1195 (0.3211)	0.2571 (0.0305)

Note: p-values in parentheses.

Table IV. (Cumulative) abnormal equity returns for firms undertaking CSR initiatives (1996–2005)

Day	Full sample ( $N = 71$ )			Early adopter ( $N = 21$ )			Late adopter ( $N = 50$ )		
	Mean	<i>t</i> -stat.	% (>0)	Mean	<i>t</i> -stat.	% (>0)	Mean	<i>t</i> -stat.	% (>0)
-5	-0.45	-1.00	45.5	-0.56	-0.62	44.4	-0.40	-0.79	45.8
-4	-0.13	-0.23	34.3	-0.52	-0.62	33.3	0.04	0.06	34.7
-3	0.18	0.33	52.9	-0.87	-1.02	30.0	0.60	0.89	62.0
-2	-0.20	-0.37	42.3	-0.85	-0.99	40.0	0.06	0.09	43.1
-1	0.43	0.74	40.3	-0.34	-0.34	40.0	0.68	0.97	40.4
0	0.75	1.43	54.2	-0.91	-1.09	34.3	1.44	2.17**	60.6
1	-0.33	-0.61	43.5	0.02	0.02	42.1	-0.46	-0.69	44.0
2	-0.27	-0.49	47.8	-0.51	-0.58	52.6	-0.18	-0.26	45.8
3	-0.02	-0.04	42.3	-1.09	-1.31	38.1	0.42	-0.63	44.0
4	-0.10	-0.17	40.6	0.34	0.39	40.0	-0.30	-0.40	40.9
5	0.53	0.96	42.0	0.84	0.93	42.1	0.41	0.60	42.0
-1,1	0.86	1.47	50.7	-1.23	-1.79*	38.1	1.65	2.28**	56.0
-5,5	0.39	0.31	46.5	-4.44	-1.95**	33.3	2.30	1.87*	52.0

Note: The superscripts \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively.

Table V. Comparisons of CARs for early and late adopters (Hypothesis 1)

	CAR (3 days)		CAR (11 days)	
	Mean	Median	Mean	Median
Early adopter	-1.23	-0.76	-4.44	-3.76
Late adopter	1.65	0.68	2.30	0.97
Difference	-2.88	-1.44	-6.73	-4.73
t value for mean difference	(-2.89)***		(-2.59)***	
Wilcoxon statistic for median difference			(-2.11)**	

Note: The superscripts \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively.

The two effects are significantly different, as indicated by the t-statistic of  $-2.89$  for the 3-day window in Table V. The median difference of  $-1.44$  per cent is also statistically significant at the 5 per cent level ( $z = -2.11$ ), measured by Wilcoxon statistics. Moreover, the mean and median differences for the 11-day windows are significant at the 1 and 5 per cent levels, respectively.

Consistent with Hypothesis 1, we find in the full sample a negative and significant coefficient on the dummy variable, *Early*, indicating that early adopters have lower equity returns than late adopters. Taken together, the evidence from Tables IV and V indicates that CSR initiatives adopted in the initial and late phase of institutional reforms are interpreted by investors in a sharply different way. The results provide support for the first-mover disadvantage argument.



### The Effect of Value of Equity Transfer Transactions

To test whether the South African enterprises that undertake higher monetary value CSR initiatives realize a higher equity return (Hypothesis 2), we regress the 3-day abnormal equity return on the value of equity transfer transactions, proxied by *Stake*, controlling for the timing of transactions. We expected a positive coefficient on *Stake*. Because the early-adopter sub-sample has a small sample size of 21, the parametric regression relying on asymptotic approximations may not be appropriate here. Consequently, we turned to the non-parametric bootstrap regression method, which allows us to estimate the sampling distribution of a statistic empirically without making assumptions about the form of the population. Details of the bootstrap method are provided in Appendix 2.

We computed the mean and standard errors of coefficient estimates from the bootstrapped samples. Then t-statistics for coefficient estimates were calculated based on bootstrapped standard errors. For comparison purposes, we used the non-parametric bootstrap method for the early adopter and late adopter sub-samples, as well as for the full sample. The results are summarized in Table VI.

We found that the coefficient on *Stake* is positive and significant, as was expected. This indicates that high-value CSR initiatives are associated with significantly higher abnormal returns than low-value CSR initiatives. This is consistent with our second hypothesis. Next, we examined whether the cross-sectional relationship differs across early and late adopters. To this end, we split the sample to two sub-samples according to the timing of the transaction. For early adopters, we expected a negative coefficient on *Stake* to reflect unfavourable investor perception on high-value CSR initiatives in the initial wave. For late adopters, we expected a positive sign to reflect positive investor reaction to high-value CSR initiatives in the second wave. We found that the coefficient on *Stake* is positive and significant for the late adopter, but the monetary value of a CSR initiative appears to have no relation with the equity returns for early adopters.

Table VI. The impact of CSR value on (cumulative) abnormal equity returns (CAR) (Hypothesis 2)

<i>Dependent variable:</i> CAR (-1, 1)	<i>Exp. Sign</i>	<i>Full sample</i> Coefficient (t-stat.)	<i>Early adopter</i> Coefficient (t-stat.)	<i>Late adopter</i> Coefficient (t-stat.)	<i>Full sample</i> Coefficient (t-stat.)	<i>Early adopter</i> Coefficient (t-stat.)	<i>Late adopter</i> Coefficient (t-stat.)
Intercept		0.38 (0.37)	-1.25 (-1.24)	-0.98 (-0.63)	0.25 (0.23)	-0.82 (-0.96)	-1.00 (-0.67)
Early	-	-2.86 (-2.67)***			-2.47 (-2.09)**		
Stake	+	8.27 (2.20)**	0.85 (0.40)	16.72 (2.54)**	9.12 (2.25)**	1.93 (0.71)	17.02 (2.65)***
Momentum	+				0.04 (0.81)	0.08 (2.05)**	0.02 (0.31)
No. of obs.		71	21	50	71	21	50

Note: The superscripts \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively.

For robustness, we repeated the analysis by adding the control variable, *Momentum*, which is constructed as the cumulative abnormal equity returns for the one year prior to the event, in the regression model. We used this to proxy for stock price momentum and market anticipation prior to the announcement, following Lang and Stulz (1992). On one hand, this variable was used to control for the market momentum of the stock price of the ‘event’ company before the announcement, if the company is using such a strategy to signal its value to investors. On the other hand, this variable controls for market anticipation if the information is released to the market prior to the actual announcement day. We expected the coefficient on *Momentum* to be positive, because positive CAR before the announcement is more likely to lead to positive abnormal returns on the announcement day. Results are reported in Table VI. As expected, the coefficient on *Momentum* is positive, but is only significant for the early-adopter sub-sample. Results for our major variables, *Early* and *Stake*, are qualitatively the same for the full sample and the sub-samples after controlling for *Momentum*. In sum, Table VI confirms our second hypothesis that firms undertaking CSR initiatives with high monetary value realize significantly higher shareholder returns than those with low value. This effect is significant for late adopters.

### Cross-Sectional Analysis

To gain further insight into firm characteristics and the market reaction, we conducted a multivariate regression analysis for the information effect of equity transfer transactions,

$$CAR_j = \alpha_0 + \alpha_1 Early_j + \alpha_2 Stake_j + XControls_j + \varepsilon_j$$

where for each observation  $j$ , the dependent variable is the cumulative abnormal returns for the 3-day event window. As a robustness check, we also used the 11-day event window (*Car11d*) as a dependent variable. The variables of concern are *Early* and *Stake*. Because there are wide variations in terms of firm characteristics, such as *Age*, *ESize*, *Lev* and *Vol*, *Mining*, *MNC*, *Multiple* and *Momentum*, we included these variables to control for other cross-sectional differences that may have an impact on the market reaction. We also used the macroeconomic variable, *GDP*, i.e. the annual real GDP growth rate of South Africa for the ‘event’ year, to control for investor demand.

Table VII presents the results for the full sample. Results are similar for both *Car3d* and *Car11d* as dependent variables. Significant effects of *Early* and *Stake* still hold after controlling for other firm characteristics. *Momentum* is positively related with *Car3d* and *Car11d*, but is only significant at the 10 per cent level for *Car11d*. *Age* and *ESize* are significantly related with *Car3d*, but the significance disappears for *Car11d*. Notably, *Lev* and *Vol* are significantly and negatively related with both *Car3d* and *Car11d*, suggesting that firms with lower leverage and lower equity volatility are more likely to benefit from CSR initiatives. Other control variables, such as *GDP*, *Mining*, *MNC* and *Multiple* are found to be insignificant.

Table VII. Multivariate regressions of cumulative abnormal returns

<i>Independent variables</i>	<i>Expected sign</i>	<i>Model 1 Coefficient (t-stat.)</i>	<i>Model 2 Coefficient (t-stat.)</i>	<i>Model 3 Coefficient (t-stat.)</i>
Intercept		19.94 (3.41)***	19.30 (3.20)***	26.28 (2.07)**
Early	Dummy variable equal to 1 if the event occurred before 2001 and 0 otherwise	-	-2.68 (-2.21)**	-2.88 (-2.28)**
Stake	Percentage of equity sold to a black organization as part of CSR deal	+	11.24 (3.67)***	11.14 (3.53)***
Momentum	Cumulative abnormal equity returns for one year prior to the event	+	0.03 (1.01)	0.03 (0.89)
LAge	Log of the age of the event firm	-	-1.40 (-2.80)***	-1.25 (-2.29)**
LEsize	Log of market equity value of the event firm	-	-0.66 (-2.80)***	-0.64 (-2.63)***
Lev	Leverage ratio of the event firm	-	-0.05 (-3.18)***	-0.06 (-3.13)***
Vol	Annual equity return volatility of the event firm	-	-0.04 (-3.30)***	-0.04 (-2.91)***
GDP	Real GDP growth rate for the event year	+	0.38 (0.70)	0.39 (0.70)
Mining	Dummy variable equal to 1 if the firm is a mining company and 0 otherwise			-0.30 (-0.22)
MNC	Dummy variable equal to 1 if the firm is a multinational company and 0 otherwise			-1.30 (-0.79)
Multiple	Dummy variable equal to 1 if the firm has multiple events in the sample period, and 0 otherwise.			0.49 (0.44)
	<i>Dependent variable</i>		CAR(-1, 1)	CAR(-1, 1)
	R-square (%)		43.19	43.94
	R-square adj. (%)		35.86	33.49
	p-value for F-stat		(<0.0001)***	(<0.0001)***
	No. of obs.		71	71
				CAR(-5, 5) 27.24 (0.0011)***

Note: The superscripts \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels, respectively.

## DISCUSSION

This study explored CSR initiatives in South Africa subsequent to the end of apartheid and prohibitive economic sanctions by United Nations member countries in 1994. As a research site, South Africa offers a unique empirical context in which to investigate CSR in the largest emerging economy in the African continent with several fairly well developed features of a capitalist, market economy co-existing with historic problems of social exclusion. Theoretically, this article makes three key contributions.

First, it contributes to the CSR literature in general, and to the emerging literature on the institutional theory of CSR (Campbell, 2007), in particular. It highlights how changes in social behaviour in response to institutional reforms (domestic CSR regulations in this case) influence the performance of firms operating in an emerging economy. While neo-institutional researchers have found that firms facing uncertainty are likely to imitate the decisions of other firms (Greve, 2000), our analyses suggest that not all emerging economy firms facing uncertainty are equally likely to imitate the CSR decisions of first mover firms or are able to generate strategic benefits from CSR initiatives. Recent work by Delios et al. (2008) in the area of international expansion decisions has demonstrated that integrating ideas from the economics-based competitive rivalry theory and the sociology-based information theory of mimetic behaviour have greater explanatory power. Future research designs that give attention to both competitive and non-competitive motives of imitative CSR initiatives will contribute to a more fine-grained understanding of the strategic effects of CSR.

Second, this study contributes to the international business (IB) literature by showing how institutions matter for the domestic social strategies of corporations operating in a less studied emerging economy. This work provides evidence that companies are rewarded by investors when they make a commitment to comply with new CSR standards in countries where governments are requiring corporations to contribute to a better society. While government actions can help create a unique CSR climate, IB scholars have paid surprisingly little attention to the implications of the CSR regulations for positive social change initiatives by corporations. The few existing studies that do so primarily focus on the environmental behaviour of multinationals operating in economies undergoing institutional upheaval (Child and Tsai, 2005; Christmann and Taylor, 2001). Attempts to establish a relationship between other types of corporate social behaviour and the consequences of such social initiatives for domestic firms operating in these institutional environments are virtually non-existent. However, as countries enforce CSR laws, scholars have noted that there is an increasing need to examine how institutions influence the development of stakeholder attitudes towards CSR (Doh and Guay, 2006). This paper is a first step in that direction.

Third, in contrast to most prior studies that take a static view of institutional reforms in emerging economies, this study captures the rapidly changing relationship between institutions and organizational social responses. By focusing on this dynamic interaction, this study demonstrates that the market value of CSR varies as institutions evolve. Moreover, certain features of CSR initiatives (in this case, the monetary value of the stake transferred) might influence their wealth impact. By shedding light on the institutional conditions that generate benefits for firms adopting CSR initiatives in the presence of regulations, our study contributes to emerging research that recognizes the importance of exploring conditions for predicting first-mover advantage from adopting CSR initiatives (Sirsly and Lamertz, 2008). For salient social issues, we would speculate that capital markets in developed economies are more likely to reward first movers. To glean a better understanding of the strategic use of CSR (McWilliams et al., 2006; Siegel and Vitaliano, 2007), it is critical that future empirical tests also be conducted in developed economy settings to uncover whether early-adopter or follower roles lead to better strategic positions.

Empirically, this study makes two main contributions. First, it extends the corporate social performance literature that has traditionally been conducted using accounting measures of performance. By examining stock market reactions following CSR announcements, this study contributes to the limited established empirical research on the impact of CSR and its relevance in the capital market in emerging economies. Second, by relying on a long sample period (1996–2005), we were able to track how institutional transitions in this emerging economy influence market reactions to CSR initiatives. Hence, our work departs from existing work in emerging economies, which largely takes a static approach.

Some of the limitations of our research should be mentioned. First, CSR initiatives may take place outside the realm of the Johannesburg Stock Exchange (JSE). Because our tests relied on financial data, we excluded CSR initiatives for which we were unable to obtain financial data and stock return data from the JSE. This resulted in a relatively small sample. Future work could overcome this limitation by including both publicly listed and private South African corporations.

Researchers may question why our study does not control for other parameters that might affect investor demand (e.g. number of black organizations, net worth of black organizations). To explain this, it is important to understand the unique nature of financing mechanisms utilized by black investor groups to conclude equity transfer transactions in South Africa. Typically, black investor groups did not put up any money or assume any risk or debt (Malherbe and Segal, 2000). The funder (a bank or an insurer) would lend funds to a vehicle company created by black investor groups or black consortiums (loose agreements between a group of black investors, unions, and individuals). Much of the equity in the listed company initiating the CSR initiative was issued to the black investor group at no cost. If shares of the listed company increased in value beyond some threshold, the increase in value was shared with the black investor group. Since vehicle companies have no assets or debt, we did not control for net worth of black organizations. Though a separate vehicle company is created for each equity transfer transaction, there is no way to track whether these are active. Also, because black consortiums are not registered entities, we did not control for the number of black organizations.

Testing our hypotheses in the context of a single country allowed us to hold the environment constant. Yet, the uniqueness of the Broad Based Black Economic Empowerment (BBBEE) policies in South Africa weakens the generalizability of our findings. Despite this limitation, we believe our main finding concerning the value maximizing impact of time for CSR adoption in response to CSR legislation will hold true across a wide range of other social issues, such as working conditions and human rights in emerging economies. Although differences in exogenous and indigenous forces may lead to significant inter-firm variations in CSR adoption in response to new CSR laws across emerging economies, we expect that investor demand will be greater during the late phase of institutional reform when shareholder value will be maximized.

Future work may possibly explore the value effects of CSR initiatives addressing other areas in emerging economies in Latin America, Asia, and the African continent, where governments are creating an enabling environment by enacting CSR laws. Since CSR adoption plays an important role in winning business for South African firms, and CSR

targets are increasingly being measured by accredited verification agencies, these firms may be more likely to pursue substantive implementation than firms in other emerging economies. An interesting extension of this study would be to conduct a cross-country study that explores how rating systems enforced by accredited agencies alleviate the problem of symbolic CSR investments.

## CONCLUSION

Management scholars have called for greater attention to be directed towards understanding the interconnections between institutions and socially responsible corporate behaviour. Towards that end, we have attempted to capture the complex relationship between regulations and CSR in a less studied emerging economy context. In developed economies, capital markets are viewed to be important pressure points for corporate social action. We find that the market value of CSR in emerging economies varies as institutions evolve. The ambiguity of new laws and scepticism about their value initially limit the incentives that capital markets can create for CSR initiatives. However, once normative and cognitive beliefs come to be institutionalized, corporate virtue is rewarded by capital markets.

By examining investor response to CSR initiatives, this study demonstrates that changes in the institutional environment can influence stakeholder expectations about the responsibilities of corporations to the broader society, and shifting societal views of the corporate role, in turn, influence corporate action to address social problems. Our results of positive market reaction to late movers reveal that institutional reforms create increased awareness of and support for CSR in South Africa. This also suggests that the institutional environment has prompted changes in corporate social action that are making important contributions to addressing social problems in South Africa.

## APPENDIX 1: EVENT STUDY METHOD

We use standard event study method to estimate abnormal returns and make inferences. Equation (A1) below is used to estimate the relationship between a given firm's return ( $R_{it}$ ) and the market portfolio return ( $R_{mt}$ ), where  $i$  represents the firm and  $t$  represents time in trading days.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (\text{A1})$$

where  $\beta_i$  represents the estimated relationship between the market return and the firm return.

Once the normal or expected shareholder return is estimated, equation (A2) was used to compute the abnormal returns ( $AR$ ) resulting from a CSR adoption announcement.  $AR$  is calculated as the difference between the observed return and the estimated return from the market model.

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}). \quad (\text{A2})$$

The abnormal returns can be aggregated over all  $N$  events in the sample:



$$\overline{AR}_t = \frac{1}{N} \sum_{i=1}^N AR_{it}. \quad (A3)$$

Because the events occur over various dates, they can be considered as independent. The variance of the sum is then just the sum of variances:

$$V(\overline{AR}_t) = \frac{1}{N^2} \sum_{i=1}^N \sigma_{it}^2. \quad (A4)$$

The cumulative average abnormal returns (CAR) for  $[t_1, t_2]$  are the sum of the average abnormal returns over the days in the event window, where  $t_1$  and  $t_2$  represent the first and last day, respectively. The CAR and associated t-statistics are then:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} \overline{AR}_t. \quad (A5)$$

A standard parametric significance test was performed. The test statistic is for the null hypothesis that the abnormal return or cumulative average excess return is equal to zero. Tests of significance follow the procedure described in MacKinlay (1997), which assumes independence across events.

$$t = \frac{CAR(t_1, t_2)}{\sqrt{V[CAR(t_1, t_2)]}} = \frac{CAR(t_1, t_2)}{\sqrt{\sum_{t=t_1}^{t_2} V(\overline{AR}_t)}}. \quad (A6)$$

## APPENDIX 2: BOOTSTRAP METHOD

The general principle of bootstrapping for the cross-section data is as follows (Efron and Tibshirani, 1993). Suppose we are interested in statistic  $T = t(S)$  as an estimate of the corresponding population parameter  $\theta = t(P)$ . We sample with replacement from the original data  $S = (y, X)$  in pairs to get a bootstrap sample  $S_b^*$ . Then we compute the statistic  $T$  for each bootstrap sample, that is,  $T_b^* = t(S_b^*)$ . We repeat this procedure  $R$  times. Then the distribution of  $T_b^*$  around the original estimate  $T$  is analogous to the sampling distribution of the estimator  $T$  around the population parameter  $\theta$ . The average of the bootstrapped statistics,

$$\bar{T}^* = \hat{E}^*(T^*) = \frac{\sum_{b=1}^R T_b^*}{R} \quad (A7)$$

estimates the expectation of the bootstrapped statistics. Similarly, the estimated bootstrap variance of  $T^*$ ,

$$\hat{V}^*(T^*) = \frac{\sum_{b=1}^R (T_b^* - \bar{T}^*)^2}{R-1} \quad (A8)$$

estimates the sampling variance of  $T$ .

In our study, we choose  $R = 5000$ , that is, we obtain 5000 bootstrap samples. We compute the mean and standard errors of coefficient estimates from the bootstrapped samples. Then t-statistics for coefficient estimates are calculated based on bootstrapped standard errors.

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