

A TEST OF THE ECLECTIC PARADIGM: EVIDENCE FROM THE U.S. REINSURANCE MARKET

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ABSTRACT

This study provides a test of the eclectic paradigm with data from U.S. reinsurers. The U.S. reinsurance industry provides a unique setting to test the eclectic paradigm due to the extensive data available on U.S. reinsurers and the well-developed literature related to reinsurance. The ability to test the hypotheses related to the eclectic paradigm in a service industry and incorporate industry-specific factors adds to the eclectic paradigm literature which has traditionally focused primarily on manufacturing firms. In addition, the application of the eclectic paradigm to the reinsurance industry provides an empirical framework that combines several prior streams of literature which examine the reinsurer's decision to internationalize. The current study includes firm-specific factors, country-specific factors of the international markets, and factors related to the U.S. reinsurance industry. This article finds support for traditional factors impacting globalization such as host market size, loss experience, and competitiveness as well as reinsurer's ability to expand based on available capacity. Understanding the importance of firm-, country-, and industry-specific factors is key for managers, as analyzing these issues in isolation may lead to an incomplete picture of the factors impacting the internationalization decision, hindering managers' ability to make decisions that are in the best interest of the firm. With the continued interdependence of the world reinsurance marketplace, as well as the recent expansion of the European Union, internationalization issues are of critical importance not only to U.S. insurers, reinsurers, and regulators, but also to their global counterparts.

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INTRODUCTION

Factors that influence the extent to which firms internationalize have been the subject of considerable academic research. Among the frameworks constructed to explain this process is the eclectic paradigm put forth by Dunning (1977). The eclectic paradigm explains the decision to internationalize as a function of ownership, location, and internalization (OLI) advantages. Sometimes referred to as the OLI paradigm, this framework has been further developed and tested in a number of studies (e.g., Dunning, 1980; Dunning, 1981; O'Farrell, Wood, and Zheng, 1996; Galan and Gonzalez-Benito, 2001; Javalgi, Griffith, and White, 2003).

Much of the empirical research related to the eclectic paradigm has focused on manufacturing firms. However, the academic literature has not reached a consensus on the transferability of the findings to service firms.¹ As such, the current study adds to the literature in this area by testing the theories of the eclectic paradigm using a service industry, specifically U.S. reinsurers. Due to the availability of detailed data on the operations of U.S. reinsurers, as well as the amount of reinsurance assumed from other countries by specific reinsurers, a refined test of the eclectic paradigm can be developed based on reinsurers' traits, traits of the countries from which business is assumed, and traits of the U.S. reinsurance market. In addition, an examination of the operations of U.S. reinsurers in the world marketplace is especially timely given the expansion of the European Union (EU) in 2004 as well as potential changes in international accounting regulations governing reinsurance. These changes in the international reinsurance market highlight the potential impact of trade barriers and regulations on the global reinsurance marketplace.

Recent reinsurance studies demonstrate the increasingly global operations of the insurance industry. For example, Weiss and Chung (2004) investigate the impact of large losses on the price and capacity of the reinsurance market, whereas Campbell, Goldberg, and Rai (2003) examine the impact of the Third Directives of the EU on the reinsurance market. Also, academic research related to the demand for reinsurance and functioning of the reinsurance marketplace generates a foundation from which to create firm-, country-, industry-specific variables to more accurately apply the eclectic paradigm to the financial services sector (e.g., Mayers and Smith, 1982, 1990; Outreville, 1995; Adiel, 1996; Garven and Lamm-Tennant, 2003; Li, Moshirian, and Sim, 2003; Weiss and Chung, 2004; Cole and McCullough, 2006).

The organization of this article is as follows. The section titled "Background on the International Reinsurance Marketplace" provides information on two common markets that are important to the U.S. reinsurance industry. The "Literature Review" section summarizes the related literature that has motivated this research. The "Hypotheses Development" section presents the factors considered in this examination of the involvement of U.S. reinsurers in foreign markets. The "Data and Methodology" section

¹ As noted later, several studies provide varying levels of discussion on the applicability of the findings of tests of the eclectic paradigm using manufacturing firms to services firms (e.g., Boddewyn, Halbrich, and Perry, 1986; Johanson and Valhne, 1990; O'Farrell, Wood, and Zheng, 1996, 1998; Katrishen and Scordis, 1998). A recent study by Capar and Kotabe (2003) provides empirical evidence that the relation between international diversification and performance is not the same for service firms as it is for manufacturing firms.

describes the various sources of data and explains the methodology. The "Results" section provides a summary of the findings, and the "Conclusion" section discusses potential implications of the study.

BACKGROUND ON THE INTERNATIONAL REINSURANCE MARKETPLACE

In recent years, the globalization of the world's insurance and reinsurance markets has become of heightened importance. Weiss and Chung (2004) investigate the international impact of large loss shocks on the reinsurance market, noting the impact of capacity changes around the world on domestic insurance prices. Estimates show that over 88 percent of reinsurance assumed by U.S. reinsurers from foreign countries is from countries that are members of the EU or the North American Free Trade Agreement (NAFTA).² The increase of free-trade initiatives worldwide is expected to further reduce the barriers for foreign firms to entering new markets.

The signing of the NAFTA in 1992 set the stage for a more open financial services sector on the North American continent. The main outcome of the Agreement was the gradual opening of the Mexican marketplace. Prior to NAFTA, there already were relatively few restrictions between Canada and the United States in the area of financial services trade. However, this was not necessarily the case for the United States and Mexico.³

The beginning of what is now referred to as the EU can be traced to the post-World War II era. By uniting the countries of Europe economically, and subsequently politically, the hope was to avoid another conflict among European neighbors. Though the EU initially had 15 members, the addition of Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia in 2004 increased the number of member countries to 25 (European Governments On-Line, 2003). Additionally, a small number of other countries, although not members of the EU, agreed to membership in the European Economic Area (EEA), making them subject to the same standards as EU member countries.⁴

A number of directives from the EU (and its predecessor, the European Economic Community) were designed to aid in the creation of a single insurance marketplace. The Third Directives for Insurance (both Life and Non-Life) produced what can be accurately described as a passport for any insurance company to sell coverage in any

² This estimate is based on the reinsurance assumed by the sample of U.S. reinsurers used in this study from 1996 to 2000. The requirements for inclusion in the sample are provided in the "Data and Methodology" section.

³ One of the objectives of the NAFTA relating to the insurance sector was to allow certain lines of insurance business, including reinsurance, to be sold on a cross-border basis. Prior research suggests that the U.S. insurance industry stood to gain a significant portion of the Mexican marketplace. For a more thorough analysis of the regulatory implications of the NAFTA relative to the insurance sector, see Sinha and Condon (2001). In addition, for a more detailed discussion of the objectives and proposed benefits of the NAFTA see Birdwell et al. (1997).

⁴ Iceland, Norway, and Liechtenstein are members of the EEA. As a result, both Iceland and Norway are considered EU countries in the following analysis. Due to data restrictions in the Organisation for Economic Co-Operation and Development (OECD) database, Liechtenstein is not included in the analysis.

EU member country.⁵ Prior to the adoption of these directives, the approval of the host country was required before a foreign company could supply insurance coverage. The purpose of the Third Directives was to increase competition in all countries of the EU, especially in those countries that were previously under a monopolistic insurance environment.⁶ A 1996 SwissRe Report suggested that the main effects from the single market initiatives were increased competition from foreign firms, innovations from already existing domestic insurers, and possibly merger activity to gain economies of scale.

Some academic studies have empirically examined the changes in the competitive environment issue. For example, a study by Campbell, Goldberg, and Rai (2003) finds that the Third Non-Life Directive resulted in a reduction in wealth for publicly held nonlife insurers, which supports the theory that competition can be effective in controlling prices. In addition, a study by Mahlberg and Url (2003) uses data envelopment analysis to analyze the impact of the single market on the Austrian insurance industry. The study finds "considerable inefficiency," evidence of returns to scale via merger activity, and increased levels of reinsurance in the Austrian marketplace.

LITERATURE REVIEW

Several studies using survey methodology find that trade barriers, including cultural barriers, are a major consideration in the decision to enter foreign markets for insurers (e.g., Schroath and Korth, 1989; Zimmerman, 1999). In addition, Hamwi, Hudson, and Niroomand (1998) suggest "uncertainty associated with global expansion" may negatively affect an insurer's decision to enter a foreign market. Others studies point out the benefits of global operations. Katrishen and Scordis (1998) find that economies of scale can be achieved by smaller insurers through entry into foreign markets. Further, Loubergé (1983) suggests that being active in foreign markets is advantageous to reinsurers because it creates greater risk-spreading. Finally, Outreville (1995) indicates that globalization allows firms to compensate for insufficient capacity in the domestic market.

The decision of firms to internationalize also has been explained using the eclectic paradigm introduced by Dunning in the 1970s (Dunning, 1977) and revised in several subsequent works (e.g., Dunning, 1981, 1988, 1995). Dunning's framework suggests that a firm's decision to internationalize is based on its ability to compete in that market generated by certain advantages. These advantages are categorized as ownership advantages, location advantages, and internalization advantages. The eclectic

⁵ As long as an insurer is meeting the regulatory requirements of its domicile country, it can offer coverage in another member country via a branch office. For more specifics on the regulation of nondomiciled insurance companies in the EU, see Campbell, Goldberg, and Rai (2003). It should be noted that although the Third Directives for Insurance have created a more open environment for the sale of insurance, there are still differing levels of regulation within the member countries.

⁶ It should be noted that the European Parliament has approved legislation known as the Reinsurance Directive. This creates the same regulatory passport that the Third Directives on Insurance created for the primary insurance industry. Included in this legislation is the removal of deposit requirements in a few member nations. However, these initiatives are beyond the time period studied here.

paradigm integrates concepts that were previously discussed in several prior streams of literature examining the decision of firms to operate globally, including factors such as barriers to entry as well as the benefits of internationalization.

Prior studies of the eclectic paradigm have generally focused on manufacturing firms. Several studies discuss whether the framework and related findings are applicable to service firms.⁷ The current study extends this line of research by providing an empirical examination of the eclectic paradigm for service firms using data from the reinsurance industry. As mentioned earlier, the availability of detailed firm-level data for U.S. reinsurers makes this type of analysis possible. In addition, the industry provides a unique setting in which to test the eclectic paradigm, due in part to the nature of the service provided. Specifically, the reinsurance industry allows for an examination of the trade-offs between economies of scale and operating costs in an environment in which a physical presence in the host country is not necessarily required to conduct business. Finally, prior insurance research in the demand for reinsurance and the international insurance area provides insight into the firm-specific factors that influence the operations of U.S. reinsurers in the global marketplace. The results of these studies are used as a basis for the selection of firm-specific variables tailored to the nuances of the reinsurance industry in testing the motives for internationalization of U.S. reinsurers.⁸

HYPOTHESES DEVELOPMENT

Based on the framework created by Dunning (1977, 1981, 1988, 1995) and the subsequent testing of that framework in various studies (e.g., Dunning, 1980; O'Farrell, Wood, and Zheng, 1996; Galan and Gonzalez-Benito, 2001; Javalgi, Griffith, and White, 2003), an empirical framework for the globalization of U.S. reinsurers is developed. For the purposes of this study, the three original categories of variables suggested by Dunning (1977, 1981, 1988) are tested. The categories are (1) firm-specific factors, (2) country-specific factors, and (3) industry-specific factors.⁹ The variables used within each category, as well as the expected relation to the level of internationalization of U.S. reinsurers, are summarized in Table 1.

⁷ For a discussion of the transferability of the eclectic paradigm and findings of studies examining manufacturing firms to service firms, see, for example, Boddewyn, Halbrich, and Perry (1986), Johanson and Valhne (1990), O'Farrell, Wood, and Zheng (1996, 1998), Katrishen and Scordis (1998), and Capar and Kotabe (2003).

⁸ Traditional demand for insurance and reinsurance studies used in the identification of firm-specific factors include Mayers and Smith (1982, 1990), Garven and Lamm-Tennant (2003), Weiss and Chung (2004), and Cole and McCullough (2006). International insurance consumption studies used include Beenstock, Dickinson, and Khajuria (1988), Outreville (1990, 1992), Brown, Chung, and Frees (2000), Ma and Pope (2003), and Li, Moshirian, and Sim (2004).

⁹ In Dunning's development of the eclectic paradigm, he recognizes that in testing the hypotheses related to the ownership, location, and internalization advantages, there are a variety of factors to consider. He categorizes these as firm, country, and industry (or activity) factors. These categories make up the basis for the empirical hypotheses used in the current study. Although the industry (or activity) category of factors is not commonly found in empirical examinations of the eclectic paradigm, these factors are included in the current study to provide a thorough analysis of the OLI paradigm as applied to services firms. As noted later, to test the robustness of the results to the exclusion of the industry factors, the models are estimated omitting the industry factors.

TABLE 1
Variable Descriptions and Expected Signs

Variable	Definition	Exp. Sign
Firm-specific factors		
Ownership advantages		
Percentage of foreign reins. assumed	Business assumed from foreign markets/total reinsurance assumed	+
U.S. parent	Dummy variable equal to 1 if reinsurer has a U.S. parent, 0 otherwise	–
Net income/losses	Net income/losses and LAE	+
2 year loss development	2-year loss development	–
Internalization advantages		
Size	Natural logarithm of admitted assets	+
Direct business/surplus	Direct business written/surplus	–
Geographic Herfindahl	Geographic Herfindahl index	+
Line-of-business Herfindahl	Line-of-business Herfindahl index	
Individual line-of-business variables	The proportion of premiums written in each line of business relative to total premiums written	±
Country-specific factors		
Gross domestic product	Natural logarithm of gross domestic product	+
Loss ratio	Nonlife domestic claims paid/net premiums written in the host country	+
Percentage of domestic reinsurers	Number of domestic reinsurers/total reinsurers	–
Government effectiveness	Government effectiveness	+
Corruption	Perceptions of corruption	–
Free-trade initiatives dummy	Dummy variable equal to 1 for EU and NAFTA countries, 0 otherwise	+
Free-trade initiatives × gov. effectiveness	Interaction of free-trade initiatives dummy and government effectiveness variable	+
Free-trade initiatives × size	Interaction of free-trade initiatives dummy and reinsurer size	–
U.S. reinsurance industry factors		
Reinsurers' dir. bus./surplus	Direct business written/surplus of the reinsurance industry	–
Reinsurers' liquidity	Cash and invested assets/total liabilities of the reinsurance industry	+

The firm-specific factors provide measures of the firm's capacity to internationalize, potential comparative advantages of internationalization, and the accumulation of assets. Country-specific factors allow tests of the impact of characteristics of various countries on the internationalization process. Issues such as competitiveness of the local reinsurance market, free-trade initiatives, effectiveness and/or corruption of the government, and the overall economic environment are considered. Finally,

industry-specific factors measuring the liquidity and leverage of the U.S. reinsurance industry are examined.¹⁰

Firm-Specific Factors

The eclectic paradigm considers a variety of firm-specific factors that impact the firm's ability and propensity to internationalize. Both traditional factors related to the firm's potential comparative advantages, as well as firm-specific factors known to influence the operations and performance of reinsurers, are added to capture the specific nuances of firms within the reinsurance industry. These factors provide a more detailed test of the eclectic paradigm and control for potential confounding effects based on the variations across firms.

Ownership Advantages. Two of the issues considered in the examination of ownership advantages in prior works are expertise in the foreign markets and profitability of the firm. Both expertise in the foreign markets and firm profitability can affect a firm's ability to internationalize. The potential expertise of the firm is captured through both the extent of reinsurance assumed from other countries and whether the reinsurer is owned by a foreign parent. Both factors provide the reinsurer with potential advantages in selling reinsurance in a foreign market. The extent to which reinsurers are active in foreign markets increases the probability of entry in a given market due to potential economies of scale and increased comparative advantages. Galan and Gonzalez-Benito (2001) suggest that the firm's decision to enter foreign markets is impacted by its prior experience in foreign markets and ability to learn from those experiences. This study uses the percentage of reinsurance premiums assumed from foreign markets to total reinsurance assumed to capture the firm's level of potential experience and economies of scale in the international market. Additionally, like Weiss and Chung (2004), a dummy variable is included to control for differences in firms owned by U.S. versus foreign parents. By controlling for foreign ownership, the study is able to capture differences related to expertise in foreign markets of the parent company. Further, because of the international presence of the parent, the reinsurer may naturally have a stronger presence or easier access to the international markets both within the group and outside of the group. For these reasons, the U.S. parent dummy variable is expected to be negatively related to the level of internationalization of the firm.

Galan and Gonzalez-Benito (2001) find that the availability of capital for new investments also is an important factor in internationalization. Additionally, Javalgi, Griffith, and White (2003) consider adequate financial resources as a potential comparative advantage. In the insurance setting, solvency of the reinsurer is of interest not only to the reinsurer in its decision to internationalize, but also to the potential cedents. A reinsurer that is more profitable is likely viewed as more financially sound and therefore able to assume higher levels of reinsurance. This is especially important

¹⁰ As mentioned earlier, the inclusion of the industry-specific variables is done in keeping with the original framework of the eclectic paradigm which allows for control of factors impacting the entire industry, in addition to individual firms. A robustness test is conducted omitting the industry-specific factors. The findings are provided in the "Results" section.

because the collection of reinsurance recoverables is critical to the financial health and stability of a ceding company. As a result, the overall financial strength of the reinsurer can have an impact on the ceding company's perceived financial health. Net income to total losses is included to capture the overall profitability of the reinsurer.

Additionally, an insurer-specific variable that measures the manipulation of loss reserves is included as an additional measure of overall financial health. Prior studies in both the insurance and accounting literature find that insurers have the incentive to manipulate loss reserves in order to meet financial goals (e.g., Grace, 1990; Petroni, 1992; Gaver and Paterson, 1999, 2004). Like Cole and McCullough (2006), the 2-year loss development is used in this study as a proxy for the reinsurers reserving practices. If a reinsurer is underreserving, insurers may not view the reinsurer as particularly sound, and, therefore, may not be willing to cede as much to that reinsurer. As a result, it is expected that understating reserves will be negatively related to the amount of reinsurance assumed from foreign insurers.

Internalization Advantages. Issues related to diversification, ownership structure, experience in the foreign markets, and capacity are traditional factors used to explain a firm's decision to operate internationally because of potential comparative advantages. As seen in prior studies, the firm's overall capacity is an important element in internationalization as the ability to commit resources to global operations is affected by the volume of resources available (e.g., Ali and Camp, 1993; Javalgi, Griffith, and White, 2003). In addition, larger firms may be better able to manage the potential risks associated with internationalization. Organization size is a common factor used to measure the capacity of the firm (e.g., Aaby and Slater, 1989; Ali and Camp, 1993; Javalgi, Griffith, and White, 2003). This study uses the natural logarithm of firm assets as a measure of firm size. This variable is expected to be positive and significant.

In the reinsurance setting, a reinsurer's underwriting capacity can limit the amount of reinsurance it is able to assume. The limitation may be self-imposed by management or imposed by an external source such as a regulatory agency. It is expected that reinsurers with more capacity are likely to assume more reinsurance in general, and therefore, more foreign business. Direct business to surplus is used to test this hypothesis as this measure provides information about the extent of the reinsurer's excess underwriting capacity. A similar measure of leverage is used by Garven and Lamm-Tennant (2003) and Cole and McCullough (2005) in the examination of the demand for reinsurance. The smaller the direct business to surplus ratio, the more underwriting capacity the reinsurer has, therefore, the more business the reinsurer would be able assume. As a result, a negative relation is expected.¹¹

Loubergé (1983) and Galan and Gonzalez-Benito (2001) are among the many authors who suggest that participation in the global marketplace can serve as a form of risk diversification. Katrishen and Scordis (1998) note that the level of diversification also impacts the firm's cost structure both in terms of the complexity of the organization and potential economies of scale and scope. As common in insurance studies, both the geographic and line-of-business Herfindahl indices are included as measures of

¹¹ The issues related to capacity are closely linked to the profitability issues described earlier.

the firm's level of diversification and the potential need to diversify into the international marketplace. Higher levels of concentration, either geographic or product, may indicate the need for geographic diversification as well as the possibility of greater marginal benefits from international diversification. By increasing the geographic base of business, it is possible for U.S. reinsurers to decrease overall firm-level risk through internationalization.

Additional Insurer-Specific Firm Factors. As mentioned earlier, in addition to the traditional factors used to test the eclectic paradigm, factors specific to the insurance industry have been added to better test the hypotheses in this setting. Along with the insurance-specific factors already discussed, this study considers the impact of the types of business written on the decision to internationalize.¹² Although concentration, as measured by both the geographic and line-of-business Herfindahl indices, provides a measure of the diversification of the firm's business, the percentage of business written in each of the property-casualty lines of business helps to provide a more complete measure of the potential impact of business mix on internationalization.¹³ The inclusion of these variables is done to control for decisions made based on product line rather than the location of the ceding company. Since the various lines of business differ in their loss development patterns, claims distributions, and overall levels of risk, different lines may be associated with different patterns of reinsurance. Further, it is common for insurers and reinsurers to vary in the types of business in which they engage. As such, the inclusion of individual line-of-business variables helps to control for the possibility that if an insurer in a specific country specializes in a particular line of business, the decision to assume business from that country may be driven by a common specialization rather than firm- or country-specific characteristics.¹⁴

Country-Specific Factors

Within the eclectic paradigm, various country-specific factors are expected to influence the level of internationalization. Country-specific factors examined in this study include the host country's market size, the loss experience of the host market, the competitiveness of the host country's insurance environment, and the regulatory climate

¹² Other factors specific to the insurance industry are presented in the preceding two sections. For example, as discussed in the ownership advantages section, this article uses the 2-year loss development factor to proxy for the reinsurers' overall reserving practices. This loss reserve variable measures the potential level of underreserving by the reinsurer, which provides an industry-specific measure of financial weakness. In the "Internalization Advantages" section, direct business to surplus is discussed. Underwriting leverage is included to capture the underwriting capacity or the reinsurers' ability to expand.

¹³ Each of these variables equals the proportion of premiums written in each line of business relative to total premiums written. All lines of business contained in the property-casualty insurer database that appear in every year of the sample period are included with an omission to prevent orthogonality. The models described in the main sections of the article do not include the individual line-of-business variables.

¹⁴ Additional discussion of the inclusion of the individual line-of-business variables can be found in the "Results" section. In addition, the results of these models are presented in Appendix A.

of the host country. Additionally, a measure designed to capture the impact of free-trade initiatives on internationalization is included.

Size of the Domestic Market. Several studies discuss the importance of the size of the foreign market in the decision to internationalize (e.g., O'Farrell, Wood, and Zheng, 1996; Galan and Gonzalez-Benito, 2001). As noted by Habib and Zurawicki (2002), gross domestic product is a common measure of market size. It is expected that U.S. reinsurers will have a greater incentive to enter countries with larger markets. This study uses the natural logarithm of the gross domestic product as a measure of market size.¹⁵ A positive relation to the level of internationalization is expected.

Loss Experience of the Foreign Market. The overall underwriting performance of the host country's insurers is likely to influence the internationalization decision of U.S. reinsurers. Insurance studies suggest that the demand from foreign markets may occur for two reasons. One, since the purchase of reinsurance shifts some of the ceding company's risk to the reinsurer, it can be used to reduce the probability of bankruptcy for the ceding company. Two, the ceding company may benefit from the real services offered by the reinsurer, such as claims handling and pricing as well as any specialized knowledge the reinsurer might have. These services could improve the overall quality of the ceding company's business thereby improving its loss experience and ultimately its profitability (e.g., Mayers and Smith, 1990; Hoyt and Khang, 2000; Garven and Lamm-Tennant, 2003). For these reasons, it is expected that the domestic insurers' loss experience in the host market will be positively related to the amount of reinsurance assumed from that country.

Competition. Outreville (1995) considers the impact of both the type of market structure and the presence of domestic reinsurers on the retention capacity of the markets in developing countries and finds a significant effect for the market dummy variable but not the local reinsurance dummy variable. This study includes the number of domestic reinsurers relative to the total number of reinsurers that operate in that country as a measure of the competitiveness and capacity of the foreign market. All else equal, the higher the percentage of domestic reinsurers, the more competitive the domestic reinsurance marketplace of the country. Since a highly competitive domestic market can act as a deterrent to entry into the market by foreign firms, a negative relation is expected between the percentage of domestic reinsurers in a country and the volume of premium assumed from that country. This effect might provide initial evidence of the competitive nature of a country's domestic reinsurance market acting as a barrier to entry to foreign reinsurers, including those domiciled in the United States.

Regulatory Environment. Prior research indicates that the regulatory environment of countries are considered when firms decide to internationalize (e.g., Habib and Zurawicki, 2002; Elango, 2003; Campbell, Goldberg, and Rai, 2003). Two variables, the World Bank's measures for overall government effectiveness and perceptions of

¹⁵ In addition to the use of the natural logarithm of the gross domestic product, the natural logarithm of the gross national income also was considered as a measure of firm size. The results with the alternative measure are presented in the "Results" section.

corruption, are included in this study to determine the potential relation of the regulatory environment on the level of international activity of U.S. reinsurers.¹⁶ The World Bank's *Government Indicators* specifically defines government effectiveness as a measure of "the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies." It is expected that U.S. reinsurers will assume more from foreign countries that have more effective governments as these countries are likely viewed as more politically stable. The perceived corruption variable is similar to the measure used by Habib and Zurawicki (2002) and is defined in the World Bank's *Government Indicators* as "the exercise of public power for private gain." As that study finds, it is expected that U.S. reinsurers will assume less from foreign countries with higher levels of perceived corruption.¹⁷

Free Trade. Habib and Zurawicki (2002) empirically test the impact of free-trade agreements on levels of international activity. In their study, the dummy variable is positive and significant in all the models. This suggests that free-trade agreements create economic ties that increase internationalization. The current study uses a dummy variable similar to that of Habib and Zurawicki (2002) which is equal to 1 if the country is a member of the NAFTA or the EU, and zero otherwise.¹⁸ If these initiatives are effective in reducing trade barriers and increasing economic ties, a positive relation is expected.

Additional Variables. In addition to the variables outlined above, several interactions are included to analyze the potential joint impact of free-trade initiatives with both government effectiveness and size of the reinsurer. In the case of the interaction of free trade and government effectiveness, the significance of this variable indicates whether the combination of perceived levels of government effectiveness and the presence of free-trade initiatives is an important factor in the internationalization of U.S. reinsurers. It is expected that government effectiveness may have an even stronger effect for countries with free-trade initiatives, as the markets of these countries will be viewed as both highly accessible and relatively stable. To test this hypothesis, the free-trade initiative dummy is interacted with government effectiveness. If it is the combination of these factors, not free-trade membership or government effectiveness alone, that encourages U.S. involvement in these markets, a positive relation is expected.

Campbell, Goldberg, and Rai (2003) find that the effect of the Third Directives may vary depending on the size of the firm, as a negative relation is observed between size and abnormal returns. This result suggests that the EU Directives may have allowed smaller firms easier access to the market in which larger firms may already have been present, therefore benefiting smaller insurers and not larger insurers. To test this hypothesis, the free-trade initiative dummy is interacted with size. Consistent with Campbell, Goldberg, and Rai, a negative relation is expected.

¹⁶ The World Bank publishes this information every 2 years. In alternate years, the data were interpolated.

¹⁷ Due to the presence of multicollinearity in some of the sensitivity tests, the corruption variable is not included in all of the empirical models. However, results related to the inclusion of this variable in the primary Model 2 as presented in Table 4, can be found in the "Results" section.

¹⁸ As a robustness test, the impact of the EU and the NAFTA are considered separately. Findings are discussed in the "Results" section and the results are presented in Appendix B.

U.S. Reinsurance Industry Factors

In early versions of the eclectic paradigm, Dunning not only identified firm-specific and country-specific factors that can create competitive advantages, but industry-specific factors as well.¹⁹ Insurance-specific studies such as that of Browne and Hoyt (1995) and Browne, Carson, and Hoyt (1999) find a relation between insurer insolvencies and overall market factors. The current study includes industry average levels of both leverage, measured as direct business written to surplus, and liquidity, measured as cash and invested assets to total liabilities, to determine if these industry-specific factors influence the decision of U.S. reinsurers to internationalize. It is expected that U.S. reinsurers will assume less from foreign insurers if the leverage of the U.S. reinsurance industry is high, as this may indicate that U.S. reinsurers as a whole are less likely to have the additional capacity to operate globally. Additionally, higher leverage is often a sign of financial weakness. In this case, in an effort to improve their financial positions, firms may choose not to engage in international transactions as prior literature suggests that these transactions can be more costly (e.g., Rugman, 1981; Katrishen and Scordis, 1998).

If the average level of liquidity of the U.S. reinsurance industry is high, it is likely that the U.S. reinsurers will have high levels of involvement in the foreign markets. There are two potential explanations for this hypothesis. One, higher levels of liquidity may signal higher levels of free cash flows, suggesting that U.S. reinsurers may have an incentive to increase involvement in foreign markets to reduce the excess. Second, higher levels of liquidity in the U.S. reinsurance market may indicate a higher level of financial strength, thus increasing the demand for U.S. reinsurance by foreign insurers and reinsurers. These arguments are similar to those made for the capacity and financial health of individual reinsurers discussed earlier.

DATA AND METHODOLOGY

Data

Data are collected for the period 1996 through 2000 from several sources. They are the National Association of Insurance Commissioners' (NAIC) *Property/Casualty Insurance Database*, the Organisation for Economic Co-Operation and Development's (OECD) *Insurance Statistics Yearbook*, the World Bank's *Government Indicators*, and the World Bank's *World Development Indicators*. The NAIC data are used to create most of the firm-level variables as well as the U.S. reinsurance industry aggregate variables. Aggregate variables for the overall liquidity and leverage of the U.S. reinsurance industry are calculated for each year based on the average leverage and liquidity of U.S. reinsurers.

For the purpose of this study, the A.M. Best definition of a reinsurer is used. A.M. Best defines a reinsurer as any firm whose reinsurance assumed from nonaffiliates is more than 75 percent of the direct business written plus reinsurance assumed from affiliates. Reinsurers with missing data or nonlogical values for data used in this analysis are removed.

¹⁹ As noted earlier, though these factors are generally not included in empirical studies relating the eclectic paradigm to services firms, the current study constructs models both with and without these factors in an effort to provide empirical tests of both the early eclectic paradigm framework as well as the revised framework more consistent with that used in other studies in this area. The findings are presented in the "Results" section.

Schedule F, Part 1 of the NAIC *Property/Casualty Database* is used to determine the volume of premium assumed from various countries. The total premium assumed from individual reinsurance contracts is aggregated by country based on the domicile of the ceding country for each contract.²⁰ These data are aggregated by country for each reinsurer for every year in the sample. This results in a final sample of 35 reinsurers for a total of 631 observations. On average, reinsurers assumed business from three to four foreign countries each year. This number generally increased over the sample period rising from a low of approximately four in 1996 to a high of nearly seven in 2000, serving as initial evidence of increasing internationalization in the U.S. reinsurance industry.

The OECD's *Insurance Statistics Yearbook* is used to obtain information about the number of insurers operating in each country as well as premium and loss information for the domestic insurers within each country. The World Bank publications are used to obtain economic and regulatory information on the countries included in the data set. Finally, a search of A.M. Best Company's data was conducted for each reinsurer to determine if a U.S. or foreign parent owned the firm.

In studies that use OECD data, such as Ma and Pope (2003), the number of possible foreign countries is limited to 30. The final data set for this study consists of 24 of these countries.²¹ All 15 of the original EU member countries are included as well as both the NAFTA member countries.²² Summary information for the sample is provided in Table 2. Panel A summarizes the volume of reinsurance assumed by U.S. reinsurers from the top five countries. The United Kingdom, Canada, and Germany consistently rank as the top three countries between 1998 and 2000. In 2000, these three countries represent more than 56 percent of the reinsurance assumed from foreign countries, or nearly \$1.3 billion in premiums, for the U.S. reinsurers included in the sample. Of the four countries that rank in the top five every year (Canada, Germany, France, and Australia), three are either EU or NAFTA member countries.

Panel B ranks the top five countries by the number of reinsurers assuming premiums from that country in each of the years in the sample. The United Kingdom, Canada, France, Germany, and Mexico consistently rank in the top five between 1998 and 2000. In addition, Canada, France, and Germany consistently rank in the top five in every year in the sample, whereas Mexico ranks in the top five in 4 of the 5 years. All of these countries are either EU or NAFTA members.

Panel C provides information on the average volume of reinsurance assumed from each country per reinsurer. As with the other two rankings, Canada, France, and

²⁰ Contracts are omitted if the country of origin is unable to be determined.

²¹ The countries included in the final data set are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Mexico, Netherlands, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom. Six OECD countries are not included in this study due to missing or incomplete data. They are the Czech Republic, Japan, Korea, New Zealand, Slovak Republic, and Turkey. However, Japan, New Zealand, and Turkey can be included if the foreign insurers' loss ratio variable is not used. As a robustness test, models are estimated without the loss ratio variable. The findings are discussed in the "Results" section.

²² The increase of member countries in the EU to 25 occurred in 2004, which is outside of the time period studied here.

TABLE 2
Country Summary Information

	1996	1997	1998	1999	2000
Panel A: Rankings by Total Volume of Reinsurance Assumed by U.S. Reinsurers (in thousands)					
Canada	\$285,644	Canada	U.K.	\$283,219	U.K.
Germany	\$152,704	Germany	Canada	\$212,023	Germany
France	\$50,639	France	Germany	\$178,252	Canada
Mexico	\$44,740	Australia	France	\$105,298	Australia
Australia	\$34,443	Mexico	Australia	\$69,971	France
Panel B: Rankings by Total Number of Country Observations for U.S. Reinsurers Assuming Business from Each Country					
Canada	15	Canada	U.K.	19	U.K.
Germany	12	France	Canada	17	Canada
France	10	Germany	Germany	12	France
Italy	7	Mexico	Mexico	11	Germany
Australia	6	Italy	France	11	Mexico
Panel C: Rankings by Average Amount of Reinsurance Assumed from the Country per Reinsurer (in thousands)					
Canada	\$19,043	Germany	U.K.	\$14,906	U.K.
Germany	\$12,725	Canada	Germany	\$14,854	Germany
Mexico	\$8,948	Australia	Canada	\$12,472	Canada
Australia	\$5,741	Poland	Australia	\$9,996	Australia
France	\$5,064	France	France	\$9,573	France
				\$6,412	Ireland
				\$20,032	Germany
				\$19,996	U.K.
				\$12,373	Canada
				\$11,821	France
				\$6,412	Ireland
				\$360,568	U.K.
				\$239,954	Germany
				\$185,602	Canada
				\$94,890	Australia
				\$83,359	France
				\$521,712	U.K.
				\$463,005	Germany
				\$303,579	Canada
				\$130,702	Australia
				\$130,198	France

Note: Countries from which only one reinsurer assumed business are not included in the rankings.

Germany are consistently in the top five in every year of the sample. As shown by the results of Table 2, it is important to realize that the volume of reinsurance assumed from a foreign market is not always perfectly correlated with the number of firms doing business with that market.

Methodology

The purpose of this study is to examine the factors that influence a reinsurer's decision to assume reinsurance from a particular country. For each reinsurer, the amount of reinsurance assumed from a given country is aggregated for each year based on the individual contract data provided by Schedule F, Part 1 of the NAIC's *Database*. The dependent variable is the natural logarithm of reinsurance assumed from a particular country in a given year for each insurer in the sample. The following model was then constructed:

$$\log_assumed_{jit} = a + \Sigma \beta X_{it} + \Sigma \beta Y_{jt} + \Sigma \beta Z_t + e_{jit} \quad (1)$$

where

- $\log_assumed_{jit}$ = natural logarithm of foreign reinsurance assumed from the j th country by the i th reinsurer in the t th year
- X_{it} = a vector of variables representing the firm-specific factors of the i th reinsurer in the t th year
- Y_{jt} = a vector of variables representing the country-specific factors of the j th country in the t th year
- Z_t = a vector of variables representing the reinsurance industry-specific factors in the t th year.

All models are examined for the presence of autocorrelation. The results indicated that no autocorrelation is evident. In addition, models are corrected for heteroscedasticity by using robust standard errors.²³ Two separate main models are constructed. Each model contains the three major categories of factors thought to influence the reinsurer's involvement in the global market. These are (1) firm-specific factors, (2) country-specific factors, and (3) U.S. reinsurance industry-specific factors. The variables in categories one (firm-specific factors) and three (U.S. reinsurance industry-specific factors) are consistent across the two models. Variables representing country-specific factors vary to test different hypotheses. Additionally, several alternate models are created to test the robustness of the results.

RESULTS

The descriptive statistics for the variables included in the models are provided in Table 3. The remainder of this section is divided into two parts. The first provides the results of the primary models and the second provides the results of additional models estimated to test the robustness of the results. The main robustness tests involve estimating the two models with the individual line-of-business controls. Additional

²³ The programming procedure specifies that the Huber/White/Sandwich estimator of variance is used instead of the traditional calculation.

TABLE 3
Summary Statistics

Variable	Mean	Min	Max
Assumed premiums	6.5696	0.0000	12.6813
Firm-specific factors			
Ownership Advantages			
Percentage of foreign reins. assumed	0.1903	0.0000	0.9377
U.S. parent	0.2235	0.0000	1.0000
Net income/losses	0.0765	-0.4056	2.5589
2-yr loss development	3.5723	-32.3610	248.7360
Internalization advantages			
Size	21.3911	16.1702	24.3789
Direct business/surplus	0.0897	0.0000	1.2747
Geographic Herfindahl	0.4924	0.0385	1.1519
Line-of-business Herfindahl	0.4314	0.1613	1.2769
Country-specific factors			
Gross domestic product	26.9026	22.7081	28.4996
Loss ratio	0.81	0.36	1.52
Percentage of domestic reinsurers	0.66	0.00	1.00
Government effectiveness	1.6150	-0.2200	2.5350
Corruption	1.6676	-0.4600	2.5800
Free-trade initiatives dummy	0.8035	0.0000	1.0000
Free-trade initiatives $\times$ gov. effectiveness	1.2640	-0.2200	2.5200
Free-trade initiatives $\times$ size	17.0925	0.0000	24.3789
U.S. reinsurance industry factors			
Reinsurers' dir. bus./surplus	25.5397	0.2009	91.8210
Reinsurers' liquidity	9.4709	1.9920	30.8289

Notes: Percentage of foreign reins assumed = business assumed from foreign markets/total reinsurance assumed; U.S. parent = dummy variable is equal to 1 if reinsurer has a U.S. parent, 0 otherwise; net income/losses = net income/losses and LAE; 2-yr loss development = 2-year loss development; size = natural logarithm of admitted assets; direct business/surplus = direct business written/surplus; geographic Herfindahl = geographic Herfindahl index; line-of-business Herfindahl = line-of-business Herfindahl index; gross domestic product = natural logarithm of the gross domestic product; loss ratio = nonlife domestic claims paid/net premiums written in the host country; percentage of domestic reinsurers = number of domestic reinsurers/total reinsurers; government effectiveness = government effectiveness; corruption = perceptions of corruption; free-trade initiatives dummy = dummy variable is equal to 1 for EU and NAFTA countries, 0 otherwise; free-trade initiatives $\times$ gov. effectiveness = interaction of free-trade initiatives dummy and government effectiveness variable; free-trade initiatives $\times$ size = interaction of free-trade initiatives dummy and reinsurer size; reinsurers' dir. bus./surplus = direct business written/surplus of the reinsurance industry; reinsurers' liquidity = cash and invested assets/total liabilities of the reinsurance industry. Summary statistics for the individual line-of-business variables are available from the authors upon request.

robustness tests include a more detailed examination of free-trade initiatives and variations in reinsurer profitability.

Primary Models

The results of the empirical models are presented in Table 4. Model 1 includes all country-specific factors except for the regulatory and political environment variables

TABLE 4
Model Results

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-36.2174	2.8870***	-36.9274	3.5417***
Firm-specific factors				
Ownership advantages				
Percentage of foreign reins. assumed	4.1882	0.6053***	4.1993	0.6123***
U.S. parent	0.0025	0.2079	0.0039	0.2067
Net income/losses	-1.0758	0.5758*	-1.0869	0.5512**
2-yr loss development	-0.0004	0.0049	-0.0008	0.0051
Internalization advantages				
Size	0.6346	0.0586***	0.7206	0.1161***
Direct business/surplus	0.4464	0.6110	0.4507	0.6034
Geographic Herfindahl	0.5746	0.2757**	0.5703	0.2732**
Line-of-business Herfindahl	0.4165	0.4544	0.4379	0.4460
Country-specific factors				
Gross domestic product	1.0105	0.0948***	0.9943	0.0952***
Loss ratio	1.4757	0.7773**	1.3762	0.7851*
Percentage domestic reinsurers	-0.7817	0.2814***	-0.6131	0.3010**
Government effectiveness			-0.4424	0.4159
Free-trade initiatives dummy	0.0975	0.2591	1.2025	2.9600
Free-trade initiatives × gov. effectiveness			0.8039	0.4471*
Free-trade initiatives × size			-0.1115	0.1276
U.S. reinsurance industry factors				
Reinsurers' dir. bus./surplus	0.0006	0.0025	0.0000	0.0026
Reinsurers' liquidity	0.0033	0.0090	0.0035	0.0091
R-square		0.3139		0.3211

Notes: Percentage of for. reins. assumed = business assumed from foreign markets/total reinsurance assumed; U.S. parent = dummy variable is equal to 1 if reinsurer has a U.S. parent, 0 otherwise; net income/losses = net income/losses and LAE; 2-yr loss development = 2-year loss development; size = natural logarithm of admitted assets; direct business/surplus = direct business written/surplus; geographic Herfindahl = geographic Herfindahl index; line-of-business Herfindahl = line-of-business Herfindahl index; gross domestic product = natural logarithm of the gross domestic product; loss ratio = nonlife domestic claims paid/net premiums written in the host country; percentage of domestic reinsurers = number of domestic reinsurers/total reinsurers; government effectiveness = government effectiveness; free-trade initiatives dummy = dummy variable equal to 1 for EU and NAFTA countries, 0 otherwise; free-trade initiatives × gov. effectiveness = interaction of free-trade initiatives dummy and government effectiveness variable; free-trade initiatives × size = interaction of free-trade initiatives dummy and reinsurer size; reinsurers' dir. bus./surplus = direct business written/surplus of the reinsurance industry; reinsurers' liquidity = cash and invested assets/total liabilities of the reinsurance industry.

***Significant at .01 level, **significant at .05 level, *significant at .10 level.

and the interaction variables. The results suggest that the decision to internationalize is impacted by the firm's experience in the global marketplace as seen by the positive and significant sign on the variable measuring the total amount of foreign reinsurance assumed. The measure of reinsurer profitability also is significant, but not with the predicted sign. The results indicate that more profitable U.S. reinsurers

assume less from foreign markets. This result may be due to the fact that profitable U.S. reinsurers may be viewed as more stable and financially sound by both U.S. and foreign insurers. Thus, due to increased demand within the United States, the benefits gained from the diversification of risk by entering the foreign market may not outweigh the costs associated with operating internationally. This issue is more closely examined in the sensitivity analysis. The size of the reinsurer also is significant with a positive sign. This result supports the hypothesis that reinsurers that have the capacity to commit resources to internationalization assume more reinsurance. Finally, the geographic Herfindahl is significant and positive indicating that reinsurers that are more geographically concentrated assume more from foreign countries as this can help diversify some firm-level risk.

All of the country-specific factors in Model 1 are significant with the exception of the free-trade initiative variable. The results indicate that U.S. reinsurers assume more from countries with larger markets.²⁴ In addition, U.S. reinsurers assume more from countries in which the insurers have higher loss ratios, suggesting that these insurers may be in need of the real services and risk-sharing created by these transactions.²⁵ Also, the competitiveness of the domestic market is negatively related to the amount of reinsurance assumed, which suggests that highly competitive domestic reinsurance markets can act as barriers to entry to U.S. reinsurers. Finally, none of the reinsurance industry variables are significant.²⁶

Model 2 incorporates additional country-specific factors that capture the perceived government efficiency of the host country.²⁷ In addition, the interaction of government effectiveness and the free-trade initiatives dummy as well as the interaction of the size of the reinsurer and the free-trade initiatives dummy are included.²⁸ The results for the firm-specific, country-specific, and reinsurance industry-specific factors included

²⁴ When the natural logarithm of the gross national income is used as an alternative measure of the size of the host country market, the results are consistent with those reported in Table 4.

²⁵ The models also are run without this variable to expand the sample to include Japan, New Zealand, and Turkey. There are two differences in the results in comparison to the results of Model 1 reported in Table 4. One, the free-trade initiatives dummy is significant and positive, indicating that U.S. reinsurers assume more from countries with free-trade agreements. Two, the geographic Herfindahl index is not significant. When the loss ratio is dropped from Model 2, there also are differences in the results in comparison to those reported in Table 4. First, the geographic Herfindahl index and the interaction of free-trade initiatives and government effectiveness are not significant. Second, two of the other country-specific variables are significant. Specifically, as predicted, the free-trade variable is significant and positive and the interaction of free-trade and size is significant and negative.

²⁶ As mentioned in the "Hypothesis Development" section, more recent studies examining the eclectic paradigm generally do not consider industry factors as part of the analysis. As a robustness test, the models also are estimated dropping these factors. The results are consistent with those reported in Table 4.

²⁷ When the corruption variable is included in this model, the results are consistent with those reported in Table 4, and the corruption variable is not significant.

²⁸ Based on the results of an incremental *F*-test, there is not a significant increase in predictive power between Model 1 and Model 2. Due to this result and the small increase in *R*-squared between Model 1 and Model 2, caution should be used when comparing the results of models.

in both models are consistent. Additionally, the interaction of the free-trade initiative variable and government effectiveness variable is positive and significant, indicating that U.S. reinsurers assume more from EU countries in which the local government is viewed as more effective. This suggests that it is the combination of these factors, not free-trade membership or government effectiveness alone, that impacts the extent of U.S. involvement in these markets.

Sensitivity Analyses

In order to test the robustness of the results presented in Table 4 to several assumptions, a series of sensitivity analyses related to business mix, free-trade membership, and firm profitability are conducted. The primary robustness tests involve running both models with individual line-of-business controls. The inclusion of the specific control variables for the percentage of business written in each of the property-casualty lines by a given reinsurer helps to control for potential differences based on either the characteristics of the line of business or characteristics of the market related to the given line. The results, as shown in Appendix A, are generally consistent with those discussed in the previous section with the exception of the loss of significance of the host market loss experience variable and the interaction of free-trade initiatives and government effectiveness in Model 2.²⁹ In addition, several of the individual line-of-business controls are significant indicating that the specific business mix of reinsurers affects the extent of internationalization.

Several additional tests were performed to more closely examine issues related to free-trade and reinsurer profitability. The presence of free trade is examined in two different ways. First, the original models are estimated with separate dummy variables for EU and NAFTA member countries. Results of these tests can be found in Appendix B. The results of Model 1 are consistent with those reported in Table 4. Additionally, the NAFTA dummy variable is significant and positive. The results of Model 2 are generally consistent with those reported in Table 4 except for the loss of significance of the host country loss experience variable. Additionally, the interaction of the EU and government effectiveness is significant and positive. This result suggests that U.S. reinsurers assume more from EU countries in which the local government is viewed as more effective. Thus, it appears that it is the combination of EU membership and the regulatory environment that impacts U.S. reinsurers' involvement in those markets, rather than EU membership or government effectiveness alone.

Next, the original Model 1, presented in Table 4, is estimated separately using two subsamples: countries that are members of free-trade initiatives and countries that are not members of free-trade initiatives. These results are reported in Appendix C. For countries with free-trade initiatives, the results are relatively consistent with those

²⁹ Although variance inflation factors do not find evidence of multicollinearity with the inclusion of the overall line-of-business Herfindal index (product diversification) and the individual line-of-business controls, the line-of-business Herfindahl is highly correlated with some of these variables. As such, the models in Appendix A also were estimated without the line-of-business Herfindahl index. The results are consistent with those presented in Appendix A (when both the line-of-business Herfindahl index and the individual line-of-business variables are included).

obtained for the full sample presented in Table 4. The only difference is that the geographic Herfindahl is not significant for the free-trade country sample. For reinsurers assuming business from insurers in countries that are not members of free-trade initiatives, there are several differences in comparison to the results of the full sample. Specifically, the firm profitability measure, as well as country loss experience and competitive market variables, are no longer significant. In addition, contrary to expectations, the firm-specific underwriting capacity variable is significant and positive.

In a further sensitivity analysis, a more detailed analysis of the role of reinsurer profitability in the internationalization process is conducted. The models are estimated separating the sample into profitable and less profitable reinsurers. The results are found in Appendix D Panel A reports the results for the profitable firms subsample, and Panel B reports the results for the less profitable firms subsample. The mean of the firm-specific net income to losses variable is used to establish the cutoff point for each year. There are significant differences in the results obtained for these two subsamples. For both profitable and less profitable reinsurers, as with the full Model 1 shown in Table 4, the percent of foreign reinsurance assumed and the size of the reinsurer are significant and positive. The result for the size of the host market also is consistent with the full sample model reported in Table 4. In addition, for profitable reinsurers the line-of-business Herfindahl index is significant and positive, suggesting that more profitable insurers that are more concentrated are more active in the foreign markets. This variable is not significant for the less profitable reinsurers. Finally, for the sample of less profitable reinsurers, the competitiveness of the host country marketplace is significant and negative, suggesting that this may act as a barrier to entry for these firms.

In Model 2, both the percent of foreign reinsurance assumed and the size of the reinsurer are significant and positive for both profitable and less profitable reinsurers subsamples. Additionally, the host market size variable is significant and positive for both subsamples. However, several additional variables are significant for the more profitable reinsurers that are not significant for the less profitable insurers. Specifically, the line-of-business Herfindahl index is significant and positive, the government effectiveness variable is significant and negative, and both the interaction of government effectiveness and the free-trade initiatives dummy as well as the size of the reinsurer and free-trade initiatives dummy are significant with the expected signs. Finally, for the less profitable subsample of U.S. reinsurers, the host country competition variable is significant and negative. This result suggests that the competitive environment of the host country may act as a barrier to entry for these firms.

CONCLUSION

This study provides a more comprehensive approach to model the decision process of U.S. reinsurers to assume from foreign insurers based on the eclectic paradigm. A test of the eclectic paradigm in this setting is important for two reasons. First, this study provides a test of the eclectic paradigm for service firms. Prior academic research related to the eclectic paradigm has focused mainly on manufacturing firms, with little consensus reached on the application of the eclectic paradigm to service industries. Based on the nature of reinsurance services, the study is able to test the eclectic paradigm for a sample of firms for which a significant, physical presence in the host country is not required to conduct business.

Second, due to the detailed data available on U.S. reinsurers, as well as the extensive literature related to the operations of reinsurers and the reinsurance market, a refined test of the eclectic paradigm is developed, controlling for both traditional factors thought to affect the internationalization decision as well as factors specific to the insurance industry. By examining the reinsurance assumed by country of origin in conjunction with details on the general economic condition and insurance market in those countries, a significant amount of detail is added to the analysis.

The results of the study both support and add to prior literature. This creates several key implications. First, the results indicate that the eclectic paradigm does provide a comprehensive framework in which to investigate the internationalization of services firms, specifically U.S. reinsurers. By integrating firm-, country-, and industry-specific factors, a more complete picture of the decision to internationalize is created. Further, by adding characteristics specific to the operations of reinsurers, the study helps to capture some of the key facets of this industry in the tests. The results show that firm-specific factors relating to the reinsurers' ownership and internalization advantages are important aspects of the internationalization process. In addition, reinsurers appear to consider the characteristics of the individual countries in deciding the extent to which to conduct business in a particular country, specifically, factors related to market size, loss experience, and competitive environment. These results underscore the importance of taking a more comprehensive approach to modeling the internationalization process in order to reflect the unique aspects of the specific industry examined.

Additional sensitivity testing of the eclectic paradigm related to the inclusion of a more complete specification of business mix and membership in specific free-trade initiatives (the EU and NAFTA), as well as differences based on profitability of reinsurers, yields more refined results. Although some of the findings, especially for the firm-specific factors in Model 1, are relatively stable in the sensitivity analyses, there are some notable differences. Specifically, there are some key differences in the results when firms are examined based on the free-trade membership status of countries to which they internationalize and the profitability of the firm. This highlights the importance for managers of considering a variety of factors in making the decision to internationalize.

Aside from testing the eclectic paradigm, the results of the study have broader implications. Specifically, the internationalization of U.S. reinsurers impacts not only the solvency of the U.S. insurance market, but also the international insurance market. As such, a comprehensive understanding of the factors that influence the extent of internationalization can be useful to lawmakers in the United States and abroad tasked with the regulation of reinsurance transactions.

Finally, the study of the internationalization of U.S. reinsurers is timely given the recent expansion of the EU and potential changes in international reinsurance accounting regulations. These issues, as well as the continued globalization of the financial services market, highlight the ongoing importance of the issues discussed in relation to country-specific advantages that can be created by such factors as market size, loss experience, competitiveness, government effectiveness, and free-trade agreements in the foreign markets. Given the interdependence of the world's insurance and reinsurance marketplace, as discussed in studies such as Weiss and Chung (2004), this is a key issue

for insurers, reinsurers, and regulators. The application of the eclectic paradigm to the reinsurance industry allows for a more complete examination of the internationalization of U.S. reinsurers within the global marketplace by simultaneously considering the impact of a variety of ownership, location, and internalization advantages.

APPENDIX A: MODELS WITH INDIVIDUAL LINE-OF-BUSINESS CONTROLS

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-36.5506	3.0589***	-36.5299	3.7145***
Firm-specific factors				
Ownership Advantages				
Percentage of foreign reins. assumed	4.0996	0.6353***	4.1030	0.6430***
U.S. parent	-0.0579	0.2302	-0.0606	0.2288
Net income/losses	-1.1444	0.6084*	-1.1502	0.5754**
2-yr loss development	-0.0012	0.0045	-0.0015	0.0046
Internalization advantages				
Size	0.6558	0.0629***	0.7002	0.1190***
Direct business/surplus	0.6766	0.6721	0.6643	0.6603
Geographic Herfindahl	0.6496	0.2992**	0.6366	0.2959**
Line-of-business Herfindahl	0.5237	0.4771	0.5234	0.4693
Country-specific factors				
Gross domestic product	1.0139	0.0994***	1.0003	0.0997***
Loss ratio	1.3281	0.7968*	1.2372	0.8060
Percentage of domestic reinsurers	-0.8125	0.2921***	-0.6634	0.3094**
Government effectiveness	-0.3681	0.4144		
Free-trade initiatives dummy	0.0687	0.2642	0.3107	3.0215
Free-trade initiatives × gov. effectiveness			0.6972	0.4489
Free-trade initiatives × size			-0.0637	0.1299
U.S. reinsurance industry factors				
Reinsurers' dir. bus./surplus	0.0000	0.0025	-0.0007	0.0026
Reinsurers' liquidity	0.0010	0.0096	0.0015	0.0097
R-square	0.3456	0.3507		
Individual line-of-business controls				
Fire	-0.5839	0.5550	-0.5406	0.5552
Allied lines	0.8744	0.8734	0.6727	0.8722
Ocean marine	-2.2579	1.9025	-2.4496	1.9619
Earthquake	-1.2915	0.4626***	-1.3599	0.4773***
Aircraft	1.4691	2.9199	1.4700	2.9949
Burglary and theft	-11.9764	38.7698	-4.9532	43.6095
Boiler and machinery	1.2689	0.5535**	1.1078	0.5628**
Financial guaranty	1.6781	1.0655	1.5373	1.0115
Fidelity	5.0767	1.8065***	4.6307	1.9315**
Surety	-0.6195	0.9930	-0.6468	1.0035
Credit	5.7053	3.4816	5.3566	3.5131

Continued.

APPENDIX A (CONTINUED)

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-36.5506	3.0589***	-36.5299	3.7145***
Medical malpractice—occurrence	-0.8699	0.7161	-0.7758	0.7344
Medical malpractice—claims made	-2.1778	1.5648	-2.0213	1.5120
Other liability—occurrence	0.7852	0.7829	0.8232	0.7703
Other liability—claims made	0.2636	0.8844	0.2095	0.8981
Product liability—occurrence	6.4873	2.8315**	5.9631	2.9856**
Product liability—claims made	-81.4892	35.7028**	-78.5031	38.1030**
Workers compensation	-0.2876	0.3560	-0.3097	0.3537
Private passenger auto liability	0.6805	0.5242	0.6587	0.5400
Commercial auto liability	-0.7082	0.7194	-0.7012	0.7039
Auto physical damage	-0.2742	0.4238	-0.2971	0.4197
Homeowners multiple peril	-0.7220	0.5171	-0.7104	0.5041
Farmers multiple peril	2.9159	5.7613	3.9486	6.0970
Group accident and health	0.7489	1.5142	0.7543	1.4631
Inland marine	-0.0037	1.4466	0.1321	1.4695
Mortgage guaranty	-0.2235	0.6618	-0.2360	0.6582
Other accident and health	-0.1808	1.4575	-0.3396	1.5014
Reinsurance—property	-0.2657	0.7221	-0.2013	0.7215
Reinsurance—liability	-1.5898	0.7565**	-1.5403	0.7742**
Reinsurance—financial lines	-0.1049	1.3934	-0.1084	1.3305

Notes: Percentage of for. reins. assumed = business assumed from foreign markets/total reinsurance assumed, U.S. parent = dummy variable is equal to 1 if reinsurer has a U.S. parent, 0 otherwise; net income/losses = net income/losses and LAE; 2-yr loss development = 2-year loss development; size = natural logarithm of admitted assets; direct business/surplus = direct business written/surplus; geographic Herfindahl = geographic Herfindahl index; line-of-business Herfindahl = line-of-business Herfindahl index; gross domestic product = natural logarithm of the gross domestic product, loss ratio = nonlife domestic claims paid/net premiums written in the host country; percentage of domestic reinsurers = number of domestic reinsurers/total reinsurers; government effectiveness = government effectiveness; free-trade initiatives dummy = dummy variable equal to 1 for EU and NAFTA countries, 0 otherwise; free-trade initiatives $\times$ gov. effectiveness = interaction of free-trade initiatives dummy and government effectiveness variable; free-trade initiatives $\times$ size = interaction of free-trade Initiatives dummy and reinsurer size, reinsurers' dir. bus./surplus = direct business written/surplus of the reinsurance industry, reinsurers' liquidity = cash and invested assets/total liabilities of the reinsurance industry; individual line-of-business controls = the proportion of premiums written in each line of business relative to total premiums written.

***Significant at .01 level, **significant at .05 level, *significant at .10 level.

APPENDIX B: EU AND NAFTA EXAMINED SEPARATELY

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-38.7562	2.9806***	-38.7360	3.5664***
Firm-specific factors				
Ownership advantages				
Percentage of foreign reins. assumed	4.7163	0.6299***	4.6001	0.6321***
U.S. parent	0.0391	0.2059	-0.0025	0.1994
Net income/losses	-1.3383	0.6999*	-1.2547	0.5313**
2-yr loss development	-0.0002	0.0053	0.0002	0.0062
Internalization advantages				
Size	0.7039	0.0567***	0.7399	0.1162***
Direct business/surplus	0.7330	0.6167	0.6460	0.5763
Geographic Herfindahl	0.5924	0.2692**	0.6607	0.2634**
Line-of-business Herfindahl	0.4051	0.4639	0.5017	0.4459
Country-specific factors				
Gross domestic product	1.0371	0.0977***	1.0439	0.0939***
Loss ratio	1.6326	0.7761**	1.2113	0.7559
percentage of domestic reinsurers	-0.6728	0.2773**	-0.5947	0.2978**
Government effectiveness			-0.4037	0.4130
EU dummy	-0.1621	0.2664	-0.6155	3.0707
EU × gov. effectiveness			2.0099	0.4787***
EU × size			-0.1379	0.1318
NAFTA dummy	1.0488	0.3009***	-2.6503	3.3719
NAFTA × gov. effectiveness			0.4388	0.4695
NAFTA × size			0.1415	0.1490
U.S. reinsurance industry factors				
Reinsurers' dir. bus./surplus	0.0008	0.0025	-0.0016	0.0025
Reinsurers' liquidity	0.0011	0.0089	0.0077	0.0088
R-square			0.3429	0.3884

Notes: Percentage of for. reins. assumed = business assumed from foreign markets/total reinsurance assumed, U.S. parent = dummy variable is equal to 1 if reinsurer has a U.S. parent, 0 otherwise; net income/losses = net income/losses and LAE; 2-yr loss development = 2-year loss development; size = natural logarithm of admitted assets; direct business/surplus = direct business written/surplus; geographic Herfindahl = geographic Herfindahl index; line-of-business Herfindahl = line-of-business Herfindahl index; gross domestic product = natural logarithm of the gross domestic product, loss ratio = nonlife domestic claims paid/net premiums written in the host country, percentage of domestic reinsurers = number of domestic reinsurers/total reinsurers; government effectiveness = government effectiveness; EU dummy = dummy variable is equal to 1 for EU countries, 0 otherwise; EU × gov. effectiveness = interaction of EU dummy and government effectiveness variable; EU × size = interaction of EU dummy and reinsurer size; NAFTA dummy = dummy variable is equal to 1 for NAFTA countries, 0 otherwise; NAFTA × gov. effectiveness = interaction of NAFTA dummy and government effectiveness variable; NAFTA × size = interaction of NAFTA dummy and reinsurer size; reinsurers' dir. bus./surplus = direct business written/surplus of the reinsurance industry; reinsurers' liquidity = cash and invested assets/total liabilities of the reinsurance industry.

***Significant at .01 level, **significant at .05 level, *significant at .10 level.

APPENDIX C: FREE-TRADE INITIATIVE COUNTRIES VERSUS NONFREE-TRADE INITIATIVE COUNTRIES

	Free-Trade Countries		Other Countries	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-34.0980	3.3180***	-51.9268	7.8429***
Firm-specific factors				
Ownership advantages				
Percentage of foreign reins. assumed	4.3900	0.6640***	3.0105	1.3983**
U.S. parent	-0.0742	0.2273	0.1178	0.5457
Net income/losses	-1.0895	0.5835*	-0.9628	1.9751
2-yr loss development	0.0003	0.0050	-0.0194	0.0213
Internationalization advantages				
Size	0.5990	0.0654***	0.9735	0.1660***
Direct business/surplus	0.1770	0.6442	4.8132	1.6732***
Geographic Herfindahl	0.3855	0.2991	2.2409	0.6985***
Line-of-business Herfindahl	0.2884	0.4936	1.4539	1.2099
Country-specific factors				
Gross domestic product	0.9603	0.1038***	1.2664	0.2518***
Loss ratio	2.0035	1.2036*	0.2994	1.0521
Percentage of domestic reinsurers	-0.9781	0.3488***	0.8670	0.7753
U.S. reinsurance industry factors				
Reinsurers' dir. bus./surplus	0.0005	0.0028	-0.0006	0.0062
Reinsurers' liquidity	-0.0014	0.0099	0.0159	0.0227
R-square		0.3057		0.3700

Notes: Percentage of for. reins. assumed = business assumed from foreign markets/total reinsurance assumed; U.S. parent = dummy variable is equal to 1 if reinsurer has a U.S. parent, 0 otherwise; net income/losses = net income/losses and LAE; 2-yr loss development = 2-year loss development; size = natural logarithm of admitted assets; direct business/surplus = direct business written/surplus; line-of-business Herfindahl = line-of-business Herfindahl index; gross domestic product = natural logarithm of the gross domestic product; loss ratio = nonlife domestic claims paid/net premiums written in the host country; percentage of domestic reinsurers = number of domestic reinsurers/total reinsurers; reinsurers' dir. bus./surplus = direct business written/surplus of the reinsurance industry; reinsurers' liquidity = cash and invested assets/total liabilities of the reinsurance industry.

***Significant at .01 level, **significant at .05 level, *significant at .10 level.

APPENDIX D: PROFITABLE REINSURERS VERSUS LESS PROFITABLE REINSURERS**Panel A: Profitable Firms**

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-34.4302	5.8373***	-36.3484	7.0281***
Firm-specific factors				
Ownership advantages				
Percentage of foreign reins. assumed	4.8672	1.0004***	4.9446	1.0509***
U.S. parent	0.0950	0.4974	0.1845	0.4667
Net income/losses	-1.1453	0.7399	-1.4758	0.7503*
2-yr loss development	-0.0164	0.0314	-0.0220	0.0324
Internalization advantages				
Size	0.4658	0.1272***	0.8486	0.2533***
Direct business/surplus	-1.1164	1.3916	-0.5333	1.3332
Geographic Herfindahl	0.0035	0.7424	0.1061	0.7098
Line-of-business Herfindahl	1.1714	0.6858*	1.2475	0.6418*
Country-specific factors				
Gross domestic product	1.0460	0.1890***	1.0089	0.1760***
Loss ratio	1.9328	1.5431	1.8615	1.3761
Percentage of domestic reinsurers	-0.7858	0.5457	-0.4793	0.5602
Government effectiveness			-3.0438	1.2013**
Free-trade initiatives dummy	0.2287	0.5231	2.7917	5.3818
Free-trade initiatives × Gov. effectiveness			3.8322	1.2424***
Free-trade initiatives × size			-0.4365	0.2565*
U.S. reinsurance industry factors				
Reinsurers' dir. bus./surplus	0.0035	0.0072	0.0036	0.0077
Reinsurers' liquidity	-0.0020	0.0203	0.0022	0.0199
R-square		0.3054		0.3605

Panel B: Less Profitable Firms

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-35.7598	3.5558***	-36.7673	4.2679***
Firm-specific factors				
Ownership Advantages				
Percentage of foreign reins. assumed	3.9269	0.7317***	3.9614	0.7402***
U.S. parent	-0.1336	0.2494	-0.1431	0.2489
Net income/losses	-2.6177	2.1931	-2.5123	2.2153
2-yr loss development	-0.0018	0.0049	-0.0016	0.0051
Internalization advantages				
Size	0.7081	0.0763***	0.7478	0.1335***
Direct business/surplus	-0.0328	0.8499	-0.0243	0.8520
Geographic Herfindahl	0.0058	0.0080	0.0057	0.0082
Line-of-business Herfindahl	-0.3098	0.7184	-0.3578	0.7252

Continued.

APPENDIX D (CONTINUED)

Panel B: Less Profitable Firms

	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
Intercept	-35.7598	3.5558***	-36.7673	4.2679***
Country-specific factors				
Gross domestic product	0.9894	0.1116***	0.9728	0.1121***
Loss ratio	0.9215	0.7626	0.6455	0.8040
Percentage of domestic reinsurers	-0.6989	0.3151**	-0.5978	0.3356*
Government effectiveness			0.4473	0.4261
Free-trade initiatives dummy	-0.0044	0.2761	1.3860	3.2819
Free-trade initiatives × gov. effectiveness			-0.2748	0.4777
Free-trade initiatives × size			-0.0411	0.1424
U.S. reinsurance industry factors				
Reinsurers' dir. bus./surplus	0.0005	0.0031	0.0001	0.0031
Reinsurers' liquidity	-0.0044	0.0109	-0.0037	0.0110
R-square		0.3422		0.3453

Notes: Percentage of for. reins. assumed = business assumed from foreign markets/total reinsurance assumed; U.S. parent = dummy variable is equal to 1 if reinsurer has a U.S. parent, 0 otherwise; net income/losses = net income/losses and LAE; 2-yr loss development = 2-year loss development; size = natural logarithm of admitted assets; direct business/surplus = direct business written/surplus; geographic Herfindahl = geographic Herfindahl index; line-of-business Herfindahl = line-of-business Herfindahl index; gross domestic product = natural logarithm of the gross domestic product; loss ratio = nonlife domestic claims paid/net premiums written in the host country; percentage of domestic reinsurers = number of domestic reinsurers/total reinsurers; government effectiveness = government effectiveness; corruption = perceptions of corruption; free-trade initiatives dummy = dummy variable is equal to 1 for EU and NAFTA countries, 0 otherwise; free-trade initiatives × gov. effectiveness = interaction of free-trade initiatives dummy and government effectiveness variable; free-trade initiatives × size = interaction of free-trade initiatives dummy and reinsurer size; reinsurers' dir. bus./surplus = direct business written/surplus of the reinsurance industry; reinsurers' liquidity = cash and invested assets/total liabilities of the reinsurance industry.

***Significant at .01 level, **significant at .05 level, *significant at .10 level.

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