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What Drives Capital Flows?
The Case of Cross-Border M&A Activity and Financial Deepening

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Abstract

What macroeconomic and financial variables play key roles in the foreign direct investment decision (FDI) of firms? This question is addressed in this paper using a large panel data set of cross-border Merger & Acquisition (M&A) deals for the period 1990-1999. Various econometric specifications are built around the simple "gravity model" commonly used in the trade literature. Interestingly, financial variables and other institutional factors seem to play a significant role in M&A flows. In particular the size of financial markets, as measured by the stock market capitalization to GDP ratio and the credit provided to the private sector by financial institutions to GDP ratio in the domestic economy, have sizeable positive effects on the incentives for domestic firms to invest abroad.

Keywords: Mergers & Acquisitions; Cross-border; Capital flows; Financial deepening

JEL Classification: F21; F23; G34

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1 Introduction

The 1990s witnessed an explosion in cross-border merger and acquisitions (M&A) activity, as can be seen in Figure 1. Increases in these capital flows partly reflected a shift in the composition of foreign direct investment (FDI) away from "greenfield" investment (i.e., firms started from scratch). These increases were also spurred by the growth in global financial markets that allowed firms to take advantage of investment opportunities at home and abroad.

This increase in M&A activity raises a host of issues. For example, high activity within Europe and European investment in the U.S. has led economists to ask questions such as: Did the growth and merging of financial markets in Europe, spawned by the arrival of the Euro in 1999, lead to the increase in cross-Atlantic investment by European companies? Did the increase in acquisitions of U.S. companies by European firms play a role in the depreciation of the Euro?

At a more general level, these cross-border M&A flows have also allowed firms to diversify their production abroad and have led to increased economic integration across countries. Given the importance of these M&A flows and that economists have traditionally concentrated on studying "greenfield" investment, it is only natural to inquire into the determinants underlying the size and direction of these flows.

This study applies the gravity model framework to these questions. This simple empirical framework has been commonly used in the trade literature and more recently in the asset trade literature. Generally, gross bilateral capital flow data are rare, but I am able to fill this void through the use of a new comprehensive data set of world M&A flows covering the period 1990-1999. According to the data set used in this study the value of deals announced have increased by almost 7 fold over the decade, while the deals which have gone into effect during this period have increased by 10 fold. One can see in Tables 1 and 2 that the growth in announced M&A deals has not been restricted to just OECD country-pairs, but also between

non-OECD countries, and between OECD and non-OECD countries[1]. Furthermore, the number of deals announced has only trebled thereby indicating that the value of the average deal has also increased substantially.

Given this increase in activity, why should we care about these deals? First, these forms of capital flows may be considered as safer forms of foreign investment for the target country — compared to equity or debt flows, for example — because the country does not have to worry about a sudden reversal of inflows, as witnessed in the crises during the late 1990s. Second, these flows offer different types of economic gains. For example, a cross-border M&A is a decision made by firms that should in theory be the result of the prospect of future synergies between firms. Furthermore, these deals offer firms the ability to diversify production abroad and save on various production costs. There is also the issue of risk diversification. Normally, one associates risk diversification with the use of equity; however, shareholders of firms that invest abroad indirectly gain from the foreign investment of these firms[2]. Therefore, given these and other issues associated with an ever globalizing world, understanding what the determinants of these flows are should be of interest for many policy issues.

Though there has been a good deal of literature addressing the various consequences and possible causes of domestic M&As[3], practically no work has been done examining these capital flows at the international level. Two exceptions are Pryor (2001) who analyzes some general trends of cross-border M&A flows during the 1990s; and Vasconcellos and Kish (1998), who examine Europe-U.S. flows. This paper attempts to uncover the possible determinants of these flows empirically using a comprehensive framework. In particular, I am interested in analyzing what macroeconomic and financial factors lie at the heart of these

[1]Given that I concentrate on announced deals in this paper, similar statistics are not reported here for deals that came into effect. These numbers are available upon request.

[2]Rowland and Tesar (2000) show that there are gains from international diversification through multinational firms

[3]See Andrade, Mitchell and Stafford (2001) and Holmstrom and Kaplan (2001) for recent surveys of such research.

flows. Examples of the questions considered include the following: Do financially deep capital markets play a significant role in acquisitions? Are firm acquisitions driven by barriers to trade in goods? Do tax differentials or exchange rate movements matter? Does information play a role? Furthermore, I control for other possible determinants such as relative skill abundance.

The key factor in this list on which I concentrate is the role of domestic financial markets in providing incentive/capital for cross-border M&A deals. The 1990s witnessed a boom in equity markets. Academics and the private sector have both pointed to this boom as spurring on investment by firms through mergers and acquisitions at the domestic level (see Section 2.1 for more on this). It is not immediately apparent that this effect should be large for outward foreign investment, once control is made for other more 'traditional' variables (e.g., skill differences). So, exploring this avenue is interesting on this ground alone. Moreover, a positive result would point towards the importance of domestic financial markets in real economic activity at an international level. Though the recent rise in equity prices is at the heart of domestic stock market growth (as measured by the stock market capitalization to GDP ratio in this paper), this result should nonetheless be of interest to policy makers from countries with underdeveloped financial markets. By creating an institutional environment conducive for domestic financial markets to grow — not only formal stock markets, but also credit markets — policy makers will give their countries ability to reap the gains from international financial investment. Furthermore, lessons from this paper may also be relevant for Europe, where the consolidation of national financial centers across the Euro area has begun and will lead to deeper financial markets.

The gravity model fits the data well, though not as spectacularly as when used in estimating trade flow for goods as measured by its ability to explain total variation in the data, i.e., the R^2. However, several variables are significant both statistically and economically. One very interesting result is the importance of financial deepening, measured by stock market size relative to GDP, in the acquisition country's economy. Furthermore, the role of

credit provided to the private sector by banks and other financial institutions, which is an important source of finance for developing countries, also seems to play a positive role for the acquisition country. I am also able to incorporate other institutional factors; namely, the effects of tax treaties and trade agreements. Bilateral capital tax treaties appear to increase M&A activity between two countries, though this result is not statistically significant. The type of regional trade agreement seems to matter and is robust across specifications. Namely, customs unions or free trade agreements tend to decrease cross-border investment flows, while service agreements work in the opposite direction.

Section 2 will discuss some of the key issues that will be considered, and will describe some of the underlying theoretical background. Section 3 will describe the data and present the econometric methodology. Section 4 provides empirical results. Finally, a conclusion is presented.

2 Issues and Theoretical Background

FDI can be broken into two major components: investment in new assets in a foreign country (commonly referred to as 'greenfield' investment), or acquisition of pre-existing foreign assets. A cross-border M&A falls into the latter category, where a domestic firm acquires another firm in a foreign country[4]. Therefore, in what follows, I shall particularly concentrate on the FDI literature for inspiration.

The literature on the incentives for FDI is vast and is not constrained to a particular sub-field of economics (see Markusen and Maskus (2001) for an excellent recent survey). For example, research in trade examines the incentives for FDI given trade barriers, while researchers who are interested in the distortionary effects of taxes on investment have also raised this issue in the context of international capital flows. Before proceeding to the

[4]A merger can also take place between the two firms where there is no outright acquiring firm. This issue is not dealt with for two reasons. First, the data set does not differentiate between a merger or an acquisition and always list a target and acquiror country. Second, very often what is announced as a merger initially often turns out to be an acquisition ex post — the recent Daimler-Chrysler deal is a good case in point.

empirical work, I will provide some background on the theoretical and empirical research that have addressed these and other issues. This list will be far from complete, but will concentrate on hypotheses that can actually be tested using the M&A data set and will concentrate on macroeconomic and financial factors.

2.1 Financial Depth

The role of financial development has taken a prominent role in recent research in several different areas of the literature, such as economic growth, financial stability and international financial integration — see Caprio and Honohan (2001) for an excellent recent survey of this literature. Financially deep markets — whether measured by size or liquidity — provide firms access to capital necessary to undertake investment projects which they might otherwise be unable to take advantage of. Firms wishing to grow very often need to rely on external financing, therefore their ability to grow (as well as their incentive to) relies heavily on their ease of access to cheap funds. Though financial development is more often associated with developing countries, the growth of financial markets also has an impact in the industrial world — witness the investment boom during the 1990s. This logic has been described in the popular press[5] as well as by the financial sector as a possible reason for the growth of M&A activity in the past decade. For example, in commenting on the factors needed for the revival of cross-border M&A to their 1998 boom-levels, Morgan Stanley highlights the importance of financial factors:

- **More vibrant global equity markets.** We suspect cash will remain the king in terms of financing cross-border transactions over the near-term, although a rebound in world equity markets could increase the viability of using equity to finance deals. In addition, a rebound in equity prices could boost confidence among CEOs to pursue mergers.[6]

Recent research has examined how different domestic financial constraints played roles in the emerging market crises of the late 1990s. My question differs from this line of study

[5] E.g., see *The Economist*, September 29, 2001, p. 64.

[6] "M&A Update – Nearing a Bottom?", *Global Economic Forum*, November 7, 2001. `http://www.morganstanley.com/gef/`

in that I am interested in how the financial deepening of a country can aid firms in investing abroad, rather than the impact on capital inflows. This should be a question of interest for policy makers given the importance of international diversification, whether it be by private investors or firms. By investing in another country's economy, firms can hedge themselves against domestic volatility, thereby smoothing their income streams. This mechanism should also be important for developing countries as they grow and their firms invest abroad.

Financial economists have also begun to ask what role financial markets might play in explaining M&A activity. For example, Shleifer and Vishny (2001) develop a model to explain the distinct waves of acquisitions since the 1960s where acquisitions are driven by the market value of firms. This work differs from the proposition stated above on two counts. First, the authors are primarily concerned with domestic, in particular U.S., M&A activity. Second, their theory belongs to the behavioural finance models because acquisitions are driven by the perceived synergy of the merged firms relative to their present market values, whereas the argument for financial development proposed above relates to the lifting of a financial constraint faced by firms.

Though Shleifer and Vishny (2001)'s model would be interesting to test with firm-level data, the present study is more concerned with addressing the issue of financial deepening. Furthermore, my line of research will be easier to implement for a large cross-section of countries using aggregated financial market data. Analyzing the role of financial deepening in this area seems to be quite novel, though some empirical evidence addressing financial incentives of cross-border deals has been provided by Vasconcellos and Kish (1998), who examine how relative stock market performance and bond yield differentials affect Europe-U.S. M&A activity. However, their work differs from the present study in several respects: (i) they do not address the issue of financial deepening per se; (ii) they only concentrate on financial variables; (iii) a much smaller sample of countries is used, and (iv) their estimation procedures are very different from the ones implemented in this paper since the authors do not have information on many deals, and no information at all on the value of these deals.

Several measures of financial deepening have been proposed in the literature, and an extensive database containing many of these data has recently been constructed by Beck, Demirgüç-Kunt and Levine (1999). One common financial deepening variable used in many studies (e.g., growth regressions) is the ratio of M2 to GDP. However, this variable is not quite suitable for the issue at hand because it does not directly address the availability of credit to the private sector. Therefore, two other measures are considered. The first is a measure of stock market size relative to GDP. Testing the significance of this variable directly addresses the influence of growing equity markets on cross-border investment flows. The 1990s witnessed a stupendous growth in stock market size and activity (see Table 3) in the industrial world as well as the launching and growth of new markets in transition and developing economies. However, it is well recognized that the banking sector plays the primary role in providing funds for private sector investment in the developing world. Therefore, the second measure of financial deepening considered is the amount of credit provided by banks and other financial institutions to the private sector relative to GDP. It would also be of interest to examine other organized markets, such as the domestic bond market, but bond market capitalization data only exists for a relatively small sample of countries.

2.2 Trade: M&A Deterrent (or Not)?

A stylized, and puzzling, fact in the trade literature is that world FDI and trade flows tend to move in the same direction, whereas standard trade theory generally predicts that the two flows should be substitutes of each other. Part of the intuition behind this theory relies on firms needing to avoid trade costs, whether they be due to transportation or tariffs[7]. These costs should in theory lead firms to invest in a foreign economy. However, an interesting recent paper by Baldwin and Ottaviano (2001) presents a theory where firms engage in both

[7]See Mundell (1957) for early theoretical work addressing the relationship between trade and foreign investment in the presence of barriers trade and investment. Economies of scale, firm-specific capital and other considerations are also essential in a firm's investment decision (e.g., see Markusen (1995) for a survey on multinational enterprises).

intra-industry FDI and intra-industry trade simultaneously. The combination of differentiated goods and trade costs lead to this result. Though this result is not necessarily robust across all industries in reality, the theory does provide some reasoning behind the empirical positive correlation of trade and FDI.

Recent work on the multinational firm also addresses the interaction between FDI and trade flows. Markusen, Venables, Eby-Konan and Zhang (1996) and Markusen (1997) provide theoretical models, referred to as "knowledge-capital" models, which allow for horizontal and vertical integration of firms across countries in the presence of trade costs and other factors. These models are quite complicated and rely on numerical simulations to provide results and testable implications. Carr, Markusen and Maskus (2001) present a reduced form model based on the knowledge-capital framework that can be tested empirically using affiliation production as the measure of cross-country investment activity. The results in this paper point to this new theory as being quite promising, as do other results highlighted in Markusen and Maskus (2001). I do not use this empirical specification in the present paper given that I am not concentrating on the multinational firm per se, and my endogenous variable differs from the one used in these studies. However, adopting this specification would be an interesting avenue of future research.

This paper instead addresses the issue of trade vs. FDI empirically by using a gravity model. If a cross-border M&A is acting as a substitute for trade then, *ceteris paribus*, a natural result to expect would be a positive coefficient for the distance between two countries (which can be considered as a proxy for physical trade costs). However, the relationship between distance and the cost of trade should be treated as partial at best for it says nothing about trade policy. Furthermore, the cost of investment may also increase with distance, therefore one might still expect a negative coefficient for the distance variable. To attempt to deal with this problem, I include a measure of bilateral trade as well as variables representing different types of regional trade agreements. I only have bilateral trade data up to 1997, and the expected sign of its coefficient is ambiguous given the various theoretical literature

discussed above. However, the stylized fact of previous empirical literature points to an expected positive sign. Therefore, this variable is primarily used to check the robustness of the main results, e.g., whether the coefficient on distance still remains significant. The effect of trade agreements on FDI is not necessarily straightforward. One might expect that by entering into a trade agreement, two countries will become more integrated economically and therefore enter into more cross-border investment deals (and trade more as well). However, trade agreements vary in their scope, e.g., a customs union imposes far greater conditions on common tariffs then a service agreement. So, the relative "strength" of these deals might have an effect on the incentive to replace FDI with trade (or vice versa). Furthermore, a service agreement might very well stimulate cross-border deals because firms whose main source of business is the service sector will be able to take advantage of the lifting of various restrictions. These variables do not address the issue of investment cost directly and I was not able to collect such direct costs. However, certain proxies of costs have been suggested in the literature, particularly information costs, which will next be addressed.

2.3 The Role of Information

The role of information has received attention recently in the international capital flow literature. For example, Gordon and Bovenberg (1996) provide a model to explain the Feldstein-Horioka puzzle that relies on the existence of asymmetric information between investors in two countries as a central mechanism in the model[8]. Recent work by Martin and Rey (2001) considers the importance of information costs in cross-border asset flows. They endogenize the incompleteness of financial markets and assume there exist some "iceberg" costs (transaction, information, etc.) in the trade of assets across countries. A direct implication from this model is that gross bilateral asset flow will be greater the smaller the transaction costs. This model is also quite applicable in the case of M&As given that these deals are simply another method for agents/firms to purchase the rights to future foreign output. Therefore,

[8]The model concentrates on greenfield investment, but there also exists acquisition of existing firms.

information may also play an important role for gross M&A flows[9].

Portes and Rey (2001) put this idea to a test and provide strong empirical evidence on the importance of information in determining gross bilateral equity flows. They too use a gravity model, but use two more specific proxies of information than simply distance, namely gross bilateral telephone traffic and number of domestic bank branches located in the foreign country. Another paper, which is even more related to M&A flows is de Ménil (1999) who applies a gravity model to bilateral FDI flow for a small set of countries for the period 1982-1994. He relies on distance as a proxy for information, arguing that the sign of the coefficient for this variable will show whether information quality or avoiding trade costs are more important in FDI decisions. I consider both distance and gross telephone traffic in the regressions presented below.

2.4 Taxes

Taxes affect the incentives of agents and firms in all areas of economic activity, and FDI is no different. There is a large literature which examines the effect of different types of taxes on foreign investment flows. For example Razin, Sadka and Yuen (1998) explore the theoretical implications of taxing different types of capital inflows (portfolio, debt, and direct investment). There is a large amount of empirical research exploring the impact of different forms of taxation on U.S. direct for investment inflows and outflows — see Hines Jr. (1997) for an excellent survey of this literature. Many studies analyze a small number of countries, and are able to focus attention on different types of tax credits, some geared specifically at attracting foreign capital. Furthermore, issues such as double-taxation and multinational-specific taxes are tackled. Unfortunately it is not feasible to collect such specific data given the cross-country nature of this study. Therefore, as a proxy of tax effects, I examine the average corporate tax rate of the target country. All else being equal, one would expect that

[9]The Martin-Rey model is primarily concerned with the importance of information for financial investors. However, it is not farfetched to argue that firms must invest heavily in information acquisition before deciding on acquiring a foreign firm and for future supervision.

a country with a lower tax rate would attract investment. However, this measures does not address tax credits, multinational-specific taxes, or the issue of double taxation. Therefore, results using this tax rate measure must not be treated as definitive.

A second line of attack, one subject to less ambiguity in measurement problems, is to examine the effect of tax treaties between two countries. Countries enter into such treaties for several reasons. For example, a tax treaty will (i) enable a standardized set of definitions to be used and thereby strengthen tax jurisdiction between treaty partners; (ii) affect the taxation of multinationals, such as eliminating double-taxation; (iii) promote the exchange of tax information, thus enhancing the enforcement of tax laws, and (iv) prevent countries from treaty shopping. These factors provide both positive and negative incentives for future cross-border investment. On the one hand, firms might be encouraged to invest abroad because treaties tend to lower taxes abroad in general. Furthermore, treaties can be tailored to encourage FDI (e.g., by the elimination of double-taxation), and reduce the general uncertainty of future tax regimes. On the other hand, incentives might fall because firms no longer have to operate in several countries to decrease their tax liability (e.g., through the practice of transfer pricing). Moreover, firms might have invested in low-tax countries in the past, as well as in countries where they could easily misrepresent their revenues so as to avoid taxes back home. I am aware of only one other paper that explores these issues — a paper by Blonigen and Davies (2001) that examines U.S. inbound and outbound FDI with 65 countries over the period 1966-92. The authors employ the knowledge-capital specification discussed above and use foreign affiliate sales and FDI stocks as possible left-hand side variables. They find that tax treaties actually have a negative effect on FDI.

2.5 The Exchange Rate

Does the exchange rate affect FDI? Some researchers have argued that exchange rate movements may indeed. For example, work by Cushman (1985), Froot and Stein (1991), and Blonigen (1997), present theoretical arguments and empirical evidence to explain why a

U.S.$ depreciation might have played a role in the inflow of foreign capital into the U.S. during the 1980s. The three models explore different channels of the effect of exchange rate movements on FDI [10], but only Cushman (1985) considers exchange rate volatility, while the other two only examine exchange rate depreciations/appreciations. All three theories predict that a depreciation of the domestic currency should lead to an inflow in foreign investment. Klein and Rosengren (1994) put the Cushman factor-cost hypothesis vs. the Froot-Stein wealth-effect hypothesis to a test, and find evidence of the wealth effect dominating. This result is interesting for the present study given that the Klein and Rosengren (1994) measure of relative wealth is the ratio of domestic and foreign stock market capitalizations. Therefore, this variable is also considered to ensure that the financial variables discussed in Section 2.1 are not just behaving as proxies for the acquisition country's wealth. I also follow Klein and Rosengren (1994) and use the contemporaneous real exchange rate.

The importance of exchange rate volatility has been stressed in the international trade literature, and has been shown to be empirically important in recent work by Rose (2000) that explores the effects of currency unions on bilateral trade flows. Rose shows that the impact of membership in a currency union on trade is large and significant. If FDI is acting as a substitute for trade because of exchange rate volatility, then it might be expected that low exchange rate volatility may actually have a *negative* effect on bilateral M&A flows. Cushman (1985) examines this type of argument (and others) theoretically. He sets up a model where the fact that firms are risk averse may lead them to increasing FDI given exchange rate volatility. However, he also presents different cases of firms' behaviour (e.g., as when they intend to sell their product) where this volatility may in fact lead to decreased FDI. The empirical results in this paper point towards FDI increasing with increased volatility, though this does not hold across all specifications. Goldberg and Kolstad (1995) build on this work

[10]Cushman (1985) concentrates on the effect of exchange movements on factor costs, such as labour; Froot and Stein (1991) examine the role of credit market imperfections and the wealth effects on firms due to nominal exchange rate movements, while Blonigen (1997) stresses the importance of the valuation of firm-specific assets relative to movements in the real exchange rate.

to examine the effect of real exchange rate volatility. They argue that one should care about short-term volatility if the behaviour of firms is being driven by their risk aversion. Their model also predicts a positive relationship between FDI and volatility, though this result depends on the assumptions made about the shocks hitting the economy. Therefore, answering which direction exchange rate volatility affects cross-border M&A activity is ultimately an empirical question. Finally, I do not use Rose (2000)'s currency union dummy variable given the relatively short span of the M&A data set compared to Rose (2000)'s sample. There is extremely little temporal variation of this variable during the 1990s, and this results in multicollinearity in some specifications, and near collinearity in the rest. Instead, I use a 5 year rolling measure of monthly nominal exchange rate changes volatility, prior to each period t. Ultimately, I would like to use the real exchange rate volatility, but cannot given that the price level data does not exist at the monthly level (and would be very limited at the quarterly level).

2.6 Other Variables of Interest

The proceeding list of variables is far from complete, but concentrates on the financial and macroeconomic factors underlying cross-border M&A flows. However, the empirical model can also be augmented with variables representing various similarities or differences between countries. For example, relative skill abundance of countries plays an important role in the trade-approach to FDI. It is not obvious what effect this variable might have on investment inflows (though the knowledge-capital model predicts higher affiliate sales in small skill-abundant countries). A higher relative skill level might attract investment as firms search for productive labour to use. However, there is also the issue of comparative advantage, where rich skill-abundant countries might be establishing firms in poorer countries to take advantage of unskilled but cheap labour. One would ultimately like to control for wage differentials given this argument, but data from the International Labour Organization was quite incomplete, and many of the series were not comparable across countries. Therefore,

a measure of relative skill abundance based on a measure of aggregate human capital is used. A dummy variable is constructed indicating whether the target country is more highly skilled, as measured by the percentage of the population who have completed a higher degree. More details on this variable are described below in Section 3.1. Furthermore, given the importance of information highlighted above, a common language dummy is included. This is meant to capture a country-pair specific effect, and makes sense economically. For example, the integration of a foreign firm will most probably be more successful if managers can communicate with each other. Therefore, one might expect to see language, for example, play a role in a firm's decision making process. Other standard variables included in the gravity model are the size and prosperity of the two countries, measured in terms of real income and real income per capita, are also included.

Finally, I also include OECD dummy variables among the possible controls, since the sample includes less developed countries that make up a smaller share of the sample and have many characteristics different from their industrial counter-parts (e.g., political instability or corruption). Ideally, I would like to control for other important characteristics of the countries more directly, such as relative wages, direct trade and investment costs, and levels of corruption[11], but cannot given data constraints. Therefore, rather than paring down the number of countries in the sample significantly, such variables are not considered in the present paper. Finally, the degree of domestic market M&A activity might affect the decisions made by firms about foreign acquisitions (e.g., different strategic alliances). Obtaining these data for so many countries was however simply not possible. However, by including levels of real GDP in the regression, I address this issue somewhat if one believes that strong economic performance contributes to increased activity in domestic M&As.

[11]See Wei (2000) on this point.

3 Data and Econometric Methodology

3.1 Data Description

I use several data sources in constructing the panel. The cross-border M&A data come from a unique database produced by Thomson Financial Securities Data. In particular, I have the following daily information for all deals in the world[12] between January 1, 1990 and August 13, 2001:

- Announcement date,
- Date deal is effective,
- Target and acquiror firms' names,
- Target and acquiror firms' country of origin,
- Target and acquiror parent firms' country of origin,
- Target and acquiror parent firms' region,
- Target and acquiror firms' industrial sector,
- Value of deal in U.S.$,
- Form of payment(s) used in deal, e.g., cash, stocks, etc., and
- Target and acquiror financial advisors.

This database began in 1985 and supposedly covers all deals in the world since 1990. However, the one significant deficiency with this data set is that, since firms do not have to announce the value of a deal, not all deals have values attached to them. Specifically, only 43.70% of the daily deals for my sample period have a value attached to them. Pryor (2001) uses the same data source, but for a smaller number of years. He argues that most probably the missing values are for smaller deals (where announced values are not widely known) and therefore imputes the missing values using an arbitrary method. He simply assigns to a missing value a quantity equal to 1/6th of a value for deals announced in the same industrial sector and target/acquisition country groups. He finds that this approximation does not change the general trend compared to a sample ignoring the missing values. I chose not to

[12]See Table 5 for a list of countries in the sample.

follow this methodology for several reasons. First, it is not certain whether the assumption made by Pryor is correct. Second, I could not detect any patterns of which industry sectors, countries or years, have more missing values than others. Therefore, the number of deals with no values appear to be random given these criteria. Finally, I was told by a representative at Thomson Financial that whether a deal is assigned a value or not depends on what appears on the newswire or other sources that the analysts use to construct this data set. This points to a random sample. I therefore treat whether a value is recorded or not as random and simply aggregate the values which are reported annually. Furthermore, I only assign a value of zero if no deals are announced in a given year. As can be seen in Tables 1 and 2, the world number and value of these deals have been on the rise during the 1990s. Furthermore, this pattern has not been exclusive to the developed world.

To investigate the importance of financial deepening I construct a stock market capitalization to GDP ratio. The data were originally compiled by Beck et al. (1999). However their measure takes the average of period t and $t-1$ each year and ends in 1997, and it is not entirely clear that a two-year average of the ratio is the appropriate measure to use when measuring the impact of financial market deepening on M&A activity. Therefore, to avoid potential complications when dealing with lags, I simply create the ratio of stock market capitalization to GDP for each t for the period 1985-1999. The stock market capitalization data are taken from Standard & Poor's (1995, 2000, 2001) and GDP data (denominated in U.S.$) are from the World Bank's WDI. Given that several countries did not have organized stock markets in the 1990s[13], a large portion of the sample would be lost if this variable was included. To circumvent this problem, a zero was entered each year for countries who did not have a stock market for the whole sample. Furthermore, an exhaustive search was made on the internet (see the appendix of Standard & Poor's (1995, 2000, 2001) for addresses) in order to be sure that the missing values for some countries' markets were in fact missing,

[13]Out of 194 countries in my sample, only 101 countries had operating stock markets, and many of these did not exist for the only time period examined.

and not that the countries' markets had not begun functioning yet. In this latter case, a zero was entered. The private credit to GDP ratio was constructed using data from the IMF's International Financial Statistics (IFS) database. In particular, data for credit provided to the private sector by banks and other financial institutions were used for the acquisition country. See the appendix of Beck et al. (1999) for a detailed description of the data used from the IFS. Finally, I take the log of the ratio of the target country's stock market capitalization to the natural logarithm of the acquisition country's stock market capitalization (both in current U.S.$), as specified in Klein and Rosengren (1994).

Bilateral real exchange rate data are calculated using the end-of-year nominal exchange rate and consumer price indices listed in the IFS database. The depreciation/appreciation rates are calculated by taking the log difference of period t and period $t-1$. The volatility measure of the nominal exchange rate is constructed as follows. First, the log difference of end-of-month exchange rates are calculated from the IFS database. Next, the standard deviation of this measured is calculated for 5 years prior to each period t, thus a rolling-measure is calculated.

The Office of Tax Policy Research at the University of Michigan Business is about to launch the World Tax Database on the internet. This data source will offer comprehensive information on different tax rates for a sample of 150 countries. The average corporate tax rate for every country has been made available to me for the period 1975-2001. Though preliminary and incomplete, these data are used in the estimation below. In particular, the target country's tax rate is used. Furthermore, information on whether two countries share an income or capital tax treaty in a given year is collected from Tax Analysts (2001). These data are simply coded as 0/1 dummies for each year. As one can see from Table 4, the number of income and tax treaties has been increasing over the sample period.

A time-varying dummy variable is also constructed for whether countries are involved in a regional trade agreement using information from the World Trade Organization. Additional dummy variables are created representing the type of regional trade agreement in force. The

four types are: (i) service agreement, (ii) free trade area, (iii) customs union, and (iv) other. Table 4 shows that the number of these agreements were on the rise during the 1990s.

I turn to Glick and Rose (forthcoming) for some of the gravity data. These data offer real GDP and real GDP per capita, originating from the World Penn Tables and the World Bank. However, since the data end in 1997 and my country pairs are not identical to theirs, I update GDP and population figures using the World Development Indicators (WDI) issued by the World Bank. This can only be done until 1999 given data limitations. Therefore, the panel I use is only for the period 1990-1999. The other two gravity variables that I consider is the surface distance between two countries and a dummy variable indicating whether they share a common language. The coordinates used to calculate distance are taken from the CIA Factbook[14], and the information on languages is taken from EITI. The information variable is simply measured as gross bilateral telephone traffic between two countries (the sum of the two-way traffic). The source of these data is the International Telecommunications Union[15]. These data were available to me for the period 1990-98 and were quite incomplete, which halves my sample size in the specifications using this variable presented below. Therefore, I treat these regressions primarily as a robustness check.

Finally, a measure of relative skill abundance is constructed using the human capital data from Barro and Lee (2000). Specifically, a country is considered to be relatively more skill abundant if the percentage of higher school completed in the population (aged 15 years and older) is greater than that in the other country. One should expect to see this percentage to be much higher for industrial countries. A 0/1 coding is created accordingly. These data are not ideal for this project given that they only have measures every 5 years. However, one could argue that the relative skill abundance between two countries does not change greatly over a 10-year period and some diagnostic checks confirm this result[16]. Therefore, skill-level

[14]See Appendix A for a list of websites where electronic data can be obtained.

[15]I would like thank Wei-Kang Wong for sharing these data with me.

[16]Regressions of Y_t on Y_{t-5} were run for the whole sample, where Y is the measure of skill considered. I could not reject the null hypothesis that the coefficient on Y_{t-5} was significantly different from 1.

variable might only change over two periods: 1990-94 and 1995-99.

3.2 The Gravity Model

The gravity model is a simple empirical model which originated in the trade literature. Briefly stated, its main implication is that the gross flow of trade between two countries should depend inversely on the distance between the countries and depend proportionally on their economic size (this is generally measured as the product of the two countries real GDP). This model has been successful in the goods trade literature, and more recently in the asset trade literature in the work of Portes and Rey (2001). Furthermore, de Ménil (1999) points to its relevance in FDI flows. Therefore, all econometric work will be built around this specification using annual data.

The specification used augments the standard gravity-type variables (i.e., distance and economic size) with other macroeconomic and financial variables. Furthermore, to avoid possible problems of endogeneity, some independent variables are lagged. In particular, the financial market variables are lagged one period, since one could argue that an increase in capital inflows will boost domestic market activity and therefore have an effect on asset prices and the availability of credit[17]. In particular the following equation is estimated:

$$\begin{aligned} ln(MA_{ij,t}) = \beta_0 &+ \beta_1 ln(Y_i Y_j)_t + \beta_2 ln\left(\frac{Y_i Y_j}{Pop_i Pop_j}\right)_t + \beta_3 ln(D_{ij}) + \beta_4 ln\left(\frac{StockMkt}{Y}\right)_{j,t-1} \\ &+ \beta_5 ln\left(\frac{Credit}{Y}\right)_{j,t-1} + \beta_6 ln(RXR_{ij,t}) + \beta_7 ln(V(e)_{ij}) + \beta_8 ln(Tax_{i,t}) \\ &+ \beta_9 captax_{ij,t} + \beta_{10} CU_{ij,t} + \beta_{11} FT_{ij,t} + \beta_{12} SA_{ij,t} + \beta_{13} Othert_{ij,t} + \beta_{14} Skill_{ij,t} \\ &+ \beta_{15} Lang_{ij} + \beta_{16} ln\left(\frac{Tel_{ij}}{\sqrt{Y_i Y_j}}\right)_t + \beta_{17} ln(Wealth_{ij,t}) + \beta_{18} ln(Trade_{ij,t}) + \varepsilon_{ij,t}, \end{aligned} \tag{1}$$

where i and j denote the countries and t denotes time. The variables are defined as follows:

- $MA_{ij,t}$: real M&A investment flows from country j to i at time t,
- Y: real GDP,

[17] I was also concerned about the possible endogeneity of the real exchange rate, but some diagnostic checks and recent work by Brooks, Edison, Kumar and Slok (2001) show that cross-border M&A activity have no significant effect on exchange rate movements.

- Pop: population,
- D_{ij}: the distance between i and j,
- Tel_{ij}: total gross telephone traffic between i and j,
- $StockMkt$: real stock market capitalization,
- $Credit$: real credit provided to the private sector by banks and near-banks,
- RXR: real exchange rate of i w.r.t. j ($P_i * e/P_j$),
- $V(e)$: volatilty of monthly nominal exchange rate changes for 5 years prior to t,
- Tax_i: the average corporate tax rate in country i at time t,
- $captax$: a binary variable equal to 1 if i and j share a capital tax treaty at time t,
- CU: a binary variable equal to 1 if i and j belong to a customs union (regional trade agreement),
- FT: a binary variable equal to 1 if i and j belong to a free trade agreement (regional trade agreement),
- SA: a binary variable equal to 1 if i and j belong to a service agreement (regional trade agreement),
- $Othert$: a binary variable equal to 1 if i and j belong to other types of regional trade agreements,
- $Skill$: a binary variable equal to 1 if i is more skilled than j and t,
- $Lang$: a binary variable equal to 1 if i and j have a common language,
- $Wealth$: country i's stock market capitalization divided by country j's,
- $Trade_{ij,t}$: real goods trade flow from country j to i at time t,
- β_0: a vector of nuisance coefficients (constant, OECD dummies, and annual dummies), and
- $\varepsilon_{ij,t}$: an error term, which is assumed to be distributed $N(0, \sigma^2)$.

Given the discussion in Section 2, one can summarize the expected signs for the coefficients in (1) as:

Variable	Expected Sign
$ln(Y_iY_j)$	+
$ln\left(\frac{Y_iY_j}{Pop_iPop_j}\right)$	+
$ln(D_{ij})$	+/-
$ln\left(\frac{StCap}{Y}\right)_j$	+
$ln\left(\frac{Credit}{Y}\right)_j$	+
$ln(RXR_{ij})$	-
$ln(V(e_{ij}))$	+/-
$ln(Tax_i)$	+/-
$captax_{ij}$	+/-
CU_{ij}	+/-
FT_{ij}	+/-
SA_{ij}	+/-
$Othert_{ij}$	+/-
$Skill_{ij}$	+/-
$Lang_{ij}$	+
$ln\left(\frac{Tel_{ij}}{\sqrt{Y_iY_j}}\right)$	+
$ln(Wealth_{ij})$	-
$ln(Trade_{ij})$	+/-

Equation (1) could easily be estimated using various panel econometric techniques (e.g., random effects), but this ignores two rather serious complications with the data. The first problem is that for many country-pairs the gross bilateral flows of M&As is zero for a given year. That is to say there are no deals recorded from country j to country i[18]. Unfortunately, the log of zero does not exist, so many observations would be lost by using the log-log specification in (1). Therefore, an appropriate transformation must be made to the dependent variable. The second problem is that the data are censored at zero. In other words, it is quite possible that firms might wish to disinvest from a country (i.e., the gross bilateral M&A flow is in fact negative), but this is not observed in the data and is instead recorded as a zero. Therefore, I account for this problem using an appropriate censoring model.

One obvious choice to deal with the zeroes is the Box and Cox (1964) transformation:

$$g(y,\lambda) = \begin{cases} \frac{y^\lambda - 1}{\lambda} & \text{if } \lambda \neq 0, \\ ln(y) & \text{if } \lambda = 0, \end{cases} \tag{2}$$

[18]This differs from deals being announced in a given year but no value being announced. In this case, the observation is treated as a missing value.

for $y > 0$, where y represents the M&A flow, and λ is a parameter chosen to maximize a given criteria (the right-hand side variables remain in log-form, though). A more general function, which allows for the possibility of negative y's is defined by Bickel and Doksum (1981). Though this function is more appropriate to use given the censoring problem (i.e., possible unobserved negative M&A flows), the negative term drops out of the censoring model considered, so the standard Box-Cox transformation suffices. Next, the censoring problem can be defined simply as:

$$y = \begin{cases} 0 & \text{if } y^* \leq 0, \\ y^* & \text{otherwise,} \end{cases} \tag{3}$$

where y^* is the unobserved "latent" value of M&A flows. It is quite straightforward to derive the likelihood for this problem given (2), (3) and the assumption of normality for the errors in (1). The resulting likelihood is non-linear in λ, which results in some computational difficulties. Therefore, the model is estimated taking λ as a fixed parameter. A simple grid search over a range of λ's is used to choose the λ which yields the highest estimated likelihood of the estimated model. This is initially done for the pooled regression and the λ chosen is then used for the rest of the regressions to be consistent. The derivation of the likelihood function and further discussion of estimation is presented in Appendix B.

The Box-Cox transformation is not the only way to deal with the zero problem. Another method that is explored is to replace $ln(M\&A)$ with $ln(1 + M\&A)$. This method is not perfect, given that adding a one to a small number has much larger effects than when added to a large number, but is also considered as robustness check. Finally, non-censored OLS and panel results are also presented initially for $ln(M\&A)$, the Box-Cox transformation, and $ln(1 + M\&A)$, to have an idea of the effect of using censored data. This is particularly important in this study given that only 20% of the data are uncensored after taking the appropriate transformations.

4 Results

Before proceeding with the estimation results, it is worthwhile to describe briefly how the coefficients should be interpreted. If the specification is $ln(y) = ln(X)\beta$ (or $X\beta$ in case of the dummy variables), as in the non-censored regression, then $\frac{dy}{y} = \beta_i \frac{dx_i}{x_i}$, so the coefficients can be interpreted as elasticities. This does not follow exactly when using the Box-Cox transformation since it is only an approximation of the log function. As it turns out, the coefficients for most of the variables are quite a bit larger in the Tobit models than for the regression using only non-censored data. However, the increase in size from using the Tobit model is not only an artifact of the transformation, since coefficients also increase when using the transformed variables in regressions that ignore censoring but use the zeroes. These coefficients increase as well, but not as much as when using the Tobit specification. This is also true for the $ln(1 + y)$ transformation, though the coefficients are smaller than the Box-Cox transformation. Therefore, the coefficients in the Tobit models should only be interpreted as approximate percentage changes, and should be scaled downwards.

The "optimal" $\bar{\lambda}$ is found to equal 0.0576 by estimating the pooled Tobit regressions. This result was obtained from running the Tobit model over several values of λ, refining the numerical search iteratively until the largest likelihood is obtained. This is a valid procedure since the Box-Cox transformation is an increasing, monotonic function of λ, and the Tobit likelihood has a global maximum. Finally, results for the $ln(1 + M\&A)$ specification are presented in Appendix C for the purpose of clarity.

4.1 Pooled Results

I first examine the results from running regressions with the pooled data that can be found in Tables 6-8. Tables 6 and 7 do not account for censoring, while Tables 8 does. To address the concern that there might be country-pair effects affecting the variance of the shocks, I control for heteroskedasticity by using weights based on country-pairs[19]. I also control for

[19]Breusch-Pagan tests for heteroskedasticity shows that this is a valid concern.

possible time effects by including annual dummies that are not reported (the constant term is also excluded). Five different specifications are considered in the regressions. Specification (1) is the baseline specification. I augment this specification with the telephone call traffic variable in specification (2) to account for possible investment costs, so as to judge whether the distance variable still proxies for some investment costs. Specification (3) includes the wealth variable. This specification is quite important for judging whether stock market depth and private credit really drive the M&A flows, or whether they are simply acting as proxies for the acquisition country's wealth relative to the target country's. Finally, specifications (4) and (5) include the goods trade variable, that tests explicitly whether M&As and trade are complements or substitutes, as well as testing whether the effect of trade agreements disappear. Specification (5) also includes the telephone variable to judge how the trade and distance coefficients are affected.

Overall, the fits of all the regressions are decent, though the R^2 is smaller for the Tobit models[20]. The first fact to note is the positive effect that financially deeper markets in the acquisition countries have on M&A flows. The lagged value of stock market capitalization to GDP in the acquisition country has a positive and significant effect in all three models. Examining column (1) of Tables 6-8, one sees that a 1% increase in this ratio would result in an increase of 0.5% to 17.36% increase in cross-border M&A activity. As discussed above, this 17.36% in Table 8 is an inflated number. However, the $ln(1 + M\&A)$ transformation (see Table 13 in Appendix C) also points to a large elasticity, and 17.36% represents almost a 6 time increase compared to the OLS result of Table 7. Credit provided to the private sector by banks and near-banks also appears to be important in stimulating cross-border flows, though the coefficients are much smaller than the stock market ones, and are not statistically significant for the standard gravity model of Table 6, nor for some of the Tobit specifications. It is also interesting to note that both the stock market and credit coefficients are largest when I control for the possible wealth effect in specification (2). The most probable

[20]Note that the pseudo R^2 is calculated as 1 - LogLikelihood/(LogLikelihood of the Constant only model).

reason for this is that specification (2) drops observations where the target country has zero stock market capitalization due to the log transformation of the wealth variable. With this caveat aside, it would appear that capital provided by stock markets play a relatively more important role than bank credit in financing cross-border M&A deals.

The real exchange rate (RXR) does not appear to have any effect on M&A activity in the pooled results. Coefficients are economically small in all the tables and statistically insignificant. Furthermore, the signs on the coefficients vary across the different specifications. The coefficient for the wealth variable is only significant in the regression run in Table 6 (specification (3)), and its sign is positive, which is opposite to the result found in Klein and Rosengren (1994) and the theory of Froot and Stein (1991). However, the sign is reversed when the sample size is increased in Table 7, and is not statistically significant in the pooled Tobit regressions. Results for nominal exchange rate volatility (V(e)) are ambiguous. The standard regressions in Table 6 show that volatility has a positive and statistical (though not really economic) significant effect on cross-border M&As as has been found in previous work. However, this result does not hold up to increased sample size nor taking account the censoring problem. Therefore, it does not appear that the exchange rate has a large effect on cross-border M&A flows, unlike in the case of goods trade.

Higher tax rates in the target country have rather strong negative effects on inward M&A flows — a 1% increase in the average corporate tax rate will dampen inflows from anywhere between 0.552% to 9.926%, depending on the specification. Again, the 9.926% is a very high upper-bound. However, the strong results are interesting to note and make sense, though one should take them with a grain of salt given that only an average corporate tax rate is used as an explanatory variable. Capital tax treaties appears to play a positive role in cross-border investment flows[21]. This contradicts the results of Blonigen and Davies (2001), and seems to indicate that the potential effects of lower taxes, elimination of double taxation and other benefits of these treaties, might be stronger than the negative effects discussed above.

[21]Similar results were found when using income tax treaties.

However, the results found in this study are not statistically significant, so one cannot arrive at any definitive conclusions.

The other institutional variables considered are the regional trade agreements. Both customs unions and free trade agreements have a negative and significant effect on M&A flows in Table 7 as well as the Tobit estimations, though these results do not follow from the simple OLS. Therefore, the incentives to trade resulting from the treaties have a tendency to decrease the incentive for cross-border investment; e.g., there is no longer the need for "tariff-jumping". However, service agreements and other trade agreements appear to have positive effects on the capital flows. The positive coefficient on the service agreement variable points to the importance of economic integration provided by these agreements, such as possible movements of human capital (e.g., banking services). Summing the coefficients of these four agreements appears, however, to wash out to zero. Finally, these results are robust to the inclusion of actual trade between the two countries as seen in specifications (4) and (5), and the coefficient on the trade variable is positive and significant, which conforms to the stylize fact of complementary between the flows of direct investment and goods found in previous empirical research.

The coefficients for distance, telephone call traffic, real GDP, real GDP per capital, and common language variables all have the expected signs in almost all specifications for the pooled OLS and Tobit regressions. The one exception is in Table 6, where the coefficient on distance actually becomes positive, though insignificant, when trade is included. It is interesting that the distance effect is not wiped out by the telephone call traffic variables as in Portes and Rey (2001). This would imply that there are other investment costs, which are not being picked up by the telephone proxy. This result is robust to including the trade variable as in specification (4). However, both the coefficients on distance and telephone traffic decrease in magnitude when trade is included, though both remain significant. Therefore, the two variables appear to be capturing possible costs to investment, but also pick up the complementarity between trade and M&As when trade is left out of the specification.

Meanwhile, the common language effect is particularly strong. Finally, the coefficients on the skill and OECD variables appear to change when comparing the models taking into account the censored data and the simple linear specification, which do not. In all tables an OECD acquisition country ($OECD_j$) has a positive effect on M&A activity is not a terribly surprising result given that most of these deals involved industrial countries. However, the coefficient on the target OECD variable ($OECD_i$) changes signs and becomes negative in Tables 7 and 8, but is not statistically significant. The same pattern emerges for the human capital variable. According to the pooled OLS results (Table 6), a country will invest in countries which are relatively more skill abundant, but this results is reversed when the censored data are considered (though, this result is not statistically significant for the Tobit models). This change in sign may occur because the expanded data set (compared to the one used to generate the results in Table 6) includes many more developing country, and the skill variable may therefore also be capturing possible effects of lower labour costs. Therefore, this concern and the crude measure of human capital makes me wary of how robust the coefficients for the skill variable are.

4.2 Random Effects Results — A Robustness Check

I also estimate equation (1) using a random effects model to take advantage of having a large panel available, and to check for robustness. As for the pooled regressions, I first estimate the model ignoring the censoring problem and then estimate a random effects Tobit model. A fixed effect regression could also be estimated, but Hausman tests rejected this specification. Furthermore, some of the fixed effects (distance and OECD dummy variables) would be dropped from the regression. The results from the random effects specifications are in Tables 9-11. Time dummy variables and a constant are also included in these regressions, but are not reported as in the pooled regressions.

The results are very similar to those in the pooled regressions, which is a nice robustness check. Some differences can be seen, though. For example, the exchange rate volatility

coefficients for the pooled regression in Table 6 are statistically significant, but this is not the case in the random effects model in Table 9. The sign on the coefficient for the volatility variable also changes when comparing the pooled Tobit regressions in Table 8 with the random effect Tobit results in Table 11. The coefficients are negative for all specifications in the random effects models (i.e., the signs change for specifications (3)-(5)). Furthermore, the negative coefficients are actually statistically significant for the random effects Tobit models. These differing results do not leave me with much confidence regarding the effect of exchange rate volatility on M&A flows, and warrants further research. However, given that the effect of this variable is not the central issue of this study, I leave this for future work. Finally, the coefficients for the stock market capitalization and credit ratios remain positive, large, and significant. This fact and results from the pooled regressions leave me confident that financial deepening does play an important role in cross-border M&A activity.

5 Conclusion

This paper attempts to determine some of the factors underlying gross cross-border M&A flows for the period 1990-1999. A simple gravity model is estimated, controlling for possible bias caused by censored data. Empirical results highlighting the importance of financially deep markets appear to be encouraging. Furthermore, regional trade agreements are also significant driving variables, though the type of trade agreement matters: custom unions and free trade agreements work against cross-border M&A activity, while service agreements have a positive effect. Information, trade and a common language also seem to have a positive impact.

M&A flows are preeminent in the industrial world, but as emerging markets continue to liberalize and foreign firms are allowed to invest in them, these flows should play more important roles in international integration. Furthermore, as developing countries continue to develop financially deeper markets, their firms will also have the opportunity to diversify abroad, and acquiring foreign firms might be one way of doing so. Therefore, the results

in this paper should be seen as encouraging for policy makers who are pursuing such goals. Finally, the usual caveat of missing variables must be made when using a large cross-country panel. I am sure other country-specific variables, such as investment barriers, corruption, political instability or wage data also play an important role in FDI decisions, but collecting these data for a large number of countries over several years was not feasible. Hopefully including OECD dummies help control for these fixed effects. These issues should be considered when interpreting the results in this paper. This caveat aside, I believe that this paper is a promising step in examining the relationship between financial deepening and capital flows and further work should be done exploring the effects of these variables at a deeper level.

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Table 1: World Gross M&A Flows Announced (Current $U.S. billions)

Year	World	OECD w/ OECD	Other w/ Other	OECD w/ Other
1990	140.75	108.32	1.96	30.47
1991	69.49	51.99	1.43	16.07
1992	79.47	49.19	1.88	28.40
1993	91.85	57.23	5.84	28.78
1994	110.53	86.45	3.74	20.33
1995	196.98	156.83	5.29	34.86
1996	209.68	143.79	11.60	54.29
1997	330.61	206.85	20.31	103.45
1998	581.76	444.02	15.37	122.37
1999	1018.63	798.30	9.93	210.39

Table 2: World M&A Deals Announced

Year	World	OECD w/ OECD	Other w/ Other	OECD w/ Other
1990	2452	1930	38	484
1991	2856	2132	86	638
1992	2567	1877	76	614
1993	2769	1904	169	696
1994	3432	2208	208	1016
1995	4205	2805	245	1155
1996	4515	2859	304	1352
1997	4998	3222	347	1429
1998	5835	3789	369	1677
1999	6741	4360	346	2035

Note: 43.70% of daily deals in the data set have values. However, when aggregated across countries 93.30% of the sample have values ≥ 0. Source: Thomson Financial.

Table 3: World Stock Market Capitalization (Current $U.S. billions)

Year	World	OECD	Other
1990	9399.70	8879.00	520.70
1991	11347.46	10536.91	810.55
1992	10932.89	10022.91	909.99
1993	14016.96	12318.41	1698.55
1994	15124.36	13285.65	1838.71
1995	17788.39	15859.49	1928.90
1996	20252.66	17829.61	2423.05
1997	23115.24	20807.66	2307.57
1998	26992.91	25027.42	1965.49
1999	36150.48	33200.65	2949.83

Source: Standard and Poor's *Emerging Market Factbook*.

Table 4: Number of World Bilateral Tax Treaties and Regional Trade Agreements in Effect

Year	Capital Tax Treaty	Income Tax Treaty	Customs Union	Free Trade Agreement	Service Agreement	Other Trade Agreement
1990	415	913	205	245	67	1265
1991	430	957	214	235	66	1267
1992	452	1001	215	272	66	1346
1993	507	1084	215	312	66	1347
1994	561	1182	215	427	170	1532
1995	599	1276	263	549	243	1549
1996	672	1397	278	570	243	1549
1997	722	1476	281	616	244	1549
1998	749	1525	281	645	244	1549
1999	772	1562	281	658	244	1549

Sources: Tax Analysts' *Worldwide Tax Treaty Index* or `http://treaties.tax.org/` and the WTO (`http://www.wto.org/english/trato_e/region_e/region_e.htm`).

Table 5: Countries with M&A Data

Abu Dhabi	Cook Islands	India	Monaco	Spain
Albania	Costa Rica	Indonesia	Mongolia	Sri Lanka
Algeria	Croatia	Iran	Morocco	St Kitts&Nevis
Andorra	Cuba	Ireland-Rep	Mozambique	Sudan
Angola	Cyprus	Isle of Man	Myanmar(Burma)	Surinam
Antigua	Czech Republic	Israel	Namibia	Swaziland
Argentina	Czechoslovakia	Italy	Nepal	Sweden
Armenia	Denmark	Ivory Coast	Neth Antilles	Switzerland
Aruba	Dominica	Jamaica	Netherlands	Syria
Australia	Dominican Rep	Japan	New Zealand	Taiwan
Austria	East Germany	Jersey	Nicaragua	Tajikistan
Azerbaijan	Ecuador	Jordan	Niger	Tanzania
Bahamas	Egypt	Kazakhstan	Nigeria	Thailand
Bahrain	El Salvador	Kenya	North Korea	Togo
Bangladesh	Equator Guinea	Kuwait	Norway	Tonga
Barbados	Eritrea	Kyrgyzstan	Oman	Trinidad&Tobago
Belarus	Estonia	Laos	Pakistan	Tunisia
Belgium	Ethiopia	Latvia	Panama	Turkey
Belize	Fiji	Lebanon	Papua N Guinea	Turkmenistan
Benin	Finland	Lesotho	Paraguay	Uganda
Bermuda	Fr Polynesia	Liberia	Peru	Ukraine
Bhutan	France	Libya	Philippines	United Kingdom
Bolivia	Gabon	Liechtenstein	Poland	United States
Bosnia	Georgia	Lithuania	Portugal	Upper Volta
Botswana	Germany	Luxembourg	Puerto Rico	Uruguay
Brazil	Ghana	Macau	Qatar	Utd Arab Em
Brunei	Gibraltar	Macedonia	Romania	Uzbekistan
Bulgaria	Greece	Madagascar	Russian Fed	Vanuatu
C. African Rep	Greenland	Malawi	Rwanda	Venezuela
Cambodia	Grenada	Malaysia	Saudi Arabia	Vietnam
Cameroon	Guatemala	Maldives	Senegal	Virgin Islands
Canada	Guernsey	Mali	Sierra Leone	Western Somoa
Cape Verde	Guinea	Malta	Singapore	Yemen
Cayman Islands	Guyana	Marshall Is	Slovak Rep	Yugoslavia
Chad	Haiti	Martinque	Slovenia	Zaire
Chile	Honduras	Mauritania	Solomon Is	Zambia
China	Hong Kong	Mauritius	South Africa	Zimbabwe
Colombia	Hungary	Mexico	South Korea	
Congo-Rep	Iceland	Moldova	Soviet Union	

Table 6: Pooled OLS

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	0.449	0.305	0.512	0.361	0.294
	(0.081)***	(0.096)***	(0.086)***	(0.089)***	(0.099)***
$(\text{Credit/Y})_{j,t-1}$	0.064	-0.022	0.143	-0.036	-0.072
	(0.110)	(0.128)	(0.113)	(0.118)	(0.132)
RXR	-0.012	0.008	-0.002	0.012	0.014
	(0.016)	(0.019)	(0.016)	(0.016)	(0.018)
V(e)	0.106	0.168	0.131	0.142	0.196
	(0.061)*	(0.073)**	(0.063)**	(0.065)**	(0.076)**
Tax_i	-0.552	-0.641	-0.566	-0.552	-0.667
	(0.192)***	(0.243)***	(0.199)***	(0.195)***	(0.242)***
Capital Tax Treaty	0.164	0.034	0.159	0.198	0.024
	(0.163)	(0.181)	(0.164)	(0.155)	(0.173)
Customs Union	0.108	-0.631	0.057	-0.011	-0.455
	(0.247)	(0.372)*	(0.247)	(0.268)	(0.356)
Free Trade Agr.	0.194	-0.301	0.143	0.158	-0.213
	(0.203)	(0.268)	(0.207)	(0.217)	(0.268)
Service Agr.	0.495	1.143	0.485	0.485	0.922
	(0.235)**	(0.312)***	(0.238)**	(0.230)**	(0.290)***
Other Trade Agr.	0.597	0.816	0.540	0.574	0.744
	(0.235)**	(0.267)***	(0.253)**	(0.231)**	(0.271)***
Skill	0.388	0.244	0.355	0.308	0.244
	(0.128)***	(0.153)	(0.126)***	(0.130)**	(0.149)
Language	1.037	0.585	1.082	0.913	0.604
	(0.107)***	(0.142)***	(0.110)***	(0.110)***	(0.142)***
Y_iY_j	0.286	0.333	0.282	0.097	0.217
	(0.034)***	(0.040)***	(0.035)***	(0.043)**	(0.064)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	0.039	0.073	-0.016	-0.026	0.024
	(0.071)	(0.097)	(0.078)	(0.073)	(0.098)
Distance	-0.213	-0.077	-0.250	0.016	0.016
	(0.068)***	(0.097)	(0.070)***	(0.082)	(0.104)
Telephone_{ij}		0.270			0.211
		(0.054)***			(0.059)***
Wealth			0.057		
			(0.023)**		
Trade_{ij}				0.285	0.180
				(0.054)***	(0.076)**
OECD_i	0.314	0.260	0.265	0.486	0.349
	(0.158)**	(0.205)	(0.160)*	(0.157)***	(0.199)*
OECD_j	0.732	0.504	0.910	0.699	0.575
	(0.159)***	(0.201)**	(0.180)***	(0.166)***	(0.199)***
Observations	2767	1504	2699	2200	1454
R^2	0.24	0.28	0.24	0.25	0.28

Notes: See text. All variables (except dummies) are in logs. Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Box-Cox Pooled OLS

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	2.595	2.522	2.688	2.106	2.110
	(0.257)***	(0.336)***	(0.338)***	(0.248)***	(0.334)***
$(\text{Credit/Y})_{j,t-1}$	1.590	1.605	1.754	1.332	1.598
	(0.387)***	(0.539)***	(0.403)***	(0.357)***	(0.517)***
RXR	0.013	0.040	0.044	0.030	0.038
	(0.081)	(0.110)	(0.086)	(0.081)	(0.109)
V(e)	-0.122	-0.136	0.055	0.171	0.107
	(0.316)	(0.451)	(0.351)	(0.340)	(0.456)
Tax_i	-2.283	-2.584	-3.217	-1.421	-2.052
	(0.733)***	(1.034)**	(0.870)***	(0.701)**	(0.991)**
Capital Tax Treaty	1.398	1.768	1.376	0.960	1.712
	(1.070)	(1.358)	(1.073)	(1.038)	(1.342)
Customs Union	-2.953	-5.333	-2.937	-4.472	-5.367
	(1.501)**	(1.806)***	(1.537)*	(1.589)***	(1.828)***
Free Trade Agr.	-1.268	-3.630	-1.283	-0.874	-3.252
	(1.378)	(1.678)**	(1.403)	(1.420)	(1.677)*
Service Agr.	6.303	8.392	6.575	7.331	8.385
	(1.519)***	(1.942)***	(1.534)***	(1.579)***	(1.921)***
Other Trade Agr.	0.845	2.083	0.177	1.335	2.067
	(0.941)	(1.355)	(0.971)	(0.949)	(1.386)
Skill	-0.885	-2.016	-0.787	-1.174	-1.913
	(0.645)	(0.899)**	(0.662)	(0.640)*	(0.907)**
Language	7.200	5.041	8.099	6.135	4.811
	(0.729)***	(0.921)***	(0.779)***	(0.712)***	(0.916)***
Y_iY_j	2.840	3.106	2.900	1.583	2.147
	(0.155)***	(0.205)***	(0.160)***	(0.197)***	(0.289)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	1.329	1.585	1.070	1.157	1.443
	(0.294)***	(0.460)***	(0.325)***	(0.318)***	(0.449)***
Distance	-4.209	-3.630	-4.212	-2.803	-2.595
	(0.476)***	(0.649)***	(0.504)***	(0.500)***	(0.689)***
Telephone_{ij}		1.605			1.271
		(0.214)***			(0.196)***
Wealth			-0.013		
			(0.117)		
Trade_{ij}				1.758	1.432
				(0.202)***	(0.285)***
OECD_i	-0.067	-0.481	-0.180	0.490	-0.678
	(0.743)	(1.108)	(0.792)	(0.758)	(1.102)
OECD_j	2.682	1.633	3.241	2.080	1.179
	(0.716)***	(0.991)*	(0.836)***	(0.710)***	(0.983)
Observations	13434	6298	12476	10962	6066
R^2	0.30	0.34	0.31	0.32	0.34
$\bar{\lambda}$	0.0576	0.0576	0.0576	0.0576	0.0576

Notes: See text. All variables (except dummies) are in logs. Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Box-Cox Pooled Tobit

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	17.359	15.288	17.720	14.506	12.793
	(1.577)***	(1.945)***	(1.688)***	(1.620)***	(1.930)***
$(\text{Credit/Y})_{j,t-1}$	7.380	3.440	8.472	3.113	2.060
	(2.494)***	(2.834)	(2.648)***	(2.213)	(2.500)
RXR	-0.144	0.031	-0.062	0.254	0.124
	(0.310)	(0.373)	(0.316)	(0.313)	(0.365)
V(e)	-0.591	-1.067	0.684	1.072	0.188
	(1.220)	(1.508)	(1.284)	(1.375)	(1.522)
Tax_i	-7.267	-7.499	-9.926	-2.530	-4.475
	(2.844)**	(3.594)**	(3.135)***	(2.841)	(3.462)
Capital Tax Treaty	2.802	3.517	2.532	1.632	4.188
	(3.259)	(3.780)	(3.185)	(3.083)	(3.645)
Customs Union	-12.392	-14.915	-11.881	-17.556	-15.696
	(4.921)**	(5.798)**	(4.858)**	(5.362)***	(5.881)***
Free Trade Agr.	-10.898	-17.612	-10.919	-8.709	-15.426
	(5.167)**	(5.531)***	(5.190)**	(5.224)*	(5.529)***
Service Agr.	10.464	11.630	11.317	11.232	11.304
	(4.739)**	(5.710)**	(4.664)**	(5.080)**	(5.717)**
Other Trade Agr.	12.248	19.879	8.276	12.406	17.376
	(4.715)***	(5.506)***	(4.595)*	(4.568)***	(5.252)***
Skill	1.368	-2.724	1.462	-1.335	-3.577
	(2.539)	(3.154)	(2.512)	(2.476)	(3.112)
Language	22.835	12.004	24.934	18.075	11.573
	(2.460)***	(2.954)***	(2.545)***	(2.394)***	(2.941)***
Y_iY_j	11.402	10.533	11.037	3.876	4.827
	(0.551)***	(0.711)***	(0.582)***	(0.999)***	(1.235)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	5.641	6.025	4.250	4.054	4.944
	(1.498)***	(2.113)***	(1.671)**	(1.675)**	(1.931)**
Distance	-19.755	-12.935	-19.709	-11.116	-7.376
	(1.779)***	(2.255)***	(1.773)***	(2.047)***	(2.370)***
Telephone_{ij}		6.970			4.719
		(1.135)***			(0.963)***
Wealth			0.330		
			(0.471)		
Trade_{ij}				10.939	8.583
				(1.268)***	(1.455)***
OECD_i	-4.080	-2.886	-5.097	-1.844	-4.434
	(3.136)	(4.064)	(3.143)	(3.201)	(3.903)
OECD_j	19.376	16.650	21.145	18.404	15.038
	(3.424)***	(3.976)***	(3.875)***	(3.399)***	(3.890)***
Observations	13434	6298	12476	10962	6066
Log-Likelihood	-17675.82	-9304.72	-17092.01	-13909.10	-8946.05
Constant LogL	-19912.86	-10545.33	-19268.30	-15889.29	-10186.23
pseudo R^2	0.11	0.12	0.11	0.12	0.12
$\bar{\lambda}$	0.0576	0.0576	0.0576	0.0576	0.0576

Notes: See text. All variables (except dummies) are in logs. Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: Random Effects OLS

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	0.453	0.321	0.517	0.391	0.312
	(0.077)***	(0.099)***	(0.081)***	(0.086)***	(0.101)***
$(\text{Credit/Y})_{j,t-1}$	0.005	-0.040	0.046	-0.060	-0.098
	(0.104)	(0.129)	(0.107)	(0.117)	(0.132)
RXR	-0.016	0.003	-0.008	0.005	0.007
	(0.017)	(0.021)	(0.017)	(0.018)	(0.021)
V(e)	0.078	0.131	0.095	0.069	0.131
	(0.061)	(0.079)*	(0.062)	(0.069)	(0.082)
Tax_i	-0.481	-0.580	-0.503	-0.519	-0.601
	(0.177)***	(0.237)**	(0.185)***	(0.194)***	(0.242)**
Capital Tax Treaty	0.158	0.151	0.153	0.246	0.136
	(0.139)	(0.180)	(0.142)	(0.150)*	(0.181)
Customs Union	0.012	-0.744	-0.017	-0.066	-0.584
	(0.246)	(0.331)**	(0.248)	(0.272)	(0.343)*
Free Trade Agr.	0.077	-0.477	0.040	0.076	-0.364
	(0.198)	(0.258)*	(0.201)	(0.214)	(0.263)
Service Agr.	0.350	1.034	0.310	0.377	0.832
	(0.218)	(0.289)***	(0.219)	(0.242)	(0.302)***
Other Trade Agr.	0.520	0.658	0.457	0.483	0.638
	(0.237)**	(0.291)**	(0.248)*	(0.258)*	(0.296)**
Skill	0.262	0.166	0.230	0.256	0.183
	(0.115)**	(0.153)	(0.118)*	(0.123)**	(0.153)
Language	0.957	0.673	1.000	0.894	0.687
	(0.109)***	(0.149)***	(0.113)***	(0.117)***	(0.150)***
Y_iY_j	0.234	0.285	0.230	0.095	0.183
	(0.029)***	(0.039)***	(0.031)***	(0.043)**	(0.059)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	-0.020	0.020	-0.063	-0.065	-0.021
	(0.064)	(0.092)	(0.068)	(0.077)	(0.096)
Distance	-0.239	-0.197	-0.275	-0.061	-0.097
	(0.071)***	(0.098)**	(0.074)***	(0.084)	(0.106)
Telephone_{ij}		0.186			0.145
		(0.043)***			(0.048)***
Wealth			0.044		
			(0.023)*		
Trade_{ij}				0.208	0.161
				(0.048)***	(0.071)**
OECD_i	0.333	0.268	0.270	0.459	0.336
	(0.155)**	(0.202)	(0.161)*	(0.168)***	(0.205)
OECD_j	0.792	0.630	0.939	0.744	0.720
	(0.160)***	(0.215)***	(0.180)***	(0.177)***	(0.217)***
Observations	2767	1504	2699	2200	1454
R^2 Overall	0.24	0.27	0.24	0.25	0.27
R^2 Between	0.19	0.25	0.19	0.21	0.25
R^2 Within	0.07	0.05	0.07	0.05	0.05

Notes: See text. All variables (except dummies) are in logs. Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: Box-Cox Random Effects OLS

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	1.878	1.988	2.017	1.390	1.658
	(0.204)***	(0.294)***	(0.242)***	(0.221)***	(0.302)***
$(\text{Credit/Y})_{j,t-1}$	1.414	1.347	1.496	1.289	1.095
	(0.279)***	(0.418)***	(0.291)***	(0.295)***	(0.422)***
RXR	-0.053	-0.034	-0.002	0.008	0.001
	(0.084)	(0.107)	(0.087)	(0.084)	(0.107)
V(e)	-0.294	-0.703	-0.124	-0.523	-0.695
	(0.226)	(0.340)**	(0.249)	(0.255)**	(0.350)**
Tax_i	-0.989	-0.964	-2.208	-0.419	-0.530
	(0.593)*	(0.873)	(0.728)***	(0.641)	(0.882)
Capital Tax Treaty	2.178	1.508	2.172	1.451	1.339
	(0.774)***	(1.055)	(0.801)***	(0.805)*	(1.054)
Customs Union	-1.435	-2.677	-1.462	-2.767	-3.103
	(1.043)	(1.349)**	(1.074)	(1.143)**	(1.410)**
Free Trade Agr.	-0.003	-1.011	-0.122	0.249	-1.142
	(0.952)	(1.259)	(0.976)	(1.026)	(1.283)
Service Agr.	2.726	3.169	2.867	3.467	3.404
	(0.995)***	(1.324)**	(1.028)***	(1.083)***	(1.368)**
Other Trade Agr.	0.742	2.167	0.219	1.509	2.073
	(1.026)	(1.305)*	(1.076)	(1.044)	(1.326)
Skill	-1.520	-2.401	-1.579	-1.579	-2.302
	(0.561)***	(0.755)***	(0.579)***	(0.568)***	(0.751)***
Language	7.224	5.480	7.976	6.140	5.052
	(0.626)***	(0.819)***	(0.653)***	(0.629)***	(0.815)***
Y_iY_j	2.463	2.853	2.527	1.550	1.943
	(0.146)***	(0.192)***	(0.151)***	(0.178)***	(0.247)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	-0.397	1.284	-0.596	0.591	1.471
	(0.270)	(0.415)***	(0.282)**	(0.306)*	(0.426)***
Distance	-3.829	-3.788	-3.865	-2.618	-2.705
	(0.371)***	(0.506)***	(0.384)***	(0.396)***	(0.534)***
Telephone_{ij}		1.050			0.818
		(0.167)***			(0.176)***
Wealth			0.009		
			(0.102)		
Trade_{ij}				1.664	1.450
				(0.160)***	(0.233)***
OECD_i	3.118	0.616	2.830	1.403	-0.166
	(0.738)***	(1.000)	(0.797)***	(0.767)*	(1.005)
OECD_j	5.788	2.477	6.169	3.100	1.530
	(0.727)***	(0.955)***	(0.801)***	(0.752)***	(0.959)
Observations	13434	6298	12476	10962	6066
R^2 Overall	0.29	0.33	0.30	0.31	0.34
R^2 Between	0.41	0.43	0.42	0.44	0.45
R^2 Within	0.02	0.03	0.02	0.02	0.03
$\bar{\lambda}$	0.0576	0.0576	0.0576	0.0576	0.0576

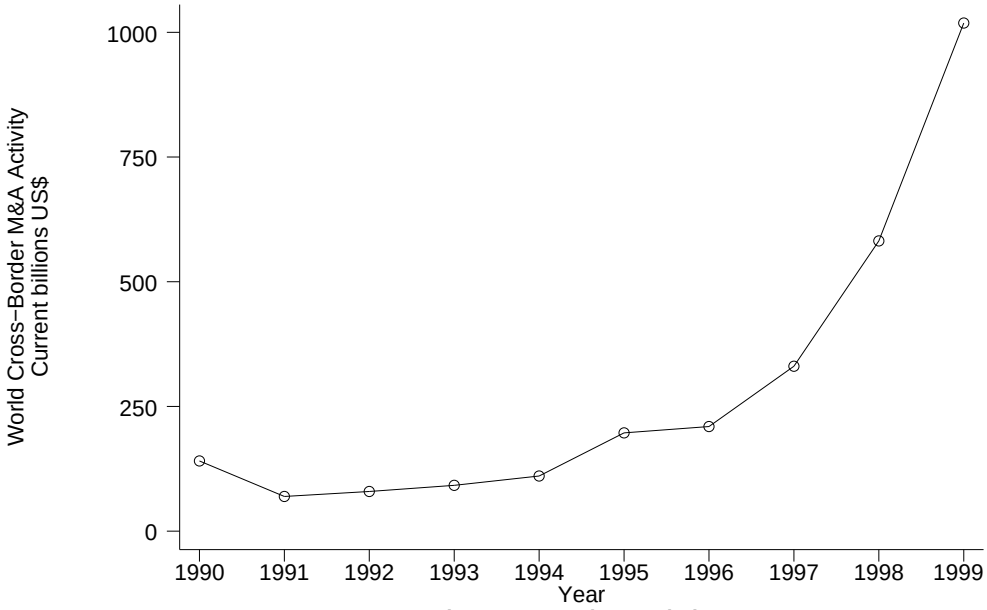
Notes: See text. All variables (except dummies) are in logs. Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11: Box-Cox Random Effects Tobit

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	15.045	14.427	15.465	13.261	12.210
	(1.223)***	(1.575)***	(1.327)***	(1.348)***	(1.565)***
$(\text{Credit/Y})_{j,t-1}$	9.033	3.078	9.480	3.993	1.216
	(1.703)***	(1.969)	(1.736)***	(1.762)**	(1.910)
RXR	-0.185	-0.056	-0.070	0.276	0.182
	(0.322)	(0.416)	(0.323)	(0.346)	(0.398)
V(e)	-1.515	-2.951	-0.567	-2.104	-2.844
	(1.042)	(1.424)**	(1.086)	(1.178)*	(1.433)**
Tax_i	-3.786	-2.587	-7.613	0.258	-0.170
	(2.692)	(3.735)	(3.072)**	(2.926)	(3.505)
Capital Tax Treaty	4.851	3.285	4.138	3.351	4.084
	(2.864)*	(3.541)	(2.855)	(3.092)	(3.548)
Customs Union	-6.013	-8.662	-5.772	-11.507	-10.581
	(4.335)	(5.084)*	(4.267)	(4.763)**	(5.316)**
Free Trade Agr.	-4.012	-6.363	-4.269	-4.831	-6.573
	(3.743)	(4.607)	(3.726)	(4.164)	(4.558)
Service Agr.	1.645	1.587	2.375	2.956	2.062
	(3.925)	(4.724)	(3.866)	(4.286)	(4.869)
Other Trade Agr.	13.895	20.289	10.002	14.563	19.910
	(4.442)***	(5.337)***	(4.538)**	(4.662)***	(5.817)***
Skill	-2.409	-5.039	-2.594	-3.774	-5.127
	(2.313)	(2.837)*	(2.296)	(2.382)	(2.788)*
Language	22.767	15.462	24.750	19.070	14.293
	(2.374)***	(2.983)***	(2.443)***	(2.467)***	(3.020)***
Y_iY_j	9.058	10.121	8.957	4.013	4.658
	(0.577)***	(0.807)***	(0.594)***	(0.807)***	(1.054)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	-0.995	4.795	-1.755	3.055	5.006
	(1.193)	(1.705)***	(1.243)	(1.395)**	(1.760)***
Distance	-17.903	-13.741	-17.823	-10.879	-7.540
	(1.508)***	(1.923)***	(1.520)***	(1.672)***	(1.993)***
Telephone_{ij}		5.229			3.408
		(0.768)***			(0.783)***
Wealth			0.266		
			(0.412)		
Trade_{ij}				9.276	8.467
				(0.858)***	(1.157)***
OECD_i	5.215	-3.403	2.774	-2.080	-6.019
	(3.145)*	(3.773)	(3.325)	(3.130)	(3.751)
OECD_j	25.965	18.368	26.512	17.922	15.012
	(3.029)***	(3.796)***	(3.273)***	(3.286)***	(3.953)***
Observations	13434	6298	12476	10962	6066
Log-Likelihood	-16932.83	-8961.57	-16368.98	-13404.68	-8636.94
$\bar{\lambda}$	0.0576	0.0576	0.0576	0.0576	0.0576

Notes: See text. All variables (except dummies) are in logs. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: World Cross-Border M&A Activity



Source: Thomson Financial

A Electronic Data Sources

- CIA Factbook: `http://www.cia.gov/cia/publications/factbook/`
- Languages: `http://www.eiti.com/country_language_lookup.cfm`
- Tax Treaties: `http://treaties.tax.org/` (30-day free trial offer)
- Trade Agreements: `http://www.wto.org/english/trato_e/region_e/region_e.htm`
- Human Capital: `http://www.cid.harvard.edu/ciddata/ciddata.html`

B Box-Cox Tobit Model

B.1 Simple Specification

Let y denote M&A flows and X be the matrix of regressors described in Section 3.2, then (1) can be written as:

$$ln(y) = X'\beta + \varepsilon, \tag{B.1}$$

where time and group notation have been dropped for convenience and $\varepsilon \sim N(0, \sigma^2)$. As discussed in the text, two problems must be dealt with: (i) the log of zero does not exists, and (ii) y is censored at zero. The following model outlines how this can be dealt with.

B.2 Model

First, the censoring will the take following form:

$$y_n = \begin{cases} 0 & \text{if } y_n^* \leq 0, \\ y_n^* & \text{otherwise,} \end{cases} \tag{B.2}$$

where y^* is the latent variable. Second, rather than estimating (B.1) the following model is what really should be estimated:

$$g(y_n^*, \lambda) = x_n'\beta + \varepsilon_n, \tag{B.3}$$

where ε_n has the same distributional assumptions as in (B.1) and $g(y^*, \lambda)$ is the Box-Cox transformation:

$$g(y_n^*, \lambda) = \begin{cases} \frac{{y_n^*}^\lambda - 1}{\lambda} & \text{if } \lambda \neq 0, \\ ln(y_n^*) & \text{if } \lambda = 0. \end{cases} \tag{B.4}$$

Given the censoring problem and that λ is unknown, (B.3) must be estimating using maximum likelihood estimation. Now, following Ruud (2000)[22] and using his notation, I find the following densities given that $g(\cdot)$ is an increasing, monotonic function and the assumptions made above about ε:

$$f_y(c|x_n') = \begin{cases} 0 & \text{if } c < 0, \\ \Phi\left(\frac{\frac{-1}{\lambda} - x_n'\beta}{\sigma}\right) & \text{if } c = 0, \\ \frac{c^{\lambda-1}}{\sigma}\phi\left(\frac{\frac{c^{\lambda}-1}{\lambda} - x_n'\beta}{\sigma}\right) & \text{if } c > 0. \end{cases} \tag{B.5}$$

Finally, given (B.5) the expected log-likelihood function is:

$$E_N\left\{\mathbf{1}\{y_n = 0\} log\left[\Phi\left(\frac{\frac{-1}{\lambda} - x_n'\beta}{\sigma}\right)\right] + (1 - \mathbf{1}\{y_n = 0\}) log\left[\phi\left(\frac{\frac{y_n^{\lambda}-1}{\lambda} - x_n'\beta}{\sigma}\right)\right]\right\}, \tag{B.6}$$

where $\mathbf{1}$ is the indicator function. Ideally, one would like to optimize (B.6) over λ, β and σ, but this is not feasible computationally. Therefore, a simple change of variable is made to facilitate optimization. Specifically, let $z_n^*(\bar{\lambda}) \equiv g(y_n^*, \bar{\lambda}) + \frac{1}{\bar{\lambda}}$, where $\bar{\lambda}$ is a fixed λ, whose value is chosen "optimally" by a grid search over a range of values of λ. Given this substitution, and following the same logic as for y_n, (B.6) can be re-written as:

$$E_N\left\{\mathbf{1}\{z_n = 0\} log\left[\Phi\left(\frac{-x_n'\beta}{\sigma}\right)\right] + (1 - \mathbf{1}\{z_n = 0\}) log\left[\phi\left(\frac{z_n - x_n'\beta}{\sigma}\right)\right]\right\}, \tag{B.7}$$

which is simply the Tobit model (Tobin (1958)). The case of $ln(y^* + 1)$ follows immediately by setting $g(\cdot)$ equal to this expression.

The Tobit model can incorporate heteroskedasticity and can be applied to panel data as well. In particular, a random effects model can be extended from above. However, estimation of this model requires simulation given that the likelihood function for each group is expressed as an integral. Fortunately, Stata 7.0 has a routine to estimate this model using the Gauss-Hermite quadrature approximation method. This method is susceptible to numerical inaccuracy and depends on the number of quadrature points used in the approximation. However, the estimations in this study appear to be fairly robust.

[22] pp. 791–801.

C ln(1+M&A) Tables

Table 12: ln(1+M&A) Pooled OLS

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	0.947	0.922	0.980	0.769	0.772
	(0.094)***	(0.123)***	(0.123)***	(0.090)***	(0.122)***
$(\text{Credit/Y})_{j,t-1}$	0.577	0.584	0.637	0.484	0.581
	(0.141)***	(0.196)***	(0.147)***	(0.130)***	(0.189)***
RXR	0.005	0.016	0.017	0.011	0.015
	(0.030)	(0.040)	(0.031)	(0.030)	(0.040)
V(e)	-0.045	-0.051	0.019	0.061	0.038
	(0.115)	(0.165)	(0.128)	(0.124)	(0.167)
Tax_i	-0.831	-0.949	-1.172	-0.519	-0.754
	(0.267)***	(0.378)**	(0.317)***	(0.256)**	(0.362)**
Capital Tax Treaty	0.508	0.652	0.499	0.349	0.631
	(0.389)	(0.496)	(0.390)	(0.378)	(0.491)
Customs Union	-1.075	-1.933	-1.070	-1.632	-1.951
	(0.548)**	(0.658)***	(0.561)*	(0.580)***	(0.667)***
Free Trade Agr.	-0.476	-1.353	-0.482	-0.332	-1.210
	(0.503)	(0.612)**	(0.511)	(0.518)	(0.612)**
Service Agr.	2.290	3.036	2.389	2.672	3.041
	(0.553)***	(0.706)***	(0.558)***	(0.575)***	(0.700)***
Other Trade Agr.	0.313	0.766	0.068	0.490	0.760
	(0.343)	(0.495)	(0.355)	(0.346)	(0.506)
Skill	-0.323	-0.735	-0.288	-0.429	-0.698
	(0.235)	(0.328)**	(0.241)	(0.233)*	(0.331)**
Language	2.615	1.831	2.943	2.230	1.749
	(0.265)***	(0.336)***	(0.284)***	(0.259)***	(0.334)***
Y_iY_j	1.033	1.131	1.054	0.575	0.781
	(0.056)***	(0.075)***	(0.058)***	(0.072)***	(0.105)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	0.484	0.576	0.389	0.421	0.525
	(0.107)***	(0.168)***	(0.119)***	(0.116)***	(0.164)***
Distance	-1.537	-1.326	-1.538	-1.024	-0.949
	(0.174)***	(0.237)***	(0.184)***	(0.183)***	(0.252)***
Telephone_{ij}		0.585			0.463
		(0.078)***			(0.071)***
Wealth			-0.005		
			(0.043)		
Trade_{ij}				0.641	0.523
				(0.074)***	(0.104)***
OECD_i	-0.025	-0.173	-0.066	0.178	-0.245
	(0.271)	(0.405)	(0.289)	(0.277)	(0.403)
OECD_j	0.982	0.601	1.185	0.761	0.435
	(0.261)***	(0.362)*	(0.305)***	(0.259)***	(0.359)
Observations	13434	6298	12476	10962	6066
R^2	0.30	0.34	0.31	0.32	0.34

Notes: See text. All variables (except dummies) are in logs. Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 13: ln(1+M&A) Pooled Tobit

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	6.337	5.587	6.468	5.298	4.677
	(0.576)***	(0.711)***	(0.616)***	(0.592)***	(0.705)***
$(\text{Credit/Y})_{j,t-1}$	2.687	1.251	3.085	1.133	0.747
	(0.911)***	(1.035)	(0.966)***	(0.808)	(0.913)
RXR	-0.051	0.013	-0.022	0.094	0.047
	(0.113)	(0.136)	(0.115)	(0.115)	(0.133)
V(e)	-0.218	-0.393	0.247	0.388	0.067
	(0.446)	(0.552)	(0.469)	(0.502)	(0.556)
Tax_i	-2.649	-2.751	-3.619	-0.926	-1.647
	(1.039)**	(1.313)**	(1.145)***	(1.038)	(1.265)
Capital Tax Treaty	1.019	1.295	0.918	0.593	1.540
	(1.191)	(1.384)	(1.164)	(1.128)	(1.334)
Customs Union	-4.521	-5.430	-4.335	-6.411	-5.723
	(1.801)**	(2.124)**	(1.778)**	(1.964)***	(2.155)***
Free Trade Agr.	-4.004	-6.483	-4.012	-3.206	-5.677
	(1.890)**	(2.026)***	(1.899)**	(1.913)*	(2.024)***
Service Agr.	3.806	4.213	4.117	4.098	4.103
	(1.735)**	(2.094)**	(1.708)**	(1.861)**	(2.095)*
Other Trade Agr.	4.479	7.269	3.027	4.535	6.354
	(1.722)***	(2.012)***	(1.679)*	(1.669)***	(1.920)***
Skill	0.496	-0.995	0.530	-0.489	-1.305
	(0.927)	(1.153)	(0.917)	(0.905)	(1.138)
Language	8.318	4.372	9.085	6.586	4.216
	(0.899)***	(1.080)***	(0.930)***	(0.875)***	(1.075)***
Y_iY_j	4.156	3.842	4.022	1.411	1.759
	(0.202)***	(0.260)***	(0.213)***	(0.365)***	(0.451)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	2.057	2.196	1.549	1.478	1.802
	(0.547)***	(0.772)***	(0.610)**	(0.612)**	(0.705)**
Distance	-7.213	-4.727	-7.196	-4.062	-2.698
	(0.650)***	(0.825)***	(0.648)***	(0.748)***	(0.867)***
Telephone_{ij}		2.544			1.721
		(0.415)***			(0.352)***
Wealth			0.120		
			(0.172)		
Trade_{ij}				3.993	3.134
				(0.463)***	(0.532)***
OECD_i	-1.490	-1.050	-1.861	-0.673	-1.615
	(1.146)	(1.485)	(1.148)	(1.170)	(1.427)
OECD_j	7.083	6.092	7.728	6.725	5.503
	(1.251)***	(1.453)***	(1.415)***	(1.242)***	(1.422)***
Observations	13434	6298	12476	10962	6066
Log-Likelihood	-14890.09	-7791.00	-14374.76	-11694.50	-7482.61
Constant LogL	-17122.32	-9029.35	-16546.23	-13671.31	-8720.85
pseudo R^2	0.13	0.14	0.13	0.14	0.14

Notes: See text. All variables (except dummies) are in logs. Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 14: ln(1+M&A) Random Effects OLS

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	0.686	0.727	0.737	0.509	0.607
	(0.074)***	(0.107)***	(0.088)***	(0.081)***	(0.110)***
$(\text{Credit/Y})_{j,t-1}$	0.515	0.489	0.545	0.468	0.397
	(0.102)***	(0.153)***	(0.106)***	(0.108)***	(0.154)**
RXR	-0.018	-0.011	0.000	0.004	0.001
	(0.031)	(0.039)	(0.032)	(0.031)	(0.039)
V(e)	-0.110	-0.261	-0.048	-0.194	-0.258
	(0.082)	(0.124)**	(0.091)	(0.093)**	(0.128)**
Tax_i	-0.358	-0.356	-0.803	-0.152	-0.197
	(0.217)*	(0.319)	(0.266)***	(0.234)	(0.322)
Capital Tax Treaty	0.789	0.547	0.786	0.525	0.485
	(0.283)***	(0.385)	(0.292)***	(0.294)*	(0.385)
Customs Union	-0.527	-0.974	-0.535	-1.013	-1.132
	(0.381)	(0.493)**	(0.392)	(0.417)**	(0.515)**
Free Trade Agr.	-0.022	-0.400	-0.066	0.074	-0.440
	(0.348)	(0.460)	(0.356)	(0.375)	(0.469)
Service Agr.	0.989	1.144	1.038	1.266	1.234
	(0.364)***	(0.484)**	(0.375)***	(0.395)***	(0.500)**
Other Trade Agr.	0.276	0.798	0.085	0.555	0.762
	(0.374)	(0.477)*	(0.393)	(0.381)	(0.484)
Skill	-0.553	-0.876	-0.574	-0.576	-0.839
	(0.205)***	(0.276)***	(0.211)***	(0.207)***	(0.275)***
Language	2.624	1.993	2.898	2.233	1.838
	(0.228)***	(0.299)***	(0.238)***	(0.229)***	(0.298)***
Y_iY_j	0.897	1.040	0.920	0.564	0.708
	(0.053)***	(0.070)***	(0.055)***	(0.065)***	(0.090)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	-0.146	0.466	-0.219	0.215	0.535
	(0.099)	(0.152)***	(0.103)**	(0.112)*	(0.156)***
Distance	-1.400	-1.385	-1.413	-0.957	-0.990
	(0.135)***	(0.185)***	(0.140)***	(0.144)***	(0.195)***
Telephone_{ij}		0.383			0.298
		(0.061)***			(0.064)***
Wealth			0.003		
			(0.037)		
Trade_{ij}				0.607	0.530
				(0.059)***	(0.085)***
OECD_i	1.137	0.228	1.032	0.510	-0.059
	(0.269)***	(0.365)	(0.291)***	(0.280)*	(0.367)
OECD_j	2.115	0.911	2.254	1.133	0.564
	(0.265)***	(0.349)***	(0.292)***	(0.274)***	(0.351)
Observations	13434	6298	12476	10962	6066
R^2 Overall	0.29	0.33	0.30	0.31	0.34
R^2 Between	0.41	0.43	0.41	0.44	0.44
R^2 Within	0.02	0.03	0.02	0.02	0.03

Notes: See text. All variables (except dummies) are in logs. Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 15: ln(1+M&A) Random Effects Tobit

	(1)	(2)	(3)	(4)	(5)
$(\text{StockMkt/Y})_{j,t-1}$	5.490	5.274	5.638	4.848	4.463
	(0.446)***	(0.576)***	(0.483)***	(0.493)***	(0.572)***
$(\text{Credit/Y})_{j,t-1}$	3.296	1.126	3.458	1.453	0.434
	(0.622)***	(0.719)	(0.634)***	(0.643)**	(0.697)
RXR	-0.066	-0.020	-0.024	0.101	0.069
	(0.118)	(0.152)	(0.118)	(0.126)	(0.146)
V(e)	-0.558	-1.086	-0.215	-0.775	-1.049
	(0.380)	(0.521)**	(0.397)	(0.430)*	(0.523)**
Tax_i	-1.378	-0.952	-2.764	0.092	-0.071
	(0.982)	(1.366)	(1.119)**	(1.068)	(1.280)
Capital Tax Treaty	1.760	1.207	1.511	1.238	1.521
	(1.048)*	(1.296)	(1.045)	(1.135)	(1.296)
Customs Union	-2.208	-3.155	-2.117	-4.199	-3.865
	(1.581)	(1.858)*	(1.556)	(1.739)**	(1.941)**
Free Trade Agr.	-1.497	-2.375	-1.584	-1.810	-2.443
	(1.369)	(1.689)	(1.362)	(1.520)	(1.668)
Service Agr.	0.595	0.553	0.862	1.072	0.754
	(1.432)	(1.727)	(1.411)	(1.566)	(1.779)
Other Trade Agr.	5.090	7.444	3.674	5.332	7.288
	(1.622)***	(1.951)***	(1.656)**	(1.704)***	(2.129)***
Skill	-0.869	-1.845	-0.941	-1.375	-1.883
	(0.844)	(1.036)*	(0.838)	(0.871)	(1.018)*
Language	8.287	5.655	9.010	6.963	5.219
	(0.869)***	(1.088)***	(0.894)***	(0.902)***	(1.104)***
Y_iY_j	3.298	3.702	3.260	1.465	1.701
	(0.211)***	(0.292)***	(0.217)***	(0.295)***	(0.385)***
$(\text{Y}_i\text{Y}_j)/(\text{Pop}_i\text{Pop}_j)$	-0.363	1.746	-0.641	1.112	1.824
	(0.435)	(0.624)***	(0.453)	(0.510)**	(0.644)***
Distance	-6.543	-5.019	-6.509	-3.974	-2.758
	(0.551)***	(0.702)***	(0.555)***	(0.611)***	(0.728)***
Telephone_{ij}		1.913			1.244
		(0.280)***			(0.286)***
Wealth			0.094		
			(0.150)		
Trade_{ij}				3.386	3.090
				(0.313)***	(0.423)***
OECD_i	1.893	-1.230	1.019	-0.762	-2.200
	(1.148)*	(1.379)	(1.212)	(1.144)	(1.371)
OECD_j	9.481	6.740	9.672	6.566	5.500
	(1.106)***	(1.386)***	(1.193)***	(1.201)***	(1.447)***
Observations	13434	6298	12476	10962	6066
Log-Likelihood	-14146.82	-7446.92	-13651.40	-11189.27	-7172.63

Notes: See text. All variables (except dummies) are in logs. Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%