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THE STOCK MARKET REACTION OF GERMAN AND AMERICAN COMPANIES TO A POTENTIAL GERMAN UNIFICATION

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Abstract

This paper examines the abnormal returns associated with German firms and with American MNCs with a presence in Germany in response to the fall of the Berlin Wall on November 9, 1989. German firms exhibit a positive abnormal return of 2.69 percent in the week immediately following the event and negative abnormal returns of 0.67 percent in the year following the event, indicating an initial overestimation of their ability to profit from newly arising opportunities. Applying an SUR methodology, American firms with a presence in Germany exhibit negative abnormal returns of 0.52 percent on the event day. These abnormal returns are inversely related to firm size, and are not attributable to increases in either systematic or bankruptcy risk. I hypothesize that negative abnormal returns of American MNCs operating in Germany are attributable to a potential competitive disadvantage of American versus German firms resulting from information asymmetries or a "first-mover" advantage.

INTRODUCTION

On October 3, 1990, the German people officially united for the second time since 1871. This was not a surprise, as the event had been planned for months in advance through various legislative and regulatory events (see Table 1). Indeed, the fall of the Berlin Wall on November 9, 1989 for the first time opened a realistic gateway for a reunited Germany. The question at hand is thus twofold. First, how did the German stock market in general react when it first perceived the possibility of a unification between the German Democratic Republic (GDR) and the Federal Republic of Germany (FRG)? Second, how did shareholders of American firms with an established presence in the FRG perceive the news of a potentially unified Germany?

Potential Advantages for German and American Companies

The answer to the question whether West German citizens perceived the fall of the Berlin Wall to be potentially beneficial seems obvious. The initial euphoria in both East and West Germany that accompanied the fall of the Wall was perceived to be indicative of a successful German future in an economic sense. However, this euphoria was, to a large extent, emotionally motivated and should not be the primary factor with which to analyze either the West German or the American stock market response to this surprise event.

There are, however, various other reasons why both shareholders of West German and shareholders of American companies with a presence in Germany could benefit from a potential unification. First, there would be increased opportunities for East German acquisitions by both West German and American companies. Second, even if a unification would not occur[1], an additional market opportunity would be presented to both West German and foreign firms with a presence in West Germany in the form of access to other European markets. If the two Germanys would indeed unify, then the resulting country would border nine other European countries, giving it the most neighbors in all of Europe.[2] Third, operating directly in (or selling to companies that operate in) East Germany would give investors unique insights into the psyche of the Eastern European people, enabling them to take advantage of business opportunities in the (now former) USSR or other Eastern European countries, thereby tapping entirely new markets. As one author put it, "the combination of Western capital and expertise with a cheap and skilled East German workforce

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should result in a thriving industrial base and extensive consumer markets."[3] In a sense, this reasoning is similar to the "positive-multinational network" hypothesis discussed in [16]. The authors show that there is a positive abnormal return on the day of an international takeover bid for those firms that already have international operations but are not yet operating in the target firm's country.[4] However, the authors found only insignificant negative returns associated with bids of firms who were already operating in the target firm's country, attributable to the fact that foreign acquisitions not expanding an MNC's multinational network do not alter the market's perception regarding the acquiring firm's ability to arbitrage restrictions or capture informational externalities.

TABLE 1
Important Events in the "Reunification Period"

Date	Event
Nov 9, 1989	The Berlin Wall falls, followed by massive immigration from East to West Germany.
Dec 1989	Poll taken in East Germany indicates that 71 percent of the people favor sovereignty rather than reunification
Jan 1990	Passage of regulation to allow privately owned producers and foreign investment in GDR
Feb 1990	East German leader Modrow announces that he favors unification; FRG proposes economic and monetary union between the two German economies.
Mar 1990	East German election; candidates who favor unification are elected.
Mar 1, 1990	The Berlin Treuhandanstalt, responsible for privatizing East German businesses, is founded.
May 18, 1990	Staatsvertrag between the two Germanys that specifies the reforms required in East Germany and set out the terms for German economic, monetary, and social union. (GEMU).
Jul 1, 1990	GEMU becomes effective.
Aug 31, 1990	Representatives of the GDR and FRG sign a treaty for unification.
Sep 12, 1990	The allies give up their occupation rights in all parts of Germany, which allows unification to be realized.
Oct 3, 1990	The two Germanys officially unify.

A fourth potential advantage associated with a German unification relates to the type of East German firms to be sold publicly. Due to infrastructural and other problems, most opportunities in East Germany focused on the areas of construction, environmental cleanup,[5] housing, hospitals, retail outlets, transportation, energy, tourism, and telecommunications.[6] Thus, the Berlin *Treuhandanstalt*, the institution responsible for eventually selling the approximately 8,000 public East German companies, eventually provided generous subsidies that were available both to West German and foreign investors. To the extent that such subsidies could be foreseen when the Berlin Wall fell, there could be a positive impact on the share prices of potential acquirers of these East German companies, both domestic and foreign.

The final and most important advantage that could be expected for potential acquirers, however, was that East Germany, in contrast to all other Eastern European countries, had the potential of an instantaneous leap from a socialist to a market-based economy should it opt to be integrated with the Federal Republic. That is, while other Eastern European countries would be forced to develop their own market-based systems, East Germany had the potential of simply adopting that of its neighbor, providing it virtually overnight with a fully convertible currency,[7] a western-style commercial base, and a favorable tax system.[8]

Potential Disadvantages for German and American Companies

Although the potential gains seem overwhelming, there are also several potential disadvantages associated with a potential German unification for possible domestic and foreign acquirers. First, the last time East Germany came close to a revolt, the Red Army moved into East Berlin on June 17, 1957. Although of a short duration, there was an initial

anxiety that the Soviet Union would intervene in 1989 as well. The incorporation of this very real political risk by both German and American stockholders may have reduced any potential positive returns associated with the fall of the Berlin Wall.

A second disadvantage applying primarily to American companies also relates to political risk and the uncertainty resulting therefrom. *Ex-post*, East Germany was integrated with West Germany. Conversely, this issue was all but unresolved when viewed *ex-ante*. For example, in May 1990, Foreign Deputy Minister Irmgard Adam-Schwaetzer of West Germany announced that she did not believe a unification would occur in 1990.[9] Even if such a unification would occur, however, it was not clear what form the unified country would take. Indeed, at least for a while, most East Germans were pushing for a combination of their socialist and West Germany's market system. This, too, would increase the uncertainty of investing in East Germany, and could thus carry with it negative impacts on returns of American firms with a presence in East Germany due to increased uncertainty with regards to policy making.[10] The importance of this point is highlighted by [49], who find that political stability is the most important factor for American companies assessing political risk. Similarly, [36] point out that Eastern European countries may experience a corporate vacuum during the transition to capitalism, during which labor and management are in control of corporations and may begin liquidating some of the firms' assets, which highlights this increased uncertainty even further.[11]

Another point related to political risk was the uncertainty surrounding West Germany's economic future (individually or within the EC context), as well as East Germany's ability to survive. Investments in East Germany could have initially been perceived by the market as favorable, but there were numerous potential dilemmas; examples are the ranking of East German productivity somewhere around 40 percent of that of West Germany,[12] the bureaucratic mindset of the East German people, inefficient management, problems with the infrastructure and telecommunications (which made assessing the potential value of a venture increasingly difficult), and the lack of reliable accounting data.[13]

Directly related to West Germany's economic future was the question of how the reunification would be financed. If the potential unification was going to take place via borrowing, then West Germany's inflation rate could be expected to increase. With Europe '92 at hand, the question was how both the Bundesbank and the central banks of other European countries would react to an increased West German inflation rate. It can be reasonably assumed that the Bundesbank would use a tight monetary policy, thereby increasing interest rates.[14] Undoubtedly, increased uncertainty in the form of the potential reaction of European central banks to a German unification may have mitigated any expected foreign direct investment benefits that could be achieved via unification or increased sales to a reunited Germany. As one author put it, "the transition presents a situation of heightened uncertainty and risk, with potentially serious ramifications for Europe and the rest of the world."[15]

A related issue to the Bundesbank's actions was the question whether the Bundesbank would retain its central role in economic development or whether the bank would take a subordinate position to political objectives.[16] In other words, if the West German economy would suffer overall, and/or if individual West German companies acquiring former public East German companies would have an increased chance of losing their investment, then American companies with sales to West Germany would be exposed to greater risk and uncertainty, implying a potential negative stock return associated with the fall of the Berlin Wall.

Other foreseeable problems for potential acquirers of East German firms included property rights[17], required reorganizations of acquired firms, potential commitments to employees, and extensive modernization.[18] All told, only 20 to 33 percent of East German firms were expected to survive should East Germany convert to a market economy.[19]

The remainder of this paper is organized as follows. Section 2 presents a review of related literature, while Section 3 derives the hypotheses. Section 4 addresses sample selection and availability of data for both samples, and Section 5 discusses the methodologies. Section 6 presents empirical results, complemented by Sections 7 and 8, which address cross-sectional and risk-shift analyses, respectively. Section 9 concludes.

REVIEW OF RELATED LITERATURE

Empirically, literature addressing stock returns associated with the German reunification in general is very sparse and absent for the fall of the Berlin Wall. However, one study addresses the issue directly; [50] finds that German reunification had both positive and negative information content for German stocks (using the 30-stock DAX index) and for world stocks (using the Financial Times World Stock Index). However, he did not find an impact on American stocks (using the S&P 500 Index). With little explanation, the author labels a period beginning in August 1989 and ending in July 1990 as the "reunification period," and examines stocks over that period using a GARCH-M model. Yet, he never singles out individual events.

The decision to examine stock returns of American firms with an established presence in Germany (and not just any American firm) is also based on empirical results. [56] find that there is a correlation among the daily stock price indices

of the U.S., Japan, the United Kingdom, and Germany, but [53] find only weak cross-volatility spillovers from the U.S. to Germany and from Germany to Japan and no spillovers from Germany to the U.S. Similarly, [44], examining weekly data from 1979 to 1991 for the United States, Germany, the United Kingdom, and Japan, find that there is a long-lived linkage between the U.S. and the German market, while there is only a short-lived relationship between the other countries examined.[20] Furthermore, [37] finds no relationship between market volatility and stock prices using an ARIMA model and concludes that stocks' reaction to market volatility decays rapidly and that shocks can affect the required rate of return on stocks for only a short period of time.

The articles in the preceding paragraph indicate that there is weak evidence of a correlation between stock markets throughout the world. Therefore, in the present sample, American companies with a stake in West Germany are examined; consequently, the correlation between the German and American stock markets should be accented. Furthermore, by examining November 9, 1989, an *ex ante*, rather than *ex post*, analysis is conducted to predict the impact of the fall of the Berlin Wall on American stocks in particular. This allows the present author to assess what the market expected to happen. As [27] mention, international diversification (with regards to stock markets) is more difficult when information is uncertain.

As mentioned earlier, a potential disadvantage to German unification is the form of financing chosen by West Germany, especially if West Germany should choose to finance by borrowing. This is also supported empirically. For example, [30] finds support for the "risk premium hypothesis," which states that there is a negative relationship between stock returns and unexpected inflation. That is, if the German Bundesbank should decide not to follow its historical path of action to preserve low inflation, but instead to resume its central EC role (or, alternatively, to subordinate that role to political objectives), then there is reason to believe that the fall of the Berlin Wall would have a negative impact on West German stock prices and on stock prices of American firms with a stake in Germany. This is also supported by [29], who find evidence against the "proxy hypothesis"[21] and in support of a negative relationship between stock returns and inflation, which persists.

HYPOTHESES

The "Surprise-Competition Hypothesis"

Table 2 provides a summary of the potential advantages and disadvantages of a German reunification discussed above. Note that all the potential disadvantages share the increased risk and future uncertainty associated with a potential German reunification. Furthermore, note that all the potential advantages, while certainly valid for German firms, are contingent on the assumption that American firms with an established presence in German will have an opportunity to invest in the GDR simultaneously with German firms. If, however, German companies will have an opportunity to invest in East Germany before American companies do, then some of the potential advantages can actually turn into disadvantages for American firms. That is, there will be a few East German companies that are truly worth acquiring, and if West German companies have greater opportunities to acquire these companies than American firms do and/or possess greater information on these bargain companies, then American companies may actually be at a disadvantage, potentially losing market share and missing potentially profitable opportunities. This would lead to a negative impact on share prices of those American companies that are not able to acquire these East German firms. This negative effect would be due to the fact that, in the presence of such a surprise event, German firms would be better able to take advantage of opportunities arising therefrom. This reasoning is incorporated in hypotheses 1 and 2 below.

> **Hypothesis 1**: West German firms will experience a positive abnormal return in the period surrounding the fall of the Berlin Wall.
>
> **Hypothesis 2:** American firms with an established presence in West Germany will experience a negative abnormal stock return on the day of the fall of the Berlin Wall.

Support of these hypotheses would complement [16]'s findings that there are no significant positive abnormal returns associated with those firms already functioning in a foreign country. Indeed, for MNCs operating in a foreign country, there would be a negative abnormal return associated with the surprise event due to increased competition and possible loss of market share.

TABLE 2
Summary of Potential (Foreseeable) Advantages and Disadvantages to West German and American Firms on November 9, 1989

Potential Advantages	Potential Disadvantages
Initial Euphoria	Political Instability (Red Army, Timing of Unification)
Future Acquisitions	Timing of Privatization (Corporate Vacuum)
Access to Other European Markets	East German Companies' Ability to Survive
Subsidies to Foreign Investors	East German Productivity
Instantaneous Leap from Socialist to Market-Based Economy	Financing of Potential Reunification ("Risk Premium" Hypothesis)
Infrastructural Opportunities	Commitments Required of Foreign Investors
Spillover Effects from German Stock Market	West German Economic Uncertainty

To isolate the effects of this "surprise-competition" hypothesis on share prices of American companies, the risk-related disadvantages identifiable through the existing literature (discussed above and listed in Table 2), should not be viable, or at least to a lesser extent. This leads to the following hypothesis:

> **Hypothesis 3:** American companies with an established presence in West Germany will not experience an increase in risk following the fall of the Berlin Wall.

Hypotheses 1 through 3 will be collectively referred to as the "surprise-competition hypothesis" (henceforth SC).

Proportion of European Sales

If the SC hypothesis is true, then those American companies with significant sales to Europe may be expected to be affected by the potential loss of market share to a greater extent than those firms with a relatively small proportion of their sales to Germany or Europe. In other words, they would be exposed to the effects of the SC hypothesis to a greater extent than firms operating primarily in the U.S. This reasoning results in the following hypothesis:

> **Hypothesis 4:** American companies with a relatively large proportion of their sales to West Germany will experience a larger negative abnormal returns than American companies with a relatively small proportion of their sales to West Germany.

Firm Size and Number of West German Subsidiaries

It could be argued that bigger American companies and those American companies with a lot of subsidiaries in Germany would experience a similar negative return as those American firms with a lot of sales to Germany. Particularly those companies with a lot of subsidiaries in Germany should experience a greater exposure to a potential loss of market share. Conversely, bigger American companies already operating in Germany may exhibit a relatively small negative return associated with the fall of the Berlin Wall, as they may have greater access to information and may be able to move faster pending potential opportunities than relatively small American firms. Thus, American companies with subsidiaries in Germany may be expected to exhibit a return that is similar to the return experienced by German companies in response to the fall of the Wall, as they may be better able to take advantage of investment opportunities in East Germany.

The resulting hypotheses are stated in alternative form below:

Hypothesis 5: Large American companies with a presence in West Germany will experience either a greater or a smaller negative abnormal return than small American companies with a presence in West Germany.

Hypothesis 6: American companies with multiple subsidiaries in West Germany will experience either a greater or a smaller negative abnormal return than those American companies with relatively few subsidiaries in West Germany.

Number of European Subsidiaries

American companies doing business in a lot of other nations besides Germany may be expected to have greater experience in dealing with increased competition in a given country and should therefore be expected to exhibit a relatively small abnormal return in comparison to those companies that operate in Germany only. These firms may be expected to be less exposed to events in Germany due to a greater degree of international diversification. The resulting hypothesis is stated below:

Hypothesis 7: American companies operating in more than one country besides West Germany will experience a smaller negative abnormal return than those American companies operating in relatively few countries besides West Germany.

Type of Industry

Those American companies able to take advantage of infrastructural opportunities should experience a relatively large negative abnormal return in the period surrounding the fall of the Berlin Wall. That is, the opportunities missed by them because of German firms' greater ability to take advantage of these opportunities or greater informational access are more blatantly obvious than for those American firms involved in, say, consumer products. Alternatively, if the two Germanys should unify, there may be more infrastructural work than German companies alone can handle. The popular literature has shown, for example, that there were still various opportunities for these firms a good part into 1991 and 1992. This rationale leads to the following hypothesis:

Hypothesis 8: American companies involved in infrastructural businesses will experience either a greater or a smaller negative abnormal return than those companies not involved in infrastructural businesses.

AVAILABILITY OF DATA AND SAMPLE SELECTION

West German Firms

To analyze the general impact of the fall of the Berlin Wall on West German stocks (Hypothesis 1), *Barron's National Business and Financial Weekly* was utilized to obtain weekly stock data published by the Commerzbank (i.e., the DAX index). To analyze the long-term impact of this event on German industrial stocks, annual stock data for German stocks was obtained from *International Financial Statistics (IFS)*, which provides averages of about 95 percent of Germany's industrial stocks. This data was then used to obtain a general percentage change in the weeks surrounding the fall of the Berlin Wall.

American Firms

The second part of the analysis focuses on the stock price impact of the fall of the Berlin Wall on American firms with an established presence in West Germany. The initial sample consisted of 55 American firms that had both sales and subsidiaries in Germany[22] and was obtained from the *World Directory of Multinational Enterprises*.[23] A more realistic measure of international involvement may be the reaction of shareholders of those U.S. firms conducting acquisitions in East Germany after the fall of the Wall but before the German unification on the day that they acquired the firm. However, there were only thirty U.S. acquisitions, joint ventures, and capital increases combined in Western Europe over the period 1987 to 1991.[24] Confounding events reduced the sample to 22 firms. Subsequently, daily stock returns for each firm were obtained from the CRSP (Center for Research in Securities Pricing) tapes. Table 3 presents summary characteristics of the sample firms.

TABLE 3
Sample Characteristics for Twenty-Two American Firms

Company	Proportion Of European Sales (%)	Total Assets ($000s)	Subsidiaries In Germany	Operating In ? Countries
Aluminum Company of America	8	9,902	2	8
American Brands	68	5,454	4	12
Clark Equipment	19	884	4	10
Colgate Palmolive	29	3,228	1	13
CPC International	28	3,261	2	37
Dana Corporation	10	2,802	3	18
Eastman Kodak	25	14,451	1	30
FMC	13	2,595	2	39
Heinz	15	3,605	2	21
Hewlett-Packard	36	8,133	1	31
Ingersoll-Rand	17	2,248	2	15
ITT	21	39,983	9	4
Johnson & Johnson	28	6,546	3	25
Kimberly-Clark	14	3,886	1	19
Mattel	40	775	1	16
MMM	26	6,640	2	24
Pitney Bowes	11	2,432	2	15
PPG Industries	20	4,988	3	19
Quaker Oats	20	2,975	1	15
Rohm & Haas	26	1,954	1	16
Stanley Works	15	1,388	2	9
Union Carbide	13	7,892	1	22

METHODOLOGY

West German Firms

After obtaining the sample, an autoregressive model with one lag term of the following form was used to forecast the expected return of West German stocks for the week following the fall of the Berlin Wall and for the year 1990:

Equation 1

$$RET_t = \alpha + \beta RET_{t-1} + \varepsilon_t ,$$

where RET_i represents the weekly return on the DAX Index or the annual return on the portfolio of the German stocks included in *International Financial Statistics*.

For the annual analysis, returns for German industrial firms from 1952 to 1988 were used to obtain the coefficients of the autoregressive model. For the weekly analysis, the analysis was conducted using a period of forty-five weeks, ending with the week of October 30, 1989, to forecast the return of the DAX Index in the week after the fall of the Berlin Wall. Next, forecasted weekly and annual returns were compared with the actual returns for the period under consideration.[25]

American Firms

An event study is especially appropriate if the event in question is a surprise. For the fall of the Berlin Wall, this is certainly true, as no one expected the events to happen as they did on that day. Thus, the impact of an *anticipated* unification or market economy in East Germany can be analyzed by conducting an event study for this event, which really made this option viable. Therefore, it should be interesting to see how the stock markets in both Germany and the United States reacted on that particular day. It would be extremely difficult to assess any later developments regarding a potential German unification using an event study, as all events in Germany occurred at an extremely rapid pace after the fall of the Berlin Wall.[26]

Usually, event studies are conducted using an estimation period to estimate the coefficients of the market model. Subsequently, abnormal returns are estimated by applying these coefficients to the event of interest. However, according to [43], such a methodology is inadequate when changes in both risk and return might take place and when all firms are affected simultaneously by an event, as the market model returns and residuals may be cross-sectionally correlated. Accordingly, a seemingly unrelated regression (SUR) methodology is employed here for the American sample firms. The major advantage of the latter is that it allows simultaneous consideration of both systematic risk and returns. SUR does not depend on separate market model regressions from an estimation period, but rather eliminates the potentially dangerous correlation between their residuals explicitly via incorporation into the hypotheses tests. Since the primary objective of this study is to analyze the SC hypothesis, consisting of both a risk and return component, and since the event of interest is November 9, 1989 (the same for all firms), an SUR methodology is employed here.

The sample period used is from August 15, 1989 to February 6, 1990 and consists of 121 trading days.[27] The following equation was then specified over the sample period:[28]

Equation 2

$$R_{pt} = \alpha_p + \beta_p R_{mt} + \eta_p E_t + \lambda_p P_t R_{mt} + \varepsilon_p$$

where:

R_{pt} = the return on an equally weighed portfolio of the 22 sample firms on day *t*,
R_{mt} = the return on the market on day *t*, using the *S&P 500 Index* as a proxy for the market,
E_t = a dummy variable equal to unity on November 9, 1989 and zero otherwise,
P_t = a dummy variable equal to unity on the event day and all subsequent days and zero otherwise.

The first two terms in the above equations represent the market model. The last two terms in the equation consist of the independent variables used to measure the changes in return and risk due to the fall of the Berlin Wall. The coefficient of *E* measures the response of the portfolio of American companies to the event. According to the SC hypothesis, η_p is expected to be negative, and the coefficient of the interaction term, λ_p, measuring the change in systematic risk from pre- to post-event periods, is not expected to be significant positive (in accordance with Hypothesis 3).

For purposes of the cross-sectional analysis, the following system of 22 equations was specified:

Equation 3

$$R_{1t} = \alpha_1 + \beta_1 R_{mt} + \eta_1 E_t + \lambda_1 P_t R_{mt} + \varepsilon_1$$
$$R_{2t} = \alpha_2 + \beta_2 R_{mt} + \eta_2 E_t + \lambda_2 P_t R_{mt} + \varepsilon_2$$
$$\ldots\ldots\ldots\ldots\ldots$$
$$R_{22t} = \alpha_{22} + \beta_{22} R_{mt} + \eta_{22} E_t + \lambda_{22} P_t R_{mt} + \varepsilon_{22}$$

where the independent variables are defined as in Equation 2.

The coefficients of the event dummy variable were then used as the dependent variable in the cross-sectional analysis.

RESULTS

West German Firms

Results for the autoregressions using weekly returns are displayed in Panel A of Table 4. The expected return of the DAX Index for the week following the fall of the Wall lags the actual return for that week by 2.69 percent, as shown in Panel B. The lag variable used to forecast the returns for the week after the event has a *t*-statistic of 1.42, which is not significant at conventional levels. However, dividing the abnormal return of 2.69 percent by the standard deviation of abnormal returns during the 45-week estimation periods yields a *t*-statistics of 1.80, significant at the 10 percent level ($p = 0.07857$). Thus, it appears that there were positive abnormal returns for German firms in the week immediately following the event, which supports Hypothesis 1 and the first part of the SC hypothesis.

TABLE 4
Forecasted and Abnormal Returns of German DAX Index for the Week After the Event Using Weekly Returns
(*t*-Statistics in Parentheses Where Applicable)

Panel A – Results Of Weekly Autoregression

Variable	Coefficient
RET_{t-1}	-0.23 (-1.42)

Panel B – Calculation Of Abnormal Weekly Return

Actual Weekly DAX Return Before Wall Falls	-0.89%
Expected Weekly DAX Return After Wall Fell Based on Autoregression	0.53%
Actual Weekly DAX Return After Wall Fell	3.22%
Abnormal Return	2.69% (1.80)*

* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level

Table 5 displays the result for the annual analysis. Panel B contains the forecasts and resulting deviations from actual returns in 1990, using the coefficients from the autoregression whose results are displayed in Panel A. The significance of the autoregression results (Panel A) indicates that this forecast is reliable ($t = 2.26$; $p = 0.0284$). The annual results indicate that the forecasted returns for 1990, using the coefficients from the regression, exceed the actual return for 1990 by 0.67 percent ($t = -2.93$; $p = 0.00578$). In other words, the immediate positive abnormal return of 2.69percent accruing to the portfolio of stocks during the week following the fall of the Berlin Wall was not sustainable in the long run. Apparently, German firms were not able to take advantage of the opportunities as effectively or efficiently as was initially expected by their shareholders.

American Firms

Table 6, Panel A shows some summary statistics of the event dummy coefficient resulting from equation system 3. Note that the mean abnormal return over the event period is quite low and that the minimum and maximum values, although large, both fall within a normal range of standard deviations and are quite similar in terms of absolute value, which lends some support to the contention that removing confounding effects eliminated some of the bias in the sample.

TABLE 5
Forecasted and Abnormal Returns of German Industrial Companies for 1990 Using Annual Returns
(*t*-Statistic in Parentheses Where Applicable)

Panel A – Results Of Annual Autoregression

Variable	Coefficient
RET_{t-1}	0.36 (2.29)**

Panel B – Calculation Of Abnormal Annual Return

Actual Return of German Industrial Firms in 1989	27.88%
Expected Return of German Industrial Firms in 1990 Based on Autoregression	15.55%
Actual Annual Return of German Industrial Firms in 1990	14.89%
Abnormal Return	-0.67% (-2.93)***

* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level

Table 6, Panel B presents the results from estimating equation 2. As expected, the β coefficient is highly significant (*t* = 27.64) positive, implying that a large portion of the sample firms' returns moves with the market. This is also confirmed by the high explanatory power of the model (adjusted R-squared of 90.71 percent). For the 22 sample firms, there is a significant response in stock value on the day the Berlin Wall fell of 0.52 percent. This strongly supports Hypothesis 2, the second component of the SC hypothesis. Furthermore, the risk shift parameter is neither positive nor significant, giving support for Hypothesis 3, the final component of the "surprise competition" hypothesis.

In sum, there is strong support for the second and third part of the "surprise-competition" hypothesis (Hypotheses 2 & 3). A more detailed analysis of the risk change associated with American firms is presented later in the paper. However, to further investigate the source of the abnormal returns accruing to American firms on November 9, 1989, a cross-sectional analysis is conducted first.

CROSS-SECTIONAL ANALYSIS

Cross-Sectional Model

Equation system 3 was used to obtain abnormal return coefficients (η_i) for each of the sample firms. Then, to test hypotheses 4 through 8, a cross sectional model of the following form was employed:

Equation 4

$$\eta_i = \alpha_0 + \alpha_1 EUSAL_i + \alpha_2 SIZE_i + \alpha_3 COUNTR_i + \alpha_4 SUBS_i + \alpha_5 INFRA_i + \varepsilon_i$$

where: η_i = the abnormal return on the event date for sample firm *i*,
$EUSAL_i$ = the proportion of sales to Europe of firm *i*,
$SIZE_i$ = the size of firm *i*, measured by the logarithm of total assets,
$COUNTR_i$ = the number of countries firm *i* has subsidiaries in,
$SUBS_i$ = the number of subsidiaries firm *i* has in Germany,
$INFRA_i$ = a dummy variable equal to unity if firm *i*'s operations relate to infrastructure and zero otherwise.[29]

TABLE 6
Summary Statistics and Equation 2 Regression Results for Twenty-Two American Firms

Panel A – Summary Statistics of Event Dummy Coefficient

Summary Statistic	Percentage
Mean	-0.52%
Median	-0.27%
Standard Deviation	1.53%
Maximum	1.70%
Minimum	-5.33%

Panel B – Equation 2 Regression Results Applied to the Period from August 15, 1989 to February 6, 1990

	Intercept	Market (β)	Abnormal Return (η)	Change In Risk (λ)
Coefficient	-0.0002	0.8967	-0.0052	-0.0359
t-statistic	-0.8138	27.6400	-1.8331	-0.6666
p-value	0.4174	0.0000	0.0693	0.5064

Correlations of Variables Used in Cross-Sectional Model

Correlation coefficients for all pairs of independent variables are disclosed in Table 7. Since the two independent variables *SUBS* and *SIZE* show some degree of correlation, original model is supplemented with five alternative models, excluding the variables of lesser significance progressively. That is, for each new model, a variable that was previously excluded remains excluded.

TABLE 7
Independent Variable Pearson Correlation Matrix

	EUSAL	***SIZE***	***COUNTR***	***SUBS***	***INFRA***
EUSAL	1.0000				
SIZE	-0.0264	1.0000			
COUNTR	0.0767	0.0541	1.0000		
SUBS	0.0704	0.4266	-0.3324	1.0000	
INFRA	-0.3322	0.0827	0.2116	0.2116	1.0000

Results of Cross-Sectional Analysis

Least-squares regression results for the cross-sectional analysis are disclosed in Table 8. Model 1 uses all five independent variables to test hypotheses 4 through 8 for validity (see Equation 4). Model 2 excludes the variable *SUBS*, Model 3 excludes the next least significant variable, *EUSAL*, and so forth.

TABLE 8
Cross-Sectional Results for Twenty-Two American Firms

	Intercept	*EUSAL*	*SIZE*	*COUNTR*	*SUBS*	*INFRA*	R-Squared	Adjusted R-Squared
Model 1	-0.0549	0.0225	0.0149	-0.0004	-0.0019	0.0068	19.09%	-6.19%
t-statistic	-1.59*	0.79	1.47*	-1.02	-0.74	0.90		
Model 2	-0.0472	0.0186	0.0112	-0.0003	--	0.0054	16.29%	-3.41%
t-statistic	-1.46*	0.67	1.29	-0.77	--	0.75		
Model 3	-0.0432	--	0.0116	-0.0003	--	0.0037	14.07%	-0.25%
t-statistic	-1.38*	--	1.35*	-0.80	--	0.55		
Model 4	-0.0422	--	0.012	-0.0003	--	--	12.61%	3.41%
t-statistic	-1.37*	--	1.43*	-0.91	--	--		
Model 5	-0.0469	--	0.0116	--	--	--	8.84%	4.29%
t-statistic	-1.56*	--	1.39*	--	--	--		

* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level

Results and fit (adjusted R-squared) vary across the six models. In general, however, the explanatory of the models is very poor (Model 5 has the highest adjusted R-squared of 4.29 percent) which could indicate that there are other, more significant, independent variables that were not employed in Equation 4. For example, although the proportion of sales to Europe was taken into consideration, net income was not considered. A firm with a good past earnings performance may suffer more from the increased competition resulting from the event. Moreover, as previously mentioned, knowledge of the German psyche was identified in the popular literature as an advantage for American firms. As a proxy, one could use the length of time firms have operated in West Germany before the Berlin Wall fell. This issue is left for future research.

Also note that the intercept is significant and negative in all models. This signifies the presence of a fixed negative abnormal return in response to the event of approximately 4.5 percent associated with American companies operating in Europe, regardless of their specific characteristics. It appears that, in general, American companies with an established presence in West Germany when the Berlin Wall fell suffered some negative return. This notion is also supported by the fact that 16 out of the 22 sample firms experienced a negative return.[30]

The results for the independent variables can be summarized concisely. Except for the *SIZE* variable, none of the independent variables employed are significant. Due to its logarithmic nature, interpretation of the *SIZE* variable has to be conducted in a careful manner. For example, in Model 4, for each additional million dollars in total assets, the abnormal return will increase by approximately 0.044 percent. This provides strong support for Hypothesis 5; evidently, large American companies have better information to take advantage of pending opportunities in East Germany and may be able to move faster, at least from the viewpoint of these companies' shareholders.

Hypotheses 4, 6, 7, and 8, are not supported. Although the *SUBS* variable is insignificant, its coefficient has a negative sign, suggesting that American companies with multiple subsidiaries in West Germany will be exposed to a loss of market share to a greater extent than those companies with relatively few subsidiaries in Germany. It therefore seems that investors attribute a greater ability to cope to large companies, a capability not ascribed to those companies with multiple branches (Hypothesis 6).

Similarly, as far as the *INFRA* variable is concerned, it seems that American firms operating in West Germany when the Wall fell were ascribed an opportunity to benefit from increased opportunities, as opposed to those firms whose industry would not be affected other than by increased competition, as indicated by this variable's positive sign in the three models in which it was included.

The remaining hypotheses are not supported either in terms of significance or sign. First, the more countries a company operates in, the greater is its negative abnormal return in response to a surprise event, as indicated by *COUNTR*'s coefficient. One possible explanation for this is that investors perceive the possibility of a similar event occurring in another country the firm operates in. Apparently, this possibility has a greater impact than the experience a company would have gathered by operating in various foreign countries.

The sign of the *EUSAL* variable is also surprising. Hypothesis 4 stated that companies with a relatively large proportion of their sales to Germany will be affected by the fall of the Wall to a greater extent. In other words, their negative abnormal return should be greater. However, in Models 1 and 2, the sign of this variable is positive. One possible explanation is that, as with the SIZE variable, the proportion of sales is indicative of a firmer presence in Germany. For example, a large proportion of sales outside the United States may be associated with a greater coping ability if a surprising event takes place.

RISK ANALYSIS

As discussed previously, Hypotheses 1 and 2 simply indicate that the abnormal returns associated both with the German and American stocks could be attributable to any of the risk-related factors listed in Table 2. If, however, the negative returns of American stocks are not due to an increase in uncertainty and risk, then the results would indicate that American firms will be in a disadvantageous position relative to German firms, possibly because of a first-mover advantage on part of the German firms or because of asymmetric information. Consequently, American firms operating in Germany would find themselves in a position that may result in a loss of market share.

Analysis of Bankruptcy Risk

As discussed previously, there was no increase in the systematic risk of the American sample firms in response to the event. In fact, the coefficient of the interaction term in equation 2 was negative, indicating that there may have been a decrease in risk. However, this variable only measured the change in the sample firms' β coefficient; that is, in systematic risk. Looking again at Table 2, most of the potential disadvantages are indicative of an unsystematic (i.e., diversifiable) risk. For example, West German economic uncertainty, financing of the unification, and political instability are factors that could influence an American MNC's ability to survive. This section consequently examines the change in bankruptcy risk. As pointed out by [43], this risk is best measured by changes in the variance of total stock returns rather than β alone.[31]

The return variance was estimated for each sample firm's return for 60 days before to 60 days after the event. Next, an average variance was calculated for both the pre- and post-event period. The results are displayed in Table 9.

TABLE 9
Analysis of Bankruptcy Risk Change for Twenty-Two American Firms

Pre-Event Average Variance	Post-Event Average Variance	Wilcoxon Rank Sum Test *Z* Statistic	Binomial Sign Test *p*-Value (Increases:Decreases)	Sign Test For Sample Median *p*-Value
0.00027	0.00026	0.61000[+]	0.11860 (9:13)	0.08132

+z=1.645 would indicate significance at the10% level.

As the table shows, there was a slight decrease in the variance of the American sample firms' stock returns from sixty days before to sixty days after the fall of the Berlin Wall. To analyze whether this change was significant, several nonparametric tests were applied. First, a Wilcoxon Rank Sum test was conducted, indicating that the change was insignificant. However, the decrease in variance may not be driven by a few large decreases, but rather by various small decreases, in which case the Wilcoxon test may yield insignificant results. For this reason, a binomial test was also conducted to analyze the number of decreases to the number of increases in variance. The resulting p-value is 0.1186, not significant at conventional levels. To analyze whether there could have been a shift in the variance distribution median, a small sample sign test for the median was also conducted, yielding a *p*-value of 0.08. That is, the decrease in median from before to after the fall of the Berlin Wall was significant.[32] Thus, while the change in mean of the variance distribution is not statistically different from zero, the change in median is, indicating an increased right-sided skewness of the variance in returns. [33] In practical terms, there are more extreme variances in the right tail of the distribution than in the left tail. This indicates that there is a larger number of relatively small variances while some of the larger variances

become more extreme in the post-event period. Therefore, some support exists for the contention that there was a significant decrease in bankruptcy risk. This result is in accordance with the "surprise-competition" hypothesis, as the negative abnormal return is not attributable to an increase in risk.

Analysis of Variance Change Model

To determine the factors that caused the shift in bankruptcy risk discussed in the section above, the following model was developed:

Equation 5

$$\Delta VAR_i = a_0 + b_1 EUSAL + b\ SIZE + b_3 COUNTR + b_4 SUBS + b_5 INFRA + u_i$$

where ΔVAR_i represents the change in sample firm *i*'s stock return variance from sixty days before to sixty days after the fall of the Berlin Wall, and the other independent variables are defined as previously.

The primary purpose of this analysis is to determine whether the change in variance is caused by the size of total assets (*SIZE*), which reduced the negative abnormal return for the sample of American companies. If the change in bankruptcy risk has a positive relationship with the size of a company, then there could be an inverse, though indirect, relationship between the sample firms' negative abnormal return and its level of total assets. The implication in this case would be that the larger a firm is, the smaller will be its negative abnormal returns and the greater would be its increase in risk. Since hypothesis 3 postulates that the abnormal returns resulting from the event are independent of an increase in risk, this finding would contradict the surprise-competition hypothesis; the negative abnormal return would then be indirectly caused by factors such as expected future strains on the German economy and not by a lack of the ability of American companies with subsidiaries in Germany to take advantage of resulting opportunities before German companies do.

Table 10 gives results for three versions of the beta change regression.[34] None of the variables that were used in the cross-sectional analysis have an effect on the change in bankruptcy risk. Moreover, except for the *SIZE* variable, all the independent variables have the opposite sign from their counterparts in Table 8, giving further support to the contention that the negative abnormal returns experienced by American MNCs operating in Germany were not due to an increase in bankruptcy risk.

TABLE 10
Analysis of Change in Variances for Twenty-Two American Firms

	Intercept	***EUSAL***	***SIZE***	***COUNTR***	***SUBS***	***INFRA***	**R-Squared**	**Adjusted R-Squared**
Model 1	0.0029	-0.1755	0.0106	-8.3^{E-06}	0.0003	-0.0208	5.83%	-2.36%
t-statistic	0.01	-0.97	0.17	-0.00	0.02	-0.43		
Model 2	0.0011	-0.1747	0.0112	--	--	-0.0204	5.82%	-9.87%
t-statistic	0.01	-1.04	0.21	--	--	-0.47		
Model 3	0.0237	-0.1457	--	--	--	--	4.52%	-0.26%
t-statistic	0.60	-0.97	--	--	--	--		

* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level

IMPLICATIONS AND CONCLUDING REMARKS

This paper investigated the possibility that American firms operating in Germany prior to the fall of the Berlin Wall on November 9, 1989 experienced a negative abnormal return due to this surprise event. More specifically, the possibility that these negative returns were caused by a potential loss of market share and increased competition by German firms, rather than an increase in future uncertainty and risk in either the FRG or the GDR, was investigated.

Results confirm the claim that American MNCs experience a negative abnormal return following a surprise event that invites the possibility of acquisitions. German companies experience a positive abnormal return of 2.69 percent in the week following the fall of the Berlin Wall, while American MNCs with subsidiaries in Germany experience a negative abnormal return of 0.52 percent on the day the Berlin Wall fell. Furthermore, this negative return is not attributable to an increase in either systematic or bankruptcy risk; in fact, the sample firms seem to have experienced a decrease rather than an increase in risk.

Overall, the results are indicative of a "surprise-competition" hypothesis. That is, negative abnormal returns and an absence of a risk increase associated with American firms operating in Germany, combined with positive abnormal returns to German firms in the week following the fall of the Berlin Wall, indicate that a potential future loss of market share and/or sales of these American companies is anticipated by market participants. This is further supported by the observation that the significant negative abnormal returns are partly explained by the size of the American firms. Moreover, the bankruptcy risk decrease is not explained by the same factors as the abnormal return, but is rather unrelated to any of the factors used in the cross-sectional analysis.

The findings of this paper complement [16]'s findings that firms with acquisitions in foreign countries but already operating in those countries experience an insignificant negative return, while those firms that operate in other foreign countries but bid on an acquisition in a new country experience a significant positive abnormal return. Indeed, the findings imply that an American MNC already operating in a foreign country will experience a significant negative abnormal return if a surprise event takes place in that country that favors acquisitions by the host country's firms, thereby putting the American MNC at a competitive disadvantage relative to host country firms.

ENDNOTES

1. This could be the case, for example, if East Germany decided to become a sovereign state.
2. [59]: 6.
3. [55]: 82.
4. The size of the return was 0.31 percent. No significant results were found for those firms without existing international operations.
5. [24]: 43.
6. [39]: 11.
7. The currency conversion was accomplished on July 1, 1990.
8. [39]: 11.
9. [19]: 29.
10. For example, increased uncertainty would result from the potential repatriation of profits and/or probability of renationalization of East German firms once privatized.
11. Also see [36]: 95.
12. [48]: 25.
13. See [3,18,48]
14. See also [21]: 35.
15. [28]: 7.
16. For example, reelections were scheduled in Germany for 1990, and Helmut Kohl was facing bleak forecasts of reelection based solely on West German votes.
17. It could be expected, for example, that those Germans that fled East Germany during the 1960s would claim their old properties. When the wall fell, no decision had been made on property rights, and the issue arose only later ([54]: 36). Nevertheless, this was a foreseeable problem.
18. [38], for example, mentioned a potential "scrap hypothesis," under which all factories in East Germany would have to be rebuild (334).

19. [12]: 11.
20. The authors use a Granger Causality test.
21. The proxy hypothesis essentially states that the relationship between stock returns and inflation only "proxies" for the positive relationship between stock returns and real variables).
22. Sales have been used as a criterion of foreign involvement both by [1,13]. For example, [1] point out that "[o]ther measures such as assets, employees, or profits appear to be even further from the ideal" (1053).
23. Any American company with listed sales *and* existing subsidiaries in Germany was included in the sample. All companies in this directory are listed on the New York Stock Exchange.
24. A possible explanation for this lack of direct investment could be the Bush administration's funneling of dollars to both Poland and Hungary, with more direct investment there. On the other hand, when the Japanese invested heavily in the U.S., American firms became more aware of international diversification strategies [17]: 42.
25. This period was chosen for a reason. The previous year, a multitude of East Germans were fleeing their country via Hungary and other Eastern European countries. The regression incorporates this fact. On the other hand, there should be enough room for the data not to be distorted by potential unification hopes on part of the German peoples.
26. [42]: 1098.
27. The sample period is split into the 60 days immediately preceding and 60 days immediately following November 9, 1989, plus the event date itself.
28. In the presence of nonsynchronous trading, this equation should include a lag term. In that case, the model would be of the following form:
29. $R_{pt} = \alpha_p + \beta_p R_{mt} + \beta'_p R_{mt-1} + \eta_p E_t + \lambda_p P_t R_{mt} + \lambda'_p P_t R_{mt-1} + \varepsilon_i$
30. None of the firms in the sample exhibited nonsynchronous trading.
31. Rather than using SIC codes, the author conducted a detailed investigation of each of the sample firms to determine whether any of their business aspects would qualify them for infrastructural business. Of the 25 firms, 13 qualified.
32. The binomial sign test gives a *p*-value of 0.018.
33. P. 477
34. The respective median variances were 0.000253728 and 0.000216593.
35. Since the median was lower than the mean in the pre-even period, the variance distribution was skewed to the right initially.
36. All other combinations of this equation yielded insignificant results as well.

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