

The Comovement of Returns and Investment Within the Multinational Firm

Mihir A. Desai
Harvard University and NBER

C. Fritz Foley
University of Michigan

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ABSTRACT

This paper presents evidence on the comovement of returns and investment within U.S. multinational firms. These firms constitute significant fractions of economic output and investment in most large economies, suggesting that they could create significant economic linkages. Rates of return and investment rates of operations of multinational firms located in different countries are highly correlated across countries. Firm-level regressions demonstrate that rates of return and investment rates of affiliates are highly correlated with firm activity in the U.S. and in other locations outside of the affiliate's host country after controlling for country and industry factors. The evidence on these correlations and the importance of multinationals to local economies suggests that global firms may be an important channel for transmitting economic shocks.

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Mihir A. Desai
Harvard Business School
Morgan 363
Soldiers Field
Boston, MA 02163
mdesai@hbs.edu

C. Fritz Foley
University of Michigan
Business School
701 Tappan Street
Ann Arbor, MI 48109-1234
ffoley@umich.edu

1. Introduction

To what degree do increasing levels of financial integration amongst the world's major economies lead to changes in the synchronization of business cycles? In particular, what role could the dramatic increases in foreign direct investment play in explaining the comovement of aggregate measures of economic activity? This paper sheds light on these questions by providing facts about the scope of foreign direct investment in different countries and the correlations in investment and returns of distinct U.S. multinational operations around the world.

The relevance of a world factor in explaining movements in economic aggregates appears to be uncontroversial. What is less well understood is what factors might account for the high degrees of correlation in macroeconomic variables. High levels of financial and trade integration, as pointed out by Frankel and Rose (1998) and Heathcote and Perri (2002), can theoretically lead to either increasingly idiosyncratic or correlated movements in economic aggregates. The link between financial and trade integration and the synchronization of business cycles remains an open question with somewhat contradictory evidence emerging from econometric analysis of aggregate data.

Rather than filter the economy-wide data in a distinctive way, we approach this question with micro data on the behavior of U.S. multinational and emphasize the role that the internal markets of these firms may play in creating global linkages. In order to explore this channel, we ask a series of related question about the patterns of U.S. multinational activity around the world. First, are the activities of multinational firms sufficiently important to local economies to create these linkages? Second, is there any evidence that aggregate measures of multinational activity comove in a manner that is distinctive from the behavior of local firms around the world? Finally, is there evidence that activities of U.S. multinationals in the U.S. or in other host countries help explain affiliate investment plans and rates of returns after controlling for conditions in the affiliate host country and industry? Put differently, is multinational affiliate performance around the world a function of parent shocks or shocks affecting other affiliates within the same firm?

The analysis makes use of measures of the gross product of multinational activity and micro data that capture the inner workings of multinational firms. The Bureau of Economic Analysis (BEA) provides national income accounting analogs for the activities of U.S. multinationals around the world. These allow for the comparison of economic output by multinational firms and the size of the local economy. Additionally, these data allow for the calculation of rates of return that are the staple of macroeconomic analysis, as in Poterba (1998). We use affiliate-level data on investment and returns to determine the degree to which returns and investments by multinational affiliates around the world comove with returns and investments of the same firm outside of the host country after controlling for local returns and investment.

The results indicate that U.S. multinationals constitute a significant fraction of output and investment for many major economies and their significance has grown over the last two decades. Averaged across the G-6 countries, U.S. multinational affiliates alone comprised more than four percent of output and capital expenditures in their host countries in 1999 with levels as high as ten percent in several countries.¹ These ratios indicate the potential for multinationals to act as a channel of economic shocks. A descriptive look at the correlation coefficients of rates of return for multinational activity across countries indicates that such correlations are high and in most cases surpass correlations of returns based on economy wide measures. Similar patterns exist for correlations of rates of investment.

These high correlations of country-wide returns and investment within multinational firms suggest that shocks that occur in one part of the world or a firm's worldwide affiliates may be transmitted through the rest of the firm. In order to test this more rigorously, affiliate-level regressions attempt to identify how affiliate returns comove with local firm returns, the returns of foreign affiliates of the same parent in other host countries, and the returns on U.S. operations of the affiliate's parents. Both within-parent measures of returns – the returns on U.S. operations and returns on foreign operations of the parent in other host countries – are significant in explaining the return

¹ Throughout the paper, we refer to the G-6 countries to indicate the G-7 (G-8) after excluding the United States (the United States and Russia). G-6 countries include Canada, France, Germany, Italy, Japan, and the United Kingdom.

of affiliates. These results are robust to the inclusion of a rigorous set of country and industry controls, and they hold for the overall sample of affiliates and the sample of affiliates in G6 countries. In a similar vein, parent and other foreign investment rates of multinationals retain explanatory power in explaining affiliate investment rates after controlling for local economy investment rates. These firm level regressions indicate that firm specific factors that drive returns and investment help explain affiliate returns and investment in host countries after controlling for country and industry factors.

Taken together, the evidence provided in the paper suggests that the scope and dynamics of multinational firm activity are consistent with these firms serving as a channel for the transmission of economic shocks. Investment and returns are linked across parts of the same firm located in different countries, and these linkages cannot be explained by patterns in aggregate investment and returns at the country or industry level. These facts are important because they raise several questions for future research. What aspects of firm internal markets – intrafirm trade, internal capital markets, transfers of technology – might create these linkages? How much of these linkages can be explained by international rent sharing by workers across borders within multinationals? To what degree are multinational firms contributing to the synchronization of business cycles relative to trade linkages and bank lending and other factors? Given the exploratory nature of the analysis in this paper, we believe the results suggest that further work on how parts of the same firm create global economic linkages is merited.

The rest of the paper is organized as follows. The second section describes the related literature on international business cycles and the internal capital markets of firms and outlines the empirical methodology. The third section provides an overview of the growth of U.S. multinational activity, the changing industrial composition of investment, the relative importance of U.S. multinational activity to local economies around the world, and the changing geographic concentration of U.S. multinational activity. The fourth section provides evidence on the correlation of returns and investment rates to understand the economic linkages created by multinational firms. The fifth section discusses results from the firm-level regressions. A concluding section suggests extensions of this work.

2. *Related Literature and Empirical Methodology*

This investigation of the correlation of returns and investment plans within multinational firms is related to the growing literature on the synchronization of business cycles and asset returns and some recent literature on multinational and multidivision firms that points out potential sources of synchronicity with firms.

2.1. *International Business Cycles*

Studies of the synchronization of business cycles typically rely on econometric tests employing macroeconomic aggregates, as in Backus, Kehoe and Kydland (1992, 1995), Doyle and Faust (2002), Kose, Otrock and Whiteman (2003), and Stock and Watson (2003). These studies typically find evidence of a world factor in dictating output variability with somewhat contradictory results on the trend in degrees of comovement amongst major economies. Heathcote and Perri (2002) find reduced correlations in output and tie these reduced correlations to increased financial integration. Brodo and Helbling (2003) suggest that synchronization levels have increased over a longer historical period and across a variety of exchange rate regimes. These studies typically conclude, as in Kose, Otrok and Whiteman (2003) and Stock and Watson (2003), with calls for further investigation of the sources, rather than the degree, of these global correlations. One such investigation of the sources of these correlations is provided by Frankel and Rose (1998) who provide evidence of a correlation between trade linkages and output correlations.

Linkages between economic aggregates can be particularly trenchant in an emerging market setting where output fluctuations can be large and appear, to some observers, to be contagious. Examinations of these linkages of output and stock market movements in emerging markets have emphasized trade linkages (as in Eichengreen and Rose (1999)), financial flows (as in Kaminsky, Lyons and Schmukler (2001)), or combinations of these factors.² Studies of the comovement of returns in emerging markets are part of the larger literature on the degree to which stock markets comove (pioneered in King and Wadhvani (1990) and surveyed recently in Goetzmann, Li and

² See the papers collected in Claessens and Forbes (2001).

Rouwenhorst (2002)) and if assets are priced locally or globally, as reviewed in Karolyi and Stulz (2002).

As detailed below, the considerable scope of multinational activity around the world suggests that multinational firms may be a channel for the transmission of economic shocks around the world. There is limited evidence on this channel with contradictory conclusions. Forbes and Chinn (2003) indicate that bilateral FDI flows do not explain global linkages in financial markets while Jansen and Stokman (2004) indicated that international business cycle comovements are more pronounced for countries with large amounts of bilateral foreign direct investment flows. An investigation of the degree to which returns and investment plans comove within firms using micro data affords the opportunity to isolate more precisely the scope of this transmission channel.

2.2. *The Internal Linkages of Multinational and Multidivisional Firms*

The literature of the internal markets of firms indicates some potential reasons for why returns and investment comove within a firm. Finance scholars have recently turned their attention to the efficiency of the allocation of capital within firms.³ Both Rajan, Servaes and Zingales (2002) and Scharfstein and Stein (2002) propose rationales for how investment becomes “socialized” through a multi-divisional enterprise leading to inefficient allocation of capital within conglomerates. Such a socialization of investment or cross-subsidization would appear as correlated investment and performance across countries in a multinational setting. In the multinational setting, firms appear to use internal capital market opportunistically to overcome local rigidities – including costly external finance and capital controls – as in Desai, Foley and Hines (2003a, 2004). Given that these internal capital markets appear to be so active, it is conceivable that shocks to geographically disparate operations could be transmitted around the world through multinationals.

Underlying trends in the patterns of real activity by multinationals might also give rise to global linkages. As described by Feenstra (1995), production processes within these firms have increasingly become fragmented around the world. As a consequence,

³ See Stein (2003) for an excellent survey of this literature.

multinational activity within these economies is more likely to be tied to non-local factors providing another channel for the transmission of shocks and the comovement of returns within firms. Desai, Foley and Hines (2003b) demonstrate how these patterns of the internalization of activity have also changed the ownership preferences of multinational firms. Budd, Konings, and Slaughter (2002) consider the process by which wages are set within multinationals and raise the possibility that this process affects the transmission of shocks across borders. This work finds evidence that wages in one location depend on the performance of the firm in other locations. Therefore, international rent sharing across workers of multinational firms might also induce the comovement of returns within firms.

There has been limited empirical evidence on the interrelationship of investment plans within firms that span national boundaries. Peek and Rosengren (1997) find that Japanese bank lending decisions in California reflect changes in the value of their Japanese loan portfolios. More widespread evidence of linkages created by multinational firms has not been provided. The one exception to this that we know of is the study by Stevens and Lipsey (1992) of seven multinational firms over twenty years. This study, despite its limited sample, finds evidence of significant interdependence in investment plans between foreign and domestic operations.

2.3. *Data and Empirical Methodology*

In order to isolate the scope and dynamics of U.S. multinational activity, we employ detailed data collected by the U.S. government. We use the 1982 through 1999 results of the Bureau of Economic Analysis (BEA) annual survey of U.S. Direct Investment Abroad to create a panel of data on the gross product, returns, and investment of U.S. multinational affiliates and parents. These surveys ask reporters to file detailed survey forms for each affiliate, as well as information on the domestic activities of U.S. parents. The International Investment and Trade in Services Survey Act governs the collection of the data. The Act ensures that “use of an individual company’s data for tax, investigative, or regulatory purposes is prohibited.” Willful noncompliance with the Act can result in penalties of up to \$10,000 or a prison term of one year. As a result of these

assurances and penalties, BEA believes that coverage is close to complete and levels of accuracy are high.

U.S. direct investment abroad is defined as the direct or indirect ownership or control by a single U.S. legal entity of at least ten percent of the voting securities of an incorporated foreign business enterprise, or the equivalent interest in an unincorporated foreign business enterprise.⁴ The survey forms that U.S. multinational firms are required to complete vary depending on the year, the size of the entity surveyed. Although the most extensive data are available for 1982, 1989, 1994 and 1999, when BEA conducted Benchmark Surveys, we use data from the intervening years as well.⁵ Since many of the variables of interest are not collected for minority owned affiliates, we restrict our sample to include affiliates in which the combined direct and indirect ownership claim by a U.S. parent exceeds 50 percent. BEA collects identifiers linking affiliates through time, thereby permitting the creation of a panel.⁶

The BEA data include national income accounting analogs for the activities of multinational affiliates in countries around the world. Affiliate gross product, a measure of value-added, was developed in order to measure the extent of multinational activities in a way that is free from double counting, unlike sales data that reflect value-added within an affiliate and the value of intermediate inputs purchased by an affiliate. As in national income accounting, this measure is decomposed into employee compensation, profit-type return, net interest paid, indirect business taxes, and a capital consumption allowance.

The analysis that follows begins by employing the BEA measure of gross product in order to characterize the distribution of U.S. multinational firms across countries and industries. Values of aggregate affiliate data within a host country are compared to host country GDP, as measured by the World Bank (2003), to indicate the prevalence of multinational activity. We also compute measures of the importance of affiliate

⁴ In order to be considered as a legitimate foreign affiliate, the foreign business enterprise should be paying foreign income taxes, have a substantial physical presence abroad, have separate financial records, and should take title to the goods it sells and receive revenue from the sale. In order to determine ownership stakes in the presence of indirect ownership, BEA determines the percentage of parent ownership at each link and then multiplies these percentages to compute the parent's total effective ownership.

⁵ In non-benchmark years, reporting exemption levels were higher and less information is collected.

⁶ For a detailed description of the BEA data, see Mataloni (1995).

investment in host countries by scaling aggregate affiliate investment by gross fixed capital formation, taken from the World Bank (2003).

In order to consider the comovement of returns of the aggregate activities of U.S. multinationals in distinct host countries, we employ a variety of measures. Using the gross product data, we define the rate of return as the ratio of the sum of the profit-type return, net interest paid, indirect business taxes and the capital consumption allowance to total assets. We also employ two financial accounting based measures of returns; the return on equity is the ratio of net income to owners' equity and return on assets is the ratio of net income to assets. In order to compute correlations in economy wide returns, we rely on data in Poterba (1998) and data from Ken French's website for information on rates of return and return on equity. The French data cover a large sample of publicly traded firms and include information on the dollar stock return in local markets also. In studying the comovement of investment, we analyze correlations of aggregate affiliate capital expenditures across countries as well as these expenditures scaled by aggregate affiliate gross product and affiliate assets. Economy wide investment is measured as the value of gross fixed capital formation, and we analyze correlations of this measure and this measure scaled by GDP.

In order to analyze the comovement of returns and investment within the firm more rigorously, we employ a specification where the dependent variable is a measure of returns or investment at the affiliate-year level. In order to trace through effects of a multinational parent's activity elsewhere in the world, we include independent variables that measure returns or investment for the affiliate's parent in the U.S. (referred to as "parent" returns or parent investment) and the returns or investment of that same multinational abroad but not in the affiliate's host country or in the U.S. (referred to as "other affiliate" returns or investment). Finally, measures of local firm activity are also included as explanatory variables as are varying combination affiliate, year, and country/year and industry/year fixed effects in order to ensure that these within-firm measures are not reflecting omitted factors. All standard errors are clustered at the firm level to correct for serial correlation.

3. *The Distribution of Multinational Activity, 1982-1999*

In order to consider the scope and nature of U.S. multinational activity, Table 1 provides some sense of where multinationals have historically been most active, by country, and how this compares with the share of non-U.S. economic output that these countries constitute. These figures are presented for the four benchmark years and are limited to those countries where either the country's share in worldwide output or the country's share of U.S. multinational output was at least one percent in 1999.

Several patterns emerge from this table. First, U.S. multinational activity is more concentrated than global output. By 1999, these twenty three countries constitute 83% of non-U.S. output and 88% of U.S. multinational activity. This level of concentration has also increased quite markedly over the last two decades. Second, it is useful to consider those countries for which the two measures of the distribution of activity differ most markedly. Here, several large discrepancies are apparent. The United Kingdom, Canada, Australia, and Ireland stand out as countries with disproportionately large shares of U.S. multinational activity. In contrast, many countries in Asia – most notably Japan – feature uncharacteristically low levels of U.S. multinational activity. Finally, several large emerging markets – particularly China and India – that have received large amounts of attention for their inward foreign direct investment still have relatively little U.S. multinational activity given their share of world output – despite recent sharp accelerations. It is also reassuring that these figures are relatively well-behaved over time and conform, largely, to the folklore on U.S. multinational activity as being concentrated in developed countries, as having a bias toward Anglo countries, and as being significantly smaller in Japan. With respect to the literature on international business cycles, it is interesting to note that these patterns conform to those presented in Stock and Watson (2003) of an Anglo block of correlated economies and the distinct dynamic of the Japan economy.

In order to consider the possibility that multinational firms serve as channel of economic shocks, it is useful to isolate the relative contribution of U.S. multinationals to local output or investment. Table 2 presents the ratio of U.S. MNC gross product and investment to economy wide measures, by country. The first column presents the average ratio of affiliate gross product to host country GDP over the 1982 to 1999 period, and the second column presents this ratio for 1999. The third and fourth columns present

ratios of affiliate capital expenditures to gross fixed capital formation averaged over the sample period and for 1999. These ratios are crude measures of the relative importance of multinational activity for local economies. They are crude in several respects. First, they only represent U.S. multinational activity and, as such, understate the scope of overall multinational activity. Second, measures of economy-wide activity in the denominators include government activity and, therefore, the ratios understate the relative importance of multinational firms to the private sector in these countries.

Table 2 reveals several salient facts about the relative importance of U.S. multinational activity. First, a comparison of the averages from 1982 to 1999 and in 1999 indicates that the relative importance of U.S. multinational activity has increased in almost all of the countries in the table. Second, the increases in the relative importance of multinationals are most pronounced in Asia, though Asia remains far behind Europe in this regard. Third, the shares of total output and investment vary considerably but are seldom trivial and are often quite large, as in the case of Ireland, the United Kingdom and Canada where the U.S. multinational share close to or above ten percent. Most multinational shares are in the single digits, which given the measurement issues mentioned above, seems a significant enough channel to create global linkages.

Finally, it is useful to consider the industrial dispersion of U.S. multinational activity. The share of multinational gross product, by industry is provided in Figure 1. Unsurprisingly, the share of petroleum has dropped precipitously over the period from 1982 to 1999. Additionally, several sectors – notably, services and finance-related industries – have grown considerably. Given the distinct dynamics that are potentially associated with the petroleum industry, the correlations of returns and investment presented below are considered separately for manufacturing and industry controls are employed in the regressions that follow as well.

4. The Correlations of Returns and Investment Inside Multinational Firms

We begin by presenting some raw correlations of returns and investment rates of affiliates across countries and compare these correlations to correlations of economy wide measures across countries. These correlation tables are obviously only suggestive given the limited time series available on U.S. multinational activity (1982 to 1999) but

intriguing nonetheless. Descriptive statistics for the sample employed in the correlation tables and the regression tables are presented in Table 3. Tables 4 and 5 present such correlations across G-6 countries.

The top panel of Table 4 provides correlations of our three measures of returns to affiliate activity; these measures are the rate of return (ROR), the return on equity (ROE), and the return on assets (ROA). All of these correlations are positive and all but five of them differ from zero by statistically significant margins. Correlations of rates of return are the largest, ranging from 0.87 to 0.97. There is more variation in the correlations of ROE and ROA than ROR. Part of this variation may result from shortcomings of these measures in capturing returns to capital. Net income and owners' equity reflect only a component of returns and a component of capital and also reflect the capital structure choice of affiliates, a choice that is likely to vary through time within countries and one that may be guided by a variety of tax and managerial considerations.

The bottom panel of Table 4 presents similar correlations using economy wide measures of returns. The ROR correlations are all smaller than the ROR correlations observed for multinational firms. The French data do not cover Canada, but for the other countries, economy wide correlations of ROE are smaller than affiliate correlations for all but two country pairs. It is not possible to directly compare correlations of stock returns to any measure of affiliate returns since most affiliates are not publicly traded, but these correlations also are smaller than the correlations of affiliate rates of return, and they are of a similar magnitude as the correlations of affiliate ROE. If attention is restricted to multinational affiliates in manufacturing, in order to put aside concerns that common shocks to the petroleum industry are driving our results, the results are largely the same.

Table 5 shows correlations of measures of investment across countries. The top panel presents correlations computed from three measures of affiliate investment activity: the level of capital expenditures, capital expenditures scaled by gross product, and capital expenditures scaled by assets. All but one of these correlations is positive and more than three-fourths of the presented correlations are positive and statistically significant. The correlations of levels of capital expenditures appear to be the highest. Since capital

expenditures are measured in nominal terms, these correlations could reflect correlations in inflation rates. The other two measures are not subject to this potential shortcoming.

The bottom panel of Table 5 displays correlations of two economy wide measures of investment. Capital expenditures are measured using data on gross fixed capital formation, and the correlations cover levels of capital expenditures and capital expenditures scaled by GDP. Although the correlations of country wide measures of investment exceed correlations of affiliate measures of investment in just over half of the comparable cases, both sets of correlations are of a similar magnitude for most country pairs. As with the correlations of returns, restricting attention to manufacturing affiliates does not materially change these results. Taken together, the evidence in Tables 4 and 5 indicates that returns and investment are correlated within U.S. multinational firms. In many cases, the correlations of these measures of activity within firms exceed correlations of these measures for the broader economy. In order to study the correlates of affiliate returns more carefully, we now turn to regression analysis that permits for a richer set of controls for other confounding factors.

5. *Firm Level Regressions*

The specification outlined in section 2.3 provides a method for further analyzing the degree to which the correlations of aggregate returns and investment represent within-firm dynamics. Table 6 presents firm-level evidence on the correlation of returns inside multinational firms. In order to facilitate comparison of returns across the different parts of a multinational firm, we consider the accounting based measure of return on equity and employ the French data to control for local firm returns on equity. Observations are at the affiliate-year level and the dependent variable is the return on equity, calculated as the ratio of net income to owner's equity. The specifications in columns 1-6 employ affiliate fixed effects to control for unobserved heterogeneity across affiliates and year fixed effects to capture movements in a world factor that might explain the comovement of returns.

In the simple specification in column 1, the coefficient on parent return on equity indicates that an affiliate's parent domestic return helps explain movements in affiliate returns in a statistically significant manner. Column 2 considers the role of returns on the

foreign activities of the affiliate's parents outside the affiliate's host country by including this return as an additional explanatory variable. In this specification the sample size is reduced slightly as affiliates that are the only foreign affiliate in a parent system are dropped. The coefficient on the parent's domestic activity is reduced in value slightly but remains significant, and the 0.14 coefficient on the parent's foreign activity is positive and highly significant. Of course, these coefficients might represent the underlying correlation of country level returns across countries in which a parent is active. In order to address this concern, the specification in column 3 includes the affiliate's host country return on equity. Given the limited coverage of the French ROE data, the sample is reduced quite dramatically. In this specification, the local return is not significant and the coefficients on the parent's domestic and foreign activities remain largely unchanged.

Given the prevalence of affiliate activity in G-6 countries, the high level of interest in the transmissions of shocks among these countries, and the availability of data within these countries, it useful to run the specification presented in columns 1-3 in just this setting. The results are largely similar with parent domestic and foreign returns explaining affiliate returns and local returns having a positive but insignificant sign. Coefficients on parent ROE and other affiliate ROE are very similar to previous specifications reflecting the importance of G-6 activity to the overall sample and suggesting that these factors have a similar relationship to affiliate ROE both inside and outside the G-6.

Within the context of the G-6, it is possible to impose even further controls to account for the dynamics of local economies and their influence on affiliate returns. Specifically, the specification in column 7 employs country/year and industry/year fixed effects.⁷ This specification has the advantage of controlling for country and industry specific factors that might be driving returns of the affiliate. In this specification, the coefficients on parent domestic and foreign returns are similar to their level in previous specifications and retain their statistical significance. Across all of these specifications, the returns of an affiliate's parent – both domestically and abroad – help explain an affiliate's returns after controlling for various measures of local returns.

⁷ Computational constraints limit the use of these fixed effects in the full sample.

Table 7 employs a similar empirical framework to investigate the interrelationship of investment within the multinational firm. In columns 1 through 7 the dependent variable is the log of affiliate capital expenditures and all specifications employ affiliate and year fixed effects. As with returns, the coefficient on parent domestic investment in column 1 is positive and highly significant. When the additional independent variable of parent foreign investment is included in column 2, the coefficient on parent domestic investment is reduced in magnitude but retains its statistical significance. Parent foreign investment outside of the affiliate's host country is also highly significant and the relevance of parent domestic and foreign activities for affiliate investment mirrors the results in Table 5. In column 3, the additional control for local investment is highly significant but does not materially change the coefficients or significance levels of the within-parent variables. When attention is restricted to the G-6 in columns 4 through 7, the results are qualitatively similar with parent domestic and foreign activities helping to explain affiliate investments after controlling for local investment rates. As in Table 6, column 7 of this table includes country/year and industry/year fixed effects to pick up country or industry specific factors that might drive affiliate investment. Parent domestic investment and investment by parent affiliates in other host countries remain positive and significant in explaining affiliate investment.

The evidence provided on the correlates of affiliate investment might be affected by changes in firm scope related to merger activity or spin off activity. In order to address this concern, we repeat the analysis in Table 7 using scaled measures of investment activity. The results of this analysis appear in columns 8 through 14 of Table 7. The results are qualitatively similar to those in Table 7. Both parent domestic investment and investment by other affiliates of a parent are significantly correlated with affiliate investment. The magnitude of the coefficients on these variables is similar for the full sample and for G-6 countries and these results are robust to controlling for country and industry factors.

6. Conclusion

This paper lays out several basic facts. U.S. multinationals comprise significant fractions of output and investment in much of the world. Their rates of return and

investment levels are more highly correlated around the world than are those same measures for local firms. Controlling for local returns and investment levels, a multinational parent's domestic and foreign operations are highly correlated with an affiliates returns and investment levels.

These facts prompt a number of questions related to the inner workings of multinationals firms. Given the high degree of interdependence in returns across countries for multinational firms, is it fair to view them as an asset class that provides exposure to foreign markets? If, indeed, investment plans and returns are highly correlated around the world within a multinational firm, this may help explain why investors place a limited value on multinationality, as examined in Errunza and Senbet (1984) and Morck and Yeung (1991). What characteristics of multinational firms – their internal capital markets, their intrafirm trade, their ability to explore intangible property in several locations – are driving these linkages in returns and investments? If these linkages are so significant, how should firms consider capital budgeting when they allocate capital around the world?

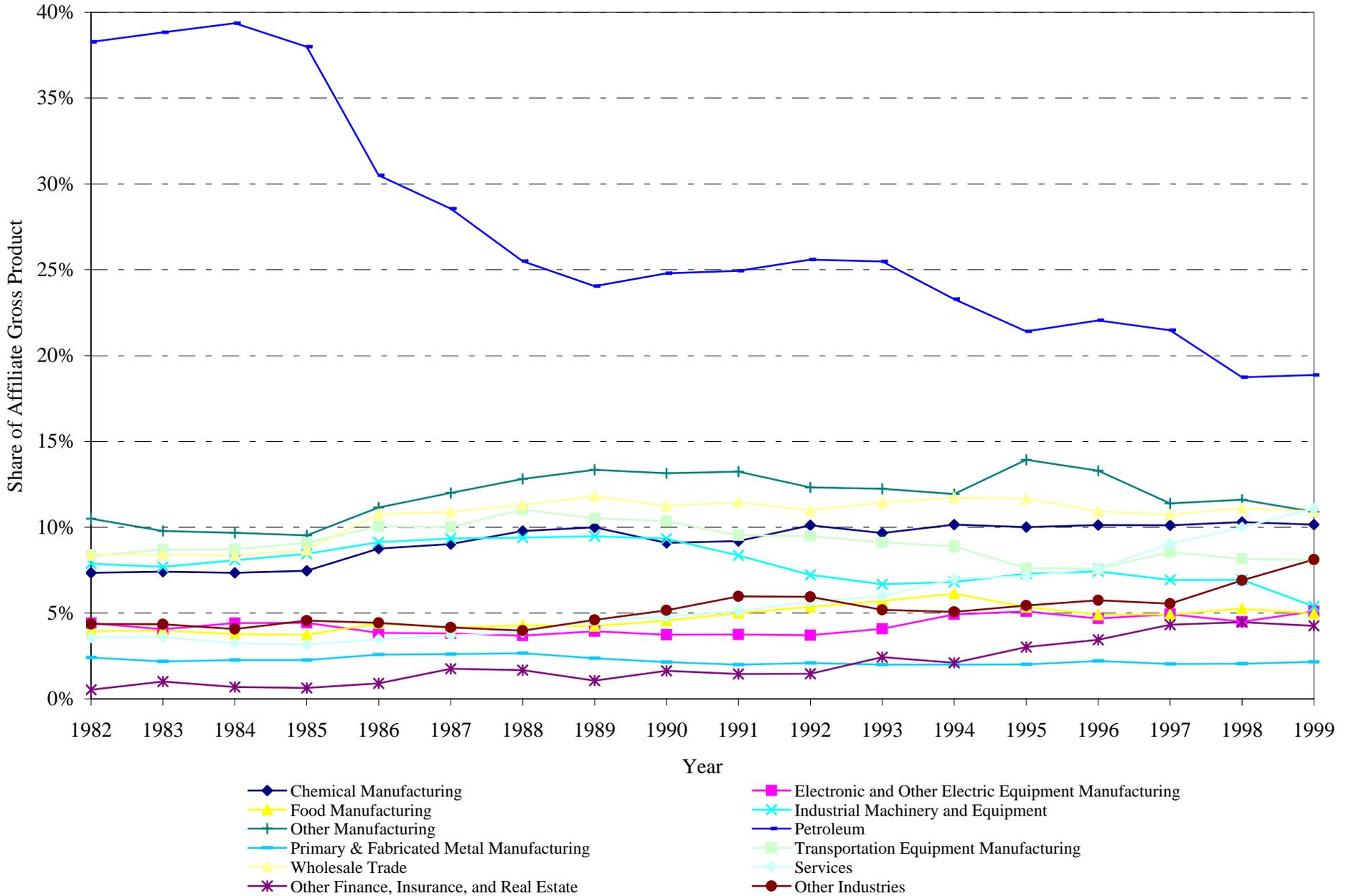
Similarly, these facts prompt questions related to the nature of economic linkages. To what degree is the emergence of an Anglo business cycle and the distinct dynamic of Japan, as in Stock and Watson (2003), a reflection of the nature of FDI flows between those countries? What exogenous shocks might usefully be employed to better identify the relevance of multinational firms for transmitting shocks? If financial integration through foreign direct investment is associated with such highly correlated investments and returns, what are the welfare consequences of such integration? We leave these questions for future research.

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Figure 1: The Sectoral Composition of U.S. Multinational Affiliate Gross Product, 1982-- 1999



Note: The figure provides the share of worldwide U.S. multinational gross product by industry from 1982 to 1999.

Table 1: The Distribution of Global Output and US Multinational Activity Around the World, 1982, 1989, 1994, and 1999

	Year							
	1982		1989		1994		1999	
	GDP Share	MNC Share						
<i>Asia</i>								
China	2.81%	NA	2.64%	NA	2.83%	0.17%	4.68%	0.70%
Hong Kong	0.44%	0.43%	0.52%	0.91%	0.68%	1.21%	0.75%	1.41%
India	2.71%	NA	2.25%	NA	1.68%	NA	2.10%	0.19%
Japan	15.30%	2.05%	22.90%	4.65%	25.10%	5.39%	21.23%	5.34%
Korea	1.04%	NA	1.70%	0.23%	2.10%	0.36%	1.92%	0.58%
Singapore	0.21%	0.50%	0.23%	0.73%	0.36%	1.42%	0.39%	1.74%
Taiwan	0.68%	0.28%	1.15%	0.60%	1.27%	0.70%	1.36%	1.07%
<i>Europe</i>								
Belgium	1.23%	2.29%	1.22%	2.66%	1.23%	2.92%	1.19%	2.33%
France	7.84%	5.44%	7.58%	7.02%	7.05%	7.87%	6.82%	6.62%
Germany	10.50%	11.07%	10.49%	11.12%	10.91%	13.68%	9.94%	10.93%
Ireland	0.29%	0.85%	0.29%	1.39%	0.29%	1.57%	0.45%	2.62%
Italy	5.59%	3.79%	6.73%	5.14%	5.35%	4.62%	5.58%	3.96%
Netherlands	2.01%	2.41%	1.83%	4.12%	1.82%	3.61%	1.88%	3.36%
Norway	0.85%	1.98%	0.76%	1.30%	0.64%	1.12%	0.73%	1.11%
Spain	2.59%	1.15%	3.04%	2.30%	2.63%	2.00%	2.85%	1.90%
Sweden	1.44%	0.84%	1.53%	0.69%	1.08%	0.63%	1.15%	1.09%
Switzerland	1.39%	1.43%	1.38%	1.59%	1.36%	1.75%	1.22%	1.58%
United Kingdom	6.73%	17.19%	6.49%	16.42%	5.44%	15.55%	6.89%	18.19%
<i>North America</i>								
Canada	4.22%	15.21%	4.22%	16.24%	2.90%	11.87%	3.07%	11.61%
Mexico	2.42%	1.59%	1.72%	1.52%	2.19%	2.44%	2.27%	3.10%
<i>Oceania</i>								
Australia	2.54%	4.50%	2.35%	4.33%	1.80%	3.72%	1.92%	3.46%
<i>South America</i>								
Argentina	1.17%	1.30%	0.59%	0.49%	1.34%	1.05%	1.34%	1.28%
Brazil	3.92%	5.01%	3.46%	5.49%	2.85%	4.17%	2.51%	2.93%
Total	78.87%	79.74%	86.08%	89.58%	83.94%	88.66%	83.21%	87.73%

Note: The table provides information on the distribution of GDP and U.S. multinational gross product across countries in 1982, 1989, 1994 and 1999. GDP Share is the ratio of individual country GDP to total non-U.S. GDP. MNC Share is the ratio total U.S. multinational gross product in a country to the gross product of U.S. multinational affiliates worldwide. The table is restricted to those countries that, in 1999, comprise either one percent of non-U.S. world output or one percent of U.S. multinational gross product.

Table 2: The Scope of U.S. Multinational Activity, 1982-1999 and 1999

	Average Ratio of U.S. MNC Gross Product to GDP, 1982-1999	Ratio of U.S. MNC Gross Product to GDP, 1999	Average Ratio of U.S. MNC Capital Expenditures to Gross Fixed Capital Formation, 1982-1999	Ratio of U.S. MNC Capital Expenditures to Gross Fixed Capital Formation, 1999
<i>Asia</i>				
China	0.10%	0.40%	0.24%	0.45%
Hong Kong	3.93%	5.06%	3.35%	3.28%
India	0.10%	0.24%	0.14%	0.37%
Japan	0.49%	0.67%	0.21%	0.32%
Korea	0.38%	0.81%	0.26%	0.41%
Singapore	8.43%	11.92%	5.08%	7.57%
Taiwan	1.23%	2.11%	NA	NA
<i>Europe</i>				
Belgium	5.26%	5.27%	3.21%	2.74%
France	2.31%	2.60%	1.47%	1.56%
Germany	2.82%	2.94%	1.59%	1.79%
Ireland	12.00%	15.65%	7.64%	9.69%
Italy	1.86%	1.90%	0.85%	0.99%
Netherlands	4.49%	4.78%	3.38%	3.25%
Norway	4.85%	4.10%	5.27%	4.40%
Spain	1.64%	1.79%	1.23%	1.23%
Sweden	1.52%	2.55%	1.12%	2.17%
Switzerland	2.86%	3.46%	1.15%	2.10%
United Kingdom	6.72%	7.07%	6.80%	8.47%
<i>North America</i>				
Canada	9.47%	10.12%	8.45%	11.16%
Mexico	2.42%	3.65%	2.56%	4.15%
<i>Oceania</i>				
Australia	4.53%	4.83%	3.46%	5.35%
<i>South America</i>				
Argentina	2.22%	2.56%	2.47%	3.92%
Brazil	3.51%	3.12%	2.49%	3.51%

Note: The table provides the ratio of U.S. multinational gross product (capital expenditure) to country GDP (gross fixed capital formation), by country, averaged from 1982 to 1999 and 1999. The table is restricted to those countries that, in 1999, comprise either one percent of non-U.S. world output or one percent of U.S. multinational gross product.

Table 3: Descriptive Statistics

	Mean	Median	Standard Deviation
<i>Correlation Tables</i>			
<i>Multinational Measures</i>			
ROR	0.1894	0.1864	0.0929
ROE	0.1308	0.1275	0.0440
ROA	0.0399	0.0392	0.0158
Capital Expenditures	5,266,974	4,057,498	4,464,127
Capital Expenditures/Gross Product	0.1383	0.1311	0.0391
Capital Expenditures/Assets	0.0466	0.0449	0.0178
<i>Local Firm Measures</i>			
ROR			
ROE	0.1118	0.1151	0.0337
Stock Returns	0.1623	0.1514	0.3129
Capital Expenditures	322,000,000,000	203,000,000,000	328,000,000,000
Capital Expenditures/Gross Product	0.2156	0.2089	0.0380
<i>Regression Tables</i>			
Affiliate ROE	0.1586	0.1285	0.3797
Parent ROE	0.1202	0.1273	0.2290
Other Affiliate ROE	0.1381	0.1284	0.1958
Host Country ROE	0.1201	0.1197	0.0340
Log of Affiliate Capital Expenditures	6.3604	6.5221	2.4253
Log of Parent Capital Expenditures	11.7526	11.9585	2.1054
Log of Other Affiliate Capital Expenditures	10.6546	10.8314	2.5011
Log of Host Country Gross Fixed Capital Formation	24.9104	25.1231	1.5006
Affiliate Capital Expenditures/Assets	0.0504	0.0161	0.1108
Parent Capital Expenditures/Assets	0.0518	0.0439	0.0480
Other Affiliate Capital Expenditures/Assets	0.0457	0.0345	0.0542
Host Country Gross Fixed Capital Formation/GDP	0.2187	0.2095	0.0487

Note: The two panels of the table provide descriptive statistics for the correlation tables and regression tables, respectively. Each of the multinational measures in the correlation tables relates to the country average for the G-8 (excluding Russia and the U.S.) and are based on the activities of U.S. multinationals from 1982 to 1999 as described in the text. Local Firm Measures relate to country averages for the G-8 (excluding Russia and the U.S.) and are drawn from Poterba (1999), the Ken French website and the World Bank Development Indicators as described in the text. "Affiliate," "Parent" and "Other Affiliate" variables are associated with a multinational affiliate, their parent's domestic activity, and their parent's other foreign operations, respectively. "Host country" refers to the country of activity for the multinational activity and that data is drawn from the Ken French website (for ROEs) and World Bank Development Indicators (for gross fixed capital formation).

Table 4: The Correlation of Returns for U.S. Multinationals and Local Firms, 1982-1999

U.S. Multinational Firms

	Canada			France			Germany			Italy			United Kingdom		
	<i>ROR</i>	<i>ROE</i>	<i>ROA</i>												
France	0.90 (0.11)	0.54 (0.21)	0.51 (0.22)												
Germany	0.90 (0.11)	0.29 (0.24)	0.41 (0.23)	0.94 (0.09)	0.78 (0.16)	0.87 (0.12)									
Italy	0.87 (0.13)	0.22 (0.24)	0.20 (0.25)	0.96 (0.07)	0.71 (0.18)	0.68 (0.18)	0.93 (0.09)	0.43 (0.23)	0.59 (0.20)						
United Kingdom	0.96 (0.07)	0.43 (0.23)	0.55 (0.21)	0.94 (0.08)	0.74 (0.17)	0.64 (0.19)	0.96 (0.07)	0.48 (0.22)	0.70 (0.18)	0.94 (0.08)	0.65 (0.19)	0.64 (0.19)			
Japan	0.92 (0.10)	0.66 (0.19)	0.68 (0.18)	0.97 (0.06)	0.83 (0.14)	0.70 (0.18)	0.94 (0.09)	0.51 (0.22)	0.69 (0.18)	0.95 (0.08)	0.64 (0.19)	0.70 (0.18)	0.97 (0.06)	0.66 (0.19)	0.82 (0.14)

Local Firms

	Canada			France			Germany			Italy			United Kingdom		
	<i>ROR</i>	<i>ROE</i>	<i>\$ Stock Returns</i>	<i>ROR</i>	<i>ROE</i>	<i>\$ Stock Returns</i>	<i>ROR</i>	<i>ROE</i>	<i>\$ Stock Returns</i>	<i>ROR</i>	<i>ROE</i>	<i>\$ Stock Returns</i>	<i>ROR</i>	<i>ROE</i>	<i>\$ Stock Returns</i>
France	0.31 (0.26)	NA	NA												
Germany	0.47 (0.25)	NA	NA	0.90 (0.12)	0.71 (0.18)	0.81 (0.15)									
Italy	0.50 (0.24)	NA	NA	0.96 (0.08)	0.65 (0.19)	0.88 (0.12)	0.93 (0.11)	0.54 (0.21)	0.84 (0.13)						
United Kingdom	0.43 (0.25)	NA	NA	0.49 (0.24)	-0.02 (0.25)	0.58 (0.20)	0.57 (0.23)	-0.07 (0.25)	0.67 (0.18)	0.61 (0.22)	0.25 (0.24)	0.64 (0.19)			
Japan	0.20 (0.27)	NA	NA	0.67 (0.20)	0.67 (0.18)	0.60 (0.20)	0.56 (0.23)	0.63 (0.19)	0.31 (0.24)	0.55 (0.23)	0.38 (0.23)	0.50 (0.22)	-0.19 (0.27)	-0.47 (0.22)	0.35 (0.23)

Note: This table provides correlations of different measures of returns over the 1982-1999 period across G-8 countries excluding the U.S. and Russia. The top panel contains information for the affiliates of U.S. multinational firms. ROR is the affiliate rate of return which is calculated as the ratio of returns to capital to total assets. Returns to capital include profit-type return, net interest paid, indirect business taxes, and capital consumption allowances. ROE is the return on equity, measured as the ratio of net income to owners' equity. ROA is the return on assets, measured as the ration of net income to total assets. The bottom panel contains information for local firms. Measures of rates of return for local firms are taken from Poterba (1999) and cover only the 1982-1996 period. Measures of ROE and \$ Stock Returns for local firms are taken from the Ken French website. Standard error appear below each correlation coefficient in parentheses.

Table 5: The Correlation of Investment Rates for U.S. Multinationals and Local Firms, 1982-1999

U.S. Multinational Firms

	Canada			France			Germany			Italy			United Kingdom		
	Capital Expenditures	Capital Expenditure s/Gross Product	Capital Expenditure s/Assets	Capital Expenditures	Capital Expenditure s/Gross Product	Capital Expenditure s/Assets	Capital Expenditures	Capital Expenditure s/Gross Product	Capital Expenditure s/Assets	Capital Expenditures	Capital Expenditure s/Gross Product	Capital Expenditure s/Assets	Capital Expenditures	Capital Expenditure s/Gross Product	Capital Expenditure s/Assets
France	0.77 (0.16)	-0.40 (0.23)	0.66 (0.19)												
Germany	0.87 (0.12)	0.29 (0.24)	0.68 (0.18)	0.92 (0.10)	0.22 (0.24)	0.95 (0.08)									
Italy	0.85 (0.13)	0.47 (0.22)	0.76 (0.16)	0.94 (0.09)	0.29 (0.24)	0.89 (0.11)	0.95 (0.08)	0.39 (0.23)	0.89 (0.11)						
United Kingdom	0.89 (0.12)	0.06 (0.25)	0.85 (0.13)	0.83 (0.14)	0.60 (0.20)	0.90 (0.11)	0.92 (0.10)	0.57 (0.21)	0.90 (0.11)	0.90 (0.11)	0.50 (0.22)	0.94 (0.08)			
Japan	0.93 (0.09)	0.34 (0.24)	0.80 (0.15)	0.89 (0.11)	0.37 (0.23)	0.92 (0.10)	0.94 (0.08)	0.55 (0.21)	0.93 (0.09)	0.91 (0.10)	0.38 (0.23)	0.91 (0.10)	0.88 (0.12)	0.25 (0.24)	0.93 (0.09)

Local Firms

	Canada		France		Germany		Italy		United Kingdom	
	Capital Expenditures	Capital Expenditures/Gross Product								
France	0.88 (0.12)	0.72 (0.17)								
Germany	0.76 (0.16)	-0.59 (0.20)	0.96 (0.07)	-0.13 (0.25)						
Italy	0.91 (0.11)	0.67 (0.19)	0.96 (0.07)	0.83 (0.14)	0.87 (0.12)	-0.44 (0.22)				
United Kingdom	0.79 (0.15)	0.33 (0.24)	0.95 (0.08)	0.74 (0.17)	0.98 (0.06)	0.39 (0.23)	0.86 (0.13)	0.36 (0.23)		
Japan	0.96 (0.07)	0.82 (0.14)	0.90 (0.11)	0.68 (0.18)	0.82 (0.14)	-0.45 (0.22)	0.90 (0.11)	0.49 (0.22)	0.81 (0.15)	0.48 (0.22)

Note: This table provides correlations of different measures of investment activity over the 1982-1999 period across G-8 countries excluding the U.S. and Russia. The top panel contains information for the affiliates of U.S. multinational firms. Capital Expenditures is the log of affiliate capital expenditures and capital expenditures/gross product is the ratio of affiliate capital expenditures to affiliate gross product. Capital expenditures/assets is the ratio of affiliate capital expenditures to affiliate assets. The bottom panel contains information for local firms. Gross fixed capital formation data from the World Banks are used to measure country investment and the log of these expenditures and these expenditures scaled by country GDP are used as measures of capital expenditures and capital expenditures/gross product. Standard error appear below each correlation coefficient in parentheses.

Table 6**The Interrelationship of Returns Within Multinational Firms**

<i>Dependent Variable:</i>	Affiliate ROE						
	Full Sample			G-6			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.1638 (0.0063)	0.1458 (0.0068)	0.1584 (0.0134)	0.1062 (0.0083)	0.1514 (0.0082)	0.1320 (0.0166)	0.1975 (0.0653)
Parent ROE	0.0878 (0.0111)	0.0679 (0.0102)	0.0671 (0.0135)	0.0887 (0.0134)	0.0662 (0.0135)	0.0668 (0.0165)	0.0620 (0.0133)
Other Affiliate ROE		0.1400 (0.0144)	0.1619 (0.0192)		0.1318 (0.0161)	0.1598 (0.0214)	0.1256 (0.0158)
Host Country ROE			0.0465 (0.0817)			0.1563 (0.1314)	
Affiliate and Year Fixed Effects?	Y	Y	Y	Y	Y	Y	N
Affiliate, Country/Year, and Industry/Year Fixed Effects?	N	N	N	N	N	N	Y
No. of Obs.	178,980	170,634	99,696	76,372	70,892	54,141	70,892
R-Squared	0.5156	0.5184	0.5064	0.4981	0.5014	0.5027	0.5063

Note: The dependent variable in these specifications is affiliate ROE defined as the ratio of net income to owner's equity. The specifications in columns in 4 through 7 are restricted to affiliates in G-6 countries. The specifications in columns 1 through 6 and 8 employ affiliate and year fixed effects. The specification in column 7 employs affiliate, country/year and industry/year fixed effects. "Parent ROE" is the ratio of net income to owner's equity of the affiliate's parent in the U.S. "Other Affiliate ROE" is the ratio of net income to owner's equity of the foreign affiliates of the affiliate's parent. "Host Country ROE" is the return on equity for local firms provided in French (X). Standard errors are clustered at the affiliate level.

Table 7

The Interrelationship of Capital Expenditures Within Multinational Firms

<i>Dependent Variable:</i>	Log Affiliate Capital Expenditure							Affiliate Capital Expenditure/Assets						
	All countries			G-6				All countries			G-6			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Constant	3.7416 (0.2156)	2.6550 (0.2524)	-12.5957 (1.1998)	3.6315 (0.2128)	2.9509 (0.2597)	-17.1811 (2.4016)	2.4224 (0.4886)	0.0505 (0.0022)	0.0380 (0.0031)	0.0264 (0.0051)	0.0289 (0.0020)	0.0196 (0.0025)	0.0177 (0.0075)	0.1631 (0.0213)
Log of Parent Capital Expenditure	0.2043 (0.0190)	0.1445 (0.0161)	0.1385 (0.0154)	0.2102 (0.0194)	0.1574 (0.0188)	0.1564 (0.0186)	0.1455 (0.0186)							
Log of Other Affiliate Capital Expenditure		0.2106 (0.0155)	0.2071 (0.0151)		0.1902 (0.0164)	0.1898 (0.0164)	0.1848 (0.0166)							
Log of Host Country Gross Fixed Capital Formation			0.6104 (0.0465)			0.7582 (0.0906)								
Parent Capital Expenditure/Assets								0.1455 (0.0273)	0.0961 (0.0208)	0.0991 (0.0217)	0.1177 (0.0261)	0.0842 (0.0216)	0.0842 (0.0216)	0.0809 (0.0211)
Other Affiliate Capital Expenditure/Assets									0.2928 (0.0409)	0.3043 (0.0437)		0.2771 (0.0483)	0.2771 (0.0483)	0.2703 (0.0477)
Host Country Gross Fixed Capital Formation/GDP										0.0362 (0.0201)			0.0096 (0.0359)	
Affiliate and Year Fixed Effects?	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N
Affiliate, Country/Year, and Industry/Year Fixed Effects?	N	N	N	N	N	N	Y	N	N	N	N	N	N	Y
No. of Obs.	161,034	153,022	146,262	71,325	65,691	65,691	65,687	210,132	201,042	186,693	89,201	83,227	83,227	83,227
R-Squared	0.7867	0.7906	0.7894	0.7950	0.8008	0.8018	0.8075	0.5867	0.5946	0.5940	0.5673	0.5780	0.5780	0.5829

Note: The dependent variable in the specifications presented in columns 1 through 7 is the log of affiliate capital expenditures. The dependent variable in the specifications presented in columns 8 through 14 is the ratio of affiliate capital expenditures to affiliate assets. The specifications in columns 4 through 7 and 11 through 14 are restricted to affiliates in G-6 countries. The specifications in columns 1 through 6 and 8 through 13 employ affiliate and year fixed effects. The specifications in columns 7 and 14 employ affiliate, country/year and industry/year fixed effects. "Log of Parent Capital Expenditures" is the log of capital expenditures of the affiliates parent in the U.S. "Log of Other Affiliate Capital Expenditure" is the log of capital expenditures of the affiliates parent abroad but not in the country of the affiliate. "Log of Host Country Fixed Capital Formation" is the log of gross fixed capital formation in the country of the affiliate. "Parent Capital Expenditure/Assets" is the ratio of the capital expenditure of an affiliate's parent in the U.S. to their U.S. assets. "Other Affiliate Capital Expenditure/Assets" is the ratio of the capital expenditure of an affiliate's parent abroad to their foreign assets. "Host Country Gross Fixed Capital Formation/GDP" is the ratio of gross fixed capital formation to GDP in the country of the affiliate. Standard errors are clustered at the affiliate level.