Empirical Tests of the Transaction Cost Model: The Evolution of the Pre-1939 British Manufacturing Multinational*

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INTERNATIONAL THEORY

Historians of international business, borrowing extensively and uncritically from the new institutional microeconomists, analyze the multinational enterprise as a hierarchical alternative to market transacting [1, 2, 4, 12, 13, 16, 18, 21, 22, 24, 26, 27]. Multinational enterprises are institutions which attenuate the cost of transacting in arm's-length markets. Transaction costs arise in two ways: when the value of and quasi-rents from firm-specific advantages in technology, management skills, product differentiation and brandname are not fully appropriated; and when costs are incurred to gain information and negotiate, monitor and enforce contracts. The foundation of the transaction cost approach was Coase's insight that firms replace markets until the cost of organizing another transaction within the firm became equal to the costs of carrying out the same transaction through exchange in the market [7, p. 395]. This simple market-hierarchy paradigm has been modified into a general theory of contractual arrangements in international business. Recent work on comparative institutional arrangements distinguishes discrete intermediate modes, such as long-term contracts, franchises, licenses and agents, between the market and the hierarchical firm as shown in Table 1 [3, 29, 30, 31].

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TABLE 1
Alternative Modes and Growth Stages of British Multinational Enterprises

Mode Choices	Typical Historical Stages
Exporting	
Cartels	
Franchises	
Exporting through Mercantile House	Exporting through Mercantile House
Agents	Agents
Sales Branch	Sales Branch
Production	
Production Branch	Production Branch
License	
Cartel	
Subcontract	
Cooperative Agreement	
Joint Venture	

The introduction of a spectrum of contractual arrangements highlighted the empirical problems of the general market-hierarchy approach. Alternative institutional arrangements exist because different transaction costs apply to each mode. But little effort has gone into analyzing the transaction cost factors which make one arrangement cheaper than another. Only by dimensionalizing the transaction cost properties of the multinational enterprise can the when and where internalization is the most efficient mode for organizing economic activity be predicted. But as Casson [4, p. 12] has noted, the specification of transaction cost functions is not an easy matter, and the specification of the costs of alternative institutional arrangements has not proceeded very far. Thus the empirical criticism that the Coasean market-hierarchy formulation justified the hierarchical firm on efficiency grounds by the simple expedient of hypothesizing high enough transaction costs in the market is also applicable to the comparative institutional model. In spite of these empirical problems the transaction cost model has gained widespread acceptance among economists and business historians interested in international business. While there has also been unease, fueled by the historians healthy skepticism of general theories, internalization has been used as a general explanation for the growth of multinationals. Unfortunately the appeal to transaction costs without rigorous empirical testing has discredited the internalization model and substituted a label, transaction costs, in place of historical understanding.

Besides these empirical problems the transaction cost model has been used too restrictively by business historians. British business historians, with a few exceptions, have asked why domestic firms shift from domestic exporting to overseas production. The short answer, of course, is that they do not. Indeed one of the most important contributions of business historians has been to uncover the dynamics of multinational enterprise growth. In a study of 119 British multinational enterprises before 1939, 70 percent of the firms had overseas travellers and 99 percent entered agency contracts before making an initial foreign direct investment in a sales branch [19, pp. 620-1]. In almost all cases, overseas production by British manufacturing multinational enterprises, was preceded by sales subsidiaries. This confirmed the same pattern discovered much earlier for American multinationals by Wilkins [26, pp. 207-18; 27, pp. 417-22]. American firms first exported, next employed an agency system and then made a foreign direct investment in sales branches before finally investing in overseas production plants. More recently, Chandler [6] has emphasized a similar pattern for the largest British, American, European and Japanese multinational enterprises. Eight case studies of European multinational enterprises in the US before 1914 by Buckley and Roberts [2, p. 44, 67, 87, 91-2] revealed a similar pattern of agents preceding sales subsidiaries and sales branches preceding production. As shown in Table 1, the export-agent-sales branch-production plant route was the dominant growth strategy for British multinational enterprises.

Much more attention needs to be focused on the reasons British multinational enterprises pass through these particular series of contractual arrangements. Since the first three stages in the historical evolution of the multinational enterprise in Table 1 corresponds to choices of alternative modes for exporting, transaction cost theory is an appropriate methodology for modeling dynamic growth. Internalization theory predicts that firms choose between alternative institutions for selling or choose between alternative institutions for producing on the basis of the relative costs of each alternative mode. Interalization theory, as currently specified, cannot explain the last stage in the evolution of the multinational enterprise, the shift from a sale to a production branch. The sales branch and production plant are not alternative institutions. The decision to replace a sales subsidiary with a production facility is essentially a multiplant investment decision analyzed in terms of orthodox location theory and the theory of production. Perhaps this is best seen in Dunning's OLI framework where internalization is supplemented by ownership advantages and location factors to derive a complete model of the multinational enterprise [8, 9]. Business historians have not been alone in claiming that internalization explains the choice between sales and production branches. For example, Caves [5, p. 36] argued that "the intangible-assets model thus identifies exporting and direct investment as alternative strategies for the potential multinational enterprise." However, the formal model of exporting versus foreign investment is presented in terms of the costs of pro-

duction and tariffs without any transaction cost factors [5, pp. 37-40]. As specified, the transaction cost model is not well-suited to explaining the decision to invest in overseas production. In fact, it is surprising that the plant investment decision has attracted so much attention. If anything the investment in overseas production is easier to explain than the investment in agents or sales branches. Of course, the investment in plant raises major questions about market structure and economic welfare for the host economy, but these are rarely discussed by business historians. The rest of the paper operationalizes the transaction cost approach in order to explain the historical evolution of the British multinational enterprise. In particular, an internalization model explaining the transition from sales to production branches is specified and tested.

MARKET TRANSACTING

British multinational enterprises first exported through merchant houses or agents recruited by the firm's directors and overseas travellers. When the firm sold to mercantile houses the decision on the location of exports was taken by the merchant house and not the producing firm. In the market-agency mode, the agent sold the product, at fixed list prices for a commission. The firm had an intangible asset (monopoly advantage) embodied in a product, the return to which was appropriated through arm's-length markets. Many products are effectively transacted through the market. However, when market servicing involve more than providing a product then arm's-length markets are inefficient modes for transacting.

AGENCY AND SALES BRANCH OFFICE

Besides monopoly advantages in products, firms have product-related intangible assets in advertising, product differentiation and marketing, such as demonstration, service and repair and credit. Arm's-length markets do not fully appropriate the returns to services related to physical products [3]. Generally, the provision of product-related services are supplied simultaneously with the purchase or sales of the physical product and by the same firm. Both agencies and sales branches appropriate the returns to product-related services, but there are differential costs to each mode depending on the nature of the product, frequency of transacting and opportunism.

Based on a sample of 21 pre-1939 British multinational enterprises, agency contracts were analyzed to evaluate the input requirements, such as the amount of travelling, advertising and showing, agents performed to ensure a high quality service [20]. Principals required agents to invest in engineers or special salesmen with specific technical knowledge of the principal's product.

One common practice was to share the expense of a technical representative, who was frequently appointed by the principal, or for the principal's technical salesman to reside with the agent. The agency agreement explicitly required technical staff to demonstrate machinery, assemble machines (sometimes on the customers premises) and to provide repair and maintenance. Agency contracts compelled agents to carry stock, ensuring prompt delivery and acting as advertising when displayed in the agents' office and showrooms. Consignment stock carried by the agent allowed the principal to advance credit to customers. Service provisions dominated the agency contract overshadowing the conditions related to the physical product.

Agency contracts are subject to transaction costs, especially the costs of monitoring and opportunism. In every agency contract, vague (and unenforceable) clauses required the agent to "push the sale" of the principal's product. The threat that agents would act opportunistically by seeking their own self-interest at the expense of the principal meant contracts had to be monitored by the principal. Agents could not sit back and wait for orders. The demand for the principal's product, flowing from the principal's investments in brand name, goodwill, product differentiation and advertising, created an appropriable rent that the agent could capture at the cost of rudimentary paperwork. Such opportunism was a transaction cost arising under uncertainty and asymmetric information which meant that principals could not specify a feasible set of actions for the agent for every contingency. By the avoidance of contractual performance, the agent cheated the principal. As a result agency contracts had to be monitored and enforced to ensure compliance. But agency performance was highly prone to shirking since the input of human energy into task completion, such as working a sales area, was particularly costly to meter.

Service monitoring and enforcement provisions were written into the agency contract. Commissions, tying income to the level of sales, were incentives to high level of sales effort. The requirement to carry stock and provide showrooms regulated advertising, and the requirement to hire an engineer ensured demonstration, installation and after-sale service. Even with such requirements, principals could not be sure that service performance was adequate. Direct monitoring was necessary. Stocks were monitored by weekly, monthly and half-yearly stock lists. Agents might be required to send the terms of each sale (including the customer's name) to the principal. These provisions were strengthened by the right of the principal to inspect the stock and books and to appoint the agent's book or storekeeper. The principal's technical representative who worked from the agent's office was an effective, if costly, form of direct monitoring. All principals employed travelling representatives who monitored the agents. The agent was sometimes "bonded" to the principal through idiosyncratic investments such as special repair facilities, showrooms and warehouses and special technical knowledge related to

demonstration, installation and repair of goods. While ensuring the integrity of the exchange of service-related knowledge between the principal and agent and guaranteeing the provision of customer service by agent, such idiosyncratic investments have been dubbed "hostages" because they have zero or low resale value [32, pp. 520-1]. Agents were dissuaded from service quality shading and poor selling performance by nonsalvageable investments in specialized buildings and human capital. Finally, the credit facilities granted by agents could be the source of opportunistic advantage. Principals wrote into the agency contract provisions for repayments and sharing of bad debts to attenuate this form of agent opportunism.

The services related to the product, rather than the product itself, was the most costly aspect of the agency contract to monitor. One solution to the high costs of monitoring and agent opportunism was vertical integration. The transition from an agent to a sales branch depended on the frequency of transacting and the need for idiosyncratic investments by the principal, including brand name and special physical capital such as a distribution network. The larger the volume of sales, the greater were the monitoring costs of the agency system and the greater the losses through agent opportunism. Thus the propensity to establish branch sales offices depended on the level of sales. The more complex the product, the greater the idiosyncratic investment by the principal in specialized capital, brand name and advertising and the greater the potential appropriate rents by an opportunistic agent. An agent could shade service quality, gaining high (short-run) returns from the principal's investment in brand names and goodwill as well as the specialized capital investments in distribution. The timing of the transition from agency to sales branches depended largely on the costs related to the services provided with the product. The establishment of a sales subsidiary was the first foreign direct investment decision, and the economic problem which it solved was related to marketing and servicing a product at a distance.

PRODUCTION PLANT CHOICE

The decision to shift from a sales branch to a production plant is perhaps the easiest transition to analyze in the evolution of the British multinational enterprise. This shift does not involve any product servicing considerations. Manufacturing the product in the host economy leaves selling arrangements unchanged. The decision to invest in a production facility has been analyzed by economists and economic historians in terms of a multiplant foreign investment decision based on locational, transport, tariff and production cost variables. We accept these factors as dominant considerations in the transition from sales to production branches. However, this paper departs from the locational-production cost approach by specifying transaction cost factors which contribute to the decision to replace sales with production facilities.

In archival studies of Wellcome, Babcock, Bryant and May, Callender Cable, Albright and Wilson, and British Insulated Cable overseas plant investment was found to be concentrated into a very few years. For example, Wellcome invested in overseas plant in Canada and Australia in 1902 and the US two years later, before a break in foreign direct investment until 1954. Bryant and May had two main periods of foreign direct investment, with three production facilities formed between 1905 and 1907 and a further five branches in 1927. Babcock made three investments between 1906 and 1910 and four between 1920 and 1925. Albright and Wilson made FDIs in the US in 1896 and Canada in 1902 followed by a gap of 37 years before making a joint foreign direct investment in Australia. A similar pattern applies to Dunlop, Courtaulds, Vickers, ICI and Reckitt. The bunching of foreign direct investment decisions, shown in Table 2, was uniform across countries, product groups and firm sizes. The paper hypothesizes that the bunching can be explained largely in terms of transaction costs.

Two types of transaction costs are internalized within a production branch: the rents from production-based knowledge which are not easily codified and patented and scope economies related to managing at a distance. Scope economies arise when knowledge of multinational management has public good characteristics allowing the input to be shared between several non-competing applications without impairing its value in any one application [28, p. 346; 25, p. 226]. Management knowledge has strong learning-by-doing characteristics and it is embodied in human capital organized as teams [25, p. 228]. The bunching in Table 2 reflects such scope economies. The production branch is the particular contractual arrangement which attenuates the transaction costs arising from recognition and disclosure of knowledge in arm's-length markets.

TABLE 2
Bunching of Foreign Direct Investment in Production Branches, 18701939

Gap in Years	All Firms (%)	Firms with Three or more Foreign Investments (%)
No Gap	26	26
1-3	19	22
4-10	21	19
11-25	18	17
26-39	7	9
40+	7	8

Source: Sample of 448 British multinational enterprises

To test these propositions, quantitative data on 380 pre-1939 British multinational enterprises were collected, allowing a qualitative dependent variable, 1 for production branch and 0 for only a sales branch to be defined for each firm [22]. The following locational and production cost independent variables were derived: qualitative variables for each product group proxying production costs; MARKET, the percentage of the labor force in manufacturing in 1923, proxying market size and maturity; DEVELOP a qualitative variable measuring the level of development, PSYCHIC, a qualitative variable measured by whether the host country was English speaking; and DISTANCE, a qualitative variable "far or near" to measure physical distance. High psychic proximity proxied by a common language, culture and social system lowers the economic and political costs of investing while distance from the parent raises the costs. Transaction costs were proxied by three variables: NUMBER, which is the number of branches each parent firm operates abroad; DIVER, the number of different SIC product groups for each firm, and RAW, a binary dummy variable measuring whether the parent had backward vertical contracts or integration.

Since individual firms faced the binary choice of investing in a production plant or operating a sales subsidiary, limited-dependent or qualitative choice models provide an appropriate characterization of the mode choice decision. For firm i, given the matrix of explanatory variables denoted X_i, we assume the probability of investing in a production plant, P_i, can be described by the logistic function,

$$P_i = 1/[1 + \exp(-bX_i)]$$

where b are the coefficients to be estimated. Usually this equation is written as a logit or log of the odds ratio,

$$\ln [P_i/(1-P_i)] = bX_i$$

and estimated by a maximum likelihood procedure which treats each individual firm as a separate observation [10, 17]. This is the econometric procedure followed here.

The result of the logit equations are reported in Table 3, the reference firm (in equations 1-4) produced all product groups other than food and drink and chemicals. In models 1-4 the product dummies are significant, suggesting that insofar as the dummies captured production costs, cost factors increased the probability of forming a production facility. In model 5 a larger number of product group dummies are introduced. Although the additional dummies are not significant, the signs are those expected, particularly for textiles and metal goods. On the basis of a log likelihood chi square test the additional dummies in equation 5 can be excluded from the model and the models in equations 1-4 are adequate representations of the production

TABLE 3
Logit Models for the Sales Branch-Production Plant Decision Model

	Model: 1	2	3	4	5
Food/Drink	1.77 (3.27)	1.44 (2.53)	1.79 (3.27)	1.75 (3.21)	1.70 (2.98)
Chemicals	1.01 (2.86)	0.90 (2.48)	1.01 (2.83)	1.00 (2.83)	0.91 (2.33)
Engineering					0.04 (0.14)
Metal Goods					-0.39 (-0.85)
Textiles					-0.37 (-1.00)
Psychic	0.86 (3.29)	0.85 (3.28)	0.86 (3.30)		0.83 (3.16)
Distance	-0.25 (-0.93)				
Developed				0.45 (0.69)	
Market			-0.008 (-0.46)		
Diver	0.69 (3.60)	0.30 (1.19)	0.66 (2.88)	0.71 (3.08)	0.66 (2.94)
Number	0.18 (2.65)	0.17 (2.39)	0.17 (2.62)	0.12 (1.77)	0.18 (2.70)
Raw		2.63 (2.51)			
Constant	-0.46 (-1.86)	-0.45 (-1.80)	-0.26 (-0.50)	0.16 (0.84)	-0.37 (-1.29)
X^2	53.08	64.34	53.28	44.49	54.95
DF	6	6	6	6	6
Cases	380	380	380	380	380

cost aspect of the sales branch-production plant decision. More generally, the hypothesis that all the coefficients are equal to zero, implying that all alternatives are equally likely, can be rejected on the basis of the reported likelihood ratio tests for all equations.

The location variables return mixed results. PSYCHIC is positive and significant. The greater the psychic proximity, the greater the likelihood that British multinational enterprises invested in production. Psychic proximity measures the advantages of a similar language, legal system and culture as well as political and exchange risk. DISTANCE is negative and insignificant, the opposite sign to that expected. The binary, measuring the level of development, is positive, but insignificant, implying that British firms were more likely to invest in production branches in developed markets. MARKET is an imperfect proxy for market size and maturity, but employed because of data limitation on variables such as income per head. The coefficient is insignificant, but the negative sign is consistent with our hypothesis on bunching. If the bunching is driven by internal scope economies, then market size would not be expected to be an important explanatory variable. This is consistent with Jones' [15, p. 7] remark that Courtauld's investments in Denmark and Spain occurred during a period of enthusiasm for continental factories which hints at a similar process of foreign direct investment bunching.

The economies of scope hypothesis receives statistical support from the transaction cost variables. NUMBER, DIVER, and RAW are all positive and statistically significant. There is evidence in model 2 of multicollinearity between DIVER and RAW, with a significant change in the coefficient of DIVER when RAW is introduced. According to a likelihood ratio test for variable inclusion, RAW should remain in the model, so equation (2) in Table 3 is the preferred model. The results support our theory that firms invest in production facilities to attenuate transaction costs related to appropriating production based knowledge and scope economies. Scope economies arise when knowledge related to managing internationally can be shared between several noncompeting applications. There is some evidence that teams were formed to manage the firm internationally, suggesting learning-by-doing aspects to managerial knowledge. Such scope economies in managerial knowledge would account for the pronounced bunching of British pre-1939 foreign direct investment.

CONCLUSIONS

Transaction cost theory offers powerful insights into the evolution of the multinational enterprise. There are a range of contractual arrangements, including market transacting, long-term contracts, cartels, franchises, licenses, agencies, subcontracting and vertical integration in hierarchical firms. When

the choice is between alternative exporting modes then transaction costs factors are the key determinants of mode choice. The choice between sales and production branches depends on locational and production costs as well as internalization factors. To operationalize the internalization model the transaction costs of each contractual arrangement must be specified. I argue that the choice between alternative exporting modes has unique transaction cost factors, including monitoring and opportunism, related more to the transfer of product-related services (such as demonstration, credit, assembly and installation and repair) than to the physical product.

The choice between sales and production branches had to explain the pronounced bunching of British pre-1939 foreign direct investment. The paper modeled a transaction cost model based on appropriating the returns on scope economies of managing at a distance to explain the bunching. The model was tested statistically. The results showed that the internalization proxies were significant, and the transaction cost factors were important determinants of the decision to invest in production branches by pre-1939 British manufacturing multinationals.

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