"MONOPOLISTIC COMPETITION, COSTS OF ADJUSTMENT AND THE BEHAVIOR OF EUROPEAN EMPLOYMENT"

by
Michael C. BURDA*

N° 88 / 17

* Michael C. BURDA, Assistant Professor of Economics,
INSEAD, Fontainebleau, France

Director of Publication :

Charles WYPLOSZ, Associate Dean
for Research and Development

Printed at INSEAD,
Fontainebleau, France

MONOPOLISTIC COMPETITION, COSTS OF ADJUSTMENT AND THE BEHAVIOR OF EUROPEAN EMPLOYMENT

Michael C. Burda

INSEAD

77305 Fontainebleau, FRANCE
September 1987

Abstract

A model of dynamic labor demand under monopolistic competition is derived and estimated using manufacturing data from European countries and the U.S. While there is little evidence of significantly higher quadratic adjustment costs in Europe, the overidentifying restrictions implied by the model estimated under rational expectations are not rejected for most European economies. We interpret this finding as well as low covariance of estimated residuals across these countries as implying the absence of operative quantity constraints on firms.

This paper is Chapter 2 of my Ph.D. Dissertation at Harvard University. I am grateful to Olivier Blanchard and Julio Rotemberg for useful discussions; the comments of Michael Emerson, Warwick McKibbin, Danny Quah, and participants in the Kiel Staff Seminar were also helpful. I thank the Deutscher Akademischer Austauschdienst for financial support and the Institut für Weltwirtschaft, Kiel, for the use of facilities.

The dismal labor market performance in Europe despite a significant slowdown in real wage growth poses a significant challenge to the conventional "wage gap" wisdom of the last decade, which maintains that excessive labor costs continue to represent the most important barrier to a sustained expansion of employment.[1] That the slowdown in real wage growth has borne little fruit has prompted many influential analysts including Tobin (1984), Layard *et al*. (1984), and Bruno (1986) to interpret high unemployment and slow employment growth as Keynesian phenomena; i.e. attributable to nominal rigidities and insufficient aggregate demand.

The neoclassical explanation of persistence in employment, which despite its rich tradition in the American literature has received little attention in European circles, appeals to quasifixity of labor due to fixed costs or costs of adjustment. In addition to costs inherent to the factor labor (Oi 1962, Becker 1964, Nadiri and Rosen 1969, Sargent 1978), institutionally mandated job tenure arrangements and severance pay can also generate significant noncompensation labor costs, and there is a widespread perception among economists who study Europe that these costs may be significant in explaining the

[1]See Bruno and Sachs (1985). Average growth in manufacturing compensation per hour divided by the output deflator for manufacturing averaged over the period 1980-1984 (compared to its value over 1975-1979 in parentheses): 0.4% (3.0%) in the United Kingdom, 3.1% (5.8%) in France, 2.6% in West Germany (4.7%), and 1.0% (4.8%) in Sweden. Source: US Bureau of Labor Statistics.

current employment malaise (Lindbeck 1982, Soltwedel 1984, Belassa 1984, Emerson 1986).

In this essay we investigate two issues. The first is the plausibility of the adjustment cost rationalization of European employment behavior, and implicitly, the high persistence observed in European unemployent rates. The second is the appropriateness of the goods market clearing paradigm in the European context. As noted above, much discussion of the European unemployment problem has focused on the effects of contractions in aggregate demand and presumed that quantity constraints are operational for some fraction of or all firms. In order to address these issues, we analyze a model of dynamic labor demand under monopolistic competition with a variety of non-wage, non-compensation costs. This approach allows for particular types of deviations from the competitive paradigm, while maintaining the assumption of a cleared goods market. After analyzing some of its properties, we estimate the model with manufacturing data from eight European economies and the US. By comparing parameter estimates across industries and countries, we hope to gain insight into the relevance of these costs. At the estimation stage, tests of overidentifying restrictions are used to bring evidence to bear on the appropriateness of the model.

For the nine economies examined, there is little evidence of quadratic external adjustment costs at annual sampling frequencies. There is some empirical support for Oi's (1962) model of fixed labor charges, suggesting that marginal revenue product deviates from product wages in equilibrium by the amortization of fixed human capital costs, or to the extent that firms offer premia to reduce labor turnover. These estimated fixed costs are significantly higher in Europe, suggesting a potential role for institutions in explaining cross-country differences; on the other hand, they are not capable in the current model of generating slow adjustment to factor cost changes. A more significant finding is the acceptance of the overidentifying restrictions for manufacturing in most European countries, in contrast to the US. We interpret these results as evidence that that most European manufacturing sectors are not output constrained, as a first approximation. The lack of correlation of computed expectational errors (residuals of the estimated Euler equations) across these countries provides additional support for this interpretation.

The plan of the paper is as follows. The institutional factors in Europe that could induce differences in labor costs are reviewed in Section 1. In Section 2, we develop a model of a monopolistically competitive firm facing fixed labor costs and costs of adjustment. After characterizing optimal employment policies for the representative firm, we examine the implications of aggregate product market equilibrium, given the expected path of nominal wages. Under conditions of flexible prices and complete information about the current price, shifts in the demand curve faced by the representative firm have no independent influence on the hiring decision not already summarized in the product wage, a conclusion similar to that of

Solow (1986). We examine and discuss the effects of the model's parameters on aggregate employment dynamics in Section 3. In Section 4, the model is estimated and the overidentifying restrictions implied by rational expectations are tested; the results are then compared and discussed. Section 5 summarizes the results.

1. The Institutional Rationale for Differential Fixed and Adjustment Costs

It is well understood that, for a variety of reasons, it may not be optimal for a firm to adjust production immediately or completely to changes in relative factor prices. In his classic paper, Oi (1962) showed that sunk costs of search, hiring, and training of employees induce firms to retain some workers in periods of subnormal demand. Because labor is not perfectly homogeneous, these fixed costs on the part of the employer render labor a quasi-fixed factor in production; the long-term nature of employment relationships is further evidence that labor possesses characteristics similar to capital. Sargent (1978), Kennan (1979), Meese (1980), Pindyck and Rotemberg (1983), and Shapiro (1986) have modelled the quasifixity of labor as a result of increasing costs of adjustment, reflecting the stylized fact that firms prefer to maintain a constant or steady path of employment.[2]

[2]Firms may prefer stable employment if reputational loss is associated with highly variable hiring (Bils 1985), or may simply be increasingly unable to absorb sudden large increases (or endure sudden large decreases) in employment.

In addition to costs inherent to the factor labor and the "market" on which it is traded, institutional arrangements are also capable of generating costs of adjusting employment. The most obvious of adjustment costs is severance pay or relocation benefits. These may be modelled externally as direct accession or dismissal costs, which are linear or convex in the change, or as imputed fixed costs, to the extent that the employer imputes to each newly hired employee the expected discounted value of the severance benefit, regardless of whether or not the cost is actually incurred.

Institutions designed to enhance job security play a more prominent role in Europe than in the US. In the United Kingdom, the Redundancy Payments Act (1965) mandates severance pay in certain cases, part of which is borne by the firm. The Industrial Relations Act (1971) establishes rights against unfair dismissal, and Employee Tribunals exist to mediate difficult cases; the Employment Protection Act (1975) further developed these rights.[3] In the Federal Republic of Germany, dismissals are governed by the Kündigungsschutzgesetz (Employment Notice Act). A quit or layoff requires prior notice and the mandated notification period ranges from two weeks to three months, depending on the experience and classification of the employee. Institutional arrangements may induce convexity in hiring and firing costs; layoffs of roughly 10% or more of the work force at large firms require the accession of the works council (Betriebsrat), consisting of

[3]Nickell (1979) provides a detailed discussion of the structure of labor costs in Britain. Effects of the Employment Protection Act of 1975 are surveyed by Daniel and Stilgoe (1978).

elected employee representatives. In such cases, severance bonuses for laid-off employees are mandated, which can amount to as much as eighteen months' net pay. Individual layoffs can be challenged in labor court, and employers often find the severance bonus an attractive form of "in-court settlement," which the German legal system explicitly encourages. Soltwedel (1984) has documented the rise of both court cases and severance costs in the Federal Republic of Germany, and we reproduce his findings below in Table 1.

Given the large degree of convergence in employee protection legislation in the European Community (see Emerson 1986), the institutional patterns in other European countries do not differ significantly from the UK and Germany. Until recently, all layoffs in France required official approval, and in firms with more than ten employees can be a lengthy, bureaucratic process.[4] Italian workers are generally guaranteed a severance payment when dismissed. Austria, despite its relatively impressive unemployment record, has job tenure regulations almost identical to those of Germany. The Scandinavian and Benelux countries possess similar institutional job tenure protection arrangements. In contrast, the US labor market is relatively unfettered, and "costs of adjustment" are generally regarded in the US literature as inherent to labor markets and the technology of work.[5]

[4]See the OECD's 1985 Economic Survey of France, p.42. Bacot et.al. (1977) provide institutional description and assessment of these restraints.

[5]For an opposing view, see Piore (1986).

Table 1
Legally Contested Layoffs and Awarded Damages, Federal Republic of Germany, Selected Years, 1969-1981

	Adjudicated Court Cases		Awarded Damages*	
Year	000s	% of Layoffs	DM (Mill.)	DM/Layoff (1972=100)
1969	37.3	0.6	67.8	44.0
1972	61.5	0.9	157.7	100.0
1975	123.6	2.0	544.9	370.8
1978	119.1	1.8	657.3	439.1
1981	146.0	2.3	1174.5	755.3

Source: Soltwedel (1984).
*Manufacturing only.

As is well understood, these natural and institutional aspects of employment are capable of inducing inertial behavior as the optimal response to exogenous changes in the firm's environment. Under noncompetitive conditions, fixed or sunk costs can induce short run labor hoarding in downturns and cautious hiring behavior when changes in relative prices are perceived to be temporary (Oi 1962). As with fixed hiring costs, linear costs of adjustment generally have no effect on adjustment speed, but convexity can induce a slow response to changes in the firms economic environment even if changes in relative prices are perceived as permanent (Sargent 1978).

2. A Model of Dynamic Labor Demand under Monopolistic Competition

In this section a model is presented that attempts to capture institutional idiosyncracies discussed above in a form susceptible to econometric estimation. It is a hybrid of two important ideas in the macroeconomics literature. In light of the previous discussion, we admit a role for costs of adjusting labor input from the firm's perspective, thus extending the work of Sargent (1978,1979), Kennan (1979), Meese (1980), Pindyck and Rotemberg (1983), and Shapiro (1986). Second, we recognize the potential value of monopolistic competition (MC) models in macroeconomic analysis. Dissatisfaction with both fix-price disequilibrium models and the perfect competition paradigm has spawned much work in MC models in recent years; imperfect competition models allow for the possibility of price setting behavior by firms, while subsuming perfect competition as a special case.[6]

Consider an economy comprised of M identical firms, each engaged in the production of a single, differentiated good. The representative firm faces an (inverse) demand curve for its product

$$p_t/P_t = (a_t/q_t)^b \tag{1}$$

with $0 \leq b \leq 1$, where p_t and q_t are period t price and quantity of the firm's output, P_t is the value added price deflator for the industry, and a_t is a demand shifter. Equation (1) is easily derived from first principles; it is sufficient for the representative agent to maximize time separable utility that is weakly separable in some numeraire and an equally weighted CES index of the q_j, $j=1,\ldots,M$. In this case, the economy price P is also a CES index of the M prices. For an extended discussion, see Hart (1982), Kiyotaki (1985), or Blanchard and Kiyotaki (1986). For simplicity we have assumed that goods enter the utility of the representative agent symmetrically and with equal and constant elasticity of substitution, 1/b; henceforth we suppress subscripts for the firm. Note that the case of perfect competition is mimicked by the case b=0; i.e. when all goods are perfect substitutes.[7]

Each firm employs an identical isoelastic technology to produce output q_t from labor L_t:

[6] See Hart (1982), Weitzman (1982), Akerlof and Yellen (1985), Kiyotaki (1985), Mankiw (1985), Blanchard (1986), Blanchard and Kiyotaki (1986), and Layard and Nickell (1986).

[7] Note that b=0 is slightly stronger than perfect competition; it implies fixed relative prices as well.

$$q_t = A_t L_t^{\alpha} \qquad (2)$$

with $\alpha>0$. The term A_t, which is observable to the firm but not to econometricians, is a multiplicative productivity factor that subsumes technical progress, technological shocks, as well as the cumulative effect of long term changes in the capital stock.[8] We impose no statistical properties on A_t except the relatively innocuous one that it not "grow too fast." More precisely, we require that

$$E_t \left[\lim_{i\to\infty} \left(\prod_{j=0}^{i} D_{t+j}\right) A_{t+i} P_{t+i}\right] = 0$$

where D_t is the one-period nominal discount factor applied in t to nominal cash flows in t+1.[9]

Labor is hired at nominal compensation rate W_t per employee in a competitive labor market. In the time horizon at which the hiring decision is taken, labor is a variable factor; hence any per worker fixed costs, actual or imputed, are also treated as variable. These are modeled as a charge of $P_t F$ per worker per period. When positive, they represent amortized non-firm specific human capital costs corresponding to the "quasi periodic rent" of Oi (1962); they could also include imputed reserves set aside for future severance payments. One could imagine a perfectly competitive insurance industry that for premium F will assume all severance payment liabilities; F represents what the firm would charge itself if such insurance were unavailable. Negative F would then correspond to additional surplus (due to

[8]With suitable normalization, (2) can be viewed as a Cobb-Douglas production function with fixed short run capital stock.

[9]Similar conditions are imposed in Sargent (1978,1979).

firm specific capital investment)with which firms bribe employees to remain with the firm (Becker 1964, Hart 1984), or may represent an external employment subsidy from the government.

In addition, the firm faces convex external costs of adjusting employment which we model as linear and quadratic in terms of economy-wide value added,

$$P_t[c(L_t-L_{t-1}) + .5d(L_t-L_{t-1})^2] ,$$

where $d>0$. With this formulation we hope to capture both market and institutionally induced adjustment costs discussed in the previous section. Since we implicitly assume a fixed single shift, employees and man-hours move together. Expected real profits at time t are given by

$$E_t\left[1/p_t^c \sum_{i=0}^{\infty} [\prod_{\tau=0}^{i} D_{t+\tau}]\{p_{t+i}q_{t+i} - (P_{t+i}F + W_{t+i})L_{t+i} - P_{t+i}[c(L_{t+i}-L_{t+i-1}) + .5d(L_{t+i}-L_{t+i-1})^2]\}\right] ,$$

or

$$E_t\left[1/p_t^c \sum_{i=0}^{\infty} [\prod_{\tau=0}^{i} D_{t+\tau}]\{a_{t+i}^b(A_{t+i}L_{t+1}^{\alpha})^{1-b}P_{t+i} - (P_{t+i}F + W_{t+i})L_{t+i} - P_{t+i}[c(L_{t+i}-L_{t+i-1}) + .5d(L_{t+i}-L_{t+i-1})^2]\}\right] , \quad (3)$$

where E_t is the expectations operator conditional on information available in t, p_t^c is a consumer price deflator and D_t is as defined above. The firm chooses an optimal policy $\{L_t\}$ from the positive orthant of the space of infinite sequences to maximize (3) given the history of employment summarized by L_{t-1}. First order conditions that characterize the trajectory of the optimal employment policy (the so-called "Euler equations") are for i=0,1,...:

$$E_t\Big[P_{t+i}a^b\alpha(1-b)A_{t+i}^{(1-b)}L_{t+i}^{\alpha(1-b)-1} - P_{t+i}(F + c) - W_{t+i}$$

$$- P_{t+i}d(L_{t+i}-L_{t+i-1}) + P_{t+i+1}D_{t+i}c \qquad (4)$$

$$+ P_{t+i+1}D_{t+i}d(L_{t+i+1}-L_{t+i})\Big] = 0.$$

Note that the presence of market power (b>0) induces the individual firm to care about the position of the demand curve summarized by a_t; if b=0, equation (4) collapses to a model in which the representative firm supplies all it wants without influencing the price it receives (Sargent 1978 for example).

Equation (4) characterizes optimal employment paths for individual firms , taking the behavior of other firms as given. However, product market equilibrium in this monopolistically competitive economy with symmetric firms and products is characterized by the equality of all prices, i.e. $p_t = P_t$. By (1) we have $Q_t=q_t=a_t$; the Euler equation (4) for the representative firm becomes for i=0,1,...

$$E_t\Big[P_{t+i}\alpha(1-b)A_{t+i}L_{t+i}^{\alpha-1} - P_{t+i}(F+c) - W_{t+i} - P_{t+i}d(L_{t+i}-L_{t+i-1})$$

$$+ P_{t+i+1}D_{t+i}c + P_{t+i+1}D_{t+i}d(L_{t+i}-L_{t+i-1})\Big] = 0. \qquad (5)$$

or, recalling that $Q_t=A_tL_t^\alpha$,

$$E_t\Big[\alpha(1-b)Q_{t+i}/L_{t+i} - (F+c) - W_{t+i}/P_{t+i} - d(L_{t+i}-L_{t+i-1})$$

$$+ (P_{t+i+1}/P_{t+i})D_{t+i}c + (P_{t+i+1}/P_{t+i})D_{t+i}d(L_{t+i}-L_{t+i-1})\Big] = 0. \qquad (6)$$

Under the "working assumption" of firm and product symmetry, the Euler equation (6) constitutes an estimable relationship from which deep parameters may be recovered. Note that in product market equilibrium, the aggregate demand term a_t plays no role in the determination of employment.[10] Only in the presence of nominal rigidities (e.g., prices set in advance) are independent demand effects possible in this model.

3. Implications of Model Parameters for Employment Dynamics: An Excursion

In this section we investigate the role of parameters in the model for the dynamics of employment. Because the nonlinearity of Euler equations often precludes closed form solution, it is rarely possible to make exact statements about employment dynamics. Pindyck and Rotemberg (1983) have used simulation methods to address these issues. In this section, we linearize (5) around an arbitrary steady state value and compute via factorization the closed form dynamic relationship between product wages and employment. It should be emphasized that this is not a demand schedule for labor, since the representative firm in this MC model actually determines the product wage, via its joint hiring, production, and price decision, given a level of nominal wages W. Rather, this equation is a characterization of aggregate monopolistic competitive equilibrium. Under monopolistic competition, the firm individually determines the product wage; hence one may only correctly speak of responses to nominal wage disturbances, holding the level of demand constant.

[10] This result also holds *a fortiori* for the static case; see Blanchard (1986).

Furthermore, this section invokes more restrictive assumptions on the economic environment than were made previously. Combined with the imposition of a transversality condition, these assumptions are necessary to facilitate closed form solution of current employment as a function of lagged employment and the path of expected future product wages. Having solved explicitly for this relationship, we may check the role of the various parameters in determining λ, the persistence or dependence of current employment on its past. One should remember that the linearization is only appropriate if A_t has a a Wold representation.[11]

Equation (5) characterized the path of employment by the following sequence of Euler equations, which we rewrite slightly:

$$E_t[\alpha(1-b)A_{t+i}L_{t+i}^{\alpha-1} - (F+c) - W_{t+i}/P_{t+i} - d(L_{t+i}-L_{t+i-1}) \\ + (P_{t+i+1}/P_{t+i})D_{t+i}c + (P_{t+i+1}/P_{t+i})D_{t+i}d(L_{t+i}-L_{t+i-1})] = 0. \qquad (7)$$

In order to solve for the relationship between L_t and the sequence of expected future product wages and forcing variables, given L_{t-1}, we first require two approximations. First, we fix the real discount factor $\beta_t = (P_{t+1}/P_t)D_t$ at β for all t. This allows the factorization and forward solution of an appropriately linearized difference equation. Second, we fix $A_t = A$ and approximate $L_t^{\alpha-1}$ with its first order Taylor expansion around L_0:

$$\Phi_0 - (1-\alpha)\Phi_1 L_t \qquad (8)$$

[11] If A_t has a Wold representation, then the model may be linearized around its deterministic component, and deviations will have a time-invariant covariance structure.

where $\Phi_0 = (2-\alpha)L_0^{\alpha-1}$ and $\Phi_1 = L_0^{(\alpha-2)}$. Finally, we assume that $(W/P)_t$ is a covariance stationary stochastic process. We can then rewrite (7) for i=0,1,... as

$$E_t[\alpha(1-b)A[\Phi_0 - (1-\alpha)\Phi_1 L_{t+i}] - (F+c+(W/P)_{t+i}) - d(L_{t+i}-L_{t+i-1}) + c\beta + d\beta(L_{t+i+1} - L_{t+i})] = 0 \qquad (9)$$

There are an infinity of "explosive" sequences of employment that satisfy (9). With the exception of one path, however, these are suboptimal and may be ruled out using an appropriate transversality condition:

$$E_t\,[\lim_{i\to\infty} \beta^{t+i} L_{t+i}] = 0 \qquad (10)$$

This simply requires that employment not grow faster in expectation than the real rate of discount. Solution of (9) and (10) proceeds by factorization; for details, see Sargent (1979). The optimal employment rule for the firm at time t given L_{t-1} is

$$L_t = \lambda L_{t-1} - \lambda/d \sum_{i=0}^{\infty} (\lambda\beta)^i E_t[(W/P)_{t+i} + F + c(1-\beta) - A\Phi_0\alpha(1-\beta)] \qquad (11)$$

where λ is the stable root ($0<\lambda<1$) of the difference equation in the lag operator implied by (9). Since λ is less than one, (11) will satisfy the transversality condition as long as the $(W/P)_t$ process has mean exponential order less than β^{-1}.[12]

Equation (11) does not appear at first glance significantly different from the closed form labor demand

[12] A sequence $\{Z_t\}$ is of less than exponential order b if for some positive k and for all t, $|Z_t| < kx^t$, where $1<x<b$ (Sargent 1979, p.196).

schedule derived under perfect competition (Sargent 1978,1979). Even if b is nonzero, the real product wage remains a sufficient statistic for the state of the aggregate product market. The key difference may be found in the stable root λ, in which b figures prominently:

$$\lambda = \frac{1+\beta^{-1}+ A\alpha(1-\alpha)(1-b)\Phi_1/\beta d - \sqrt{[1+\beta^{-1}+A\alpha(1-\alpha)(1-b)\Phi_1/\beta d)]^2-4\beta^{-1}}}{2} \qquad (12)$$

To evaluate the impact of b, the degree of market power possessed by the representative firm, on the speed of aggregate adjustment, we differentiate:

$$d\lambda/db = (A\alpha(1-\alpha)\Phi_1/2\beta d)\left[\sqrt{\frac{[1+\beta^{-1}+A\alpha(1-\alpha)(1-b)\Phi_1/\beta d]^2}{[1+\beta^{-1}+ A\alpha(1-\alpha)(1-b)\Phi_1/\beta d)]^2-4\beta^{-1}}} -1\right]$$

The necessary condition for the existence of real, distinct roots to the difference equation in the lag operator implied by (9) is $[1+\beta^{-1}+A\alpha(1-\alpha)(1-b)\Phi_1/\beta d)]^2 > 4\beta^{-1}$; it follows that the above expression is positive (negative) as long as α is less than (greater than) 1.

Thus, market power held by individual firms for given d has an impact on the speed of aggregate adjustment to cost (product wage) shocks. For $\alpha<1$ (decreasing returns to scale), increasing market power reduces the speed of adjustment to disturbances, while in the increasing returns case (which in a growing economy with adjustment costs is possible), an increase in market power induces less persistence to shocks! Heuristically, this result is due to the role of α in the concavity of expected profits with respect to labor input, which in turn affects the firm's desire to smooth production; if $\alpha<1$, increases in b increase the concavity of expression (3) in L_t, if $\alpha=1$ (constant returns to scale) there is no impact of market power on adjustment speed; if $\alpha>1$, increases in b reduce the concavity of expected profits in employment, and thus vitiate the incentive to smooth production over time.

To see that d, the quadratic cost of adjustment parameter, is positively associated with the size of the stable root and thus with the degree of persistence, differentiate λ with respect to d:

$$d\lambda/dd= A\alpha(1-\alpha)(1-b)\Phi_1/2\beta d^2\left[\sqrt{\frac{A\alpha(1-\alpha)(1-b)\Phi_1/\beta d}{[1+\beta^{-1}+ A\alpha(1-\alpha)(1-b)\Phi_1/\beta d)]^2-4\beta^{-1}}}\ -1\right]$$

This expression is likewise positive as long as there are nonincreasing returns to scale in production ($\alpha\leq1$).

Inspection of (12) reveals that $d\lambda/dc = d\lambda/dF = 0$; that is, the parameters F and c have no effect on the adjustment speed at the sampling frequency at which labor is fully variable. This is analogous to the non-effect of linear costs of adjustment in dynamic models of investment. On the other hand, if F represents amortized expenditures on training (in value added terms), then at some higher frequency they must have been fixed for the individual firm. Hence in the "short run" they will look like sunk costs and have no effect on the firm's decision; firms will equate marginal product with marginal cost. The degree of short run persistence at higher sampling frequencies should be positively related to F/(F+W/P), the fraction of tocal costs represented by the fixed component (Oi 1962).

4. Model Estimation

4.1. General Discussion of Euler Equation Models

Estimation of first order conditions to dynamic optimization problems (Euler equations) like (6) requires an auxiliary assumption about expectations formation. An important econometric strategy pioneered by Hansen and Singleton (1982) is to exploit an implication of the rational expectations hypothesis, that the expectational errors of decisionmakers are orthogonal to information available when the expectations are formed. Defining

$$\epsilon_{t+1} = D_t(P_{t+1}/P_t)(c+L_{t+1}) - (D_t/P_t)E_t[P_{t+1}(c+L_{t+1})],$$

we have $E_t\epsilon_{t+1} = 0$ and $E_t(k_t\epsilon_{t+1}) = 0$ for all k_t in agents' information set in period t. Theoretically, consistent estimation is then possible by substituting actual employment and prices for their expectations and instrumenting with variables known at time t, including those dated t that actually appear in the estimated relationship.

In recent years, these Euler equations methods have emerged as an important approach to estimating dynamic macroeconomic models.[13] Because they do not require closed form for estimation, the econometrician has wide flexibility in choice of functional specification. There is no need to specify the entire economic environment (i.e. the statistical exogeneity of forcing variables,

[13] See Hansen and Singleton (1982, 1983), Pindyck and Rotemberg (1983), Rotemberg (1984), Shapiro (1986), and Mankiw, Rotemberg, and Summers (1985).

as is required in full information/maximum likelihood techniques. Assumption of covariance stationarity of the forcing variables is also unnecessary. The discount factor D_t, which may change over time, need not be fixed as in Sargent (1978). Perhaps most importantly, because these stochastic difference equations are derived from first principles, when estimated under rational expectations they are immune from the Lucas (1976) critique. There are, however, important limitations of Euler equation methods that deserve mention, aside from the obvious one that first order conditions such as (6) ignore potentially important information contained in the transversality condition (10).

First, the procedure outlined above will yield consistent estimates only to the extent the Euler equation holds exactly in each period. Put differently, the estimated residuals are by assumption solely expectational errors, implying that the data are free of any measurement error and the model is correctly specified. As Pindyck and Rotemberg (1983) have argued, errors-in-variables will induce correlation between the error term and the variables and result in inconsistent estimation. They suggest the use of a "conditioning set" which is a proper subset of period t information that excludes variables actually appearing in the equation. This remedy is valid, of course, only as long as measurement error itself is not serially correlated.

Misspecification represents a more serious problem, and is likely to be evident in the form of serially correlated residuals, if the omitted variable is serially correlated.

Because the residual from the estimated Euler equation is by assumption expectational error, serial correlation might also be present if a serially correlated, perhaps unobservable element of the information set was omitted. In the former case the estimates are inconsistent; in the latter case, consistent estimation is not precluded, but the estimate of the variance-covariance matrix of the asymptotic distribution of the parameter estimates is incorrect. Two responses to the latter case are possible: one can simply construct some robust estimate of the standard errors, or exploit the covariance structure of the errors at the estimation stage with a general method of moments estimator suggested by Hansen (1982). In any case, the associated χ^2 test of the overidentifying restrictions could bring evidence to bear on the appropriateness of the model. On the other hand, a rejection of the null does not reveal the source of misspecification, which might be time aggregation, (the model is only correct at a higher sampling frequency), an incorrect model, or the invalidity of rational expectations.[14]

Garber and King (1983) have recently criticized Euler equation methods for ignoring classical "Cowles Foundation" simultaneity/identification issues. In the context of estimating an intertemporal efficiency condition in consumption, they show that if there are two or more sources of unobservable behavioral shocks, the model is in general unidentified. In their example, this occurs because the expectational error consists of two components that arise from technology and tastes. Without a

[14]See Rotemberg (1984) for an interesting discussion of these and related issues.

priori restrictions the econometrician actually estimates a weighted average of two relationships--the classic consequences of an underidentified model. Using a substitution due to Shapiro (1986) of Q for AL^{α}, we effectively avoid the problem, since observed output actually contains the productivity shock. Their critique remains valid to the extent that our specification of labor demand is not correct --alternatively, if there is a second unobservable stochastic disturbance to the production function. This however is not an "incredible" identification assumption, but simply the maintained hypothesis that the model is correct.

4.2. Data, System Specification, and Estimation Results

Before estimation, two additional issues must be resolved. First, in order to identify the production and MC parameters a and b, which in (6) alone are only estimable as $\alpha(1-b)$, joint estimation of equations (6) and (2) is necessary. Second, the production function (2) must be specified in a way that allows consistent estimation when the productivity process A_t possesses a unit root, e.g., follow a random walk. Modelling A_t as a deterministic trend plus a possibly serially correlated disturbance will lead to inconsistent estimates under such conditions (Nelson and Kang 1981). We model A_t as a first order integrated autoregressive process in its logarithm, thereby allowing the possibility of a unit root. Taking logs of the production function and first differencing, yields

$$\Delta \ln Q_t = \gamma + \alpha \Delta \ln L_t + \nu_t \qquad (13)$$

where γ represents a (possibly zero) deterministic growth component of A; ν follows an AR(1) process: $\nu_t = \rho\nu_{t-1}+\eta_t$ with $-1<\rho<1$ and η white noise. We may then quasi-difference (13) with ρ to obtain the following system, in which the production function is led one period so that the two disturbances coincide temporally:

$$E_t[\alpha(1-b)Q_t/L_t - (F + c) - W_t/P_t - d(L_t-L_{t-1}) + (P_{t+1}/P_t)D_t c + (P_{t+1}/P_t)D_t d(L_{t+1}-L_t)] = 0 \qquad (14)$$

$$\Delta \ln Q_{t+1} = \rho\Delta \ln Q_t + \gamma(1-\rho) + \alpha(\Delta \ln L_{t+1} - \rho\Delta \ln L_t) + \eta_{t+1} \qquad (15)$$

Equations (14) and (15) were estimated with TSP's nonlinear three stage least squares procedure on annual manufacturing data from the United Kingdom, France, the Federal Republic of Germany, Italy, Denmark, Belgium, Norway, Sweden, and the United States. Data for estimation were obtained from standardized annual aggregate manufacturing series published by the Office of Productivity and Technology, US Department of Labor.[15] These data consist of roughly comparable nominal and real value added, employee compensation (including employers' contributions to social insurance, pensions, medical insurance, and other extra wage benefits), and annual employment (dependent status employees). Nominal short term interest rates used in

[15] "Underlying data for indexes of output per hour, hourly compensation, and unit labor costs in manufacturing, twelve countries, 1950-1985" Release USDL 86-230.

constructing D_t were obtained from the IFS (IMF) data bank; for Italy, Denmark and Belgium, D was fixed as the simple average of the available data. The conditioning set used as instruments in estimation consisted of a constant, two lags of Q/L, W/P, P, and D, and L lagged two periods.

The results are displayed in Table 2. Heteroskedastic-consistent standard errors and Hansen's (1982) J-statistics of the remaining orthogonality conditions are also reported. It should be emphasized that the tests of the overidentifying restrictions are appropriate only if the residuals are conditionally homoskedastic and serially uncorrelated. Subject to this caveat, the model is not rejected in most manufacturing European sectors; only for France and the United Kingdom does the J-statistic exceed the critical value at the 5% level. The model is also rejected by US data. In addition to the reasons cited above, the rejection of the overidentifying restrictions might reflect output constrained labor demand in these countries.

This interpretation is supported by the statistical properties of the computed residuals from the first equation, which are equal to unanticipated profits at the margin for hiring an additional unit of labor. Following Burda (1984), a correlation matrix of these computed residuals was contructed and is displayed in Table 2.3. If nominal shocks to demand were not fully offset by movements in prices, the model would be misspecified, and systematic shocks to aggregate demand across countries would be associated with systematic movements of residual labor demand (and marginal excess profitability).

Table 2

NL3SLS System Estimates, European and US Manufacturing

(Estimated asymptotic standard errors in parentheses)

Country	$\hat{\alpha}$	$\hat{b}$	$\hat{F}$	$\hat{c}$	$\hat{d}$	$\hat{\gamma}$	$\hat{\rho}$	J(14)†
UK	1.044	0.137	0.980	0.885	0.511E-4	0.0321	0.398	34.6*
(62-82)	(.532)	(.499)	(.140)	(1.32)	(.00027)	(.0123)	(.425)	
FR Germany	1.004	0.262	0.00502	-0.0233	-6.75E-6	0.0391	0.423	21.0
(62-83)	(1.01)	(.749)	(.00057)	(.0083)	(.00087)	(.0138)	(.700)	
France	1.452	0.531	1.212	17.77	0.00460	0.0486	0.476	33.4*
(52-83)	(.364)	(.119)	(.405)	(7.35)	(.00476)	(.0063)	(.247)	
Italy	1.759	0.688	-0.313	3.555	-0.00082	0.0373	0.214	12.4
(53-83)	(.450)	(.095)	(.189)	(.937)	(.00063)	(.011)	(.361)	
Belgium	1.003	0.156	93.0	126	0.625	0.0516	0.231	12.4
(62-83)	(.412)	(.347)	(16.7)	(407)	(.498)	(.0071)	(.403)	
Denmark	0.779	0.175	-0.019	0.198	2.44E-8	0.0408	0.323	13.0
(52-83)	(.199)	(.228)	(.0093)	(.078)	5.2E-8	(.00607)	(.191)	
Sweden	1.570	0.478	4.34	61.4	0.217	0.0458	0.898	3.66
(52-82)	(.639)	(.247)	(12.3)	(87.8)	(.123)	(.0434)	(.256)	
Norway	1.154	0.044	45.9	-200.0	0.146	0.0272	0.352	2.96
(52-83)	(.360)	(.381)	(23.1)	(146)	(.528)	(.007)	(.526)	
USA	1.282	0.403	0.00086	-0.00685	-1.62E-7	0.0234	0.213	24.5*
(52-83)	(.251)	(.117)	(.00023)	(.0032)	(-9.4E-8)	(.0072)	(.310)	

*Significant at the 5% level.
†For Italy, Belgium, Denmark, Sweden, and Norway: J(10)
Critical value at 5%: J(14), 23.7; J(10), 18.3.

Table 3
Cross-Country Correlations of Residuals from Euler Equations

	UK	FR	GE	IT	BE	DE	NO	SW	US
UK	1.00								
FR	0.50	1.00							
GE	0.34	0.31	1.00						
IT	-0.25	0.11	0.14	1.00					
BE	0.71	0.59	0.29	-0.18	1.00				
DE	0.24	0.14	0.14	0.27	0.23	1.00			
NO	0.05	0.36	0.17	-0.24	0.30	0.06	1.00		
SW	0.63	0.40	0.35	0.08	0.63	0.53	0.07	1.00	
US	0.42	0.55	-0.08	-0.29	0.24	-0.15	0.29	-0.01	1.00

Among those countries with J-statistics under the 5% critical value (Germany, Denmark, Sweden, Norway, Belgium, and Italy), the average cross-country correlation was 0.18; for the US, France and the United Kingdom, the correlation was 0.49 (the grand sample average was 0.21).

In general, the data provide only modest evidence for monopolistically competitive price setting behavior, and support the perfect competition paradigm in Europe as a working hypothesis for aggregative analysis. The null of b=0 is rejected in Italy, France, Sweden and the US at conventional significance levels; not coincidentally, in all four of these countries the elasticity of output with respect to employment is estimated greater than unity; steady state marginal revenue is declining in employment if and only if $\alpha(1-b)<1$.[16]

The linchpin of the adjustment cost model is the quadratic costs of adjustment parameter d, the rate at which marginal costs of adjustment increase with the size of the adjustment. It is statistically insignificant for all countries examined and is often of the wrong sign. Table 4, which displays estimates of F, c, and d in comparable terms, conveys the economic insignificance of the quadratic cost of adjustment parameter. Albeit small compared to product wage levels in 1984, the linear cost of adjustment parameter c is often significantly estimated, indicating asymmetry in costs to hiring and firing with the

[16] If L is mismeasured, α may be estimated greater than 1 because of labor hoarding, which can be a response to market power (b>0) and adjustment costs; perfectly competitive firms can sell all they desire at the prevailing price and the shadow price of hoarded labor is zero.

Table 4

Estimates of F, c, and d, in Constant Local Currency Terms Per Employee

	$\hat{F}$	$\hat{c}$	$\hat{d}$	$(W/P_v)_{1984}$
United Kingdom (1980 pounds)	980*	0.88	5.11E-5	7075
FR Germany (1976 DM)	5023*	-23.3*	-6.75E-4	34500
France (1970 FF)	1212*	17.8*	0.0046	42500
Italy (1970 Lira)	-313000	3550*	-0.152	3640000
Belgium (1980 BF)	93000*	127	0.625	745000
Denmark (1980 Kroner)	-18700*	19800*	0.024	99900
Norway (1980 Kroner)	45910*	-200	0.146	98100
Sweden (1980 Krona)	4342	61.4	0.218	96500
United States (1972 $)	863*	6.80*	-1.62E-7	14000

*Statistically significant at the 5% level from Table 2.

former more often costlier than the latter. As shown above, however, this class of adjustment costs is incapable of generating slow response to exogenous shocks.

Among the unobservable labor costs that are estimated, only the F parameter, which subsumes all wage independent per employee charges, is consistently statistically significantly different from zero. Since F may be thought of as a wedge driven between marginal cost and marginal revenue in (14), a negative estimate may be interpreted as the premium paid to workers above their marginal product. This might arise from employment subsidies or, following Hart's (1984) interpretation, when human capital is firm specific; not only is it unreasonable for the firm to expect the employee to finance his human capital investment, but it is in the firm's interest to offer a premium to reduce job turnover.

An objective of this paper is the comparison of unobservable labor costs that may arise in differing institutional contexts. The results presented in the last section suggest focusing attention of the wage independent charge parameter F. Direct comparison of estimates, however, which are denominated in constant local currency units, requires a constellation of real exchange rates, which are unobservable. A more attractive alternative procedure is the computation of the ratio $(|F|/(|F|+W/P)$, which Oi (1962) argues will be positively associated with quasifixity of labor. Using 1984 values of annual per employee compensation levels, "Oi Ratios" were computed for all countries and are presented in Table 5. If one assumes that wage independent charges inherent to the sector (institution

Table 5

Estimated Oi Ratios |F|/(W/P+|F|)

United Kingdom (1980 pounds)	0.12*
FR Germany (1976 DM)	0.13*
France (1970 FF)	0.03*
Italy (1970 Lira)	0.09
Belgium (1980 BF)	0.11*
Denmark (1980 Kroner)	0.23*
Norway (1980 Kroner)	0.32*
Sweden (1980 Kroner)	0.04
United States (1972 $)	0.06*

*Statistically significant at the 5% level from Table 2.

independent) are roughly constant across countries, the estimates of F in manufacturing are consistent with the hypothesis that job protection provisions in Europe have contributed to a higher "wedge" or imputed charge on employment. In this interpretation, employers in Europe require an extra positive margin, or reserve, to compensate for the possibility of an expensive termination. Since job tenure in the US is generally lower than in Europe, these Oi ratios will understate the difference in impacts of institutional arrangements, since amortization periods associated with shorter job tenure in the US will presumably increase the periodic charge, _ceteris paribus_.[17]

Despite systematic differences across economies, it should be stressed that in the current model, the F parameter has no influence on the rate of speed at which labor demand responds to exogenous disturbances. Hence, the acceptance of the model in many European manufacturing sectors combined with the general economic insignificance of quadratic adjustment costs estimates shift the locus of employment persistence from factor demands to the determinants of wages and productivity. Nonetheless, the perfect competition paradigm seems a useful first approximation to the actual behavior of these economies.

5. Conclusions

In this paper we have investigated the behavior of European manufacturing employment in the context of a partial equilibrium,

[17] Recent OECD estimates of average job tenure, all persons, for the US is 7.2 years; in France, 8.8 years; FR Germany, 8.5 years; the United Kingdom, 8.6 years; Belgium, 8.0 years; Italy, 7.1 years (OECD _Economic Outlook_, 1984, p. 56, Table 31).

representative firm model in which changes in labor input levels are increasingly costly. This approach seems appropriate for analyzing the European experience, given the multitude of institutionally-induced impediments documented in the literature. In addition, we attempt to incorporate a richer variety of product market behavior by allowing firms to set prices in a monopolistically competitive environment, in which perfect competition is subsumed as a special case. We derive conditions characterizing the optimal employment policy of the representative firm in monopolistic competition equilibrium as an estimable stochastic Euler equation.

Although we find little econometric evidence in support of the view that current sluggish job creation in Europe is attributable to adjustment costs, there is some evidence that fixed per employee charges are more significant in European economies than in the United States. We cannot, however, reject the hypothesis that European manufacturing on average does not face a sales constraint in markets for its output. This would imply that European employment behavior can be adequately explained by adverse combination of wage, product price, or technological developments. That the model is rejected by US, British, and French data suggests that nominal rigidities induced by price setting may be significant in these countries. The conclusions drawn from tests of the model's overidentifying restrictions are supported by the cross-country behavior of estimated expectational errors (Euler equation residuals). Among those countries that passed the Hansen (1982) test of the overidentifying restrictions, estimated residuals were considerably less correlated than among those that rejected the model. If nominal rigidities are operational on an annual basis, the conventional theories of "locomotives" would predict a high systematic component in labor demand across countries that would not be captured by the model. We regard these results as further support for the "equilibrium view" of labor demand in Europe.

References

Akerlof, G. and J.Yellen, "A Near Rational Model of the Business Cycle with Wage and Price Inertia," Quarterly Journal of Economics, 100 (Supplement 1985), 823-838.

Bacot, M., L. Foucher, M. Mouriaux, and M. Orhand, "La Legislation Relative à la Protection de L'Emploi et son impact sur les Politiques des Entreprises," Centre D'Etudes De L'Emploi, Paris, October 1977.

Belassa, B. "The Economic Consequences of Social Policies in the Industrial Countries," Weltwirtschaftliches Archiv 120:2 (1984), 213-227.

Becker, G. Human Capital (Chicago: University of Chicago Press, 1964).

Bils, M., "The Cyclical Behavior of Marginal Cost and Price," mimeo, MIT, June 1985.

Blanchard, O. "The Wage-Price Spiral," Quarterly Journal of Economics, 101 (August 1986), 543-565.

__________, and N. Kiyotaki, "Monopolistic Competition, and the Effects of Aggregate Demand," mimeo, 1986.

Bruno, M. "Aggregate Demand and Supply Factors in the OECD Countries: An Update," Economica 53 (Supplement, 1986), S35-S52.

________, and J. Sachs, The Economics of Worldwide Stagflation (Cambridge: Harvard University Press, 1985).

Burda, M. "Dynamic Labor Demand Schedules Revisited: A Sectoral Approach," mimeo, Harvard University, 1984.

Daniel, W. and E. Stilgoe, "The Impact of Employment Protection Laws," Policy Studies Institute, Volume 44, London, 1978.

Emerson, M., "Regulation or Deregulation of the Labour Market: Policy Regimes for the Recruitment and Dismissal of Employees in the Industrialised Countries," mimeo, Harvard University, June 1986.

Garber, P. and R. King, "Deep Structural Excavation? A Critique of Euler Equation Methods," NBER Technical Working Paper No.31, November 1983.

Hansen, L.P., "Large Sample Properties of Method of Moments Estimators," Econometrica 50 (July 1982), 1029-1054.

______, and K.J. Singleton, "Generalized Instrumental Variables Estimation of Nonlinear Rational Expectations Models," Econometrica 50 (September 1982), 1269-1286.

________________, "Stochastic Consumption, Risk Aversion, and the Temporal Behavior of Asset Returns," Journal of Political Economy 91 (April 1983), 249-265.

Hart, O., "A Model of Imperfect Competition with Keynesian Features," Quarterly Journal of Economics 97 (February 1982), 109-138.

Hart, R. The Economics of Non-Wage Labour Costs (London: George Allen and Unwin, 1984).

Kennan, J. "The Estimation of Parial Adjustment Models with Rational Expectations," Econometrica 47 (November 1979), 1441-1456.

Kiyotaki, N., "Macroeconomics of Monopolistic Competition," unpublished Ph.D. dissertation, Harvard University, 1985.

Layard, R., G. Basevi, O. Blanchard, W. Buiter, and R. Dornbusch, "Europe: The Case for Unsustainable Growth," Centre for European Policy Studies Discussion Paper, 1984, in Blanchard, et. al., eds. Restoring Europe's Prosperity (Cambridge: MIT Press, 1986).

Layard, R., and S. Nickell, "Unemployment in Britain," Economica 53 (Supplement 1986), S121-170.

Lindbeck, A. "Emerging Arteriosclerosis of the West European Economies: Consequences for the Lesser Developed Countries," Institute for International Economics Research Discussion Paper # 191, Stockholm, 1982.

Lucas, R.E., Jr., "Econometric Policy Evaluation: A Critique," in Brunner, K. and A. Meltzer, eds. The Phillips Curve and Labor Markets, Carnegie-Rochester Conferences on Public Policy, 1976.

Mankiw, N.G., "Small Menu Costs and Large Business Cycles: A Macroeconomic Model of Monopoly," Quarterly Journal of Economics 100 (May 1985), 529-537.

_______, J. Rotemberg and L.Summers, "Intertemporal Substitution in Macroeconomics," Quarterly Journal of Economics 100 (February 1985), 225-251.

Meese, R. "Dynamic Factor Demand Schedules for Capital and Labor under Rational Expectations," Journal of Econometrics 14 (Summer 1980), 141-158.

Nadiri, I, and S. Rosen, "Interrelated Factor Demand Functions," American Economic Review 59 (September 1969), 457-471.

Nelson, C. and H. Kang, "Spurious Periodicity in Inappropriately Detrended Times Series," Econometrica 49 (May 1981), 741-751.

Nickell, S.J., "Fixed Costs, Employment and Labor Demand over the Cycle," Economica (November 1978) 329-345.

_______, "Unemployment and the Structure of Labor Costs," Journal of Monetary Economics Supplement, Carnegie-Rochester Conference on Public Policy, 1979.

OECD Economic Surveys: France (Paris, 1985).

Oi, W. "Labor as a Quasi-Fixed Factor," Journal of Political Economy 70 (August 1962), 538-555.

Pindyck, R.S. and J.J.Rotemberg, "Dynamic Factor Demands and the Effect of Energy Price Shocks," American Economic Review 73 (December 1983), 1066-1079.

Piore, M. "Labor Market Flexibility," Industrial Relations (UC Berkeley, 1986).

Richardi, R., ed., Arbeitsgesetze (Labor Laws) (Munich: C.H. Beck, 1985).

Rotemberg J.J., "Interpreting the Statistical Failures of Some Rational Expectations Macroeconomic Models," American Economic Association Papers and Proceedings 74 (May 1984), 188-193.

Sargent, T.J., "Estimating Dynamic Labor Demand Schedules under Rational Expectations," Journal of Political Economy 86 (December 1978), 1009-1044.

_______, Macroeconomic Theory (New York: Academic Press, 1979).

Shapiro, M. "The Dynamic Demand for Capital and Labor," Quarterly Journal of Economics 101 (August 1986), 513-542.

Solow, R. "Unemployment: Getting the Questions Right," Economica 53 (Supplement 1986), S23-S34.

Soltwedel, R. "Staatliche Interventionen am Arbeitsmarkt: Eine Kritik," doctoral dissertation, Christian-Albrecht-Universität zu Kiel, 1984.

Tobin, J., "Unemployment in the 1980s: Macroeconomic Causes and Prescription," in A. Pierre, ed., Unemployment and Growth in the Western Economies (New York: Council on Foreign Relations, 1984), 79-112.

Weitzman, M., "The Macroeconomics of the Share Economy," American Economic Review (December 1985) 937-953.

INSEAD WORKING PAPERS SERIES

1985

85/01	Jean DERMINE	"The measurement of interest rate risk by financial intermediaries", December 1983, Revised December 1984.
85/02	Philippe A. NAERT and Els GIJSBRECHTS	"Diffusion model for new product introduction in existing markets" .
85/03	Philippe A. NAERT and Els GIJSBRECHTS	"Towards a decision support system for hierarchically allocating marketing resources across and within product groups" .
85/04	Philippe A. NAERT and Marcel WEVERBERGH	"Market share specification, estimation and validation: towards reconciling seemingly divergent views" .
85/05	Ahmet AYKAC, Marcel CORSTJENS, David GAUTSCHI and Ira HOROWITZ	"Estimation uncertainty and optimal advertising decisions", Second draft, April 1985.
85/06	Kasra FERDOWS	"The shifting paradigms of manufacturing: inventory, quality and now versatility", March 1985.
85/07	Kasra FERDOWS, Jeffrey G. MILLER, Jinchiro NAKANE and Thomas E.VOLLMANN.	"Evolving manufacturing strategies in Europe, Japan and North-America"
85/08	Spyros MAKRIDAKIS and Robert CARBONE	"Forecasting when pattern changes occur beyond the historical data" , April 1985.
85/09	Spyros MAKRIDAKIS and Robert CARBONE	"Sampling distribution of post-sample forecasting errors" , February 1985.
85/10	Jean DERMINE	"Portfolio optimization by financial intermediaries in an asset pricing model".
85/11	Antonio M. BORGES and Alfredo M. PEREIRA	"Energy demand in Portuguese manufacturing: a two-stage model".
85/12	Arnoud DE MEYER	"Defining a manufacturing strategy - a survey of European manufacturers".
85/13	Arnoud DE MEYER	"Large European manufacturers and the management of R & D".
85/14	Ahmet AYKAC, Marcel CORSTJENS, David GAUTSCHI and Douglas L. MacLACHLAN	"The advertising-sales relationship in the U.S. cigarette industry: a comparison of correlational and causality testing approaches".
85/15	Arnoud DE MEYER and Roland VAN DIERDONCK	"Organizing a technology jump or overcoming the technological hurdle".
85/16	Herwig M. LANGOHR and Antony M. SANTOMERO	"Commercial bank refinancing and economic stability: an analysis of European features".
85/17	Manfred F.R. KETS DE VRIES and Danny MILLER	"Personality, culture and organization".
85/18	Manfred F.R. KETS DE VRIES	"The darker side of entrepreneurship".
85/19	Manfred F.R. KETS DE VRIES and Dany MILLER	"Narcissism and leadership: an object relations perspective".
85/20	Manfred F.R. KETS DE VRIES and Dany MILLER	"Interpreting organizational texts".
85/21	Herwig M. LANGOHR and Claude J. VIALLET	"Nationalization, compensation and wealth transfers: France 1981-1982" 1, Final version July 1985.
85/22	Herwig M. LANGOHR and B. Espen ECKBO	"Takeover premiums, disclosure regulations, and the market for corporate control. A comparative analysis of public tender offers, controlling-block trades and minority buyout in France", July 1985.
85/23	Manfred F.R. KETS DE VRIES and Dany MILLER	"Barriers to adaptation: personal, cultural and organizational perspectives".
85/24	Spyros MAKRIDAKIS	"The art and science of forecasting: an assessment and future directions".
85/25	Gabriel HAWAWINI	"Financial innovation and recent developments in the French capital markets", October 1985.
85/26	Karel O. COOL and Dan E. SCHENDEL	"Patterns of competition, strategic group formation and the performance case of the US pharmaceutical industry, 1963-1982", October 1985.
85/27	Arnoud DE MEYER	"European manufacturing: a comparative study (1985)".

1986

86/01	Arnoud DE MEYER	"The R & D/Production interface".
86/02	Philippe A. NAERT Marcel WEVERBERGH and Guido VERSWIJVEL	"Subjective estimation in integrating communication budget and allocation decisions: a case study", January 1986.
86/03	Michael BRIMM	"Sponsorship and the diffusion of organizational innovation: a preliminary view".
86/04	Spyros MAKRIDAKIS and Michèle HIBON	"Confidence intervals: an empirical investigation for the series in the M-Competition" .
86/05	Charles A. WYPLOSZ	"A note on the reduction of the workweek", July 1985.

86/06	Francesco GIAVAZZI, Jeff R. SHEEN and Charles A. WYPLOSZ	"The real exchange rate and the fiscal aspects of a natural resource discovery", Revised version: February 1986.
86/07	Douglas L. MacLACHLAN and Spyros MAKRIDAKIS	"Judgmental biases in sales forecasting", February 1986.
86/08	José de la TORRE and David H. NECKAR	"Forecasting political risks for international operations", Second Draft: March 3, 1986.
86/09	Philippe C. HASPESLAGH	"Conceptualizing the strategic process in diversified firms: the role and nature of the corporate influence process", February 1986.
86/10	R. MOENART, Arnoud DE MEYER, J. BARBE and D. DESCHOOLMEESTER.	"Analysing the issues concerning technological de-maturity".
86/11	Philippe A. NAERT and Alain BULTEZ	"From "Lydiametry" to "Pinkhamization": misspecifying advertising dynamics rarely affects profitability".
86/12	Roger BETANCOURT and David GAUTSCHI	"The economics of retail firms", Revised April 1986.
86/13	S.P. ANDERSON and Damien J. NEVEN	"Spatial competition à la Cournot".
86/14	Charles WALDMAN	"Comparaison internationale des marges brutes du commerce", June 1985.
86/15	Mihkel TOMBAK and Arnoud DE MEYER	"How the managerial attitudes of firms with FMS differ from other manufacturing firms: survey results", June 1986.
86/16	B. Espen ECKBO and Herwig M. LANGOHR	"Les primes des offres publiques, la note d'information et le marché des transferts de contrôle des sociétés".
86/17	David B. JEMISON	"Strategic capability transfer in acquisition integration", May 1986.
86/18	James TEBOUL and V. MALLERET	"Towards an operational definition of services", 1986.
86/19	Rob R. WEITZ	"Nostradamus: a knowledge-based forecasting advisor".
86/20	Albert CORHAY, Gabriel HAWAWINI and Pierre A. MICHEL	"The pricing of equity on the London stock exchange: seasonality and size premium", June 1986.
86/21	Albert CORHAY, Gabriel A. HAWAWINI and Pierre A. MICHEL	"Risk-premia seasonality in U.S. and European equity markets", February 1986.
86/22	Albert CORHAY, Gabriel A. HAWAWINI and Pierre A. MICHEL	"Seasonality in the risk-return relationships some international evidence", July 1986.
86/23	Arnoud DE MEYER	"An exploratory study on the integration of information systems in manufacturing", July 1986.
86/24	David GAUTSCHI and Vithala R. RAO	"A methodology for specification and aggregation in product concept testing", July 1986.
86/25	H. Peter GRAY and Ingo WALTER	"Protection", August 1986.
86/26	Barry EICHENGREEN and Charles WYPLOSZ	"The economic consequences of the Franc Poincare", September 1986.
86/27	Karel COOL and Ingemar DIERICKX	"Negative risk-return relationships in business strategy: paradox or truism?", October 1986.
86/28	Manfred KETS DE VRIES and Danny MILLER	"Interpreting organizational texts.
86/29	Manfred KETS DE VRIES	"Why follow the leader?".
86/30	Manfred KETS DE VRIES	"The succession game: the real story.
86/31	Arnoud DE MEYER	"Flexibility: the next competitive battle", October 1986.
86/31	Arnoud DE MEYER, Jinichiro NAKANE, Jeffrey G. MILLER and Kasra FERDOWS	"Flexibility: the next competitive battle", Revised Version: March 1987
86/32	Karel COOL and Dan SCHENDEL	Performance differences among strategic group members", October 1986.
86/33	Ernst BALTENSPERGER and Jean DERMINE	"The role of public policy in insuring financial stability: a cross-country, comparative perspective", August 1986, Revised November 1986.
86/34	Philippe HASPESLAGH and David JEMISON	"Acquisitions: myths and reality", July 1986.
86/35	Jean DERMINE	"Measuring the market value of a bank, a primer", November 1986.
86/36	Albert CORHAY and Gabriel HAWAWINI	"Seasonality in the risk-return relationship: some international evidence", July 1986.
86/37	David GAUTSCHI and Roger BETANCOURT	"The evolution of retailing: a suggested economic interpretation".
86/38	Gabriel HAWAWINI	"Financial innovation and recent developments in the French capital markets", Updated: September 1986.

86/39	Gabriel HAWAWINI, Pierre MICHEL and Albert CORHAY	"The pricing of common stocks on the Brussels stock exchange: a re-examination of the evidence", November 1986.
86/40	Charles WYPLOSZ	"Capital flows liberalization and the EMS, a French perspective", December 1986.
86/41	Kasra FERDOWS and Wickham SKINNER	"Manufacturing in a new perspective", July 1986.
86/42	Kasra FERDOWS and Per LINDBERG	"FMS as indicator of manufacturing strategy", December 1986.
86/43	Damien NEVEN	"On the existence of equilibrium in hotelling's model", November 1986.
86/44	Ingemar DIERICKX, Carmen MATUTES and Damien NEVEN	"Value added tax and competition", December 1986.

1987

87/01	Manfred KETS DE VRIES	"Prisoners of leadership".
87/02	Claude VIALLET	"An empirical investigation of international asset pricing", November 1986.
87/03	David GAUTSCHI and Vithala RAO	"A methodology for specification and aggregation in product concept testing", Revised Version: January 1987.
87/04	Sumantra GHOSHAL and Christopher BARTLETT	"Organizing for innovations: case of the multinational corporation", February 1987.
87/05	Arnoud DE MEYER and Kasra FERDOWS	"Managerial focal points in manufacturing strategy", February 1987.
87/06	Arun K. JAIN, Christian PINSON and Naresh K. MALHOTRA	"Customer loyalty as a construct in the marketing of banking services", July 1986.
87/07	Rolf BANZ and Gabriel HAWAWINI	"Equity pricing and stock market anomalies", February 1987.
87/08	Manfred KETS DE VRIES	"Leaders who can't manage", February 1987.
87/09	Lister VICKERY, Mark PILKINGTON and Paul READ	"Entrepreneurial activities of European MBAs", March 1987.
87/10	André LAURENT	"A cultural view of organizational change", March 1987
87/11	Robert FILDES and Spyros MAKRIDAKIS	"Forecasting and loss functions", March 1987.
87/12	Fernando BARTOLOME and André LAURENT	"The Janus Head: learning from the superior and subordinate faces of the manager's job", April 1987.
87/13	Sumantra GHOSHAL and Nitin NOHRIA	"Multinational corporations as differentiated networks", April 1987.
87/14	Landis GABEL	"Product Standards and Competitive Strategy: An Analysis of the Principles", May 1987.
87/15	Spyros MAKRIDAKIS	"METAFORECASTING: Ways of improving Forecasting. Accuracy and Usefulness", May 1987.
87/16	Susan SCHNEIDER and Roger DUNBAR	"Takeover attempts: what does the language tell us?, June 1987.
87/17	André LAURENT and Fernando BARTOLOME	"Managers' cognitive maps for upward and downward relationships", June 1987.
87/18	Reinhard ANGELMAR and Christoph LIEBSCHER	"Patents and the European biotechnology lag: a study of large European pharmaceutical firms", June 1987.
87/19	David BEGG and Charles WYPLOSZ	"Why the EMS? Dynamic games and the equilibrium policy regime, May 1987.
87/20	Spyros MAKRIDAKIS	"A new approach to statistical forecasting", June 1987.
87/21	Susan SCHNEIDER	"Strategy formulation: the impact of national culture", Revised: July 1987.
87/22	Susan SCHNEIDER	"Conflicting ideologies: structural and motivational consequences", August 1987.
87/23	Roger BETANCOURT David GAUTSCHI	"The demand for retail products and the household production model: new views on complementarity and substitutability".
87/24	C.B. DERR and André LAURENT	"The internal and external careers: a theoretical and cross-cultural perspective", Spring 1987.
87/25	A. K. JAIN, N. K. MALHOTRA and Christian PINSON	"The robustness of MDS configurations in the face of incomplete data", March 1987, Revised: July 1987.
87/26	Roger BETANCOURT and David GAUTSCHI	"Demand complementarities, household production and retail assortments", July 1987.
87/27	Michael BURDA	"Is there a capital shortage in Europe?", August 1987.
87/28	Gabriel HAWAWINI	"Controlling the interest-rate risk of bonds: an introduction to duration analysis and immunization strategies", September 1987.
87/29	Susan SCHNEIDER and Paul SHRIVASTAVA	"Interpreting strategic behavior: basic assumptions themes in organizations", September 1987
87/30	Jonathan HAMILTON, W. Bentley MACLEOD and Jacques-François THISSE	"Spatial competition and the Core", August 1987.

87/31	Martine QUINZII and Jacques-François THISSE	"On the optimality of central places", September 1987.
87/32	Arnoud DE MEYER	"German, French and British manufacturing strategies less different than one thinks", September 1987.
87/33	Yves DOZ and Amy SHUEN	"A process framework for analyzing cooperation between firms", September 1987.
87/34	Kasra FERDOWS and Arnoud DE MEYER	"European manufacturers: the dangers of complacency. Insights from the 1987 European manufacturing futures survey, October 1987.
87/35	P. J. LEDERER and J. F. THISSE	"Competitive location on networks under discriminatory pricing", September 1987.
87/36	Manfred KETS DE VRIES	"Prisoners of leadership", Revised version October 1987.
87/37	Landis GABEL	"Privatization: its motives and likely consequences", October 1987.
87/38	Susan SCHNEIDER	"Strategy formulation: the impact of national culture", October 1987.
87/39	Manfred KETS DE VRIES	"The dark side of CEO succession", November 1987
87/40	Carmen MATUTES and Pierre REGIBEAU	"Product compatibility and the scope of entry", November 1987
87/41	Gavriel HAWAWINI and Claude VIALLET	"Seasonality, size premium and the relationship between the risk and the return of French common stocks", November 1987
87/42	Damien NEVEN and Jacques-F. THISSE	"Combining horizontal and vertical differentiation: the principle of max-min differentiation", December 1987
87/43	Jean GABSZEWICZ and Jacques-F. THISSE	"Location", December 1987
87/44	Jonathan HAMILTON, Jacques-F. THISSE and Anita WESKAMP	"Spatial discrimination: Bertrand vs. Cournot in a model of location choice", December 1987
87/45	Karel COOL, David JEMISON and Ingemar DIERICKX	"Business strategy, market structure and risk-return relationships: a causal interpretation", December 1987.
87/46	Ingemar DIERICKX and Karel COOL	"Asset stock accumulation and sustainability of competitive advantage", December 1987.
88/01	Michael LAWRENCE and Spyros MAKRIDAKIS	"Factors affecting judgemental forecasts and confidence intervals", January 1988.
88/02	Spyros MAKRIDAKIS	"Predicting recessions and other turning points", January 1988.
88/03	James TEBOUL	"De-industrialize service for quality", January 1988.
88/04	Susan SCHNEIDER	"National vs. corporate culture: implications for human resource management", January 1988.
88/05	Charles WYPLOSZ	"The swinging dollar: is Europe out of step?", January 1988.
88/06	Reinhard ANGELMAR	"Les conflits dans les canaux de distribution", January 1988.
88/07	Ingemar DIERICKX and Karel COOL	"Competitive advantage: a resource based perspective", January 1988.
88/08	Reinhard ANGELMAR and Susan SCHNEIDER	"Issues in the study of organizational cognition", February 1988.
88/09	Bernard SINCLAIR-DESGAGNé	"Price formation and product design through bidding", February 1988.
88/10	Bernard SINCLAIR-DESGAGNé	"The robustness of some standard auction game forms", February 1988.
88/11	Bernard SINCLAIR-DESGAGNé	"When stationary strategies are equilibrium bidding strategy: The single-crossing property", February 1988.
88/12	Spyros MAKRIDAKIS	"Business firms and managers in the 21st century", February 1988
88/13	Manfred KETS DE VRIES	"Alexithymia in organizational life: the organization man revisited", February 1988.
88/14	Alain NOEL	"The interpretation of strategies: a study of the impact of CEOs on the corporation", March 1988.
88/15	Anil DEOLALIKAR and Lars-Hendrik ROLLER	"The production of and returns from industrial innovation: an econometric analysis for a developing country", December 1987.
88/16	Gabriel HAWAWINI	"Market efficiency and equity pricing: international evidence and implications for global investing", March 1988.