




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Factors Affecting International Mergers and Acquisitions

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Abstract

The purpose of this paper is to investigate the factors that explain outward and inward merger and acquisition (M/A) activity for a country. The variables used to explain M/A activity include the exchange rate, interest rate, and stock market prices. Regression analysis is used to isolate and clarify the effects of these three factors for aggregate M/A activity and M/A activity within the food, beverage, and tobacco industry.

The analysis shows that three variables, the exchange rate, interest rate, and stock prices, are quite important in explaining variations in M/A activity by country. Exchange rate changes in particular have a very elastic impact on outward M/A activity, indicating that price effects are important in determining outward investment flows. The stock market index positively influenced inward and outward M/A activity. The interest rate had a negative impact on M/A in the inward and outward M/A models with M/A outflows decreasing by about the same percentage that interest rates increase.

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Introduction

There has been an active literature in agricultural economics that looks at foreign investment flows in the food processing industry (Gopinath et al. 1998; Henderson et al.; Marchant et al.). Foreign direct investment (FDI) has been quite large in food processing and these models have investigated such issues as its direction, causes, effects on competitiveness, and implications for U.S. agribusinesses and agricultural exports.

Most of the analysis in this literature begins with a model that assumes that FDI results in the establishment of new plants and equipment or “greenfield” investment (Bajo-Rubio and Sosvilla-Rivero; Barrell and Pain; Gopinath et al. 1999). Such a model assumes that the investing company chooses a location, plant size, product mix, distribution system, and other company attributes in order to maximize profits. The firm’s size and structure are endogenous with the investment decision. The idea is that the investing company uses its funds (borrowed or internally generated) to build a facility that has a high return on investment and thus maximum profit.

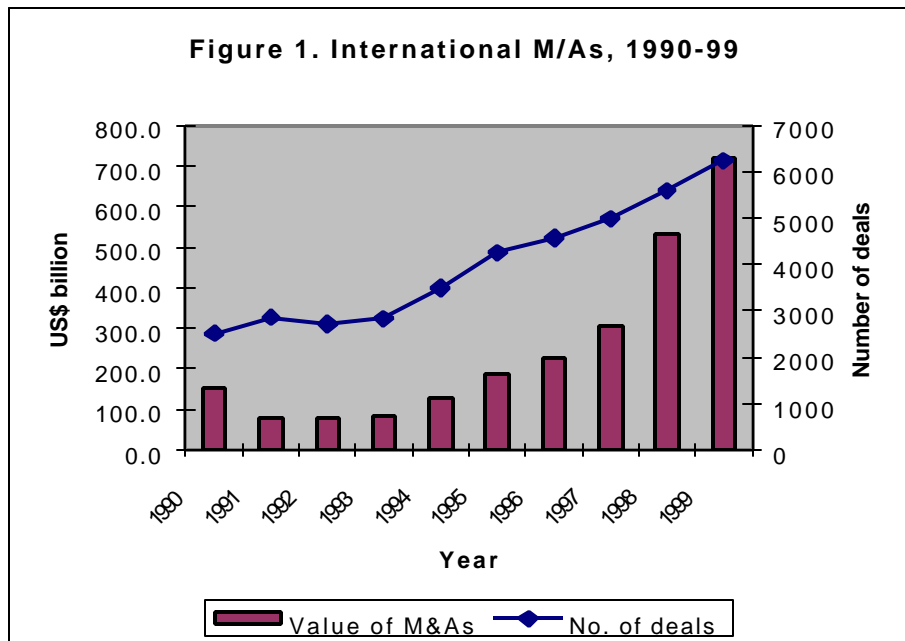
The reality is that most FDI comes in the form of a merger or acquisition (M/A) of existing facilities that have predetermined capacities, product lines, and marketing channels¹. These company characteristics can be changed after the M/A, but the factors that an acquiring company considers in its decision will be different than if it was building the plant, equipment, and distribution system from scratch. The advantage of a M/A is that risk is lowered because the company has an established track record (though there may be information asymmetry with respect to some company characteristics). The acquiring company is purchasing real assets and intangible assets such goodwill.

Background

The United Nations Committee on Trade and Development (UNCTAD) reports that international mergers and acquisitions grew from \$81 billion in 1991 to \$720 billion in 1999, an almost nine-fold increase over eight years. Figure 1 shows the value of M/As² and the number of transactions for those years. Though the number of deals has steadily increased, the value of M/As increased quite rapidly after 1994. Over the 1991-99 period, UNCTAD estimates that M/A accounted for over 80% of FDI. Kang and Johansson estimate that M/A accounted for 53% of FDI in 1991, but 85% in 1997. They posit that strong stock markets throughout the more developed

¹ Japan is an interesting exception to this rule. Most Japanese investment comes in the form of greenfield investment (Kojima). This is borne out by data presented later.

² We will use M/A to denote cross border mergers and acquisitions. This manuscript does not deal with merger and acquisition activity within countries.



Source: World Investment Report 2000.

world have fueled this increase in activity. It is clear that one cannot understand FDI exclusively through a model of greenfield investment.

Each M/A has a recipient country (the country of the new subsidiary or the inward part of the investment flow) and a sending country (the home country of the investing firm or the outward part of the investment flow). More developed countries dominate these transactions on both sides, accounting for 89% of outward M/A flows (purchases) and 73% of inward M/A flows (sales) during 1991 through 1998 (Table 1). Five countries alone, the U.S., U.K., Germany, France, and Canada, dominate M/A activity; accounting for 62% of the sales (inward) and 66% of the purchases (outward) through M/A.

Less developed countries have increased their M/A activity more rapidly since 1996. Mody and Negishi believe that privatization programs in Asia, Central and Eastern Europe and Latin America have led to this increase, along with the sale of distressed assets from the Asian financial crisis. Note that firms in these regions have also been active purchasers of other firms outside their country.

Table 1. Merger and Acquisition Activity by Region for 1990-1999 in billion \$s.

Country/Region	Outward	Inward	Net
U.S.	\$ 558	\$ 809	-\$ 251
Canada	\$ 113	\$ 91	\$ 22
U.K.	\$ 522	\$ 395	\$ 127
France	\$ 217	\$ 124	\$ 93
Germany	\$ 231	\$ 114	\$ 117
Australia	\$ 54	\$ 84	-\$ 30
Japan	\$ 56	\$ 27	\$ 29
Other MDCs	\$ 556	\$ 491	\$ 65
Latin America	\$ 71	\$ 206	-\$ 135
South, East, and SE Asia	\$ 79	\$ 97	-\$ 18
Other LDCs	\$ 19	\$ 15	\$ 4
Central and Eastern Europe	\$ 4	\$ 35	-\$ 31

Source: World Investment Report, 2000.

Table 2. Merger and Acquisition Activity and its Share of FDI, 1991-97.

	MDCs Outward	MDCs Inward	LDCs Outward	LDCs Inward
Majority M/A	\$ 768	\$ 721	\$ 70	\$ 116
Total M/A	\$1,228	\$ 968	\$ 191	\$ 450
Majority share of M/A	63%	74%	37%	26%
Total FDI	\$1,766	\$1,155	\$ 262	\$ 645
M/A share of FDI	70%	84%	73%	70%

Source: Kang and Johansson

An important distinction in M/A activity is whether the buying firm is a majority or minority owner. Table 2 gives statistics on majority versus all M/A activity and M/A activity versus FDI for MDCs and LDCs. Most of the percentages are close for each category except that the M/A is much more likely to be a majority owner for MDCs versus LDCs (60-70% for MDCs versus 25-35% for LDCs). Inward FDI in MDCs is somewhat more likely to be in the form of M/A than for the other three categories. The table shows that LDCs are net receivers of funds from FDI and M/As.

The purpose of this paper is to investigate the factors that explain outward and inward M/A activity for a country, in contrast to total FDI activity. A model is developed that explains M/A activity, rather than greenfield investment. The variables used to explain M/A activity include the exchange rate, interest rate, and stock market prices. Regression analysis is used to isolate and clarify the effects of these three factors for aggregate M/A activity and these same three factors are used to explain M/A activity within the food, beverage, and tobacco industry.

Literature Review

The literature which focuses on FDI as a greenfield investment usually begins with profit maximization or cost minimization by the firm subject to a production function constraint. The firm will choose its domestic and foreign output levels, along with its input use. Some models focus on FDI as a two-step process, whereby the firm first decides whether to establish a foreign presence, and then decides the optimal output level for the foreign subsidiary (Bajo-Rubio and Sosvilla-Rivero).

Viewing FDI through a M/A, where there is an existing company and the acquiring firm faces the zero/one decision on whether to purchase the firm, is different. The analytical literature for M/As has focused on some of the same variables as the greenfield investment approach, such as exchange rates and economic activity, but diversification and the financial capacity of the acquiring firm is more important in M/A analyses. The most important metric of financial capacity for the acquiring firm is often its stock price because M/As are often accomplished through issuance of stock by the acquiring firm. The greater the capitalization of the acquiring firm, the greater capacity they have for purchasing other firms.

Vasconcellos and Kish have done much work in this area on bilateral M/As (Vasconcellos and Kish (1996), Vasconcellos and Kish (1998)). They developed a capital budgeting model to explain M/A activity between two countries. They assume that the foreign acquisition is an investment decision where future cash flows and the firm's terminal value are discounted with an interest rate. Present and future exchange rates are important because the values over time are repatriated to the acquiring firm's home country. The purchase can be made through a combination of borrowed funds and equity funds (which come from the acquiring firm's market capitalization). Thus, the company's stock price is an important factor.

The empirical application of this model always involved acquisition differences between two countries as the dependent variable. The Vasconcellos and Kish model regressed the difference in acquisition values for two countries as a function of the exchange rate, interest rate differential, and the value of stock price indices for the countries. In their 1996 study, which explained acquisitions between US and Canadian firms, they found that the difference in interest rates and the price-earnings ratio in each stock market were important explanatory variables. In their 1998 study, which explained acquisitions between US firms and firms from four European countries, they found that stock market prices and the interest rate differentials were major determinants, whereas the exchange rate was not consistent in its relationship to acquisitions.

For this paper, the model of Vasconcellos and Kish (1996) is useful, but the work of McCorrison and Sheldon is more relevant because we want to explain aggregate M/A flows, not net M/A flows. They regressed M/A inflows into the US by industry on the real exchange rate, a relative stock price index, and a time trend. They fitted the models for 1980-90 and 1980-95. They found that the model worked well for aggregate manufacturing, but not for food manufacturing.

Conceptual Framework and Empirical Model

The conceptual model used in this analysis is similar to the capital budgeting model developed by Vasconcellos and Kish (1996). A general net present value from an acquisition (abstracting from foreign currencies) is the value of all future cash flows subtracting the initial cost of the investment:

$$NPV = \sum_{t=1}^T \frac{C_t}{(1+r)^t} + \frac{SV_T}{(1+r)^T} - C_0 \quad (1)$$

where NPV = Net present value for the M/A;

C_t = Cash flows during period t ;

r = Discount rate for the M/A;

SV_T = Salvage value of the M/A;

C_0 = Initial costs for M/A;

t = time period;

T = expected life of the project.

Or incorporating the source of funds for the acquisition and exchange rate considerations:

$$NPV = \sum_{t=1}^T \frac{[(C_t) * (1 - rr_t) * (ER_t)]}{(1+r)^t} + \frac{[(SV_T) * (ER_T)]}{(1+r)^T} - [EF_h + BF_h + BF_f * ER_0] \quad (2)$$

where rr_t = Proportion of cash flows retained to support future operations;

ER_t = Foreign exchange rate at time t ;

EF_h = Equity funds in the home currency;

BF_h = Borrowed funds in the home currency;

BF_f = Borrowed funds in the foreign currency;

This model assumes that a firm accepts an investment proposal when the NPV is positive (and capital constraints are not binding), otherwise it will reject the proposal for merging with or acquiring the firm.

Many variables in equation (2) are not available by acquisition and they are not measurable on an aggregate basis. Thus the empirical model uses proxies for these conceptual variables. The exchange rate and interest rate are observable and are included as independent variables in the empirical model. The stock market index is used as a proxy to measure access to equity and borrowed funds for the firm.

Using this capital budgeting framework, the equations to explain inward and outward M/As were specified in double log form:

$$\ln MA_{it} = a_0 + a_1 \ln XR_{it} + a_2 \ln GBY_{it} + a_3 \ln SKX_{it} + m_{it} \quad (3)$$

where MA represents the value of M/As, XR denotes the exchange rates (National currency/SDR), GBY is the government bond yield, SKX is the stock market index of

the country, the t subscript denotes time, the i subscript denotes country, and μ is error term. As the exchange rate increases, the national currency is falling in value. For inward M/As the exchange rate is expected to have a positive coefficient (a depreciation in the country's currency should increase its M/A activity), while the bond yield and stock market index have negative coefficients (higher interest rates increase the acquisition's cost, while a higher stock market index likely increases the cost of acquiring the firm). For outward M/As the exchange rate and bond yield are expected to have a negative coefficient (a depreciation in the country's exchange rate will make foreign firms more expensive), while the stock market index is expected to have a positive coefficient (a higher stock market value tends to reduce the capital constraints of acquiring firms).

Data and Methods of Analysis

Equation (3) is fitted for aggregate M/A activity and M/A activity in food, beverages, and tobacco (FBT). The countries included in the aggregate M/A activity are the U. S., Australia, Canada, France, Germany, Japan, and the United Kingdom. Data are available for these countries for 1987 - 1999. Data on M/As came from UNCTAD (through the World Investment Report 2000), exchange rates and government bond yields came from the International Monetary Fund, and stock market indexes came from the major stock exchange in each country (S&P 500, All Ordinaries Index, TSE 300, CAC 250, DAX, TOPIX, and FTSE 100 were used). More details on the data are available from the authors. Limited data are available for M/A activity in food processing. We could get data only for the U.S., the European Union, and South, East, and Southeast Asia (inward only for the Asian countries) for the 1987 - 1999 period.

A panel data approach with random effects was used for the aggregate M/A data because there were sufficient degrees of freedom for this analysis. Intercepts and slope coefficients were allowed to vary by country; the dummy variable design was orthogonal, so the coefficients reported are for an average country. Tests for multicollinearity indicated that no problems existed with the data set. However, heteroscedasticity was found for Australia (outward) and Japan (inward). These problems were corrected using weighted least squares.

A simple pooling approach was used for the food manufacturing analysis because of the limited number of observations. In order to make the data compatible among countries, two variables (the exchange rate and stock market index) were transformed into indices so that the pooling would involve unit-free variables. The index for each country was formed by dividing each year's observation by the first observation, and multiplying by 100. Dummy variables were also used to identify regions in this estimation. Tests for multicollinearity indicated that no problems existed with the data set. However, heteroscedasticity was found for South, East,

and Southeast Asia (outward) and the U.S. (inward). These problems were corrected using weighted least squares.

Results

Table 3 displays the parameter estimates, t-values, and coefficients of determination (R^2) for the estimations of equation (3) using aggregate M/A data. These estimates incorporate the transformations necessary for meeting the assumptions of ordinary least squares (OLS) regression.

The model does a good job of explaining outward M/A activity, witnessed by the higher R^2 for that equation. All slope coefficient estimates for the outward M/A activity were significantly different from zero at the 1% level and of the expected sign.

The exchange rate negatively impacts outward M/A activity. A 1% decrease in the exchange rate is associated with a 3.93% increase in outward M/As, which is a rather elastic effect. Obviously, M/A activity is quite sensitive to exchange rate changes. This negative relationship implies that an appreciation of the country's currency creates a favorable condition for the acquiring country to purchase foreign firms. This relationship is consistent with the bilateral findings of Vasconcellos and Kish (1998), but their 1996 study found no significant exchange rate effects. Certainly these results confirm that the exchange rate is an important determinant of outward M/A activity.

The government bond yield had a negative impact on M/A. If the government bond yield increases by 1%, M/A outflows will decrease by 1.18%, nearly a one-for-one change in percentage terms. So higher interest rates reduce M/A activity, but their effects are not as drastic as the exchange rate effects. Both studies by Vasconcellos and Kish used bond yield differences in a bilateral model, thus their results are not directly comparable. They found the yield differential coefficient significantly different from zero fewer than 50% of the time in their estimations.

The stock market index was found to affect outward M/A activity on a nearly one-for-one basis (unitary elasticity). If the stock market in a country increases by 1%, the model predicts that outward M/A will increase by 0.92%, an almost equal percentage. Companies obviously use some of their increased capitalization to purchase foreign companies and at the margin they are keeping their share of international investments nearly constant. Given the huge run-up in stock prices throughout the developed world in the late 1990s, one can understand how M/A activity increased so rapidly. This result supports the findings of Vasconcellos and Kish (1998), though their 1996 study found no such significant relationship.

Table 3. Results for Regression Explaining Aggregate Mergers and Acquisitions.

	Intercept	XR	GBY	SKX	R ²
Outward M/As	-1.82 (0.91) ^a	-3.93 (4.70)	-1.18 (6.24)	0.92 (8.01)	0.94
Inward M/As	-0.76 (0.61)	-1.23 (1.99)	-1.08 (3.82)	0.85 (6.64)	0.52

^aAbsolute t-values are in parentheses

The results for inward M/A activity are less satisfying than for outward activity. The lower R² indicates that the variables explain much less variation. Individualized locational factors (measured by the dummy variables) play a more pronounced role at the receiving end of M/A activity. A company has the resources to acquire a firm, but the factors that lead them to a specific firm and country seem less easy to pinpoint from an economic perspective. Geographic diversification could play a large role.

A surprising result is that the relationship between exchange rates and inward M/A activity is negative and significantly different from zero at the 5% level. This implies that companies tend to acquire firms in countries with a strong currency. This might be understandable if the investing company believes that a strong currency indicates positive future economic prospects for the country. If that is the case, exchange rate changes can have two effects on inward M/A: a price effect and a future economic growth effect. In this instance, the later effect dominates. Vasconcellos and Kish (1996) had the same finding.

The estimated coefficient on the government bond yield (-1.08) is very similar to the outward M/A equation. This is to be expected with an integrated international capital market where firms can obtain financing from various countries. The slightly smaller coefficient for inward M/A might indicate that the investing company is slightly more likely to obtain its financing from its home country.

The t-ratio on the stock market index has a higher absolute value than for the other two variables, indicating that its effect is highly significant. One might expect that as stock prices increase in the recipient country that acquisitions would be less common, yet the opposite is true. This is another instance where the variable likely has two counteracting impacts. Yes, a higher stock market index will tend to

increase the cost of the M/A, yet it also indicates brighter economic prospects for the nation and therefore a more profitable firm once it is acquired. Again, the economic activity effect dominates for the stock market coefficient, as it did with the exchange rate. This finding is also consistent with Vasconcellos and Kish (1998).

The results that the future economic prospects of the acquired firm dominates the increased costs associated with exchange rate and stock market price changes leads to some interesting, and potentially harmful, consequences. Suppose that a country's stock market has a one-shot increase, leading to more inward M/A activity. This increases the demand for its currency, appreciating its exchange rate, leading to more inward M/A activity. Thus, the increases in M/A activity feed upon themselves because of their positive impacts on the stock market and exchange rate. If these effects are not tempered, a "bubble" would develop as these changes feed upon themselves. One might argue that we have seen this bubble phenomenon in recent years with respect to M/A (and other economic) activities.

Using the same model, OLS regression was used to analyze the factors influencing M/A activity for the food, beverage, and tobacco (FBT) industry. The results are in table 4. The only difference in the analysis was that the exchange rate and stock market index were changed to index forms, as mentioned previously, and observations were available from a different set of countries/regions. Dummy variables were used to identify the United States and European Union in the inward M/A equation, while a dummy variable identified the United States in the outward M/A equation (because data from Asia were not available). Both equations had high R^2 s, 88% and 78%, indicating that they explain most of the variation in the dependent variables.

The results for the outward M/A equation for FBT have some similarity to the aggregate M/A results. The exchange rate effect is almost as large as with aggregate data (-3.56 for FBT and -3.93 for aggregate), though it is not significantly different from zero. The insignificant coefficient is consistent with McCorrison and Sheldon. The coefficient for the stock market index is quite a bit larger for FBT than for aggregate, 1.56 versus 0.92, indicating that there is a pronounced push toward capital outflows in FBT if the domestic stock market is doing well. Food and beverage markets in the U.S. and Europe are saturated, so as more market capitalization becomes available, firms in these countries seek international firms for investments.

The stock market coefficient is the only coefficient that is significantly different from zero for the outward M/A equation; indicating that increased capitalization in a country increases its international acquisitions of FBT firms. McCorrison and Sheldon found that stock market prices did not significantly impact outward M/A activity. Results for the government bond yield are surprising, with a positive coefficient; yet the parameter estimate is not significantly different from zero.

Table 4. Results for Regression Explaining Food, Beverage, and Tobacco Mergers and Acquisitions.

	Intercept	XR_IN ^a	GBY	SKX_IN	R ²
Outward M/As	8.04 (0.47) ^b	-3.60 (1.07)	1.40 (1.22)	1.56 (3.60)	0.88
Inward M/As	-2.04 (4.28)	1.97 (3.88)	-2.24 (3.67)	-0.65 (2.13)	0.78

^aXR_N and SKX_IN are the exchange rate and stock market price, respectively, in index form.

^bAbsolute t-values are in parentheses

The exchange rate positively influenced inward M/As, which was the expected result, and the coefficient was significantly different from zero at the 1% level. Evidently the price effect on exchange rate changes dominates the economic activity effect, in contrast to the aggregate M/A model. This result seems reasonable for FBT because this is a slow growth industry where a potential buyer might be more price conscious. Economic growth won't influence demand patterns much for food and beverages, so the cost of the acquisition is quite important. Further, some FBT firms produce relatively homogeneous products where profitability is more sensitive to price and exchange rate changes.

The results indicate that inward M/A activity is more sensitive to interest rate movements for FBT, which supports the idea that potential buyers are price conscious, since the cost of capital would be part of the price. The coefficient on the government bond yield is significantly different from zero at the 1% level and more than twice the magnitude obtained for aggregate M/As.

The coefficient for the stock market index is also consistent with a price conscious purchaser because as stock prices in the country increase, there are fewer M/As in FBT. This coefficient, -0.65, is also significantly different from zero at the 5% level. Buyers tend to balk at investing in the FBT industry as stock prices move higher. This is quite sensible given the low-growth prospects for and commodity nature of FBT relative to other industries.

The findings for inward M/A activity are somewhat different than McCorriston and Sheldon. They did find that the stock price index was negatively associated with

M/A activity in the US FBT industry, but the coefficient was not significantly different from zero. Further, they did not find that the exchange rate explained a significant amount of variation in M/A activities.

McCorrison and Sheldon's conclusion was that the factors which explained aggregate M/A activity didn't explain such activity in the FBT industry. Our conclusions are somewhat different. The same factors are at work, but their impacts are different because of the slow-growth and commodity nature for FBT. This characteristic of the FBT industry makes potential purchasers much more sensitive to the acquisition price, and therefore to changes in the exchange rate and the general level of stock prices in the foreign country.

Summary and Conclusions

This paper investigates factors influencing international mergers and acquisitions; a growing percentage of foreign direct investment. The analysis shows that three variables, the exchange rate, interest rate, and stock prices, are quite important in explaining variations in M/A activity by country. Exchange rate changes in particular have a very elastic impact on outward M/A activity, indicating that price effects are important in determining outward investment flows. A 1% appreciation of a country's currency will increase its outward M/A flows by almost 4%.

The analysis consistently finds two effects of exchange rate and stock price changes on inward M/A activity. The first is the price effect, which naturally flows from the capitalization framework used in model development. As the exchange rate in a foreign country depreciates or its stock market falls, its companies become more affordable to potential foreign buyers. However, these two variables also indicate the confidence that investors have in the country's economic future. As such, a counteracting impact is that a strong exchange rate and stock market attract M/A activity towards a country. We find that this later affect dominates for aggregate M/A activity, while the former affect dominates for FBT activity.

The finding that inward M/A activity is attracted by strong exchange rates and stock markets could have troubling consequences for countries. The consequences could include a potential "bubble," where the inward M/A activity increases the exchange rate and stock market, which, in turn, increases inward M/A activity, etc. We have seen some "bubble-like" movements in M/A activity through 1999, but recent M/A activity has shrunk substantially. One might conclude that the M/A bubble has burst since its 1999 peak.

It is clear that M/A activity in the food, beverage, and tobacco industry can be explained by these same three factors, though the model works much better for inward M/As. Yet the impact of these factors is different because of the slow-growth nature of the FBT industry. Potential buyers are more price conscious for FBT

purchases than they are for other M/A activities, so the price effects of the exchange rate and stock market dominate for inward M/A activities.

It is hoped that this analysis stimulates some added research emphasis on mergers and acquisitions, which have been mostly ignored by the academic community, including agricultural economists. These activities are an extremely important element of globalization that is likely to recover in the years ahead. We should certainly spend more time looking at their causes and consequences for the future structure of the world economy.

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