

**OPERATIONAL FLEXIBILITY AS  
ASSET STOCK:  
THEORY AND EVIDENCE  
FROM MULTINATIONAL OPERATIONS  
IN THE TRIAD**

**by**

**S. RANGAN\***

**96/77/SM**

\* Assistant Professor of Strategy and Management at INSEAD, Boulevard de Constance, 77305 Fontainebleau Cedex, France.

A working paper in the INSEAD Working Paper Series is intended as a means whereby a faculty researcher's thoughts and findings may be communicated to interested readers. The paper should be considered preliminary in nature and may require revision.

Printed at INSEAD, Fontainebleau, France.

**OPERATIONAL FLEXIBILITY AS ASSET STOCK:  
THEORY AND EVIDENCE FROM  
MULTINATIONAL OPERATIONS IN THE TRIAD**

**Subramanian Rangan**

Assistant Professor of Strategy and Management  
INSEAD  
77305 Bld de Constance  
Fontainebleau, France

Tel: 33-1-60.72.43.14  
email: rangan@insead.fr

October 1996

---

I am grateful to INSEAD current and former R&D Deans Landis Gabel and Yves Doz for funding this study. Feedback from Bjorn Lovas shaped this paper to a great extent, as did comments by Robert Lawrence, Ray Vernon, Dennis Encarnation, Antonio Fatas, Mun Ho, and Pekka Hietala. Raghu Rau provided exceptional research assistance, and Ray Mataloni of the U.S. Bureau of Economic Analysis provided advice and support on the data.

# **OPERATIONAL FLEXIBILITY AS ASSET STOCK: THEORY AND EVIDENCE FROM MULTINATIONAL OPERATIONS IN THE TRIAD**

## Summary

Business scholars are divided on whether manufacturing multinationals operate flexibly, i.e. shift production in response to currency changes. Flexibility optimists point to information and sunk cost advantages and predict sizable responsiveness. Flexibility pessimists claim administrative heritage and internal opportunism will stifle flexibility. Empirical analysis spanning the 1977-1993 period supports the flexibility optimism view but in a qualified manner. Multinationals do systematically exploit currency shifts, but their responses are noticeably stunted. The findings are explained by re-characterizing flexibility as a strategic asset stock. Flexibility in the current period needs appropriate investments in previous periods. But due to bounded rationality and a focus on regional responsiveness multinational managers in the 1950s, 1960s, and 1970s did not make such investments. This hypothesis is selected over the alternatives considered.

---

Key words: operational flexibility; multinational firms; network coordination; exchange rates; real options; strategic asset stocks.

The strategy literature on multinational firms points to global coordination as a key task that managers ought to master. Two strands of global coordination are emphasized, one static the other dynamic. Static global coordination--often dubbed global integration--is aimed at achieving efficiencies through specialization and sharing of technology and resources. Dynamic global coordination, on the other hand, is about leveraging on an “as-opportunities-develop” basis capabilities that are latent but internal to the multinational network. A key aspect of this latter type of coordination is operational flexibility.

Operational flexibility refers to a strategy aimed at profiting from *unanticipated shifts* in cross-national variables such as exchange rates and border tariffs. The thrust of the argument is that firms that have access to both capacity and markets in multiple countries can, by dynamically rebalancing within their international networks activities such as sourcing and production, exploit such shifts. Indeed, Bruce Kogut, whose writings on this subject have been seminal, has long maintained that the essence or “the incremental value” of being multinational lies in operational flexibility (see Kogut 1983; 1985; 1989; and Kogut and Kulatilaka 1994).<sup>1</sup>

That this view ought to be regarded seriously is perhaps obvious. But consider, in any event, the information presented in Table 1 and Figures 1a and 1b. What we can see is that small profit margins and sizable direct costs, portions of which ought to be ‘movable,’ are the norm in manufacturing industries in which multinationals bulk large. We can also see that since the late 1970s, exchange rate swings in the Triad have been massive (in the order of 30 to 40 percent in both directions). Putting together these indicative facts, even skeptics ought to be able to infer that the potential upside from operational flexibility can be non-trivial to outright sizable.<sup>2</sup>

**\*\*TABLE 1 ABOUT HERE\*\***

**\*\*FIGURES 1A AND 1B ABOUT HERE\*\***

Beyond its potential to extract profits out of volatility, operational flexibility can help firms respond to the conflicting pressures of global competition. For instance, concluding that “Customers demand differentiated products, but with the same high quality and low cost as standard global products,” Bartlett and Ghoshal (1989: 61-62) aver that “Flexibility in sourcing, pricing, product design and overall strategies is now the key...” Hamel and Prahalad (1996: 238) argue that “where anticipation is impossible, flexibility must be built in.” “*Shouldn’t managers work as hard to make things flexible as they do to make things controllable?*” they demand rhetorically.

But considering the sizable upside attached to this strategy, the question arises: don’t multinationals already operate flexibly? After all, Vernon’s 1966 classic article on the product cycle attests that such strategies were recognized long ago. In it he writes, “Once [foreign] facilities are in operation, however, more ambitious possibilities for their use may be suggested. When comparing a United States producing facility and a facility in another advanced country...if...cost differences are large enough...then exports back to the United States may become a possibility as well” (pp. 198-200).

Alas, the literature is equivocal, normative, and even pessimistic on the question of whether multinationals actually operate flexibly. Vernon (1966: 200) cautions that “any hypothesis based on the assumption that the United States entrepreneur will react rationally when offered the possibility of a lower-cost location abroad is, of course, somewhat suspect. The decision-making sequence...used in connection with international investments...is not a model of the rational process.”

Kogut (1985) expresses misgivings about both management’s ability to perceive the flexibility options latent in international networks, and firms’ possession of the organizational wherewithal to execute. As he puts it, “having the potential to exercise flexibility is a far cry from having the management system to do it” (1989: 388). And, based on their inductive research, Bartlett and Ghoshal (1989: 62) go one step further and hypothesize that “Both the centralized and the dispersed organizational form [of multinationals] are too inflexible to meet the challenge.”

This presents a veritable puzzle. How does one plausibly explain the alleged disconnect between theory and practice in the context of operational flexibility? Is this, as Rumelt, Schendel, and Teece (1994: 34) alert, simply one of those areas where “strategic management scholars need to reexamine their assumptions” because the “assumption of strategic inertia is more realistic than the...assumption of rapid, rational response to change.”

Perhaps; but considering the glaring paucity of empirical work in this area it is useful to back up a bit and ask, What is firm practice in this area? Do multinationals in response to currency swings (regarded as the most pertinent stimulus in this context--see Ghoshal, 1987; Kogut, 1985; Lessard, 1986; Porter, 1986; and Prahalad and Doz, 1987) exhibit flexibility in terms of their international sourcing and production? What can we anticipate *a priori*? How do expectations square with the evidence? Do we need a new theoretical perspective on flexibility and dynamic coordination to explain the observed patterns?; with what implications for practice?

The purpose of this paper is to explore these questions. I begin by expositing two contrasting views on operational flexibility. These views, that I label flexibility optimism and flexibility pessimism, are developed based on existing literature and they suggest hypotheses that are sharply distinguished and susceptible to empirical analysis. I then describe how I operationalize in terms of a dependent variable the notion of operational flexibility, and review the data set, variables, and estimation procedures that I employ in conducting the empirical analysis. Subsequently, I present and discuss the empirical findings in light of the flexibility optimism-pessimism hypotheses.

Since both of the conventional hypotheses are found wanting in light of the evidence, I suggest a fresh interpretation labeled flexibility realism. The central point in flexibility realism is that a firm’s ability to operate flexibly ought to be viewed as a firm-specific strategic asset stock (along the lines of Dierickx and Cool, 1989) rather than as simply a pattern of behavior that can be initiated when opportune. Most importantly, *to be flexible in the current period, firms need to have planned and invested accordingly in previous periods.* I will argue that this interpretation best explains the findings, is

consistent with other facts, and more plausible than rival explanations. In the final section, I conclude with a discussion of the implications for research and practice.

## **FLEXIBILITY OPTIMISM**

From her historical perch looking back at the “maturing” of U.S. multinationals’ foreign operations, Mira Wilkins (1974: 422) noted that the “most important” characteristic visible by 1970 was “*an element of choice*” (italics in original). Based on the fact that their resources were “dispersed,” Wilkins argued that multinationals’ “patterns of production and trade can be altered.” Hence, she concluded, “There is in the multinational corporation a unique element of flexibility.”

This view that multinationals are in a distinctively favorable position to exploit changes in relative prices is based upon a few premises that can be developed in simple terms as follows. A multinational firm locates and operates facilities in other advanced countries when demand for its products in those countries is sizable and served best, for a variety of familiar reasons, through local facilities. In the decision to incur the sizable upfront costs of establishing operations in the new location, exchange rates figure, if at all, only secondarily.

**DOUBLE SUNK COST ADVANTAGES.** Routine operation of the foreign facility provides the home facility, in principle, access to output produced abroad at foreign marginal costs (that are known with some certainty by the home facility). By contrast, a purely domestic firm in its calculus on whether to source abroad might have to compare home marginal costs with (uncertain and, therefore, anticipated) foreign average costs. After all, the purely domestic firm might have to open *de novo* a facility abroad if it wanted to source firm-specific inputs from there. If internalization were imposed as a precondition to the transaction, then equivocation (indicated by the use of “might have to”) can give way to assertion.

So although home marginal costs constitute the common benchmark for both firms when they contemplate foreign sourcing, the purely domestic firm has to compare

this benchmark against foreign average costs whereas the multinational compares it against (the presumably significantly lower) foreign marginal costs.

Under such circumstances, if exchange rates should change in favor of the foreign location, even markedly so, the purely domestic firm may not find it optimal to source from abroad let alone shift production there because it finds itself under the “tyranny” of marginal costs (see Scherer, 1996: 185). Basically, home marginal costs are likely to be lower than foreign average costs even after factoring in the new exchange rate, and therefore, though attractive, switching is not optimal for and not pursued by the domestic firm. As March and Simon (1958: 173) observed long ago, “A great deal of the inertia of ‘going concerns’ can be explained on the basis of the sunk costs doctrine.”

The multinational is relatively less confined by this single sunk costs logic because it has sunk costs on both sides of the exchange rate (i.e. double sunk costs) and is, hence, in a position to compare two marginal costs.<sup>3</sup> As a result, for the multinational shifting production abroad in response to the exchange rate change is likely to be both attractive and optimal. Ergo, the first premise for anticipating that multinationals will exhibit operationally flexible responses to exchange rate changes.<sup>4</sup>

INFORMATION AND RELATIONSHIP ADVANTAGES. Routine operation of the foreign facility also generates a set of business relationships and a continually replenished stock of information about actual prices, the existence, location, and precise needs and capabilities of buyers and suppliers in that region. Imagine again that in response to a change in exchange rates in favor of foreign the home facility wanted to explore the feasibility and economics of sourcing intermediate inputs from abroad. It ought to be able to do so relatively easily because, in principle, it has privileged and inexpensive access to the information and connections necessary to follow through with its intentions. And to the extent it is better informed, it is also better equipped to actually operate flexibly.

Purely domestic counterparts confront a more difficult situation because information and connections required to operate at home are invariably different from

that required for buying and selling abroad (Kogut, 1983: 43). Moreover, presence in the foreign market is typically a necessary condition for exchanging information reliably and for settling transactions under advantageous terms.<sup>5</sup> As a consequence, the multinational is conferred with a second distinctive advantage that is often critical in exploiting shifts in cross-national variables such as exchange rates.

SWITCHING COST AND OTHER ADVANTAGES. Both purely domestic and multinational firms are likely to face switching costs or what March and Simon (1958: 173) have referred to as “sunk costs of innovation.” Presence of switching costs “does not predict that the program will remain unchanged,” (M&S, 1958: 174), rather, in the current context, it implies that exchange rates will have to cross certain thresholds before switching becomes optimal.

Loss of plant scale economies, higher inventory and working capital costs, transport and tariff costs, the availability (in particular, the lack) of suitable capacity all reinforce the notion of thresholds in obvious ways. In fact, they conjure up the image of a series of consecutive thresholds each breached successively as the exchange rate moves further and further away from its initial position. In practical terms, this leads to the anticipation that the larger the change in exchange rates, the larger will be firms’ switching responses.<sup>6</sup>

But considering the double sunk cost and information advantages described above, the organizational repertoires of multinationals are more likely to contain “well-defined performance programs” for exchange rate-related production shifting. And to the extent that multinationals’ production shifting takes place “by a simple application of programmed switching rules,” (March and Simon, 1958: 173-175) those entities ought to be less encumbered by search and switching costs. This is another reason for anticipating multinationals to exhibit a high degree of operational flexibility (particularly in the face of large exchange rate swings).

Lastly, adherents of the ‘strategic factor markets’ school (Barney, 1986) might argue that barring asymmetrically superior foresight or luck, the total expense of establishing a facility abroad includes payment for the potential benefits conferred by

the future possibility of exercising flexibility. This portion is simply the 'option price' in the scheme of those who prefer to cast operational flexibility in terms of 'real options' (see Kogut and Kulatilaka, 1994). The point is, it could be argued that multinationals have to a certain extent pre-paid for flexibility, and, therefore, it behooves them to extract the full value of this strategic factor by exploiting it in a timely fashion. This also supports the flexibility optimism view.

To summarize, flexibility optimism rests on the premise that multinational firms control on both sides of an exchange rate facilities that are adequately integrated in terms of intrafirm information and product flows. To this premise it couples the fact that under current production technologies in manufacturing industries, a substantial proportion of production costs are non-fixed (i.e. variable) and hence possibly 'movable' (see Table 1). Finally, since changes in exchange rates take very long periods of time to get fully reflected in national prices (i.e. since exchange rates move in 'real' terms), there is, *ceteris paribus*, an opportunity to make cost savings by shifting sourcing and production to the exchange rate favored location. Consequently, and consistent with Andrews' (1971) notion that corporate strategy is about matching firms capabilities to external opportunities, it can be hypothesized that:

*H1: Units within multinational enterprises in manufacturing industries will exhibit vigorous sourcing and production shifting responses to changes in real exchange rates.*

At this stage it is probably clear to the reader that flexibility optimism derives in good measure because the multinational firm is viewed as a unified rational entity whose subunits operate to optimize firm-wide performance. This position is, no doubt, consistent with the idea that multinationals are global hierarchies which internalize foreign operations with the intention of purposively coordinating disparate facilities (see Chandler, 1977). Moreover, the concern and regularity with which these entities realign their structures and systems in efforts to maximize internal coherence and align subunit with corporate goals also lends *prima facie* credence to this position of

multinational as global optimizer. Indeed, Ghoshal and Nohria (1989: 325) have reasoned that

increased environmental complexity results in increased interdependency as both the headquarters and the subsidiary are posed with a situation of mutual vulnerability. Imperfect knowledge and fluctuations in the environment induce both the headquarters and the subsidiary to engage in reciprocal exchange relationships...The interaction in these circumstances is usually characterized by a high degree of cooperation and problem solving as opposed to high levels of conflict and bargaining...

## **FLEXIBILITY PESSIMISM**

But another set of realities must be acknowledged as well. Multinational firms' full-fledged foreign affiliates, especially those operating in the large markets of the Triad, are also internal organizations in their own right. Ghoshal and Nohria (1989: 325) themselves observe that "as the resource levels of the subsidiary increase, the independent interest of the subsidiary [the agent] and the headquarters [the principal] may diverge." The former may wish to "pursue local interests [such as preserving local jobs] that may not necessarily be in concord with headquarters interests."

Once this view is allowed, an essential and familiar ingredient--subgoal optimization--is in place for developing the arguments undergirding flexibility pessimism. Administrative heritage (or organizational inertia), shoddy internal systems, and alternatives to production shifting also play a role in the flexibility pessimism view. I will develop these points below.

**ALTERNATIVE RESPONSES AND SUPERSEDED GOALS.** It is well known that in many important situations, outcome is a function of the relative cost of alternative courses of actions (a concept perhaps best illustrated in Hirschman's 1970 exit-voice paradigm). In the current context, it could be argued that multinationals respond to exchange rate changes by hedging (to the extent optimal) in currency markets, by pricing to market and accepting fluctuations in their profit margins, and by improving productivity in the location where exchange rates have appreciated. If the cumulative effect of these responses dampens sufficiently any exchange rate change related damage, then operational flexibility may not be exercised.

Reinforcing this way of thinking, and weakening the case for flexibility optimism, some writers believe that the key to success today is the ability “to adapt to customer preferences.” “Producing at low cost is not important because the products are typically sold at high gross margins over their manufacturing costs. Price is determined by value to the customer, not by cost of manufacture” (Johnson and Kaplan, 1987: 217).<sup>7</sup>

**SHODDY INTERNAL SYSTEMS.** Another factor that weakens the case for flexibility optimism is the alleged poor quality of firms’ internal information systems. For instance, management accounting scholars Johnson and Kaplan (1987: 205) note that because firms in the 1980s are far larger in size and complexity, and face far different pressures than those faced by firms in the 1920s, the era in which today’s control systems were developed,

Contemporary cost accounting and management control systems...are no longer providing accurate signals about the efficiency and profitability of internally managed transactions...Without the receipt of appropriate cost and profitability information, the ability of the “visible hand” to effectively manage the myriad transactions that occur in a complex hierarchy has been severely compromised.

These points accord with concerns expressed in Kogut (1985) regarding the organizational ability of multinationals to follow-through in practice on the concept of operational flexibility. They suggest that although in principle multinationals ought to possess information advantages, in reality, they might not.

**ORGANIZATIONAL PERSISTENCE.** In large organizations, assigning clear roles and responsibilities to subunits--i.e. establishing subunit mandates--goes a long distance in ensuring smooth functioning and the achievement of corporate goals.<sup>8</sup> Mandates involve tradeoffs and are hard to establish. In the context of multinational firms, affiliate-level mandates are likely to include a degree of geographic exclusivity, functional focus, agreements on export markets, and, increasingly, product focus as well.

Mandates effectuate a series of resource deployments and commitments whose effects on the overall performance of the affiliate will not always or easily be separable in a cause-and-effect model. Indeed, with the passage of time, the affiliate resembles a

unit in play, a black box that works (see Wilkins, 1974: Chap. XV). Any significant tinkering with the elements or the “task structures” is to be avoided because the downside risk is not measurable with certainty.

But it is precisely this sort of tinkering that operational flexibility engenders. Affiliates will be called upon to serve markets outside their preassigned region, or required to cede their own markets to units not in the region, or in other ways called upon to restructure the intrafirm flows of intermediate and final products. In certain cases, facilities may be ramped down and workers transferred or, let go. These rearrangements are likely to perturb existing mandates and task structures, and, at least temporarily, threaten the reliability of the entire system or parts thereof.

Under such circumstances, even at the risk of foregoing quantifiable flexibility benefits, exigencies that can be dealt with through alternative strategies are likely to be dealt with through those channels.<sup>9</sup> In our context, the prediction of this line of reasoning is that multinational managers are more likely to focus on improving local productivity and flexing their prices and margins than shifting production, more especially because, as with currency swings, the change they confront is likely to be perceived as impermanent.<sup>10</sup>

Bartlett (1986) and Bartlett and Ghoshal (1989) refer to organizational persistence as “administrative heritage,” a force which they argue “must be considered on equal terms with the economic, political, and other external pressures...” (p. 81). Drawing on this, Collis (1991: 53) hypothesizes that “Administrative heritage will lead firms to...maintain for a substantial time production configurations that do not optimize physical production costs.” He, like some other writers (see Haveman, 1992 for an overview), would suggest that whether firms behave flexibly or not is as much, and perhaps more, a function of “vested interests,” “organizational power of affected parties,” and even “emotional attachment” (Collis, 1991: 64), than it is of the fundamental economics of the situation. As other strategy scholars have noted, such views are “obviously at odds with much of the literature in strategic management,

especially that which emphasizes strategic change...and flexibility” (Rumelt, Schendel, and Teece, 1994: 34).

SUBGOAL OPTIMIZATION AND INTERNAL OPPORTUNISM. Although persistence is a characteristic associated with organizations, its roots are frequently thought to lie in individual or group self-interest. For instance, Chandler (1977: 11) has written that “For salaried managers the...primary goal was to assure the continuing use of...their facilities. They were far more willing than were the owners (the stockholders) to reduce or even forego current dividends in order to maintain the long-term viability of their organizations. They sought to protect their sources of supplies and their outlets...” As pointed out earlier, such an agency perspective is relevant in the case of operational flexibility since the strategy involves a reallocation of resources that at the individual or subgroup level could be perceived as a zero-sum game.

The ills of internal opportunism and subgroup optimization are exhaustively spelled out in Williamson (1975: Chp. 7). Williamson suggests that “even in the face of employment guarantees” managers might optimize subgroup rather than firm-wide goals because of fears related to “promotion prospects” and a loss of “status” (p. 119). Moreover, “the positive association of both pecuniary and non pecuniary rewards with size” (p. 120) is also suggested as a force engendering downward stickiness.

Units that have become relatively inefficient or expensive (say due to changes in exchange rates) might be allowed to hold on to the full initial complement of resources and responsibilities because of reciprocal “cross-subsidization” or what is in effect “logrolling” (p. 120-121). Corporate management is “severely limited” in its ability to check such distortions because it is “simply too expensive...to be apprised of everything that is going on at the operating level and adjust compensation accordingly...The upshot of this is that distortion-free internal exchange is a fiction...” (p. 125).

Drawing on the preceding points, and in sharp contrast to *HI*, it can be hypothesized that:

*H2: Units within multinational enterprises in manufacturing industries will exhibit no noticeable operational responses to changes in real exchange rates. Rather, their production and sourcing will appear sticky and unresponsive.*

Although admittedly crude, the two hypotheses developed above represent well the sharply distinguished conventional views on the subject. The hypotheses also comport well with the coarse nature of the publicly available 'evidence' to which we turn next.

## **EXPLORING FLEXIBILITY EMPIRICALLY**

In general, empirical exploration of firm behavior, especially trying to establish causal links, is fraught with difficulty. The current instance is no exception. The key challenge, as the reader will have figured out, lies in operationalizing the dependent variable, i.e., in devising an indicator of operational flexibility that is both faithful to the purpose and measurable with the available historical data. Naturally, the less the chosen indicator is influenced by factors other than changes in real exchange rates the better.

One indicator, and I would argue the most plausible one, that meets these criteria is movements in the mix of inputs that go into the products sold by multinational firms. To be concrete, consider the case of the German affiliate of a U.S. parent that manufactures and sells product in Germany. The product that the affiliate sells is made with both local German and imported U.S. inputs. Now imagine that the dollar depreciates substantially in real terms vis-à-vis the Deutsche mark. If the firm is operating flexibly then the German affiliate would alter noticeably its input mix exhibiting a greater reliance on its U.S. parent for intermediate and final products to service its German custom. Consequently, the U.S. content level in the German affiliates' sales would rise displacing local German content which, as a result of the mark's appreciation, has become relatively more expensive. If the firm does not

operate flexibly, then shifts in real exchange rates will not lead to systematic shifts in its input mix.

This methodology is attractive for several reasons. First, the measure I am proposing is closely related to the elasticity of substitution concept, which is itself fundamental to the notion of operational flexibility. Second, changes in the input mix are unlikely to be systematically influenced by much else other than changes in relative prices of the inputs (suitably proxied here by bilateral industry-specific real exchange rates). To be sure, changes in production technology or some similar development might also influence the input mix in a particular year. But such changes are neither likely to be as regular as, nor correlated with changes in exchange rates.

Third, there is at the current time no good reason to believe that changes in manufacturing multinationals' input mix cause changes in real exchange rates. There is, hence, no issue of reverse causality. Lastly, other measures of operational flexibility, such as changes in levels of multinationals' intrafirm trade, are, as standard empirical work in international trade shows, more sharply influenced by changes in countries' income levels than by exchange rate changes. For all these reasons, I would argue that contrasting changes in home content levels against changes in real exchange rates allows us to operationalize quite neatly multinational operational flexibility that is driven by relative price changes.

**DEPENDENT VARIABLES.** In the manner just described I explore the sourcing and production shifting responses to exchange rate changes exhibited by two sets of multinational affiliates in manufacturing industries: the Canadian, European and Japanese manufacturing affiliates of multinationals headquartered in the United States; and the U.S. manufacturing affiliates of multinationals headquartered in Canada, Europe, and Japan.

Consequently, there are two sets of dependent variables in my analyses. In the analysis of the production shifting responses of U.S.-headquartered multinationals, the dependent variable is the percentage change in U.S. content levels in sales made abroad by their majority-owned foreign affiliates. The dependent variable in the analysis of

Canadian, European and Japanese multinationals is the percentage change in the foreign- (primarily home-) content levels in sales made in the United States by their U.S. affiliates.<sup>11</sup>

The changes in content levels are volume rather than value measures. To clarify, let me explain briefly how I calculate changes in the U.S.-content levels in sales made abroad by U.S. majority-owned foreign affiliates (MOFAs). U.S. content levels for the base year of the study are estimated by taking U.S. exports made to MOFAs in a particular country in a particular industry in the base year and dividing that figure by total sales made by those MOFAs in that same year.<sup>12</sup>

U.S. content levels in subsequent years are calculated in the same manner but with two adjustments. First, in order to remove pure price effects, I deflate the U.S. export values by the industry-specific U.S. export price, and I likewise deflate foreign sales values by the industry-specific producer price in the host country. Then, in order to remove currency translation effects, I convert back into national (foreign) currencies all MOFA sales figures (which are always reported in current U.S. dollars), and rescale these national currency figures back into U.S. dollars at the nominal exchange rate that was in effect during the base year. These two adjustments ought to greatly minimize, if not eliminate, the effects on the U.S. content measure of pure currency, pure price, or equivalent but opposing currency and price changes.

Results of these calculations for the manufacturing industry as-a-whole appear (for selected years between 1977 and 1993) in Tables 2a and 2b. The small magnitude of the figures (with the notable though understandable exception for the Canadian affiliates of U.S. firms) is consistent with the view that, in the main, multinationals in the Triad produce abroad what they sell abroad (see Wells, 1992 for an insightful review linking these patterns to regionalization).

**\*\*TABLES 2A AND 2B ABOUT HERE\*\***

Although they are not shown here, similar figures have been calculated for all six manufacturing sub-industries for which data are available. These sub-industries are food, chemicals (including pharmaceuticals), metals, non-electrical machinery, electrical machinery, and motor vehicles and parts.

COVERAGE AND DATA SOURCES. Country coverage is guided by the relative importance of countries as homes or hosts of multinational firms and by the availability of data. Thus, I examine the production shifting responses of U.S. MOFAs in 9 countries including Canada, France, Germany, Italy, Netherlands, Switzerland, United Kingdom, Japan, and Australia. On the flip side, I examine the production shifting responses of the U.S. affiliates of Canadian, French, German, Dutch, Swiss, British, and Japanese multinational parents.

The unit of analysis varies depending on the question being addressed, but period-industry-country triplets form the basic units of observation. For example, the percentage change between 1985 and 1989 in real exchange rates and U.S. content levels in sales made by U.S. majority-owned foreign affiliates in the chemical industry in France could be one such observation.

Exchange rate data are from the IMF's *International Financial Statistics*. Price deflators are from the OECD's *Indicators of Industrial Activity* and the U.S. Bureau of Labor Statistics' U.S. export, import, and producer price series. Data for estimating content levels come primarily from the U.S. Bureau of Economic Analysis' annual surveys of United States multinationals' operations abroad and foreign multinationals operations in the United States.<sup>13</sup> At the time of this research, annual surveys of foreign multinationals' operations in the United States were available for 17 years from 1977 through 1993. Annual surveys of U.S. multinationals' operations abroad were available for 12 years from 1982 through 1993. I supplement this latter series with the BEA's 1977 benchmark survey.

The fact that this is a very short time series limits seriously our ability to perform anything more than simple econometric tests. Nevertheless, the coverage here in terms of time, countries, and industries is wider than in any previous study that has

considered these issues. Fortunately, as we saw in Figure 1, the 1977-1993 time interval encompasses at least one prolonged episode each of dollar appreciation and depreciation along with other less pronounced shifts in exchange rates. These large bi-directional movements in the independent variable provide a nice ‘natural experiment’ setting for our study.

**INDEPENDENT VARIABLES.** The key independent variable in the analysis is, of course, the percentage change in industry-specific bilateral real exchange rates. I estimate these figures based on both changes in bilateral nominal exchange rates and changes in industry-specific producer prices in the United States and the partner countries in the study. For example, the real exchange rate used in the study of all U.S. manufacturing affiliates in, say, Germany will reflect changes in the mark-dollar nominal rate and the sales-share weighted changes in relative producer prices in the various sub-industries in which U.S. manufacturing multinationals participate in Germany.

Beyond changes in real exchange rates, three other factors--a rise in the intensity of international competition; the liberalization of trade and other regulations that makes the transshipment of intermediate and final goods relatively more attractive and feasible; and advances in transportation and particularly telecommunications--have possibly made it more important, easier, and less expensive for multinationals to coordinate their production networks and operate flexibly over the 1977-1993 time period.

**EMPIRICAL SPECIFICATION.** Taking this into account, the specifications I estimate are variations of the following:

$$\Delta C_{ijt} = \alpha_{ij} + \beta_{ij} \Delta e_{ijt} + \gamma_{ij} T_t + \varepsilon_{ijt},$$

where  $\Delta C_{ijt}$  denotes changes in home content level in products sold by MNE affiliates operating in industry  $i$ , country  $j$ , in period  $t$ ;  $\alpha_{ij}$  is the intercept;  $\Delta e_{ijt}$  denotes changes in the industry-specific bilateral real exchange rate;  $T_t$  is a time trend variable whose coefficient is meant to capture the role of rising competition, liberalization, and falling

telecommunication costs; and  $\varepsilon_{ijt}$  is an error term. Of course,  $\beta_{ij}$  is the exchange rate elasticity of the home content level.<sup>14</sup>

## **Empirical Results**

The plots contained in Figures 2a and 2b allow us to visually inspect at the aggregate manufacturing level the overall patterns in the exchange rate and home content series for both U.S. affiliates abroad and foreign affiliates in the U.S. Due to missing observations between 1978 and 1981 the first set of patterns appears disjointed, but all told, the images are fairly striking. Input mixes do appear to co-move with real exchange rates. Indeed, the regression results presented in Tables 3a and 3b suggest strongly that multinational firms in the Triad operate flexibly and respond to shifts in real exchange rates by shifting sourcing and possibly production to locations favored by the exchange rate change.

**\*\*FIGURES 2A AND 2B ABOUT HERE\*\***

**\*\*TABLES 3A AND 3B ABOUT HERE\*\***

The coefficients on the exchange rate change variables are, with just a couple of exceptions, statistically significant and their magnitudes accord well with estimates reported in the empirical trade literature.<sup>15</sup> The coefficient on the time trend variable was neither large nor remotely statistically significant. Consistent with that finding, the results shown in Table 3b (where the sample is split into different time periods) also suggest that if and to the extent that multinationals operate more flexibly in the 1990s than they did in the 1980s or late 1970s, they don't do so as sufficiently as to be spotted in these simple tests. (I return to this point below and advance an alternative interpretation.)

Consider the other highlights of the results: (i) There is little to differentiate the responsiveness of multinationals headquartered in the different Triad countries in the

sample. For instance, the U.S. affiliates of Japanese multinationals exhibit as much operational flexibility as the U.S. affiliates of European multinationals. (ii) Depreciations in the home country currency appear to elicit a substantially larger response than do appreciations. This suggests that relatively more is shifted back home when it is optimal for foreign affiliates to increase their reliance on home operations than when it is optimal to go the other way. (iii) Lastly, analysis across industries (not taken up in this paper) suggests considerable differences among the sub-industries within manufacturing. Multinationals in the chemical industry appear most flexible and those in autos not at all.

## Discussion

The picture that emerges is by far more consistent with the flexibility optimism view than it is with the flexibility pessimism view. Given its emphasis on organizational factors and given that multinationals from Europe, Japan, and the United States have historically been organized differently (see Franko, 1976; and Bartlett and Ghoshal, 1989), the flexibility pessimism view might have led us to anticipate marked regional differences and few industry differences (unless levels of inertia and internal opportunism are expected to vary systematically across industries). But this is not what we find; in fact, we find the opposite. Consequently, *H2* --no noticeable responses-- can be safely rejected.

This, of course, is not to say that organizational resistance stemming from a variety of sources is nonexistent in multinational firms; rather, it is to say that multinational managers--at headquarters or at affiliates or possibly both places--seem clearly to be able to perceive and exploit the opportunity of operational flexibility. Hence, at least in the context of operational flexibility, economic rationality appears to be a reasonable guide to firm behavior.

However, if one quandary appears to have been put to rest, in its place has risen another, *viz.*, Though perceptible, why are multinationals' operational responses so small relative to the upside potential foreseen in the section on flexibility optimism? To

appreciate the point better return to Table 1 and notice that for multinational firms operating in the industries we are exploring, direct costs are reported to account for a very substantial proportion of total costs. Now if “The main cost drivers are [intermediate] materials and energy, the prices of which are determined by domestic market forces and government regulation,” (Kogut and Kulatilaka, 1994: 132) then even setting aside directly allocated labor and overhead, a substantial proportion--perhaps in the order of 10 to 20 percent--of costs at the affected facility ought to be ‘movable.’<sup>16</sup>

But turning to Tables 2a and 2b we see that the actual magnitudes of the shifts are nowhere as large. For example, between 1985 and 1989 when the dollar depreciated vis-à-vis the Deutsche mark by over 40 percent, the German affiliates of U.S. multinationals (see Table 2a) did raise the U.S. content in the products they sold but by less than 2 percentage points going from 4.13 to just 5.77 percent. On the flip side, over the same period, the U.S. affiliates of German multinationals (see Table 2b) lowered their reliance on German content by less than 4 percentage points going from 14.47 down to just 10.91 percent. Such diminutive shifts in input mix in the face of enormous changes in exchange rates are noticeable for the other countries too. And the question is, Why such small moves? Considering that the dog barked, why did it not bark louder?

An obvious explanation could be that physical capacity limitations existed in the locations made relatively more attractive by the exchange rate change. If more capacity existed, we would have seen larger responses. But when one looks at the U.S. and OECD data on manufacturing capacity utilization, this hypothesis receives little support.

For instance, between 1985 and 1993 when the dollar tumbled and stayed low, U.S. manufacturing capacity utilization averaged 80.6 percent (*Economic Report of the President*, 1994, Table B-52). The reported highs for capacity utilization, in 1973 and 1966, were 88.1 and 91.1 percent respectively. Crude estimates based on U.S. manufacturing GDP (*Economic Report of the President*, 1994, Table B-12) suggest that

the productive capacity contained in these extra 7 to 10 percentage points of capacity was between \$70 and \$100 billion.

Compare those figures to the needs of the European and Japanese affiliates of U.S. multinationals. In 1985, when the dollar was at its peak and U.S. content was very expensive, the value of U.S. inputs used by these affiliates was running at just around \$10 billion (*USDIA: 1985*, Table 52). If this figure had risen to \$30 or \$40 billion, U.S. capacity utilization would have risen by just 2 or 3 percentage points. But eight years later, when the dollar had tumbled by more than 35 percent, the figure had risen to just over \$20 billion (*USDIA: 1993*, Table III.H.5).

The OECD data on European countries' manufacturing capacity utilization tells a similar story. During the early 1980s, when the dollar was high, German and French manufacturing capacity utilization had dropped substantially and was running well below 80 percent (OECD, *Indicators of Industrial Activity*). Consequently, it does not seem to add up that raw capacity limitations were a major explanation for the small responses we saw above (not to mention that the global competition of the 1980s is widely associated with over- not under-capacity).

Unfortunately, the flexibility optimism view cannot satisfactorily address this puzzle nor can it provide a cogent explanation for why multinationals might respond more vigorously to home country currency depreciations relative to appreciations. Consequently, I contend that we need to explore another rationality-based hypothesis on operational flexibility that can not only explain the empirical patterns observed above but also anticipate industry and even firm-level differences.

I will propose such a hypothesis below. This hypothesis--labeled flexibility realism--will take a more dynamic view than the flexibility optimism view. Naturally then, it considers the influence of history but not through a focus on the passage of time but through a focus on the previous actions and strategies of multinationals. After all, it is well-accepted that "The current distribution of subsidiaries and patterns of trade of a multinational are largely the results of past strategies," whose effects often "linger for decades" Wells (1992: 16).

## FLEXIBILITY REALISM

The central point in flexibility realism is that a firm's ability to operate flexibly ought to be viewed as a firm-specific strategic asset stock (along the lines of Dierickx and Cool, 1989) rather than as simply a pattern of behavior that can be initiated when opportune. Consistent with Dierickx and Cool's core requirements for being characterized as a strategic asset stock, the ability to operate flexibly is: nontradeable (especially in the multinational context where 'firm specific factors' play a central role), 'nonimitable' (due to time compression diseconomies and asset mass efficiencies), and nonsubstitutable. Most importantly, *to be flexible in the current period, firms need to have planned and invested accordingly in previous periods*. Though obvious once stated, this perspective on flexibility as a strategic asset stock is elided in the existing literature. I will attempt, therefore, to sketch out the main elements of this hypothesis and argue its merits over alternative explanations.

Investments in flexibility are seen best, not in terms of investment in excess capacity, but rather in terms of opportunity costs. For example, designing and developing two product families, one for Europe the other for North America might go a long way toward making a multinational firm locally responsive; but it is going to take away from the firm's ability to shift production should exchange rates change. In this situation, investing in flexibility might mean foregoing a degree of local responsiveness.

At a minimum, a considerable proportion of intermediate inputs will have to be common at the two locations. Better still if external suppliers at the two locations are, in the normal course, trained to supply the sister affiliate in the other location. Likewise, if engineers in the two facilities can work on common standards and designs, operational flexibility will be enhanced. The same goes for specialized capital assets--the more these assets can tolerate alternate inputs and outputs (and the less location-specific they are), the better. Investments in scenario planning (see Wack, 1985) and 'flexibility drills' might make all concerned pliable and accustomed to the idea.<sup>17</sup>

Absent such investments in flexibility, even intendedly rational multinationals will have a hard time staging more than stunted responses to changes in exchange rates or other cross-national variables. It is quite reasonable then to ask whether multinationals have historically made such investments in flexibility. A sympathetic inference, made from the evidence we have just seen, would suggest no. But let us look at some pertinent historical facts and see what they suggest.

Multinationals first expanded abroad rapidly during the 1950s and 1960s (Wilkins, 1974: 434-435). That was an era characterized by fixed exchange rates and high transport and communication costs. Trade protection and punitive tariffs were also common. As a consequence, "Even the most dedicated seekers of global-scale economies were often forced to set up manufacturing facilities behind tariff walls" (Bartlett and Ghoshal, 1989: 46). Large taste and capability differences across regions also characterized that era. As a consequence, "National subsidiary companies typically used their fully integrated local capabilities to modify products and even manufacturing processes to meet local needs. Their dependence on headquarters declined, as did the ability of managers in the corporate office to control them" (B&G, 1989: 46).

Under those circumstances, would rational multinational managers have expressly invested in operational flexibility? One would be hard pressed to answer in the affirmative. The reasons relate to the boundedness of rationality and the dominant priorities of the managers of that time. Let us consider each in turn.

First, it is hard to imagine that multinationals anticipated the rapidity and intensity of trade liberalization and ensuing global competition. If exchange rates have become a strategic factor in firms' decisions since the 1980s, the timing is in large part explained by the arrival of the two preceding forces. It is also hard to imagine that managers foresaw the dramatic advances in transportation and especially telecommunication that would make cross-shipments and international coordination much easier.

Finally, it is hard to imagine that multinational managers back in the 1950s and 1960s anticipated the sudden arrival of the floating exchange rate regime, let alone the

wide swings in exchange rates that would follow. What is more, it appears that there was back then a high (and, in hindsight, misplaced) degree of certainty about these matters. In a telling comment, Paul Einzig, reputed international economist of the times, concludes his authoritative 1962 book entitled *The History of Foreign Exchange* as follows: “As things are nowadays, a very high degree of active Government intervention in the Foreign Exchange markets appears to have come to stay...At the time of writing it appears unlikely that pressure in favour of reverting to the system of floating exchanges that operated in the ‘thirties would be restored in the leading countries” (pp. 304, 306).

In such situations, organizational scholars have long noted, it is not “reasonable to expect organizations to evolve structures which maximize flexibility...A highly flexible...organization is poorly adapted to a stable set of problems... The well-adapted organization is one which matches the stability of its problem set” (Starbuck, 1965: 481). So a simple bounded rationality line of reasoning would suggest that we ought to be realistic about multinationals’ flexibility responses in the 1980s. “Unboundedly rational optima, by neglecting deliberation cost, may...[exaggerate] opportunities for gain” (Conlisk, 1996: 685).

Now supplement the above line of reasoning with the less speculative notion that the primary nature of multinational firms’ investments in the Triad in the 1950s, 1960s and even the 1970s was of a ‘market-seeking’ nature. We can then infer that the management priorities at the time were (as Wilkins, 1974: Chap. XIV has chronicled) centered around local markets, local competition, and growth. It then becomes quite unlikely that multinational managers saw value in or invested in trans-continental operational flexibility, more especially because it might have come at the expense of much valued local responsiveness.

Such a regional orientation maintained over two or three decades in the 1950s, 1960s, and even the 1970s, is bound to have resulted in the accumulation of information sets, intermediate and final product portfolios, and physical and human assets that were not very compatible, let alone fungible, across continents.

Consequently, no matter how large and persistent the shifts in exchange rates have been during the 1980s and 1990s, the lack of earlier investment in flexibility constrained the ability of multinationals to exploit in a more sizable manner these shifts. This is the crux of the flexibility realism view. Operational flexibility, in practice, calls for the pre-existence of tappable commonalities and intrafirm linkages (including in terms of information, relationships, assets, and labor). As Jones and Ostroy (1984: 16) have stated, flexibility is “a property of initial positions.” Accordingly, I contend that *feasibility, not inertia, is at the bottom of the puzzle of the perceptible but small moves.*

One attractive feature of this hypothesis is that it can accommodate firm as well as industry differences (the latter based on the fact that production technologies in some industries, chemicals for instance, permit inputs and outputs to be relatively more standardized across regions). Moreover, unless nationality of headquarters somehow influences feasibility, multinationals from different countries (controlling for industry mix) would not be expected to exhibit varying levels of operational flexibility.

The feasibility-based flexibility realism hypothesis can also suggest why, in the Triad context, home country depreciations might elicit greater responses than home country appreciations. The reasoning would go like this. Compared to their affiliates, multinational parents are more likely to be able to perform competently a broader bundle of value adding activities and deal with a broader range of inputs and outputs. Hence, it is only reasonable to anticipate that their scope for bringing back activities is greater.<sup>18</sup>

Notice that managerial power is unlikely to be the determining influence for asymmetric responses. First, it is not obvious who--headquarters or the large foreign affiliate--has more power. Arguably, given their age and size, “effective discretion” over the operating decisions of affiliates in the Triad rests with the affiliates (especially since they are also the “points of uncertainty absorption”--see March and Simon, 1958: 167). And second, the headquarters power story cannot satisfactorily explain why when the home currency appreciates, headquarters systematically transfers out work to affiliates. The sharpest illustration (see Table 2b) comes in the case of Japanese multinationals, widely regarded as the archetype of strong headquarters. When the yen

appreciated after 1985, the share of foreign (mainly Japanese) inputs in sales made by Japanese multinationals in the U.S. drops markedly from 22 to 15 and then 11 percent.

## **OTHER ALTERNATIVE EXPLANATIONS**

It is, of course, possible to suggest other explanations for the empirical patterns observed. I will describe the three most likely candidates and assess them.

**SAMPLE SELECTION BIAS.** One alternative explanation for the empirical findings could go something like this. Multinationals have located the cost-sensitive aspects of their production in low-cost locales in East Asia and Latin America--areas not considered in the study. Therefore, by focusing on multinationals' European, Japanese, and U.S. operations, this study inadvertently examines only those aspects of the production process that are, so to speak, 'location bounded.' These activities, because of reasons related to information or local externalities, are more sensitive to distance from market than they are to cost. Naturally then, we ought not be surprised to find only small signs of operational flexibility in multinationals' Triad operations.

Although it is both intriguing and sound in principle, this hypothesis does not square well with facts. For instance, for U.S. multinational parents in manufacturing, the share of inputs in direct costs that comes from (related and unrelated parties in) developing countries is reported at less than 5 percent.<sup>19</sup> More broadly, U.S. manufacturing imports from all developing countries account for less than 7 percent of U.S. output in manufacturing and trade.<sup>20</sup> Consequently, if, in what is arguably one of the most open markets in the world, the reliance on developing country imports is so small, then it is hard to believe that multinationals here and in Europe and Japan have hived off the bulk or even a significant proportion of their value added activities to facilities (their own or others') in developing countries.

In other words, too little is being done in low labor cost regions to support the hypothesis that the activities undertaken by multinational firms in the Triad are some sort of residual that are solely of the information- and externality-sensitive variety. Furthermore, the high degree of intraindustry manufacturing trade between Europe and

the United States, and Japan and the United States suggests that, in principle, it is not incorrect to view these regions as alternative production sites. Indeed, in the context of intraindustry trade among countries in the Triad, it is differentiated (intermediate and finished) products that are believed to play a leading role (see Krugman, 1995).<sup>21</sup> This reinforces the ‘yes capacity, but not the right sort’ story.

FEW WINNERS, MISLEADING AVERAGES, AND POOR DATA. Another plausible explanation for the perceptible but small responses springs from the fact that the BEA data analyzed in this study are all reported at the industry or country but not firm level. Consequently, the data aggregate firm behavior. This means that, in principle, if some multinationals operated very flexibly—indeed as flexibly as the optimism view might predict—and others did not operate flexibly at all, the average pattern could come out looking like what we saw above.

This is an important hypothesis because it is quite likely that ability to operate flexibly varies among firms even within the same industry and country (Kogut, 1985). Nevertheless, I would contend that misleading averages are not what is at the bottom of our puzzle. First, the ‘follow the leader’ behavior of multinational firms is a widely acknowledged regularity in the international business literature (see Knickerbocker, 1973; Vernon, 1983). Multinationals are invariably engaged in small-numbers oligopolistic rivalry where the opponents and their key moves are studied and often imitated. This makes it highly unlikely then that a handful of multinationals could operate exceptionally flexibly while rival firms simply watch.

Reinforcing this view is the fact that in a field where the successful actions of firms are rapidly publicized, there is no evidence (in the form of case studies or extensive business articles) to suggest that a few, let alone several, multinationals have pulled far ahead of the pack on operational flexibility. Lastly, one would be hard pressed to explain why the winners might be disproportionately concentrated in the chemical or in the machinery industry; in other words how might one explain industry differences.

As regards the quality of the data, a few points can be made. First, since the variables used in this study are first-differenced (i.e. measured in terms of changes not levels), potential problems related to measurement error are unlikely to be serious. Second, other researchers (for instance, Brainard and Riker, 1995; and Kobrin, 1991) using the same BEA surveys have reported no significant errors or drawbacks in the data. In fact, using the same data but a different methodology to examine employment substitution responses within U.S. multinationals, Brainard and Riker (1995) report results that accord well with the findings of this study.

**CONVEX SWITCHING COSTS.** The third alternative explanation relates to Jones and Ostroy (1984: 16) statement that flexibility “refers to the cost, or possibility, of moving to various second period positions.” I have been arguing the ‘possibility’ case thus far, but what of the case for costs. Seemingly obvious, this explanation would propose that switching costs are high and often convex--the more you switch the more it costs per unit to switch. Under such circumstances, switching a little might be optimal but switching a lot is not.

While this approach to switching costs is intuitively appealing and probably correct, the hypothesis it invokes puts the cart before the horse because it assumes switching costs are exogenous. But they should not be; in fact, the asset stock theory of operational flexibility put forward in this paper would argue that the earlier and the greater the investments in operational flexibility, the lower the switching costs and the lesser the convexity of those costs. So arguing that switching costs explain the stunted responses actually reinforces the feasibility and asset stock view, but it does not propose a satisfactory alternative explanation.

## **CONCLUSION**

Focusing on the issue of operational flexibility, this paper has explored a question characterized (in Rumelt, Schendel, and Teece, 1995: 2) as fundamental to strategy research: How do firms behave? Implicit in the question, and an element that makes it fundamental, is an uncertainty about the soundness and the bounds of economic

rationality as a guide to firm behavior. What I have suggested in this paper is that in the case of operational flexibility, economic rationality (exhibited by firms' responsiveness to relative price changes) appears to be a sound guide to firm behavior. But there are constraints on the exercise of this rationality which, I argue, arise from the firms' previous actions.

In the strategy literature on multinationals, the discussion on flexibility begins with the assumption that firms possess the requisite assets to operate flexibly, and moves to questions concerning current managers' abilities--strategic and organizational--to perceive and exploit the latent advantages. The flexibility realism hypothesis, on the other hand, does not question the ability of current managers to perceive the opportunity, but rather it questions the validity of the starting assumption that the assets requisite for flexibility exist.

Flexibility realism posits that under the strong dual influences of regional mandates and bounded rationality (manifested in an inability to anticipate floating rates, sharp drops in tariffs, converging tastes, and sharp drops in costs of coordination across distances), multinational managers in the 1950s, 1960s, and 1970s did not perceive of or invest in operational flexibility. The regional focus they maintained over two or three decades meant that their information sets and production capabilities were not very fungible across regions. Facing such congenital handicaps, multinational managers in the 1980s and early 1990s could show only modest results for their efforts at dynamic coordination.

At this juncture, I want to make a couple of points about research implications. First, I want to be clear that my casting operational flexibility as an asset stock should be construed as an attempt to develop a new hypothesis that merits further exploration. In future research, I plan to conduct a set of firm-level studies focused on a few industries so that I can develop measures of investments in flexibility and see how they correlate with firms' operational responses.

Second, I believe that the bridge I have made between the resource-based view of firms' competitive advantages and multinational firms' strategies and operations

holds promise and appears worthy of extension. In his article on a dynamic theory of strategy, Porter (1994: 447) has called for “An explicit link between resources and activities...[in order to] carefully define a resource in the first place.” I have done this to a certain extent in this paper. More generally, I believe this paper has made pointed progress in addressing Porter’s (p. 445) criticism that resource-based views tend to be circular and lack testable propositions.

As for research in international business, it is often written and even taught that firms multinationalize in order to do one of three things: acquire natural resources, gain or secure foreign markets, or seek efficiencies. Likewise, multinationals are classified as horizontal or vertical. What we have just seen in the exploration of operational flexibility is that these categories and classifications are unduly restrictive in terms of the ways in which we perceive multinational firms’ networks of operations. Multinationals might go abroad to gain new markets but they might well be ready to seek efficiencies from the same units, and in so doing they might operate as horizontal as well as vertical multiplant firms. In other words, it is time to emphasize more versatile and hybrid roles for multinational foreign units.

More than two decades ago, Arrow (1974: 29) observed that “There are moments of history when we simply must act, fully knowing our ignorance of possible consequences, but to retain our full rationality we must sustain the burden of action without certitude, and we must always keep open the possibility of recognizing past errors and changing course.”

In an era in which costs are becoming more not less important to firms’ competitiveness such counsel is particularly relevant for firms. Global competition, it seems, has abruptly and noticeably lifted the price elasticity in every industry where its reach has extended. Furthermore, as with the collapse in manufactured goods tariffs, the incipient expansion of regional trading blocs forebodes a world where the transshipment of product across national borders will be more feasible. Current and anticipated technological advances in transportation and communication reinforce the possibilities. Coupled with the likelihood that at least a few key currency zones

(American, Asian, Latin American, and European) will persist well into the next century, these trends imply for multinational firms that operational flexibility could turn into an even more profitable proposition than it currently seems. It therefore behooves firms to invest starting now in flexibility, more especially since the latter is an asset stock that can be the source of a valuable competitive advantage.

What is more, planning and investing in operational flexibility is likely to generate positive firm-specific externalities that could aid other aspects of dynamic coordination. For instance, such network-wide investments will strengthen the ability of multinationals to exploit local learning and innovation, and it will also create an atmosphere wherein new transnational products and services can be co-conceived. These speculations suggest that the benefits of geographic (relative to product) diversification are likely to be more enduring and tappable by firms that apply themselves seriously.

## REFERENCES

- Andrews, Kenneth R. (1971). *The Concept of Corporate Strategy*, Dow Jones-Irwin, New York.
- Arrow, Kenneth J. (1974). *The Limits of Organization*, W. W. Norton, New York.
- Barnard, Chester I. (1938). *The Functions of the Executive*, Harvard University Press, Cambridge, MA.
- Barney, Jay B. (1986). 'Strategic factor markets: Expectations, luck, and business strategy', *Management Science*, **32**, 10, pp. 1231-1241.
- Bartlett, Christopher A. (1986). 'Building and managing the transnational: The new organizational challenge' in Porter, Michael E. (Ed.), *Competition in Global Industries*, pp. 367-399.
- Bartlett, Christopher A. and Sumantra Ghoshal (1989). *Managing Across Borders: The Transnational Solution*, Harvard Business School Press, Boston.
- Brainard, S. Lael and David Riker (1995). 'Are U.S. multinationals exporting U.S. jobs?', MIT Sloan School, unpublished paper, July, Cambridge, MA.
- Basu, Susanto (1995). 'Intermediate goods and business cycles: Implications for productivity and welfare', *American Economic Review*, **85**, 3, pp. 512-531.
- Chandler, Alfred D., Jr. (1977). *The Visible Hand: The Managerial Revolution in American Business*, Harvard University Press, Cambridge, MA.
- Collis, David J. (1991). 'A resource-based analysis of global competition: The case of the bearings industry', *Strategic Management Journal*, **12**, Special Issue, pp. 49-68.
- Conlisk, John (1996). 'Why bounded rationality?', *Journal of Economic Literature*, **XXXIV**, June, pp. 669-700.
- Dierickx, Ingemar and Karel Cool (1989). 'Asset stock accumulation and sustainability of competitive advantage', *Management Science*, **35**, 12, pp. 1504-1511.
- Franko, Lawrence G. (1976). *The European Multinationals*, Harper & Row, New York.
- Ghoshal, Sumantra (1987). 'Global strategy: An organizing framework', *Strategic Management Journal*, **8**, pp. 425-440.
- Ghoshal, Sumantra and Nitin Nohria (1989). 'Internal differentiation within multinational corporations', *Strategic Management Journal*, **10**, 4, pp. 323-337.
- Goldstein, Morris and Moshin S. Khan, 1985. "Income and price effects in foreign trade," in Jones, Ronald W. and Peter B. Kenen (Eds.), *Handbook of International Economics, Volume II*, Elsevier, Amsterdam, pp. 1041-1105.
- Hamel, Gary and C. K. Prahalad (1996). 'Competing in the new economy: Managing out of bounds', *Strategic Management Journal*, **17**, pp. 237-242.
- Haveman, Heather A. (1992). 'Between a rock and a hard place: Organizational change and performance under conditions of fundamental environmental transformation', *Administrative Science Quarterly*, **37**, pp. 48-75.

- Hirschman, Albert O. (1970). *Exit, Voice, and Loyalty*, Harvard University Press, Cambridge, MA.
- Johnson, Thomas H. and Robert S. Kaplan (1987). *Relevance Lost: The Rise and Fall of Management Accounting*, Harvard Business School Press, Boston.
- Jones, Robert A. and Joseph M. Ostroy (1984). 'Flexibility and uncertainty', *Review of Economic Studies*, **LI**, pp. 13-32.
- Knickerbocker, Frederick T. (1973). *Oligopolistic Reaction and Multinational Enterprise*, Graduate School of Business Administration, Harvard University, Boston.
- Kobrin, Stephen J. (1991). 'An empirical analysis of the determinants of global integration', *Strategic Management Journal*, **12**, pp. 17-31.
- Kogut, Bruce (1983). 'Foreign direct investment as a sequential process' in Kindleberger, Charles P. and David B. Audtresh (Eds.), *The Multinational Corporation in the 1980s*, The MIT Press, Cambridge, MA, pp. 38-56.
- Kogut, Bruce (1985). 'Designing global strategies: Profiting from operational flexibility', *Sloan Management Review*, **27**, pp. 27-38.
- Kogut, Bruce (1989). 'A note on global strategies', *Strategic Management Journal*, **10**, pp. 383-389.
- Kogut, Bruce and Nalin Kulatilaka (1994). 'Operating flexibility, global manufacturing, and the option value of a multinational network', *Management Science*, **40**, 1, pp. 123-139.
- Krugman, Paul (1995). 'Increasing returns, imperfect competition and the positive theory of international trade' in Grossman, Gene M. and Kenneth Rogoff (Eds.), *Handbook of International Economics, Volume III*, Elsevier, Amsterdam, pp. 1243-1277.
- Lessard, Donald R. (1986). 'Finance and global competition: Exploiting financial scope and coping with volatile exchange rates' in Porter, Michael E. (Ed.), *Competition in Global Industries*, pp. 147-184.
- March, James G. and Herbert A. Simon (1958). *Organizations*, Wiley, New York.
- McCallum, John (1995). 'National borders matter: Canada-U.S. regional trade patterns', *American Economic Review*, **85**, 3, pp. 615-623.
- Miller, Kent D. and Jeffrey J. Reuer, 1995. 'Asymmetric corporate exposures to foreign exchange rates', Purdue University, October, CIBER Working Paper No. 94-004, West Lafayette, IN.
- Porter, Michael E. (Ed.) (1986). *Competition in Global Industries*, Harvard Business School Press, Boston.
- Porter, Michael E. (1994). 'Toward a dynamic theory of strategy' in Rumelt, Richard P., Dan E. Schendel, and David J. Teece (Eds.), *Fundamental Issues in Strategy*, pp. 423-62.
- Prahalad, C. K. and Yves L. Doz (1987). *The Multinational Mission: Balancing Local Demands and Global Vision*, The Free Press, New York.

- Rumelt, Richard P., Dan E. Schendel, and David J. Teece, (Ed. (1994). *Fundamental Issues in Strategy: A Research Agenda*, Harvard Business School Press, Boston.
- Scherer, F. M., 1996. *Industry Structure, Strategy, and Public Policy*, Harper Collins, New York.
- Starbuck, William H. (1965). 'Organizational growth and development' in March, James G. (Ed.), *Handbook of Organizations*, Rand McNally, Chicago, pp. 451-532.
- Stinchcombe, Arthur L. (1965). 'Social structure and organizations' in March, James G. (Ed.), *Handbook of Organizations*, Rand McNally, Chicago, pp. 142-193.
- Vernon, Raymond (1966). 'International investment and international trade in the product cycle', *Quarterly Journal of Economics*, **80**, May, pp. 190-207.
- Vernon, Raymond (1983). 'Organizational and institutional responses to international risk' in Herring, Richard J. (Ed.), *Managing International Risk*, Cambridge University Press, Cambridge, pp. 191-216.
- Wack, Pierre (1985). 'Scenarios: shooting the rapids', *Harvard Business Review*, November-December, pp. 139-150.
- Wells, Louis T., Jr. (1992). 'Conflict or indifference: US multinationals in a world of regional trading blocs', OECD, Technical Paper No. 57, Paris.
- Wilkins, Mira (1974). *The Maturing of Multinational Enterprise: American Business Abroad from 1914 to 1970*, Harvard University Press, Cambridge, MA.
- Williamson, Oliver E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*, The Free Press, New York.
- Zaheer, Srilata (1995). 'Overcoming the liability of foreignness', *Academy of Management Journal*, **38**, 2, pp. 341-363.

---

<sup>1</sup> A “superb early discussion” on the “connection between random changes and the value of flexibility” is credited to a 1921 book by F. Lavington on English capital markets (see references in Jones and Ostroy, 1984).

<sup>2</sup> Working in dollar terms from the figures in Table 1, in the electric and electronics industry, for instance, if a multinational affiliate accounting for 10 percent of the firm’s overall operations switched 10 percent of its direct costs into a location where it received a 10 percent exchange rate-related saving, the firm would realize \$22 million in gross savings. If switching costs and market share investments (made in the form of lower prices passed through to consumers) took, say, an 80 percent bite out of these gross savings, the firm’s profits would still rise by about \$4 million annually through the exchange rate cycle.

<sup>3</sup> To be sure, the lesser the need for internalizing foreign operations, the lesser of a handicap the absence of foreign facilities presents.

<sup>4</sup> This is the premise underlying Kogut’s (1983) reference to real options in the context of multinational operational flexibility.

<sup>5</sup> See McCallum (1995) and Zaheer (1995).

<sup>6</sup> Contrariwise, in the absence of positive switching costs, the magnitude of the production shifting response will not vary with the magnitude of the shift in rates. Responses will then appear discontinuous. To see this, picture the case where switching costs (and for simplicity, transport and tariff costs) are zero and where the initial exchange rate is exactly at that level where marginal costs at home and abroad are equal. The multinational is now indifferent about the location of production. But if rates shift even a little bit away from this initial level, production lurches, to the fullest extent possible, to the location favored by the rate change. The process will reverse itself fully if rates move past the initial point in the opposite direction.

<sup>7</sup> Of course, while this line of thinking might suggest why multinationals need not operate flexibly, it does not explain why in the face of the market power they enjoy, multinationals would pass up an opportunity to reduce costs and use the savings toward market share and higher profit margins.

<sup>8</sup> See Barnard (1938: 137).

<sup>9</sup> See Stinchcombe (1965).

<sup>10</sup> Unlike shifts in technology, shifts in exchange rates could for practical purposes be perceived as impermanent because rates may reverse themselves in the future. This uncertainty about the future course of rates could translate into a “wait and see” attitude wherein switching is postponed because switching and re-switching are costly.

<sup>11</sup> In both cases, therefore, I examine changes from the viewpoint of affiliates as opposed to parents. Data problems do not permit the opposite analysis.

<sup>12</sup> Of all U.S. exports made to manufacturing MOFAs, over 90 percent originate from the U.S. parent (i.e. is intrafirm trade), and, typically, less than 20 percent of the total are intended “for resale without further manufacture.” In other words, the vast majority are intermediate products (BEA, *USDIA*, various years, Tables III.H.5; III.H.9; and III.H.15).

<sup>13</sup> Survey coverage is sizable. In the manufacturing industry in 1989, the BEA survey covers over 1,200 U.S. parents and their more than 6,000 majority owned foreign affiliates. In the same year but on the opposite side (i.e. foreign multinationals in the U.S.), the BEA survey provides data on over 2,500 U.S. affiliates in the manufacturing industry.

---

<sup>14</sup> Considering the breadth of the earlier discussion, this specification is clearly “parsimonious.” Some comments are, therefore, in order. First, firms don’t report and the BEA doesn’t gather data on switching costs or plant scale, not to mention the organizational factors discussed above. Further, I am not aware of another source that provides these data by industry by country by year and specifically for multinational enterprises. Hence, I estimate the reduced form specification.

Having said this, let me point out that the left out variables—including unavailability of capacity, switching costs, plant scale economies, location-boundedness of certain inputs—only impede or dampen responsiveness. This implies that although the estimates of  $\beta_{ij}$  might be biased, they are likely to be biased only downward. Consequently, if  $\beta_{ij}$  turns out to be positive and statistically significant, then we have a solid indication that the multinational firms in the sample do actually shift production in response to exchange rate changes. In this sense, the parsimonious specification provides a strong test of the hypothesis that multinationals shift production in response to exchange rate changes.

<sup>15</sup> See Goldstein and Khan (1985).

<sup>16</sup> Economists estimate that in U.S. manufacturing between 1947 and 1979, intermediate inputs accounted for ‘50 percent or more’ of gross output (Basu, 1995: 518).

<sup>17</sup> In a 1939 article, Stigler “describes one plant as being more flexible than another if it has a flatter average cost curve” (cited in Jones and Ostroy, 1984: 25). Indeed, the flexibility investments described above would take firms in precisely this direction.

<sup>18</sup> See Miller and Reuer (1995) for more on asymmetric corporate responses to currency changes.

<sup>19</sup> Estimated from figures for manufacturing in *USDIA, 1989 Benchmark Survey*, Tables II.N.1 col. 7, and Table II.Q.6 col. 1. It is assumed that 50 percent of the figure reported for COGS and SG&A is direct costs. Further, U.S. imports by U.S. parents are doubled to account for imports received from developing country affiliates. The share of total imports assigned to developing countries is calculated from the figures contained in Table II.Q.5 col. 2.

<sup>20</sup> Figures are for 1989. Import figures from U.S. Dept. of Commerce, August 1996, *U.S. Foreign Trade Highlights: 1995*, Table 15, p. 41; output figures from the *Economic Report of the President*, 1994, Table B-11.

<sup>21</sup> The other essential half of the conventional intraindustry trade story is scale economies. But regional markets in the Triad are sufficiently large so as to be able to accommodate scale efficient facilities in most industries (Kobrin, 1991; and Wells, 1992). See the references in Krugman (1995) for recent views emphasizing factors other than scale.

Table 1. Direct costs and operating income at selected large multinational firms, 1992\*

SIC Code	Industry	Directly allocated costs as proportion of total**		Operating income***	
		Average †	Range	As % of sales †	Per firm (\$s in millions) †
20	Food	0.69	0.42 - 1.00	12	2,671
28	Chemicals and allied products	0.58	0.19 - 0.96	14	1,446
33, 34	Primary and fabricated metals	0.83	0.44 - 0.97	5	279
35	Machinery, except electrical	0.64	0.35 - 0.91	4	1,112
36	Electric and electronic equipment	0.73	0.38 - 0.97	9	2,916
371	Automobiles	0.83	0.48 - 0.97	3	2,258

Note: Estimates in the table are based on data contained in Compustat Financial Information on the 50 largest firms (sales basis) in each industry listed. Invariably, multinationals from the United States, Europe, and Japan constitute the vast majority of the 50 firms in each industry.

\* In 1982, direct cost shares were in every case similar or larger.

\*\* Estimated by dividing the cost of goods sold into total costs. Cost of goods sold refers to directly allocated material, labor, and overhead. Total costs are computed as net sales minus operating income after depreciation.

\*\*\* Operating income after depreciation is estimated as net sales minus the sum of cost of goods sold, selling, general and administrative expenses, and depreciation.

† Figures are firm sales-weighted averages.

Source: Standard & Poors, COMPUSTAT, December 1995 compact disc.

Table 2a. Estimated U.S. content in sales made by U.S. multinationals' majority-owned foreign affiliates in manufacturing, 1977-1993\*

In percent; based on U.S. firms' foreign operations

Country	Year				
	1977	1982	1985	1989	1993
Australia	9.03	8.28	7.68	7.67	7.95
Canada	31.79	30.91	36.64	36.38	37.71
France	5.08	6.21	4.81	4.56	4.65
Germany	4.52	3.94	4.13	5.77	8.50
Italy	4.83	4.12	3.94	5.60	4.41
Japan	11.04	10.83	9.28	13.21	11.65
Netherlands	10.47	12.23	7.68	8.42	9.59
Switzerland	17.48	7.27	3.56	5.37	7.14
U.K.	5.08	5.80	5.45	6.54	7.76

\* Author's estimates; methodology and sources described in the text.

Table 2b. Estimated foreign content in sales made by foreign multinationals' U.S. affiliates in manufacturing, 1977-1993\*

In percent; based on foreign firms' U.S. operations

Country	Year				
	1977	1982	1985	1989	1993
Canada	17.67	7.73	9.65	9.37	10.93
France	8.18	16.19	14.72	12.68	12.64
Germany	7.08	8.35	14.47	10.91	10.19
Japan	10.67	19.07	22.11	14.59	10.70
Netherlands	5.55	7.27	12.13	9.39	10.66
Switzerland	6.17	6.08	8.13	5.70	6.32
U.K.	8.84	7.49	8.81	6.30	7.55

\* Author's estimates; methodology and sources described in the text.

Table 3a. Regressions explaining year-to-year changes in the foreign-content levels in sales made by U.S. affiliates of Canadian, European, and Japanese multinationals in manufacturing, 1977-93

Independent variables	All foreign*	Country of headquarters						
		Canada	France	Germany	Netherlands	Switzerland	United Kingdom	Japan
Constant	2.24 (1.47)	-2.26 (-0.55)	4.67 (0.80)	3.0 (1.03)	4.28 (1.12)	2.15 (0.38)	0.17 (0.06)	3.24 (1.17)
Changes in real exchange rates	1.06 (7.25)	1.63 (1.40)	1.31 (2.35)	0.96 (3.91)	1.39 (3.81)	0.61 (1.35)	0.89 (3.19)	1.31 (5.34)
<i>Summary statistics</i>								
Adjusted R-squared	.32	.06	.23	.49	.47	.05	.38	.65
Number of observations	112	16	16	16	16	16	16	16

Note: T-stats in parentheses.

\* Refers to 7 countries in the table.

Table 3b. Regressions explaining changes over multi-year intervals in the home-content levels in sales made by foreign affiliates of U.S. multinationals and the U.S. affiliates of foreign multinationals in manufacturing, 1979-93

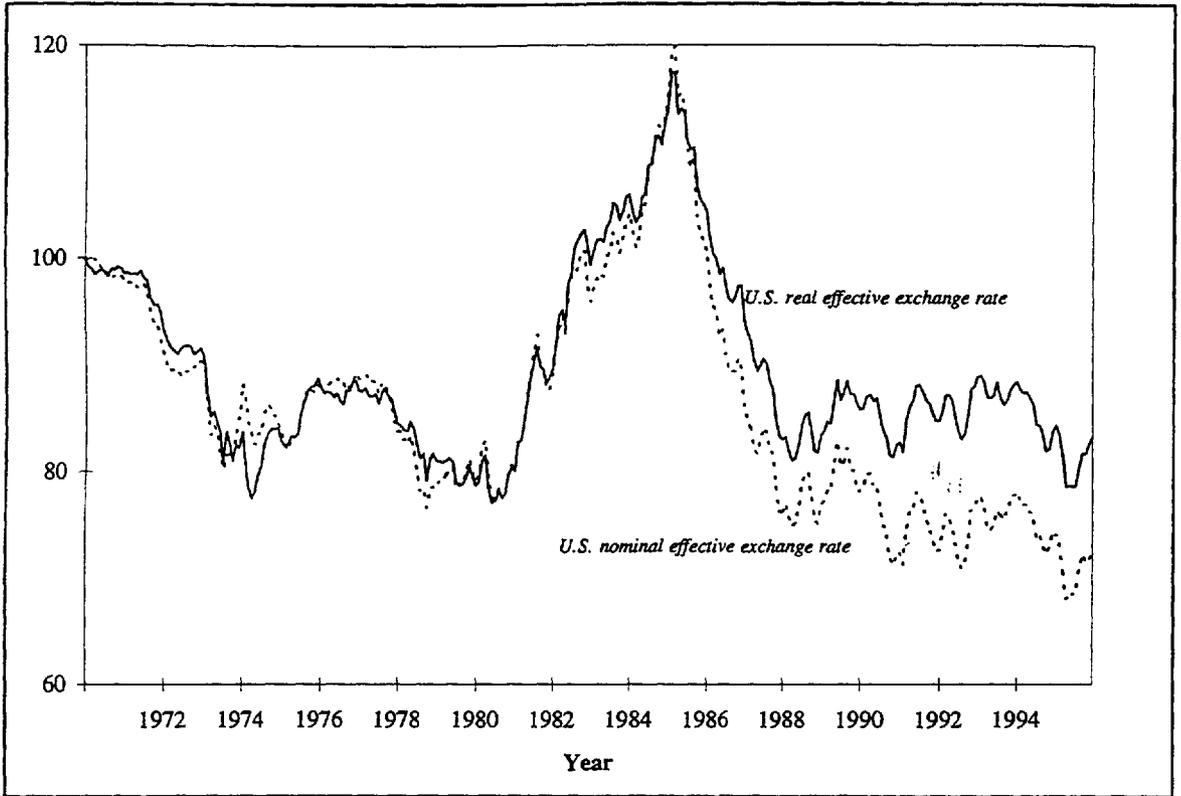
Independent variables	Foreign multinationals' U.S. affiliates			U.S. multinationals' foreign affiliates		
	Home currencies depreciating 1979-85*	Home currencies appreciating 1985-89	Home currencies appreciating and depreciating, 1989-93	Dollar appreciating, 1982-85	Dollar depreciating, 1985-89	Dollar appreciating and depreciating, 1989-93**
Constant	-60.80 (-0.99)	14.28 (1.06)	8.95 (1.96)	0.21 (0.01)	-28.51 (-1.65)	9.35 (2.13)
Changes in real exchange rates	2.80 (2.46)	1.53 (2.77)	1.39 (3.07)	1.11 (1.06)	1.49 (3.19)	1.88 (3.83)
<i>Summary statistics</i>						
Adjusted R-squared	.46	.53	.58	.02	.51	.67
Number of observations	7	7	7	9	9	8

Note: T-stats in parentheses.

\* For Japan, the yen depreciation is measured from 1978.

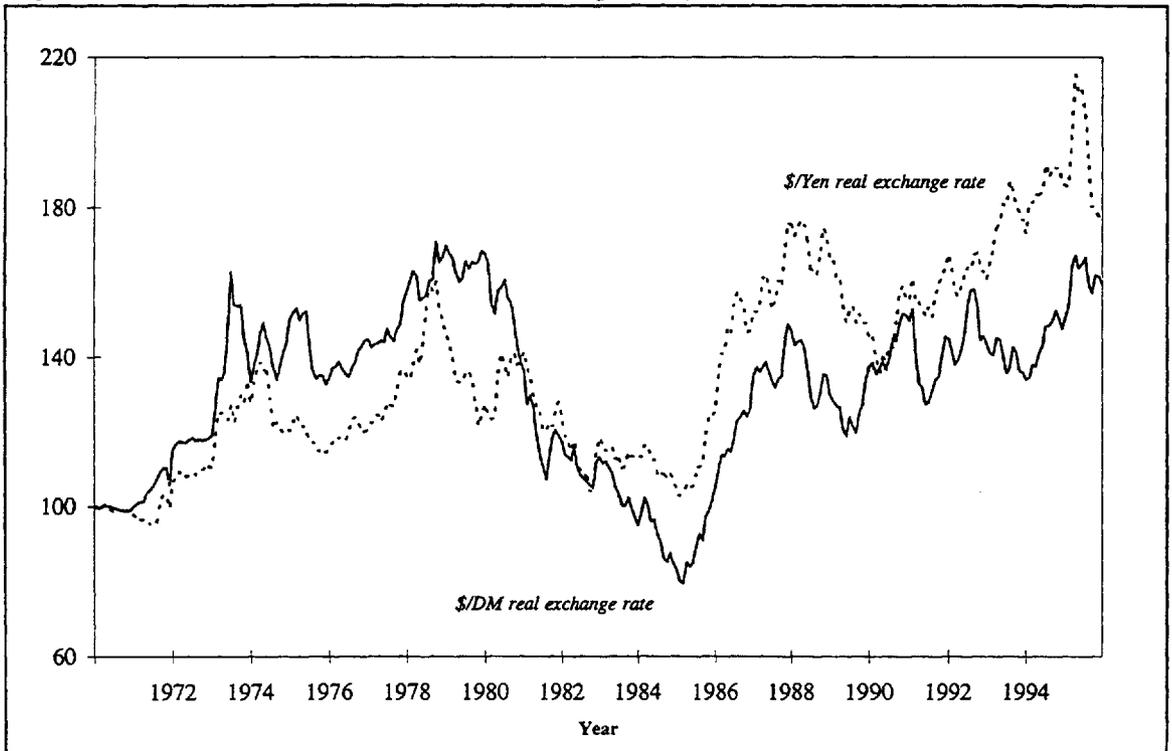
\*\* Results shown are without Japan. With Japan, the coefficient on exchange rates is 0.45 with a t-statistic of 0.66.

Figure 1a. Index of U.S. dollar's trade weighted exchange rate, 1970-1996



Source: J.P. Morgan

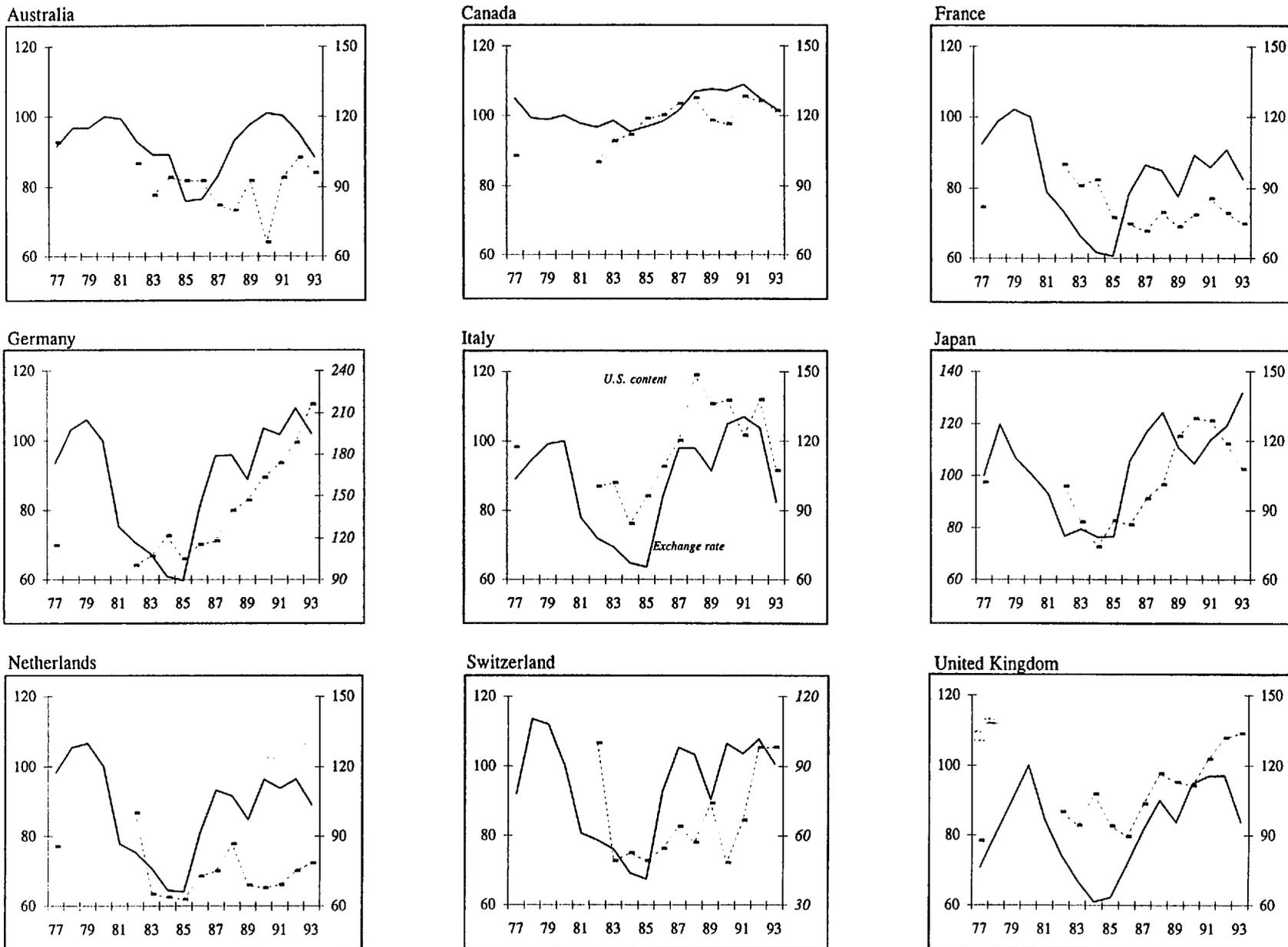
Figure 1b. The German deutsche mark and the Japanese yen vis-a-vis the U.S. dollar, 1970-1996



Source: IMF, *International Financial Statistics*, March 1996 compact disc.

Figure 2a. Country-specific industry shares-weighted real exchange rates and U.S. content levels in sales made by U.S. majority-owned foreign affiliates in manufacturing, 9 countries, 1977-93

Scale on left side and solid line pertain to real exchange rates (set at 100 for 1980); scale on right side and dotted line pertain to U.S. content levels (set at 100 for 1982)\*

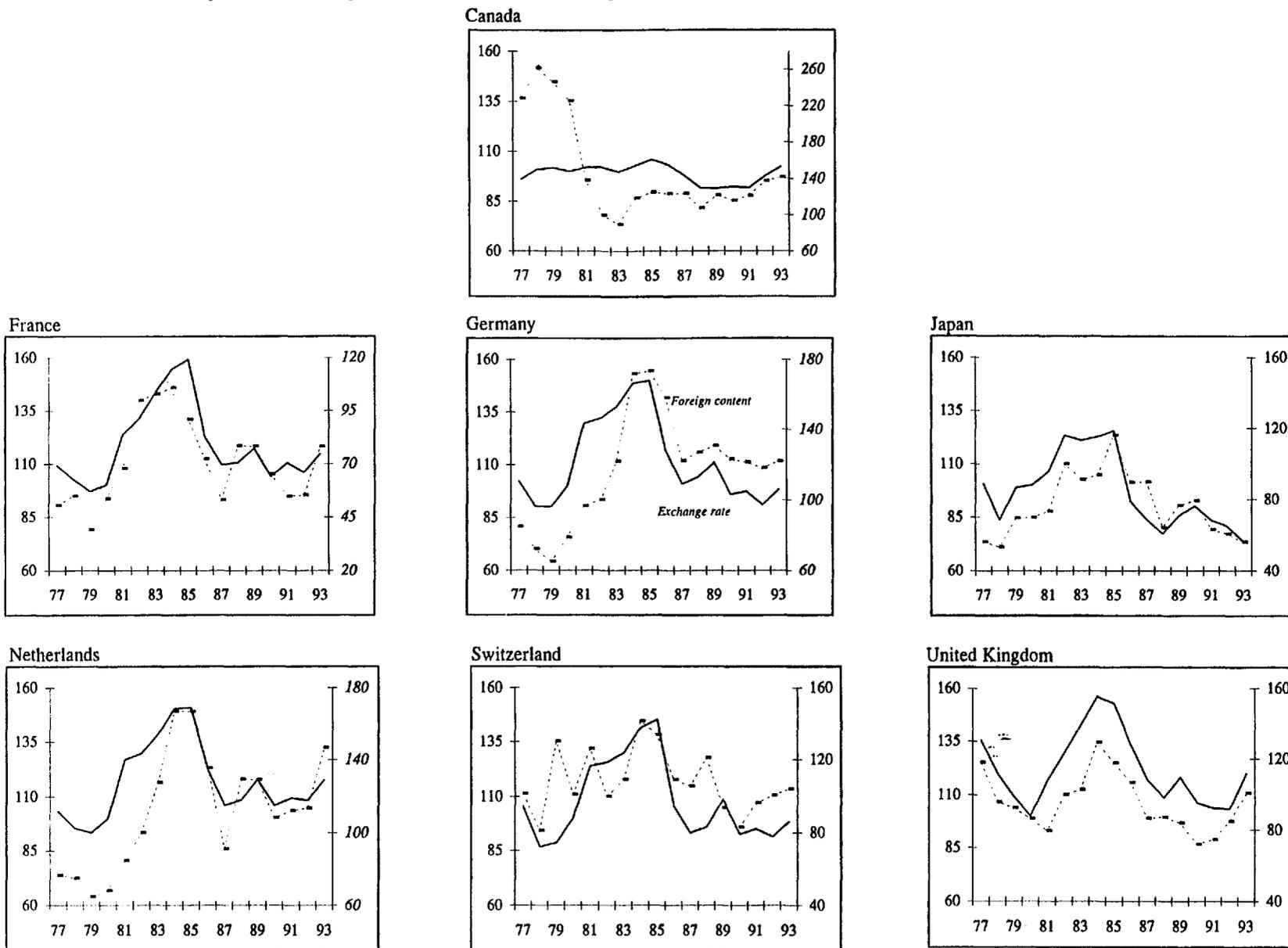


Sources: Bureau of Economic Analysis, U.S. Direct Investment Abroad; IMF, International Financial Statistics; and OECD, Indicators of Industrial Activity.

\*: Exchange rate =  $((U.S. \$/Foreign\ Currency\ Unit) \times \Sigma(P_i^*/P_i)) \times (I/I^*)$ ; U.S. content levels estimated as described in the text. U.S. content levels for years 1978-1981 are not available.

Figure 2b. Country-specific industry shares-weighted real exchange rates and foreign content levels in sales made by the U.S. affiliates of foreign multinationals in manufacturing, 7 countries, 1977-93

Scale on left side and solid line pertain to real exchange rates (set at 100 for 1980); scale on right side and dotted line pertain to foreign content levels (set at 100 for 1982)\*



Sources: Bureau of Economic Analysis, Foreign Direct Investment in the United States; IMF, International Financial Statistics; and OECD, Indicators of Industrial Activity.

\*: Exchange rate =  $((\text{Foreign Currency Units}/\text{U.S. \$}) \times \Sigma(P_i/P^*)) \times (i/I)$ ; foreign content levels estimated as described in the text.