

# Real Option Value Effects of Cross-Border Acquisitions: Service versus Manufacturer MNEs

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## ABSTRACT

*There are a number of real option motivations for U.S. multinational enterprises (MNEs) making foreign direct investments (FDI) via cross-border acquisitions. Some of these investments contain growth options, some hold flexibility options, and some FDI are embedded with both growth and flexibility options. This study posits abnormal shareholders value effects when real options are acquired by U.S. MNEs in cross-border acquisitions, and the study further predicts the value effects for service MNEs are greater than for manufacturer MNEs because service MNEs are less encumbered operationally by hysteresis than manufacturer MNEs. Real option value effects are tested empirically for 235 U.S. MNE cross-border acquisitions. Using event study methodology, this research determines abnormal acquisition announcement returns for the total study sample and for manufacturing MNE and service MNE subsamples. The study further tests for significant differences in mean and median returns between the service and manufacturer MNE subsamples. The test results for the subsample differences are mixed.*

## INTRODUCTION

There is substantial literature regarding the perceived and realized benefits from expanding business operations into foreign markets. FDI theories include operational and financial hedging through exploitation of labor, product and financial market imperfections (Dunning 1973, 1980; Hymer 1960); leveraging proprietary assets through market internalization (Caves, 1971); arbitrage of institutional restrictions and information asymmetries (Kogut, 1983, 1985); economies of scale and scope (Caves, 1971); and market power over suppliers and customers (Kogut, 1985).

Empirical test results regarding FDI performance benefits are mixed. Doukas and Travlos (1988) and Delios and Beamish (1999) find a positive relationship between scope of geographical presence and excess shareholder value, while Morck and Yeung (1991) find no such relationship. Denis, Denis, and Yost (2002) conclude that geographical diversification leads to a reduction in shareholder value. Lu and Beamish (2001, 2004) and Contractor, Kundu, and Hsu (2003) determine the value effect to be positive and negative, depending on the scope of geographical diversification. The relationship between performance and geographical diversification is depicted graphically as a sideways “S” curve.

Literature regarding real options theory and its impact on FDI and shareholder wealth creation is limited. Real options theory hypothesizes that MNEs can achieve abnormal returns through investing in foreign market growth and flexibility opportunities. There are generally three motivational sources for MNEs making cross-border growth option investments. First, growth option foreign direct investments serve as distribution platforms from which existing products can be introduced into new markets. Second, growth option investments are sometimes knowledge platforms through which the MNE can acquire product, technology, or market-specific knowledge, and third, growth option FDI can be market development platforms from which the MNE can expand across product and industry lines in establishing country presence, brand equity, and political leverage.

MNEs can also build shareholder value by developing a network of cross-border operating nodes. The MNE improves its consolidated performance through arbitraging operating and financial risk among countries. The flexibility option hypothesis posits that a multinational enterprise with this strategic network of global operations will earn excess profits as the firm shifts production from country to country in the face of labor, factor, and financial market interruptions as well as significant systematic changes in currency exchange rates, interest rates, tax rates, and input prices.

## **Purpose of Study**

The purpose of this study is to extend the literature regarding real options as a motivational factor for FDI. In particular, the study objectives are two-fold: 1) to examine empirically the real option value effects for cross-border acquisitions, and 2) to segregate and study the real option value effects for service versus manufacturer MNEs. These study objectives drive the preliminary research questions, which include:

1. Are real options a motivation in MNEs' decisions to expand internationally?
2. Do MNE shareholders value FDI real option investments?
3. Do service and manufacturer MNE shareholders value cross-border acquisitions differently?

## **Seminal Theories**

Multinationality and real options theories are primary to this study. The theory of multinationality asserts that firms expand operations internationally to exploit labor, factor, product, and financial market imperfections, or to internalize markets for their proprietary assets. The "OLI Paradigm" (Buckley & Casson, 1976; Dunning, 1973) is one FDI framework that operationalizes MNE exploitation of global market imperfections. The theory basics include: 1) firms must have a firm-specific competitive advantage ("O" or owner-specific) in the home market that can be transferred across borders; 2) the MNE must be able to find location or country specific characteristics of the foreign market ("L" or location-specific) that will facilitate the MNE in exploiting its competitive advantage in that market; and 3) the MNE will sustain its competitive advantage and maximize shareholder value by controlling the entire value chain through internalizing ("I" or internalization) the markets for its products.

Real options theory is extended to multinational finance, hypothesizing that MNEs can earn excess earnings by investing in growth platforms in new markets, industries, and products, and by developing a multinational network with geographically dispersed operating nodes. With regard to the benefit of exploitation, the growth option theory for foreign direct investment is aligned to the OLI Paradigm in that certain cross-border investments create operating platforms from which the MNE can leverage global marketing of its stable of proprietary assets and develop learning and technology platforms through which the MNE can learn with limited investment about new products, new technologies, new industries, or new geographical markets.

Regarding flexibility real options benefits, Kogut and Kulatilaka (1994) write:

The coordination of a network of subsidiaries dispersed throughout the world provides an "operating flexibility" that adds value to the firm. This operating flexibility is an advantage gained by being a multinational corporation...it can be conceived as owning the option to respond to uncertain events. (p. 124)

## **Core Literature**

There are two seminal streams of literature that support this study. First, there are many studies that examine the motivation, performance, and value effects of expanding business operations internationally. Hymer (1960), Kindleberger (1968, 1969, 1984), and Dunning (1973) posit that firms expand internationally to exploit imperfections in international markets or to leverage a firm specific advantage. Caves (1971, 1982) and Rugman (1979, 1981) extend this seminal work, theorizing that MNEs through FDI internalize the economic activities, and with proprietary asset advantages are capable of generating more efficient outcomes than external markets. This thread of study suggests that conducting business internationally has a positive impact on firm performance and value, especially when the firm has a stable of proprietary assets.

The second stream of literature examines the performance and value effects of developing a multinational network of business operations; it is based on the positive multinational network hypothesis (Doukas & Travlos, 1988). Kogut (1983) believes the benefits of the multinational network include leverage and arbitrage. Competitive leverage results from global knowledge of source markets (e.g., labor, materials and energy), and MNE size suppresses adverse political actions (e.g., legislation, regulation, and taxation). Arbitrage benefits are premised on the firm's capacity to shift operations among country nodes in the event of exogenous labor, product, financial, and currency market shocks. These arbitrage benefits are fundamental to the application of the real option flexibility hypothesis to foreign direct investment.

## HYPOTHESES

### MNE FDI and Real Options

Real options are discretionary investments that give the investing firm the right, but not the obligation, to delay and subsequently choose a best course of action. Because the real options investor has both American call and put benefits embedded within the acquired non-financial assets, the real option investor has the ability to limit downside risk while exploiting evolving favorable investment opportunities. MNEs can build shareholder value by acquiring real options through cross-border acquisitions, since option values are non-negative.

Hypothesis 1: MNE shareholder wealth change around the announcements of cross-border acquisitions is not negatively related to the presence of real options, *ceteris paribus*.

### Hysteresis

One of the salient benefits of FDI real options is the operating flexibility of a geographically dispersed set of operating nodes. Operating flexibility provides MNEs with the ability to switch operations among countries in the event of labor strikes, government intervention, changing tax and foreign exchange rates, product input shortages, and other exogenous shocks to the production process of a given location. But not all MNEs can take equal advantage of the flexibility benefit, since embedded flexibility is sometimes muted by industry structure and asset profiles.

Hysteresis is a force of inaction or inertia. Contrary to fundamental economic theory, some firms, some of the time, do not discontinue operations when marginal costs exceed marginal revenues. Because of sunk and switching costs, the firm adopts a position of inaction. These stifling forces include labor contracts, utility contracts, product and service supplier contracts, start-up and shut-down costs, and loss of going concern benefits (e.g., workforce acumen, brand equity and distribution). Hysteresis has been further defined and measured as a range of inaction, for at some point, the marginal cost-benefit relationship of an operation will clearly point to action when the probability and costs of reverse relationships (i.e., switching back) are fully considered. Within the hysteresis range, operating flexibility is limited; outside of the range, flexibility accrues value to the firm.

The flexibility benefits and costs of a multinational presence have been theorized and measured extensively for manufacturer MNEs. Operating flexibility is hypothesized to be of greater benefit for MNEs with extensive capital commitments and input price exposure, yet empirical studies (e.g., Rangan, 1998) find utilization of the multinational network to be practically difficult for manufacturer MNEs because of sticky labor and material input markets and high sunk and switching costs.

By comparison, service MNEs' assets are primarily intangible and can be transferred from country to country with little effort, cost and time. In some cases, the service asset is moved daily around the globe to accommodate a 24-hour production cycle. To the extent the service MNE has fixed assets, these assets are standard brick-and-mortar and equipment, which are easily and cheaply replaced. Service MNE labor is typically not contracted and relatively mobile; it is not defined nor constrained by location. Thus, the service MNE has a more fluid and responsive operating network than manufacturing MNEs. For these reasons, service MNEs are more likely to achieve greater flexibility real option value in their cross-border acquisitions.

Hypothesis 2: When real options are acquired, shareholder wealth changes around the announcements of cross-border acquisitions will be greater for service MNEs than for manufacturing MNEs, *ceteris paribus*.

## METHODOLOGY

### Data

The base sample of cross-border acquisitions is generated from the Securities Data Corporation (SDC) Platinum database. SDC collects data from publicly available information sources, including SEC filings, news and wire sources, and trade publications. The sample consists of U.S. acquirers of foreign firms. The initial SDC list of publicly traded U.S. corporate acquisitions of foreign firms includes 743 transactions for the 1999 and 2000 time period.

The SDC data were cleaned of private acquirers, acquisitions with no corresponding announcements, and inaccurate announcement dates. Upon cleaning the data, the final sample consists of 235 acquisition announcements. The final sample is separated by MNE firm type: manufacturer MNE (n = 126) and service MNE (n = 109). Manufacturer MNEs include SIC codes 1000 – 3999.

The primary service MNE classification, SIC codes 4000 – 8999, includes both hard service (n = 74) and soft service firms (n = 35). Within hard and soft service firms are both consumer service firms and business service firms (n = 62). Hard service firms include those services where the production and consumption of the service can be separated and include, for example, banks, insurance companies, advertising agencies, engineering services, and computer programming services. Soft service firms include those firms where the production and consumption of the service are concurrent and include, for example, transportation services, telephone communication services, and security services.

The service and manufacturer sub-samples are further subdivided into industry groups. For manufacturer MNEs, basic manufacturers (n = 34), electronics and instruments manufacturers (n = 41), consumer products manufacturers (n = 15), and computer and peripheral equipment manufacturers (n = 27) are the segregated industry groups. For service MNEs, business services (n = 62) is the only measurable subdivision.

Acquirer-specific data for the final sample are obtained from the Center for Research in Security Prices (CRSP) database and the Compustat database. To predict the expected stock return for each sample company, stock price movements for the acquisition date ( $t = 0$ ) and a 200-day period ( $t - 250$  to  $t - 50$ ) are obtained

### Event Study Methodology

This study uses standard event study methodology to assess the effect of real option acquisition announcements on shareholder wealth. Within the context of studying abnormal stock returns, event study methodology assumes that equity markets are efficient in the semi-strong form. This study employs the market model to determine whether U.S. acquiring firms' stockholders realize excess returns at cross-border acquisitions announcements. Excess returns serve as a proxy for real option value.

Abnormal or excess returns are the difference between the actual returns ( $R_{it}$ ) and the expected returns ( $\hat{R}_{it}$ ) for each firm  $i$  for trading day  $t$ . The abnormal return ( $AR_{it}$ ) for the common stock of firm  $i$  for trading day  $t$  is defined as:

$$AR_{it} = R_{it} - \hat{R}_{it}$$

where  $\hat{R}_{it} = \hat{a}_i + \hat{b}_i R_{mt}$ , and  $\hat{a}_i$  and  $\hat{b}_i$  are ordinary least squares estimates of  $a$  and  $b$  of firm  $i$  over the period  $t = -250$  to  $t = -50$ .  $R_{mt}$  is the rate of return on the CRSP value-weighted index on trading date  $t$ .

To determine whether the acquisitions made by the sample of firms had a measurable effect on the firms' stock value, abnormal returns are used. If AR is equal to zero, the acquisitions are anticipated to have no effect on shareholder value. A positive AR value implies the acquisitions are expected to create shareholder value, and a negative AR value indicates that the acquisitions will destroy shareholder value. The AR values are calculated for the total sample and two subsamples, which include manufacturing and service MNE firms.

### Tests of Mean Difference

The  $t$ -statistic is used to test if a subsample's average AR is significantly different from zero or from another subsample's average AR value. The premise for employing the  $t$ -test is the assumption that the MNE observations are drawn randomly from two independent and normally distributed populations. This study tests for mean differences between the abnormal returns of groups and subgroups with different characteristics.

### Test of Median Difference

The median test is used to test median score differences between independent groups. It tests the null hypothesis that the medians of the independent populations from which two samples are drawn are identical. The samples are combined temporarily to generate their pooled median value. A matrix is constructed for which the columns are the samples and the two rows present the sample counts above or below the pooled median value. The significance is calculated using the chi-square statistic.

## STUDY RESULTS

The calculated mean abnormal returns generated by the Eventus software are presented in Table 1. The mean abnormal return for the entire sample is 1.4%. The total sample's positive abnormal mean return supports Hypothesis 1 in which shareholder wealth changes around the cross-border acquisition announcements are hypothesized to be not negatively related to the presence of real options.

**Table 1: Eventus Output: Abnormal Returns by MNE Types**

MNE	Days	N	Mean abnormal return	Positive: negative	Patell Z	Portfolio time-series CDA) t	Generalized sign Z
Full Sample MNE	(0,0)	235	1.4%	120:115)	3.059**	4.486***	1.408\$
Service MNE	(0,0)	109	1.9%	63:46>>	2.279*	3.538***	2.487**
Manufacturer MNE	(0,0)	126	0.8%	55:70	1.770*	2.380**	-0.668

The symbols \$, \*, \*\*, and \*\*\* denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a 1-tail test. The symbols (< or >) etc. correspond to \$,\* and show the significance and direction of the generalized sign test.

The subsamples of service MNEs and manufacturer MNEs have positive mean abnormal returns of 1.9% and .8%, respectively. The greater average positive abnormal return for service MNEs in comparison to manufacturer MNEs supports Hypothesis 2 in which shareholder wealth changes around the announcements of cross borders acquisitions are posited to be greater for service MNEs than for manufacturing MNEs.

The direction of the returns shows that for the full sample of acquisitions, 120 returns were positive and 115 were negative. For service MNEs, the positive returns are 63 versus 46 negative returns. Manufacturing MNEs have more negative abnormal returns than positive, 55 positive versus 70 negative.

### Tests of Mean Difference

The total sample is subdivided in two subsamples: manufacturer and service MNEs. In Table 2, the results from the tests in mean differences in abnormal returns for the two MNE subsamples are presented. On average, service firms have a higher mean abnormal return than manufacturing firms, 1.9% versus .8%, and this supports Hypothesis 2. But the difference in mean excess returns is not statistically significant between manufacturer and service MNEs.

**Table 2: Test of Mean Differences: Abnormal Returns by MNE Groupings**

Group	N	Return %	Diff.	P
Service MNE	109	1.9		
Manufacturer MNE	126	.8	.916%	.22

### Tests of Median Differences

The acquisition announcement data are first divided into two groups by MNE type: manufacturer and service MNEs. The abnormal return medians for the two groups are tested for differences (see Table 3). The median abnormal return for total service MNEs is 1.0%, while the median abnormal return for manufacturer MNEs is -.3%. While the service MNE abnormal return median is greater than the manufacturer MNE return median and supports Hypothesis 2, the results are not statistically significant.

The data are further divided into three groups: manufacturer MNEs, hard service MNEs, and soft service MNEs. The median abnormal return values are calculated and tested for differences for the two service MNE subsamples versus the manufacturer MNE subsample.

The hard service MNE has a greater median abnormal return in comparison to manufacturer MNEs' median return. Again, this supports Hypothesis 2, in which service MNE wealth effects are greater than manufacturer MNE wealth effects with regard to cross-border acquisition announcements, but the results cannot reject the null hypothesis that the median values are the same.

**Table 3: Test of Median Differences: Abnormal Returns by MNE Groupings**

Group	N	Mean %	Median %	Diff. %	Sig.
Service MNE	109	2.0	1.0		
Manufacturer MNE	126	.9	-.3	1.3	.07
Hard Service MNE	74	1.7	.6		
Manufacturer MNE	126	.9	-.3	.9	.07
Soft Service MNE	35	2.6	1.8		
Manufacturer MNE	126	.9	-.3	2.1	.05

Soft service firms also have a greater median abnormal return value than the median manufacturer MNE abnormal return, and the results are statistically significant. This supports Hypothesis 2, but it is contrary to the prediction that hard service MNEs, for which the consumption and production of the service can be separated, should be less encumbered by hysteresis and, therefore, have greater flexibility real option value (that is, abnormal returns) than soft service MNEs.

In Table 4, the MNE data are further subdivided by SIC codes into industry subcategories. The median abnormal return for basic manufacturing MNEs is -.5% compared to a positive 1.2% for business services MNEs. The difference supports Hypothesis 2, and the median test results are statistically significant. The same test results are for electronics and instruments MNEs compared to business services MNEs and for consumer products MNEs compared to business service MNEs. The median returns are positive, and business services returns are greater than for each manufacturer MNE industry subcategory with statistically significant differences in median abnormal returns. For computer and peripheral manufacturers, the median abnormal return score is -.7% versus 1.2% for business services, but the test results do not reject the null hypothesis.

**Table 4: Test of Median Differences: Abnormal Returns by MNE SIC Industries**

Group	SIC	N	Mean %	Median %	Diff. %	Sig.
Basic Manufacturing	2000-3496	34	.4	-.5		
Business Services	7300-8999	62	2.1	1.2	.7	.03
Electronics/Instruments	(a)	41	1.4	-.5		
Business Services	7300-8999	62	2.1	1.2	1.7	.03
Consumer Products Mfg.	(b)	15	.1	-.5		
Business Services	7300-8999	62	2.1	1.2	1.7	.01
Computer Mfg.	(c)	27	1.5	-.7		
Business Services	7300-8999	62	2.1	1.2	1.9	.26

(a) 3600-3699, 3800-3899

(b) 2000-2099, 2311, 2711, 2771, 2841, 3089, 3421, 3645, 3944

(c) 3571-3578, 3672-3679

## SUMMARY OF FINDINGS

### Shareholder Wealth Changes

Regarding shareholder wealth changes at the announcement of cross-border acquisitions, this study finds a positive wealth change for the total sample of MNEs as well as for service and manufacturer MNE subsamples. The mean abnormal returns for the total sample, service MNE sample, and manufacturer MNE sample are 1.4%, 1.9%, and .8%, respectively. In all cases, the abnormal returns are statistically different from zero. The positive returns for the service MNEs outnumber the negative returns 63 to 46, and the positive sign is statistically significant. For manufacturer MNEs, the negative abnormal returns outweigh the positive returns 70 to 55, and the sign is not statistically significant. Hypothesis 1 is substantially supported by these results.

### Service MNEs versus Manufacturer MNEs

Shareholder wealth changes at the announcement of foreign acquisitions are on average greater for service MNEs, 1.9%, than for manufacturer MNEs, .8%. However, the difference between these mean abnormal returns is not statistically significant. Additionally, the service and manufacturer subsample median scores are different. The median abnormal return is 1.0% for service MNEs, and -.3% for manufacturer MNEs. The median differences test results for

abnormal returns is not statistically significant for service MNEs versus manufacturer MNEs, but it is significant for soft service MNEs (1.8%) versus manufacturer MNEs (-.3%). These results partially support Hypothesis 2.

## FUTURE STUDY

This study's time period includes return data from 1999 and 2000, which was essentially the end of a market period commonly known as the "dot com bubble" or "irrational exuberance". The return data from this time period and included in this study may be inflated, particularly for the service MNE data which have a number of technology-related acquisitions embedded within the dataset. Conducting the study during a less robust equity market time period would address the potential service MNE return bias.

The analytical power of this study could be improved by expanding the size of the study, especially when segregating the acquisition data into industry subsamples. The real option benefits of cross-border acquisitions within specific industry categories are an area for further study.

Finally, studying the effects of cross-border investments from a real option vantage might be well served through case study analysis. Studying specific acquisitions longitudinally might stimulate productive research that uses real options in what Tong et al. (2005) describe as "more bounded ways."

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