

**"FROM BARRIERS TO ENTRY
TO BARRIERS TO SURVIVAL"**

by

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From Barriers to Entry to Barriers to Survival

Abstract

Mounting evidence of a weak relationship between traditional measures of entry barriers and inter-industries variation in the actual rate of entry is the paper's starting point. Distinguishing new, independent firms from plant addition by existing multiplant operators or diversifiers only partially addresses this inadequacy. We therefore develop the concept of *barriers to survival* (BTS) as a structural phenomenon operating alongside, but substantially independent of, traditional entry barriers. It is postulated that BTS depend on the importance of industry-specific, experience-based assets. Empirical testing on a sample of 160,000 entrants across 120 US industries supports the relevance of the BTS concept.

From Barriers to Entry to Barriers to Survival

*Paul J. Verdin and Peter J. Williamson**

I. Barriers to Entry: Walled City versus Minefield

In his seminal book, Bain (1956, p3) argued that the condition of entry was primarily a structural phenomenon, roughly akin to a wall the height of which could be evaluated by:

“the advantages of established sellers in an industry over potential entrant sellers, these advantages being reflected in the extent to which established sellers can persistently raise their prices above the competitive level without attracting new firms to enter the industry.”

For those industries where barriers to entry were “great” or “substantial” Bain went on to predict that these industries would enjoy: *“Relatively stable industry structures with very little entry occurring over time (unless occasionally through major innovations in product.)”* (Bain [1956], p 176).

The group of firms who were the first to take advantage of the preferred sources of inputs in terms of absolute costs, first reaped the advantages of large scale operations, established the dominant brands and built a business infrastructure which would require large lump sums of capital for entrants to replicate quickly, would have effectively constructed for themselves a walled city. Within its shelter a concentrated group of

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sellers who recognized the dangers of ruinous competition could jointly enjoy the benefits of monopoly rents.

Potential entrants would compute the likely profits to be had by sharing in this cosy enclave and the costs of putting in place the infrastructure rapidly enough to allow them to be competitive with the incumbents, who many have spent years building their positions when the industry was emerging. In "blockaded" industries (Bain [1956], p22), they would conclude that the game was not worth the candle before even starting down the fruitless path of actual entry. In industries where the barriers were moderate, judicious management of the incentives to enter at prevailing prices in the form of entry limit pricing could dissuade potential entrants from attempting to scale the wall while still maintaining a degree of super-normal profit (Modigliani [1958], Sylos-Labini [1962]). In low entry barrier industries either opportunities to enjoy monopoly rents would be competed away as actual entry occurred or the threat of entry would result in such a low limit price that profits would be kept down to the level of "normal returns".

Various proxies for the height of entry barriers have been deployed in tests of their impact on industry performance in a large number of studies (See, for example, the review by Gilbert [1989]). The use of reduced form equations has frequently sidestepped the validity of a fundamental precondition: that the threat of entry, or at least actual entry, is empirically lower among those industries with structural characteristics which might imply higher barriers to entry.

In this paper we begin by reviewing the literature on this issue of the relationship between the commonly used proxies for barriers to entry and the actual entry observed. We then supplement these findings with a further test based on a sample of 160,000 independent firms who entered one of 134 US 3 digit SIC industries between 1978 and 1984. The results offer some support for the behavioural form of the hypothesised relationship: that actual entry relative to the stock of firms in an industry varies

systematically with commonly used proxies for the height of entry barriers. The traditional proxies representing a “walled city” view, however, are able to explain only 16% of the cross industry variance in entry rates. This result suggests there are other important factors at work including their chances of continued survival to reap the rewards of their investments.

The second part of the paper therefore augments the barriers to entry proposition with the concept of *barriers to survival* post entry. Successful entrants bring to the industry assets which are in short supply relative to current demand for the customer benefits these assets can deliver. These assets may embody new technology or systems for providing differentiation which some segment of customers value. It is the unique characteristics of these assets which enable new entrants to climb the outer industry wall.

Even after passing this first test, however, the newly established firms will lack other, industry specific assets which can only be accumulated through experience (Dierickx and Cool [1989]). Without these, they face a handicap relative to well established incumbents. Simultaneously, these incumbents who already have a large stock of industry-specific assets accumulated over time will seek to protect their market share by replicating those new assets which make the newer entrants attractive. If the incumbents succeed in extending their asset bundles, the entrants' initial competitive advantage will be eliminated over time. To remain viable therefore, entrants must accumulate industry-specific assets which will help them compete with the improving offerings of incumbents.

As a result, the young firms are forced to run an uncertain, middle distance race for survival. They must attempt to accumulate the necessary industry specific assets to reinforce their position before the incumbents destroy their differentiation, hence rationale for existence, by extending their own asset bases. We define an industry

where the necessary stock of industry-specific assets required for long-term survival is large and difficult for new entrants to acquire as having high *barriers to survival* (BTS).

The flow of entrants into an industry is found to depend not only on barriers to establishing the initial capacity to supply the market but also on these barriers to survival. The BTS are measured by the expected probability of involuntary exit during the first one to six years after entry. The impact of barriers to survival is found to be magnified in industries where the sunk costs associated with entry are high. Entry therefore depends not only on the height of the wall, but the risks associated with the extensive minefield which lies beyond. Likewise the performance of well established incumbents depends on both the rate at which new firms create capacity to supply the market and the subsequent barriers to survival they face.

In industries where barriers to survival are high for new entrants, incumbents who have survived to face another day enjoy two advantages which can be expected to underpin potentially higher sustainable levels of profitability. First, the lower expectation of longevity in the industry discourages a proportion of the entrants. Second, it means fewer of them have the time to build extensive, high quality portfolios of learning assets which would increase their competitive effectiveness against existing firms. The fact that barriers to survival lead to fewer, weaker new competitors leads us to expect that it is a relevant concept for predicting inter-industry differences in performance.

II. Barriers to Entry and the Rate of Entry

In this section we examine the existing evidence regarding the relationship between the height of barriers to entry and that observed rate of entry and present a re-estimation of the traditional entry barrier equation which makes a clear distinction between new firm

entry and plant or establishment addition by incumbents and diversifiers where there are strong reasons to believe the implications of entry barriers will be markedly different.

Existing Evidence

The first group of studies examining the relationship between entry barriers and observed entry focussed on the *net* number of firms entering the industry based on the change in counts of firms at two points in time. Using Canadian data, and excluding industries where the net number of firms had declined, Orr [1974] found a significant negative impact for the capital required for a minimum efficient scale plant, advertising intensity and concentration. R&D intensity proved to be less clear an indicator of barriers. On the incentive to enter, industry growth and past profitability had a positive impact, albeit rather weak, and a measure of risk based on the variance of industry profit over time tended to act as a disincentive. Using a similar design with US data but examining industries with net increases or decreases in their populations, Duetsch [1974], however, failed to find a significant result for the traditional proxies for entry barriers used by Orr. Only the absolute capital cost barrier appeared to act as a barrier to a net expansion of the number of firms.

Both previous studies found that the larger the industry, in terms of the total number of firms, the more firms entering net. Hirschey [1981] therefore standardised by the total number of incumbent firms to compute the % rate of net entry. When this correction was applied, none of the traditional proxies for entry barriers appeared to explain this measure of the magnitude of entry relative to the existing stock of firms. On the contrary, he discovered a significant positive, "entry promoting" effect for advertising intensity during the period 1963-72. High advertising intensity appeared both to encourage the growth of non-dominant firms in the industry as well as drawing in a larger flow of entrants.

During the first half of the 1980's improved data on entry began to become available to researchers, allowing net entry to be separated into its underlying components: gross entry and gross exit. It rapidly became apparent that the net figure used in previous work had concealed much larger shifts of firms into and out of industries. Baldwin and Gorecki [1983, 1987], for example, found that 33% of the 1979 population of firms in 141 Canadian manufacturing industries were new to their industries since 1970. Meanwhile, 43% of the 1970 population had disappeared by 1979. Even more problematic, the gross entry figures were found to be unrelated to either traditional barriers to entry proxies or past industry profitability in a systematic way.

Further exploring the behaviour of gross entry, Khemani and Shapiro [1986] found a negative effect for advertising intensity, minimum efficient scale relative to market size, and capital requirements using Canadian data 1972-76. Kessides [1986], on the other hand confirmed Hirschey's earlier finding of an 'entry promoting' impact of advertising intensity in US data. MacDonald [1986] using a sample of all establishments of over 20 employees in 4 digit food industries finds only a systematic impact of capital cost barriers. Highfield and Smiley [1987] using the Small Business Data Base of the SBA find the predicted negative signs on each of the traditional barrier proxies as well as a measure of preemptive capacity expansion by incumbents, but none are significant at accepted confidence levels. In other variations of their base model R&D intensity appears as a factor significantly encouraging gross entry. Among these studies higher industry growth was the sole consistent explanator of higher gross entry.

A further Empirical Test

One dimension of gross entry which has been less than fully explored in the literature is the question of its source (Hamilton [1985] and Baldwin and Gorecki [1987] are notable exceptions). In particular, a good deal of theoretical weight suggesting the need to distinguish carefully between entry by new, independent firms, establishment of new

operating entities by firms already in the industry, and diversification into the business by firms with bases in other industries.

First, because of their ability to take advantage of multiplant economies (See, for example, Scherer *et. al.* [1975]), incumbents establishing new plants or operating units will be able to avoid most of the impact of the kinds of barriers to entry which the original literature postulated new entrants would face. In fact, the decision by an incumbent to construct new plants or establishments is more appropriately viewed as an alternative to expanding the capacity of existing sites as a way of meeting expected growth. It is likely to be impacted by the efficient plant scale for the relevant technology rather than barriers to entry. The inclusion of plant investments by incumbents as "entry" within the gross figure used as a dependent variable would therefore bias the results, understating the importance of the deterrent effect of barriers on new entrants.

Second, diversifying firms may have a similar ability to bypass at least some of the traditional entry barriers. It has been argued and empirically supported that diversification entry by firms already established in other industries is a possible means of overcoming barriers to entry by drawing on firm specific assets and will thus more frequently occur in high-barrier industries (e.g. Hines [1957], Gorecki [1975] Yip [1982], Montgomery and Hariharan[1988]). Again, therefore, if this diversification is included in the figures there is likely to be more observed gross entry than the traditional barriers to entry model based on newly established firms would suggest.

These considerations suggest:

- that the traditional barriers to entry model is most properly viewed as a hypothesis about the relationship between gross entry by single plant firms and the height of entry barriers

- that the number of new plants established by incumbent firms will depend on efficient plant scale and expected growth in demand, while the creation of establishments by diversifying firms will vary with the size of the benefits offered by access to firm specific assets.

We therefore test three specifications which, together, embody these hypotheses:

$$eni_j = a_0 + \sum_{k=1}^m b_k BTE_{ik} + g_0 GRO_i + \varepsilon \quad (1)$$

$$end_j = a_1 + \sum_{k=1}^m \beta_k BTE_{ik} + g_1 GRO_i + \omega \quad (2)$$

$$end_j = a_2 + \theta ESIZE_j + g_1 GRO_i + v \quad (3)$$

Where eni_j is the number of new, single plant firms entering industry i during the period relative to the total number of establishments in the industry at the start of the period. BTE_{ik} are k indicators of barriers to entry for each industry i . GRO_i is the total growth in the industry during the period.

Equation (2), where end_j is the number of new establishments constructed by incumbent firms and firms diversifying from other industries, represents the specification implicit in those studies discussed above which have treated gross entry as a single figure, thereby regressing this "entry" by existing firms on the same set of explanators as for new firm entry. Since we believe this equation is mis-specified, it is included only as a control.

Equation (3) is designed to test the argument that the rate of plant creation by existing firms simply depends on growth and optimal plant size. The variable, $ESIZE$, which is

the average size of plants (establishments) in the stock at the commencement of the period is used as a rough proxy for the latter. We expect a negative coefficient. Suitable measures which might capture the benefits from access to firm specific assets, such as cumulative marketing expenditure or output in the recent past, are unfortunately not available.

Data were secured by extraction from the plant-based USEEM file of the U.S. Small Business Administration¹, on the composition of 134 3-digit manufacturing industries in terms of single-plant firms (i.e. 'independent establishments') and plants belonging to multi-plant or diversified firms ('dependent establishments'). Since this information was available over the years 1978-1984 and establishments could be tracked over time from one point of observation to another, we were also able to derive establishment-based entry measures for each industry by identifying those firms and dependent establishments who were in existence in 1984 but not in 1978.

Commonly used barriers to entry (*BTE*), their respective measures and data source [in brackets] are the following:

SCALE: scale economies, relative to the size of the market. These are measured on the basis of the minimum efficient scale, estimated by the average shipments of plants accounting for the top 50% of industry value added, divided by the total industry shipments. This is then multiplied by the ratio of average value added per employee for the largest 50% of plants in the industry over value added per employee of the smallest 50% of plants. [PICA: Census of Manufacturers, 1982].

¹For a full description of this file, characteristics of the data, manipulation and editing applied by the SBA and ourselves, see MacDonald [1985], Phillips [1985] and Verdin [1989], which also include further references. The same basic file possibly edited to varying degrees, was used in several other studies cited above.

KCOST: a measure of the capital cost as a potential barrier to entry, equal to the minimum efficient scale (measured as above) multiplied by the ratio of total investment in plant and equipment [BIE Capital Stock Data Base, Office of Business Analysis, 1978] to total employment in the industry [USEEM File: U.S. Small Business Administration];

ADV : the advertising (traceable media advertising expense) to sales ratio [PICA: FTC Line of Business, 1976]

GRO : the growth in total employment in the industry between 1978 and 1984 [USEEM file: U.S. Small Business Administration].

The results for equation (1), gross entry by new firms, is shown in Table 1. *SCALE* and *KCOST* have the expected negative signs, suggesting they do act as barriers to entry, but their significance is relatively weak. Industry growth, *GRO*, exhibits the predicted positive sign. As in a number of the previous studies reviewed above, however, *ADV* (our proxy for differentiation) as a barrier to entry, shows a positive and significant sign suggesting that prevalent use of advertising actually encourages new firms to enter.

The data therefore provide some support for the predictions of the traditional barriers to entry model in the case of new firms once these are distinguished from plant expansion by incumbents. On the other hand the low overall explanatory power of the equation and the relatively high variances associated with the estimated coefficients suggests there is a good deal more to the story than traditional barriers to entry models suggest, even when we are examining actual, rather than potential entry.

Table 1: Single Plant Firm Entry (eni_j) Versus Barriers to Entry

Variable	Coefficient	t-Statistic
Intercept	0.010	....
SCALE	-0.042	1.640
KCOST	-0.0001	1.496
ADV	0.001	2.848
GRO	0.009	2.095
$R^2 = 0.163$	$\text{Adjusted } R^2 = 0.131$	

By some statistical measures, equation (2) demonstrates a more powerful relationship between our barriers to entry proxies and plant expansion by incumbents (Table 2). The fact that it is dominated by *SCALE* and *GRO*, while *KCOST* and *ADV* become insignificant, are causes for suspicion. Despite the primitive nature of equation (3), comparison provides empirical confirmation that a “barriers to entry” model is spurious in the case of expansion by an existing or diversifying firm. A straightforward regression on industry growth and the average size of existing plants is, in fact, a much better predictor of how many new plants will be constructed by those already in business.

Even when we separate out this plant creation by existing firms as a separate process and simply look back to entry by new firms (eni_i), however, we are still left with a great deal of variation in the inter-industry rates of actual entry by new firms which remains unexplained by the traditional barriers to entry model.

Table 2: Expansion by Multiplant Firms (end_i)

Variable	Equation (2)		Equation (3)	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Intercept	0.004	2.007	0.004	2.400
SCALE	-0.015	3.203	...	...
KCOST	-0.00001	1.066	...	...
ADV	0.00009	1.540	...	...
GRO	0.005	6.116	0.005	7.626
ESIZE	...	...	-0.0097	7.497
R ²	0.346		0.475	
Adj. R ²	0.321		0.466	

One important refinement to the basic model has come in the form of dynamic limit pricing (eg Gaskins [1971], and Judd and Peterson [1986]). While this literature has little directly to say about inter-industry variation, it has the significant implication that it

is the rate at which new entrants take market share from incumbents which is critical, rather than the “in or out” effect of entry itself. In what follows we take this logic a step further to examine the potential impact of how many entrants survive and prosper for what length of time on both the number of new firms who decide to enter and performance of long term survivors.

III. Barriers To Survival

A central assumption of traditional entry theory and classical limit pricing is that the entrants expect incumbents will not reduce their output following new entry. The “Sylos postulate” (Sylos-Labini [1962]), for example, is that established firms maintain their pre-entry output volumes, set at a level to make entry unprofitable. Exactly what happens if a new firm does enter contrary to rational expectation is not explicit. Presumably, however, it discovers that it has sales insufficient to cover its average costs and promptly exits. In other words, the classic analysis makes no distinction between barriers to entry and barriers to survival (after entry) since there is a zero probability of survival for an entrant in an industry subject to limit pricing.

The survival assumption adopted by dynamic limit pricing models generally lies at the opposite pole. Once a firm enters it stays. The incumbents’ decisions revolve around how rapidly to cede share by holding price up and the feedback this will have on the rate of entry in the future.

In reality, of course, even among those firms who successfully enter the industry for a finite period only some proportion of new entrants will remain in the industry for an extended period. This proportion would not be a relevant measure of involuntary exit if the market was to be perfectly contestable making “hit and run” entry viable (Baumol and Willig [1986]). Market contestability theory therefore alerts us to the fact that low

survival rates do not necessarily imply a disadvantage on the part of new entrants relative to incumbents. Indeed, it may be that a low tenure rate among entrants were matched by a high rate of exit among older, established firms reflecting the fact of easy to entry and exit, allowing firms to opportunistically take advantage of the relative attractiveness of temporary potential in that particular industry versus elsewhere (Mills and Schumann [1985]).

Suppose, however, that the observed probability of new firms leaving the industry during some significant period after entry were substantially higher than the probability of a long established incumbent exiting the industry during the same period. Rather than simply suggesting high firm turnover associated with contestability and hit and run entry, this would lead the entrant to suspect that new firms faced disadvantages which might force them to exit the industry due to lack of profitability, instead of by choice. Such a recognition of the risk of involuntary exit after some period of operation, in turn, can be expected to influence entry decisions so long as there are any net costs were associated with entry and forced exit.

The phenomenon of successful entry followed by risk of involuntary exit, possibly after a period of operation extending into years, may be explained by the concurrent existence of four basic conditions: temporary scarcity of certain firm-specific assets among incumbents relative to uncertain demand from a segment of customers for the product of these assets; a significant role in the long run production function for industry-specific assets; that a significant proportion of both firm and industry specific assets can only be accumulated through experience; and uncertainty as to the rate at which both types of assets can be accumulated as well as the demand for them.

Disequilibrium in the market between the array of types and quantities of output supplied by incumbents and that demanded by customers offers scope for new entrants to attempt to fill this gap by bringing asset bundles new to the industry. This

disequilibrium may arise from development of new and potentially relevant technology outside the industry which would better satisfy some segment of customers' needs, or a change in customer tastes. The asset bundles which the entrants bring with them may have been accumulated by operation in another industry or by the experience of the individual entrepreneurs behind the entrant.

New entrants who bring assets which are temporarily scarce in the industry, however, will have little direct experience operating in the market. Their asset bundles, while containing some attractive jewels, will be incomplete because they lack assets which can only be accumulated through experience and are subject to "diseconomies of time compression" (Dierickx and Cool [1989]). Brand reputation would be an example.

Potential customers are then faced with a choice between alternatives which incompletely satisfy their needs. If they buy from the new entrant, they enjoy the advantage of the differentiated attributes which are offered by entrants, based on the new assets they have brought into the industry. However, this means foregoing the benefits which accumulated, experience assets would provide, since entrants' stock of these is negligible. If they buy from incumbents, who have a rich stock of experience-based assets and hence can provide the attributes which these underpin, they forego the innovative benefits offered by the entrants' new assets.

Over time, the choice set available to the customer will change. Successful entrants will improve their stock of industry-specific assets as they accumulate experience. Simultaneously, incumbents will seek to extend their asset bases by incorporating the new types of assets deployed by successful entrants into their own asset bases. Incumbents' effectiveness deploying these new types of assets and integrating them with their existing asset stocks will also improve with time and experience.

If incumbents were rapidly able to obtain and effectively integrate the new types of assets with their formidable stock of industry experience, the customer would no longer have to forgo the benefits of buying from a supplier with a large stock of accumulated assets. The new entrants' offerings would be dominated and their *raison d'être* eliminated. Alternatively, if the new entrants rapidly accumulated industry-specific assets they could become strong, long term competitors.

Uncertainty as to the speed with which both firm and industry specific assets can be accumulated over an extended period would mean that the entrants are engaged in a risky race for survival against incumbents who are seeking to eliminate these entrants' initial differentiation. In some industries, industry-specific, experience-based assets will be both important and slow and costly for entrants to accumulate compared with the rate at which incumbents can effectively deploy new assets from outside the industry. We define these industries as having high *barriers to survival*.

In what follows, we propose to measure the barriers to survival faced by new entrants in terms of the increased probability of exit during an extended period after entry compared with the exit probability of than incumbent firms. Our indicator is the ratio of the probability of exit of a new entrant relative to the probability of exit by an incumbent during a given period².

Barriers to survival are likely to be an important factor in determining how many new firms are willing to enter. The higher the barriers to survival, the greater the importance of sunk costs in deterring entry since the lower the probability of staying in business long enough and profitably enough to recoup these sunk investments. The observed

² The definition of when a firm moves from being a young 'entrant' to an established 'incumbent' is by necessity a grey area. Our data suggest, however, that the decline in probability of exit in most industries tend to flatten out about 6 years after entry so that firms who pass this age are indistinguishable from substantially older firms in terms of their probability of survival. We therefore choose this age as the cutoff between young entrants and established incumbents.

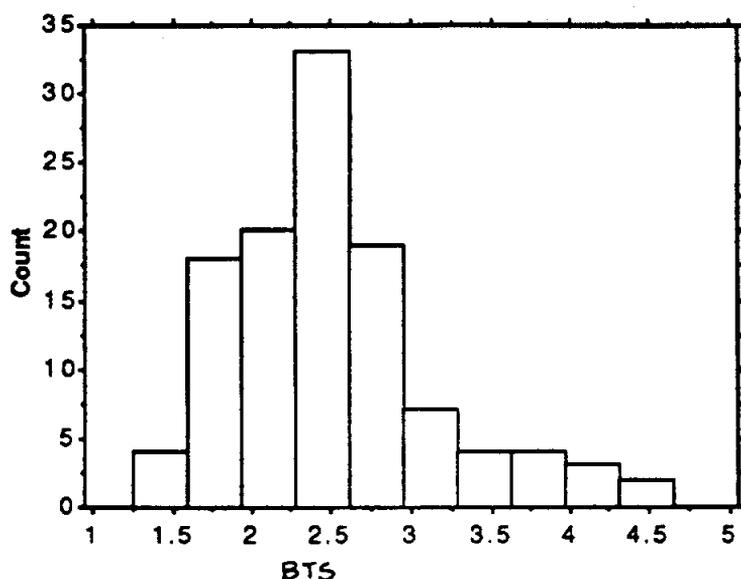
success of past entrants, meanwhile, will feed back through expectations about the barriers to survival and hence to the rate at which entry occurs in the future.

To the extent that the height of barriers to survival differ across industries, they should therefore help to explain inter-industry variation in entry rates. Moreover, barriers to survival may be influenced by a different, or wider set of features of structure and conduct than those included in the traditional entry barrier theory. In this case the distinction between barriers to entry and barriers to survival would lead to new hypotheses about the relationships between structure, conduct, entry and industry performance.

An Empirical Test of Barriers to Survival

Drawing on the same USEEM data file described above, but restricting the analysis to single plant firms, we computed a measure of the barrier to survival associated with each 3 digit industry by taking the ratio of the probability of exit between 1978 and 1984 for firms who were 0-2 years old in 1978, divided by the corresponding probability of exit for firms who were between 6 and 9 years old in 1978 (BTS). We thus have a statistic capturing the relative survival disadvantage faced by new entrants early in their lives compared with the turnover rate of well established incumbents which is assumed to be voluntary. The distribution of this barrier to entry statistic across our sample of industries is illustrated in Figure 1, which indicates a variation from industries where firms who have newly entered have almost no higher probability of exit than established incumbents (BTS close to 1.0) through to those industries where newly entered firms are more than four times as likely to exit as established incumbents.

Figure 1: Cross-industry Distribution of Barriers to Survival



The next step is to test the impact of the BTS measure in our equation seeking to explain the rate of entry. Recall, however, that the deterrent effect of barriers to survival is expected to be greater the higher are the sunk costs associated with entering the industry. If sunk costs are insignificant then the losses associated with involuntary exit are likely to be small. In this case there is probably little to be lost by entry even if forced exit is the result. We therefore test two specifications in which the standard entry barriers equation has been augmented by the inclusion of barriers to survival variables:

$$eni_j = a_3 + \sum_{k=1}^m b_k BTE_{ik} + g_3 GRO_i + h_0 BTS_i + \xi \quad (4)$$

$$eni_j = a_3 + \sum_{k=1}^m b_k BTE_{ik} + g_3 GRO_i + h_0 BTS_i * RD_i + h_1 BTS_i * UN_i + h_2 BTS_i * ADV_i + h_3 BTS_i * KE_i + v \quad (5)$$

Equation (4) simply adds the barriers to survival variable (BTS) to the traditional barriers to entry equation (1). In equation (5) we seek to capture the joint effects of barriers to survival operating in conjunction with various proxies for sunk costs associated with entry and exit through a series of variables in which BTS is multiplied by proxies representing research and development expenditure, redundancy costs, advertising investment, and expenditure on capital equipment which may have to be resold at a discount. These sunk/exit cost measures are as follows.

RD: the ratio of total R&D expenditures to net sales [National Science Foundation, 1978]

UN: the percentage of workers who are union members [Kokkelenberg and Sockell (1985)] on the expectation that redundancy costs are likely to be less avoidable when labour is unionised.

ADV: the ratio of traceable media advertising expenses to net sales [PICA - FTC Line of Business 1976].

KE: the total investment in plant and equipment [BIE Capital Stock Data Base, 1978] divided by the total employment in the industry [PICA - Census of Manufacturers, 1977]

We expect all of the BTS related variables to discourage entry and hence to exhibit negative signs. The results of OLS estimation of equations (4) and (5) are presented in Table 3.

Table 3: Single Plant Firm Entry (θ_{ni}) Versus BTE and BTS

Variable	Equation (4)		Equation (5)	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Intercept	0.028	2.750	0.020	2.100
SCALE	-0.066	2.477	-0.037	1.368
KCOST	-0.00006	2.143	-0.00002	0.629
ADV	0.001	2.507	0.002	1.442
GRO	0.006	1.416	0.013	2.569
BTS	-0.006	3.911		
BTS*RD			-0.001	3.060
BTS*UN			-0.007	2.228
BTS*ADV			-0.0005	1.234
BTS*KE			-0.0004	0.176
R ²	0.293		0.351	
Adj. R ²	0.253		0.286	

Our barriers to survival statistic enters equation 4 with a negative and strongly significant sign. Moreover, the traditional barriers to entry measures maintain their earlier signs and improve their statistical significance while the proportion of inter-industry variation in entry rates of new firms explained by the regression improves

substantially. These results suggest that the flow of entry is influenced both by the scale and capital cost barriers associated with initially establishing the capacity to supply (entering the industry by climbing a wall) and surviving after entry (crossing the minefield) and that these two influences are significantly independent.

The results of equation (5), meanwhile, suggest that the deterrent effect of these barriers to survival are magnified by the level of sunk investments which would have to be abandoned in the event of involuntary exit as well as the redundancy costs involved. Barriers to survival appear to reduce the flow of entry most systematically when the industry is characterised by the need for investment in R&D to compete with incumbents and labour is unionised, a probable signal of redundancy costs (negative and significant coefficients on $BTS*RD$ and $BTS*UN$).

Barriers to survival in combination with the need to invest in advertising ($BTS*ADV$) also appear to have a negative impact on the number of entrants for any given industry population. Although this effect is of lower statistical significance it is of particular interest in the light of the frequent finding of a positive impact on entry. While our results confirm the overall entry attracting effect of advertising intensity, they also point to advertising acting as a sunk costs which deters entry when barriers to survival are high.

Capital intensity, although with a negative sign, is far from acceptable levels for a statistically significant result. This may suggest that capital intensity does little to increase the deterrent effect of barriers to survival, a finding which is consistent with the contention that the resale value of many capital goods allows allows a high proportion of initial investment to be recouped if a new entrant is forced to exit involuntarily during the first few years. On the other hand, its lack of significance may reflect the weakness of our proxy in ignoring cross-industry variations in discount associated with disposal of the particular capital goods involved (Kessides [1990]).

When these sunk cost effects are added in combination with the barriers to survival in equation (5), the significance of the traditional barriers to entry variables is substantially reduced.

IV. Implications for Industry Structure and Performance

A key conclusion of our results is that entry conditions comprise two, at least partially independent, features: barriers to entry and barriers to long term survival post entry. Barriers to entry relate to an entrant's ability to establish the capacity to profitably supply the market immediately after entry, possibly in the face of instantaneous price attack by incumbents. Barriers to survival relate to the entrant's ability to maintain competitiveness over an extended period of time in the face of pressure for involuntary exit.

We postulated that barriers to survival arise because even initially successful entrants begin life with the handicap of a weak stock of industry-specific, experience assets relative to well established incumbents. This weakness detracts from the advantages of the new, firm-specific asset bundle which they bring to an industry. If incumbents, with a formidable base of these industry-specific assets, learn to extend their asset bundles and so eliminate the differentiation initially offered by recent entrants, they will undermine to entrants' continued viability. In order to survive, the entrants must accumulate sufficient industry-specific assets rapidly enough to keep them competitive as incumbents fill in the gaps exposed in their own firm-specific asset positions. The level of industry-specific assets required and the difficulty of accumulating them quickly therefore determine the barriers to survival entrants face.

As such, barriers to survival fall under Bain's 1956 broad definition of "advantages of established sellers in an industry over potential entrant sellers". Because they reflect

industry-specific assets which are subject to economies of time compression, however, the underlying production, buyer and information characteristics of an industry which generate barriers to survival are likely to differ from those which give rise to traditional barriers to entry.

Empirically, both barriers to entry and barriers to survival appear as significant features of industry structure. Barriers to entry, reflected in the minimum efficient scale and capital cost required to establish an initially viable operation, were found to reduce the number of new firms entering relative to the industry population. Barriers to survival were also found to discourage the flow of entry, especially in industries where substantial sunk cost investments in R&D, advertising, capital and union contracts were required. For that entry which did occur, high barriers to survival reduced its sustained impact on industry concentration.

We conclude, therefore, that barriers to survival are likely to be useful predictors of long-run industry performance worthy of further exploration. In particular, the theoretical conditions capable of explaining our observed barriers to survival phenomenon point to the need for increased emphasis on industry-specific, experience-based assets as a potentially important feature of market structure.

REFERENCES

- Baldwin, John R., and Gorecki, Paul K., (1983), *Entry and Exit to the Canadian Manufacturing Sector: 1970-79*, Economic Council of Canada, Discussion Paper no. 225, February .
- Baldwin, John R., and Gorecki, Paul K., (1987), "Plant Creation Versus Plant Acquisition: The Entry Process in Canadian Manufacturing", *International Journal of Industrial Organization*, March, pp27-42.
- Bain, J., (1956), *Barriers to New Competition*, (Cambridge: Harvard University Press).
- Baumol, W., and R. Willig, (1986), "contestability Development Since the Book", C.V. Starr Center for Applied Economics, New York University.
- Dierickx, Ingemar, and Cool, Karel, (1989), "Asset Stock Accumulation and Sustainability of Competitive Advantage", *Management Science*, December , pp1504-1514
- Duetsch, L., (1974), "Entry and the Extent of Multiplant Operations", *Journal of Industrial Economics*, June , pp477-487.
- Federal Trade Commission, (1985), *Annual Line of Business Report 1976*, Report of the Bureau of Economics, Washington D.C.
- Federal Trade Commission, (1982), *Annual Line of Business Report 1976*, Report of the Bureau of Economics, Washington D.C.
- Gaskins, D. (1971), Dynamic Limit Pricing: Optimal Pricing Under Threat of Entry", *Journal of Economic Theory*, 2, pp 306-322.
- Gilbert, R. (1989), "The Role of Potential Competition in Industrial Organisation", *Journal of Economic Perspectives*, pp 107-127
- Geroski, Paul A., (1990) *Entry, Exit and Structural Adjustment in European Industry*, London Business School, March , mimeo
- Gorecki, Paul K, (1975), "The Determinants of Entry by New and Diversifying Enterprises in the U.K. Manufacturing Sector 1958-1963: Some Tentative Results", *Applied Economics*, 139-147
- Hamilton, R.T., (1985), "Interindustry Variation in Gross Entry Rates of 'Independent' and 'Dependent' Businesses", *Applied Economics*, 271-280
- Highfield, Richard, and Smiley, Robert, (1987), "New Business Starts and Economic Activity: An Empirical Investigation", *International Journal of Industrial Organisation*, March 1987, 51-66
- Hines, Howard H., (1957), "Effectiveness of "Entry" by Already Established Firms", *Quarterly Journal of Economics*, 132-150
- Hirschey Mark, (1981), "The Effect of Advertising on Industrial Mobility, 1947-72", *Journal of Business*, 329-339

- Judd, K. and B Petersen , (1986), "Dynamic Limit Pricing and Internal Finance", *Journal of Economic Theory*, 39, pp368-399.
- Kessides, I. N., (1986) "Advertising, Sunk Costs, and Barriers to Entry" *Review of Economics and Statistics*, pp84-95
- Kessides, I. N., (1990) "Market Concentration, Contestability and Sunk Costs" *Review of Economics and Statistics*, 72, pp614-622
- Khemani, R.S., and Shapiro, D.M., (1986) "The Determinants of New Plant Entry in Canada", *Applied Economics*, Nov., pp1243-1257.
- Kokkelenberg, Edward C., and Sockell, Donna R., (1985) "Union Membership in the U.S. 1973-1981", *Industrial and Labor Relations Review*, July , pp497-543
- MacDonald, James M., (1985), "Dun & Bradstreet Business Microdata", *Journal of Economic and Social Measurement*, 173-185
- MacDonald, James M., (1986), "Entry and Exit on the Competitive Fringe", (1986), *Southern Economic Journal*, pp640-652.
- Mills, David E., and Schumann, Laurence, (1985) "Industry Structure with Fluctuating Demand", *American Economic Review*, September, 758-767
- Modigliani, F., (1958), "New Developments on the Oligopoly Front", *Journal of Political Economy*, 66, pp 215-232.
- Montgomery, Cynthia A., and Hariharan, S., (1987), *Diversified Entry by Established Firms*, Northwestern Univ.: J.L. Kellogg Graduate School of Management & Univ. of Michigan:Graduate School of Business Administration, April , Draft.
- National Science Foundation, (1978), *Research and Development in Industry*, Technical Notes and Detailed Statistical Tables, Washington D.C.
- Orr, Dale, (1974), "The Determinants of Entry: A Study of the Canadian Manufacturing Industries", *Review of Economics and Statistics*, pp58-66
- Phillips, Bruce D., (1985), *The Development of the Small Business Data Base of the U.S. Small Business Administration: A Working Bibliography*, November.
- PICA (Program on Industry and Company Analysis), Division of Research, Harvard Business School
- Scherer, F., A Beckenstein, E Kaufer and R. Murphy, (1975), *The Economics of Multi-plant Operation: An International Comparisons Study*, (Cambridge, Mass.: Harvard University Press)
- Shapiro, Daniel and Khemani, R.S.,(1987), "The Determinants of Entry and Exit Reconsidered", *International Journal of Industrial Organisation*, March , pp15-26

- Sylos-Labini, P., (1962), *Oligopoly and Technical Progress*, (Cambridge, Mass.: Harvard University Press)
- U.S. Department of Labor, Bureau of Labor Statistics (1979), *Capital Stock Estimates for Input-Output Industries: Methods and Data*, Bulletin #2034
- U.S. Department of Commerce, Office of Business Analysis (1985), *OBA Capital Stocks Data Base*, Note on Data Format, Washington D.C., Jan. 11 1985, unpublished
- Verdin, P.J., (1989), *Shake-Out Risk, Sunk Costs and Small Firm Turnover*, Unpublished Ph.D. Dissertation, Harvard University
- White, I.J., (1982), "The Determinants of the Relative Importance of Small Business", *Review of Economics and Statistics*, 42-49
- Yip. George S., (1982), "Gateways to Entry", *Harvard Business Review*, Sept-Oct., 85-92.

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90/33 OB	Caren SIEHL, David BOWEN and Christine PEARSON	"The Role of Rites of Integration in Service Delivery", March 1990.	90/44 OB	Gilles AMADO, Claude FAUCHEUX and André LAURENT	"Organisational Change and Cultural Realities: Franco-American Contrasts", April 1990.
90/34 FIN/EP	Jean DERMINE	"The Gains from European Banking Integration, a Call for a Pro-Active Competition Policy", April 1990.	90/45 TM	Soumitra DUTTA and Piero BONISSONE	"Integrating Case Based and Rule Based Reasoning: The Possibilistic Connection", May 1990.
90/35 EP	Jae Won PARK	"Changing Uncertainty and the Time-Varying Risk Premia in the Term Structure of Nominal Interest Rates", December 1988, Revised March 1990.	90/46 TM	Spyros MAKRIDAKIS and Michèle HIBON	"Exponential Smoothing: The Effect of Initial Values and Loss Functions on Post-Sample Forecasting Accuracy".
90/36 TM	Arnoud DE MEYER	"An Empirical Investigation of Manufacturing Strategies in European Industry", April 1990.	90/47 MKT	Lydia PRICE and Wilfried VANHONACKER	"Improper Sampling in Natural Experiments: Limitations on the Use of Meta-Analysis Results in Bayesian Updating", Revised May 1990.
90/37 TM/OB/SM	William CATS-BARIL	"Executive Information Systems: Developing an Approach to Open the Possibles", April 1990.	90/48 EP	Jae WON PARK	"The Information in the Term Structure of Interest Rates: Out-of-Sample Forecasting Performance", June 1990.
90/38 MKT	Wilfried VANHONACKER	"Managerial Decision Behaviour and the Estimation of Dynamic Sales Response Models", (Revised February 1990).	90/49 TM	Soumitra DUTTA	"Approximate Reasoning by Analogy to Answer Null Queries", June 1990.
90/39 TM	Louis LE BLANC and Tawfik JELASSI	"An Evaluation and Selection Methodology for Expert System Shells", May 1990.	90/50 EP	Daniel COHEN and Charles WYPLOSZ	"Price and Trade Effects of Exchange Rates Fluctuations and the Design of Policy Coordination", April 1990.

90/51 EP	Michael BURDA and Charles WYPLOSZ	"Gross Labour Market Flows in Europe: Some Stylized Facts", June 1990.	90/63 SM	Sumantra GHOSHAL and Eleanor WESTNEY	"Organising Competitor Analysis Systems", August 1990
90/52 FIN	Lars Tyge NIELSEN	"The Utility of Infinite Menus", June 1990.	90/64 SM	Sumantra GHOSHAL	"Internal Differentiation and Corporate Performance: Case of the Multinational Corporation", August 1990
90/53 EP	Michael Burda	"The Consequences of German Economic and Monetary Union", June 1990.	90/65 EP	Charles WYPLOSZ	"A Note on the Real Exchange Rate Effect of German Unification", August 1990
90/54 EP	Damien NEVEN and Colin MEYER	"European Financial Regulation: A Framework for Policy Analysis", (Revised May 1990).	90/66 TM/SE/FIN	Soumitra DUTTA and Piero BONISSONE	"Computer Support for Strategic and Tactical Planning in Mergers and Acquisitions", September 1990
90/55 EP	Michael BURDA and Stefan GERLACH	"Intertemporal Prices and the US Trade Balance", (Revised July 1990).	90/67 TM/SE/FIN	Soumitra DUTTA and Piero BONISSONE	"Integrating Prior Cases and Expert Knowledge In a Mergers and Acquisitions Reasoning System", September 1990
90/56 EP	Damien NEVEN and Lars-Hendrik RÖLLER	"The Structure and Determinants of East-West Trade: A Preliminary Analysis of the Manufacturing Sector", July 1990	90/68 TM/SE	Soumitra DUTTA	"A Framework and Methodology for Enhancing the Business Impact of Artificial Intelligence Applications", September 1990
90/57 FIN/EP/ TM	Lars Tyge NIELSEN	Common Knowledge of a Multivariate Aggregate Statistic", July 1990	90/69 TM	Soumitra DUTTA	"A Model for Temporal Reasoning in Medical Expert Systems", September 1990
90/58 FIN/EP/TM	Lars Tyge NIELSEN	"Common Knowledge of Price and Expected Cost in an Oligopolistic Market", August 1990	90/70 TM	Albert ANGEHRN	"'Triple C': A Visual Interactive MCDSS", September 1990
90/59 FIN	Jean DERMINE and Lars-Hendrik RÖLLER	"Economies of Scale and Scope in the French Mutual Funds (SICAV) Industry", August 1990	90/71 MKT	Philip PARKER and Hubert GATIGNON	"Competitive Effects in Diffusion Models: An Empirical Analysis", September 1990
90/60 TM	Peri IZ and Tawfik JELASSI	"An Interactive Group Decision Aid for Multiobjective Problems: An Empirical Assessment", September 1990	90/72 TM	Enver YÜCESAN	"Analysis of Markov Chains Using Simulation Graph Models", October 1990
90/61 TM	Pankaj CHANDRA and Mihkel TOMBAL	"Models for the Evaluation of Manufacturing Flexibility", August 1990	90/73 TM	Arnoud DE MEYER and Kasra FERDOWS	"Removing the Barriers in Manufacturing", October 1990
90/62 EP	Damien NEVEN and Menno VAN DUJ	"Public Policy Towards TV Broadcasting in the Netherlands", August 1990	90/74 SM	Sumantra GHOSHAL and Nitin NOHRIA	"Requisite Complexity: Organising Headquarters- Subsidiary Relations in MNCs", October 1990

90/75 MKT	Roger BETANCOURT and David GAUTSCHI	"The Outputs of Retail Activities: Concepts, Measurement and Evidence", October 1990	90/87 FIN/EP	Lars Tyge NIELSEN	"Existence of Equilibrium in CAPM: Further Results", December 1990
90/76 MKT	Wilfried VANHONACKER	"Managerial Decision Behaviour and the Estimation of Dynamic Sales Response Models", Revised October 1990	90/88 OB/MKT	Susan C. SCHNEIDER and Reinhard ANGELMAR	"Cognition in Organisational Analysis: Who's Minding the Store?" Revised, December 1990
90/77 MKT	Wilfried VANHONACKER	"Testing the Koyck Scheme of Sales Response to Advertising: An Aggregation-Independent Autocorrelation Test", October 1990	90/89 OB	Manfred F.R. KETS DE VRIES	"The CEO Who Couldn't Talk Straight and Other Tales from the Board Room," December 1990
90/78 EP	Michael BURDA and Stefan GERLACH	"Exchange Rate Dynamics and Currency Unification: The Ostmark - DM Rate", October 1990	90/90 MKT	Philip PARKER	"Price Elasticity Dynamics over the Adoption Lifecycle: An Empirical Study," December 1990
90/79 TM	Anil GABA	"Inferences with an Unknown Noise Level in a Bernoulli Process", October 1990			
90/80 TM	Anil GABA and Robert WINKLER	"Using Survey Data in Inferences about Purchase Behaviour", October 1990	<u>1991</u>		
90/81 TM	Tawfik JELASSI	"Du Présent au Futur: Bilan et Orientations des Systèmes Interactifs d'Aide à la Décision," October 1990	91/01 TM/SM	Luk VAN WASSENHOVE, Leonard FORTUIN and Paul VAN BEEK	"Operational Research Can Do More for Managers Than They Think!," January 1991
90/82 EP	Charles WYPLOSZ	"Monetary Union and Fiscal Policy Discipline," November 1990	91/02 TM/SM	Luk VAN WASSENHOVE, Leonard FORTUIN and Paul VAN BEEK	"Operational Research and Environment," January 1991
90/83 FIN/TM	Nathalie DIERKENS and Bernard SINCLAIR-DESGAGNE	"Information Asymmetry and Corporate Communication: Results of a Pilot Study", November 1990	91/03 FIN	Pekka HIETALA and Timo LÖYTTYNIEMI	"An Implicit Dividend Increase in Rights Issues: Theory and Evidence," January 1991
90/84 MKT	Philip M. PARKER	"The Effect of Advertising on Price and Quality: The Optometric Industry Revisited," December 1990	91/04 FIN	Lars Tyge NIELSEN	"Two-Fund Separation, Factor Structure and Robustness," January 1991
90/85 MKT	Avijit GHOSH and Vikas TIBREWALA	"Optimal Timing and Location in Competitive Markets," November 1990	91/05 OB	Susan SCHNEIDER	"Managing Boundaries in Organisations," January 1991
90/86 EP/TM	Olivier CADOT and Bernard SINCLAIR-DESGAGNE	"Prudence and Success in Politics," November 1990	91/06 OB	Manfred KETS DE VRIES, Danny MILLER and Alain NOEL	"Understanding the Leader-Strategy Interface: Application of the Strategic Relationship Interview Method," January 1990 (89/11, revised April 1990)

91/07 EP	Olivier CADOT	"Leading to Insolvent Countries: A Paradoxical Story," January 1991	91/19 MKT	Vikas TIBREWALA and Bruce BUCHANAN	"An Aggregate Test of Purchase Regularity", March 1991
91/08 EP	Charles WYPLOSZ	"Post-Reform East and West: Capital Accumulation and the Labour Mobility Constraint," January 1991	91/20 MKT	Darius SABAVALA and Vikas TIBREWALA	"Monitoring Short-Run Changes in Purchasing Behaviour", March 1991
91/09 TM	Spyros MAKRIDAKIS	"What can we Learn from Failure?", February 1991	91/21 SM	Sumantra GHOSHAL, Harry KORINE and Gabriel SZULANSKI	"Interunit Communication within MNCs: The Influence of Formal Structure Versus Integrative Processes", April 1991
91/10 TM	Luc Van WASSENHOVE and C. N. POTTS	"Integrating Scheduling with Batching and Lot-Sizing: A Review of Algorithms and Complexity", February 1991	91/22 EP	David GOOD, Lars-Hendrik RÖLLER and Robin SICKLES	"EC Integration and the Structure of the Franco-American Airline Industries: Implications for Efficiency and Welfare", April 1991
91/11 TM	Luc VAN WASSENHOVE et al.	"Multi-Item Lotsizing in Capacitated Multi-Stage Serial Systems", February 1991	91/23 TM	Spyros MAKRIDAKIS and Michèle HIBON	"Exponential Smoothing: The Effect of Initial Values and Loss Functions on Post-Sample Forecasting Accuracy", April 1991 (Revision of 90/46)
91/12 TM	Albert ANGEHRN	"Interpretative Computer Intelligence: A Link between Users, Models and Methods in DSS", February 1991	91/24 TM	Louis LE BLANC and Tawfik JELASSI	"An Empirical Assessment of Choice Models for Software Evaluation and Selection", May 1991
91/13 EP	Michael BURDA	"Labor and Product Markets in Czechoslovakia and the Ex-GDR: A Twin Study", February 1991	91/25 SM/TM	Luk N. VAN WASSENHOVE and Charles J. CORBETT	"Trade-Offs? What Trade-Offs?" April 1991
91/14 MKT	Roger BETANCOURT and David GAUTSCHI	"The Output of Retail Activities: French Evidence", February 1991	91/26 TM	Luk N. VAN WASSENHOVE and C.N. POTTS	"Single Machine Scheduling to Minimize Total Late Work", April 1991
91/15 OB	Manfred F.R. KETS DE VRIES	"Exploding the Myth about Rational Organisations and Executives", March 1991	91/27 FIN	Nathalie DIERKENS	"A Discussion of Correct Measures of Information Asymmetry: The Example of Myers and Majluf's Model or the Importance of the Asset Structure of the Firm", May 1991
91/16 TM	Arnoud DE MEYER and Kasra FERDOWS et.al.	"Factories of the Future: Executive Summary of the 1990 International Manufacturing Futures Survey", March 1991	91/28 MKT	Philip M. PARKER	"A Note on: 'Advertising and the Price and Quality of Optometric Services', June 1991
91/17 TM	Dirk CATTRYSSE, Roelof KUIK, Marc SALOMON and Luk VAN WASSENHOVE	"Heuristics for the Discrete Lotsizing and Scheduling Problem with Setup Times", March 1991	91/29 TM	Tawfik JELASSI and Abbas FOROUGH	"An Empirical Study of an Interactive, Session-Oriented Computerised Negotiation Support System (NSS)", June 1991
91/18 TM	C.N. POTTS and Luk VAN WASSENHOVE	"Approximation Algorithms for Scheduling a Single Machine to Minimize Total Late Work", March 1991			

91/30 MKT	Wilfried R. VANHONACKER and Lydia J. PRICE	"Using Meta-Analysis Results in Bayesian Updating: The Empty Cell Problem", June 1991	91/43 SM	Sumantra GHOSHAL and Christopher BARTLETT	"Building Transnational Capabilities: The Management Challenge", September 1991
91/31 FIN	Rezaul KABIR and Theo VERMAELEN	"Insider Trading Restrictions and the Stock Market", June 1991	91/44 SM	Sumantra GHOSHAL and Nitin NOHRIA	"Distributed Innovation in the 'Differentiated Network' Multinational", September 1991
91/32 OB	Susan C. SCHNEIDER	"Organisational Sensemaking: 1992", June 1991	91/45 MKT	Philip M. PARKER	"The Effect of Advertising on Price and Quality: An Empirical Study of Eye Examinations, Sweet Lemons and Self-Deceivers", September 1991
91/33 EP	Michael C. BURDA and Michael FUNKE	"German Trade Unions after Unification - Third Degree Wage Discriminating Monopolists?", June 1991	91/46 MKT	Philip M. PARKER	"Pricing Strategies in Markets with Dynamic Elasticities", October 1991
91/34 FIN	Jean DERMINE	"The BIS Proposal for the Measurement of Interest Rate Risk, Some Pitfalls", June 1991	91/47 MKT	Philip M. PARKER	"A Study of Price Elasticity Dynamics Using Parsimonious Replacement/Multiple Purchase Diffusion Models", October 1991
91/35 FIN	Jean DERMINE	"The Regulation of Financial Services in the EC, Centralization or National Autonomy?" June 1991	91/48 EP/TM	H. Landis GABEL and Bernard SINCLAIR-DESGAGNE	"Managerial Incentives and Environmental Compliance", October 1991
91/36 TM	Albert ANGEHRN	"Supporting Multicriteria Decision Making: New Perspectives and New Systems", August 1991	91/49 TM	Bernard SINCLAIR-DESGAGNE	"The First-Order Approach to Multi-Task Principal-Agent Problems", October 1991
91/37 EP	Ingo WALTER and Hugh THOMAS	"The Introduction of Universal Banking in Canada: An Event Study", August 1991	91/50 SM/TM	Luk VAN WASSENHOVE and Charles CORBETT	"How Green is Your Manufacturing Strategy?" October 1991
91/38 EP	Ingo WALTER and Anthony SAUNDERS	"National and Global Competitiveness of New York City as a Financial Center", August 1991	91/51 MKT	Philip M. PARKER	"Choosing Among Diffusion Models: Some Empirical Guidelines", October 1991
91/39 EP	Ingo WALTER and Anthony SAUNDERS	"Reconfiguration of Banking and Capital Markets in Eastern Europe", August 1991	91/52 EP	Michael BURDA and Charles WYPLOSZ	"Human Capital, Investment and Migration in an Integrated Europe", October 1991
91/40 TM	Luk VAN WASSENHOVE, Dirk CATTRYSSSE and Marc SALOMON	"A Set Partitioning Heuristic for the Generalized Assignment Problem", August 1991	91/53 EP	Michael BURDA and Charles WYPLOSZ	"Labour Mobility and German Integration: Some Vignettes", October 1991
91/41 TM	Luk VAN WASSENHOVE, M.Y. KOVALYOU and C.N. POTTS	"A Fully Polynomial Approximation Scheme for Scheduling a Single Machine to Minimize Total Weighted Late Work", August 1991	91/54 TM	Albert ANGEHRN	"Stimulus Agents: An Alternative Framework for Computer-Aided Decision Making", October 1991
91/42 TM	Rob R. WEITZ and Tawfik JELASSI	"Solving A Multi-Criteria Allocation Problem: A Decision Support System Approach", August 1991			

91/55 EP/SM	Robin HOGARTH, Claude MICHAUD, Yves DOZ and Ludo VAN DER HEYDEN	"Longevity of Business Firms: A Four-Stage Framework for Analysis", November 1991	92/03 OB	Manfred F.R. KETS DE VRIES	"The Family Firm: An Owner's Manual", January 1992
91/56 TM/EP	Bernard SINCLAIR-DESGAGNE	"Aspirations and Economic Development", November 1991	92/04 SM	Philippe HASPELAGH and David JEMISON	"Making Acquisitions Work", January 1992
91/57 MKT	Lydia J. PRICE	"The Indirect Effects of Negative Information on Attitude Change", November 1991	92/05 TM	Xavier DE GROOTE	"Flexibility and Product Diversity in Lot-Sizing Models", January 1992 (revised)
91/58 OB	Manfred F. R. KETS DE VRIES	"Leaders Who Go Crazy", November 1991	92/06 FIN	Theo VERMAELEN and Kees COOLS	"Financial Innovation: Self Tender Offers in the U.K.", January 1992
91/59 OB	Paul A. L. EVANS	"Management Development as Glue Technology", November 1991	92/07 TM	Xavier DE GROOTE	"The Flexibility of Production Processes: A General Framework", January 1992 (revised)
91/60 TM	Xavier DE GROOTE	"Flexibility and Marketing/Manufacturing Coordination", November 1991 (revised)	92/08 TM	Luk VAN WASSENHOVE, Leo KROON and Marc SALOMON	"Exact and Approximation Algorithms for the Operational Fixed Interval Scheduling Problem", January 1992
91/61 TM	Arnoud DE MEYER	"Product Development in the Textile Machinery Industry", November 1991	92/09 TM	Luk VAN WASSENHOVE, Roelof KUIK and Marc SALOMON	"Statistical Search Methods for Lotsizing Problems", January 1992
91/62 MKT	Philip PARKER and Hubert GATIGNON	"Specifying Competitive Effects in Diffusion Models: An Empirical Analysis", November 1991	92/10 SM	Yves DOZ and Heinz THANHEISER	"Regaining Competitiveness: A Process of Organisational Renewal", January 1992
91/63 EP	Michael BURDA	"Some New Insights on the Interindustry Wage Structure from the German Socioeconomic Panel", December 1991	92/11 TM	Enver YUCESAN and Sheldon JACOBSON	"On the Intractability of Verifying Structural Properties of Discrete Event Simulation Models", February 1992
91/64 FIN	Jean DERMINE	"Internationalisation of Financial Markets, Efficiency and Stability", December 1991	92/12 FIN	Gabriel HAWAWINI	"Valuation of Cross-Border Mergers and Acquisitions", February 1992
<u>1992</u>			92/13 TM	Spyros MAKRIDAKIS and Michèle HIBON et.al.	"The M2-Competition: A Budget Related Empirical Forecasting Study", February 1992
92/01 MKT/EP/TM	Wilfried VANHONACKER	"CONPRO*DOGIT: A New Brand Choice Model Incorporating a Consideration Set Formation Process", January 1992	92/14 MKT	Lydia PRICE	"Identifying Cluster Overlap with NORMIX Population Membership Probabilities", February 1992
92/02 MKT/EP/TM	Wilfried VANHONACKER	"The Dynamics of the Consideration Set Formation Process: A Rational Modelling Perspective and Some Numerical Results", January 1992			

92/15 MKT	Vikas TIBREWALA, Peter LENK and Ambar RAO	"Nonstationary Conditional Trend Analysis: An Application to Scanner Panel Data", February 1992
92/16 TM	Xavier DE GROOTE and Yu-Sheng ZHENG	"A Sensitivity Analysis of Stochastic Inventory Systems", March 1992
92/17 TM	Xavier DE GROOTE and Evan L. PORTEUS	"An Approach to Single Parameter Process Design", March 1992
92/18 TM	Xavier DE GROOTE	"Information Disclosure and Technology Choice", March 1992
92/19 FIN	Jean DERMINE	"Deposit Insurance, Credit Risk and Capital Adequacy: A Note", March 1992
92/20 TM	Tawfik JELASSI and Michèle SANGLIER	"Information, Systèmes Complexes et Technologies de l'Information", March 1992