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## SELLER'S RECOVERY OF OVERHEAD UNDER UCC SECTION 2-708(2): ECONOMIC COST THEORY AND CONTRACT REMEDIAL POLICY\*

*Richard E. Speidel † and Kendall O. Clay ††*

The law of contract liability and remedy has traditionally emerged from judicial decisions of disputes arising when exchange transactions break down. Since bargain and exchange are the grist of our market system, it is not surprising that these decisions are concerned with how bargainers ought to behave, and often rest upon unarticulated assumptions about what is good for a free enterprise market economy. The decision model frequently assumes a market which is purely competitive, that is, where demand is the equivalent of price and where bargainers are informed, experienced, relatively balanced in strategic and economic resources,<sup>1</sup> and responsive to judicial decisions about liability and remedy. Under this model, contract law should facilitate the efforts of private bargainers to enter and complete agreed exchanges and to

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\* The authors wish to express their thanks to Professor Thomas Bergin of the University of Virginia for his helpful comments on different drafts of this paper. We also profited from reading a paper on the economics of consumer credit reform by Professor George Wallace of the University of Iowa College of Law. Finally, we have been instructed through discussions with our teachers and colleagues at the University of Virginia who attended the "economics for lawyers" program, under the direction of Professor Henry Manne, at the University of Rochester in the summer of 1971. They have helped us to internalize our externalities. Or is it the other way around?

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<sup>1</sup> "The traditional contract is the result of free bargaining of parties who are brought together by the play of the market, and who meet each other on a footing of approximate economic equality." *Henningsen v. Bloomfield Motors, Inc.*, 32 N.J. 358, 389, 161 A.2d 69, 86 (1959).

obtain adequate remedies when things go wrong.<sup>2</sup> When, in a particular dispute, the model does not conform to reality, one of the parties must prove it and invoke an exception to normal operating principles.<sup>3</sup>

If liability is established<sup>4</sup> and the dispute is not settled thereafter, the court must confront the problem of adequate remedies. Questions of liability, however, cannot entirely be separated from questions of remedy. The reasons assigned for liability, whether to protect the "reasonable expectations" of the parties and thus the security of transactions or justifiable reliance or to prevent unjust enrichment, give content to the remedy and frame the outer limits of recovery. One must know why promises are enforced before the question of "how much" can be resolved.<sup>5</sup> This is another way of saying that the content of

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<sup>2</sup> For a good discussion of the "market support" role of contract law, see Macaulay, *Private Legislation and the Duty to Read—Business Run by IBM Machine, the Law of Contracts and Credit Cards*, 19 VAND. L. REV. 1051, 1055-69 (1966). For various approaches to the "support" function, see Carroll, *Harpooning Whales, of Which Karl N. Llewellyn is the Hero of the Piece: Or Searching For More Expansion Joints in Karl's Crumbling Cathedral*, 12 B.C. IND. & COM. L. REV. 139 (1970); Henderson, *Promissory Estoppel and Traditional Contract Law*, 78 YALE L.J. 343 (1969); Summers, "Good Faith" in *General Contract Law and the Sales Provisions of the Uniform Commercial Code*, 54 VA. L. REV. 195 (1968); Summers, *The Technique Element in Law*, 59 CALIF. L. REV. 733, 741-45 (1971).

<sup>3</sup> In addition to the usual exceptions of mistake, fraud, and undue influence or duress, the doctrine of unconscionability, arising from direct or analogical application of Uniform Commercial Code § 2-302, has provided further protection against abuse in the bargaining process. For an important case which also cites the relevant literature, see *Kugler v. Romain*, 58 N.J. 522, 279 A.2d 640 (1971).

Changes in economic and social structure and in patterns of business in this country signal both the breakdown of the traditional market support role played by courts and increased regulation of market transactions through legislative and administrative processes. These changes are traced and assessed in L. FRIEDMAN, *CONTRACT LAW IN AMERICA: A SOCIAL AND ECONOMIC CASE STUDY* (1965). For variations on the "return to status from contract" theme, see Leff, *Contract as Thing*, 19 AM. U.L. REV. 131 (1970); Rehbinder, *Status, Contract and the Welfare State*, 23 STAN. L. REV. 941 (1971); Slawson, *Standard Form Contracts and Democratic Control of Law Making Power*, 84 HARV. L. REV. 529 (1971); Smith, *Accountability and Independence in the Contract State*, in *THE DILEMMA OF ACCOUNTABILITY IN MODERN GOVERNMENT* 3-69 (B. Smith & D. Hague eds. 1971).

<sup>4</sup> The scope and complexity of contemporary liability issues, for example whether a particular agreement is commercially unreasonable, are strikingly illustrated in *In re Elkins-Dell Mfg. Co.*, 253 F. Supp. 864, 874-75 (E.D. Pa. 1966). See Speidel, *Unconscionability, Assent and Consumer Protection*, 31 U. PITT. L. REV. 359, 367-74 (1970). The opportunity for decisions which are more responsive to commercial needs and practices must be balanced against the costs in time, resources, and certainty of particularized inquiry. According to Professor Stewart Macaulay, when the standards for decision require an emphasis upon "particular nuances," the "chance of winning . . . can influence the settlement negotiation process, and all 'legal rights' then have to be discounted by this factor." Macaulay, *supra* note 2, at 1066.

<sup>5</sup> A contemporary illustration is the issue of the appropriate remedy when promissory liability is predicated upon induced but unbargained for reliance. See *Hoffman v. Red Owl Stores, Inc.*, 26 Wis. 2d 683, 133 N.W.2d 267 (1965); RESTATEMENT (SECOND) OF CON-

contract remedies should be strongly influenced by the reasons given for enforcing promises. Whether the policies implicit in decisions about liability are achieved, therefore, depends upon both the purposes of contract remedies and the effectiveness of the legal system in implementing them.

## I

### PURPOSE AND EFFICIENCY IN CONTRACT REMEDIES

As one might expect, there has been considerable discussion about the purposes of contract remedies. Professor Arthur Corbin suggested that one purpose is to prevent breaches of contract:

[T]hat damages must be paid tends directly to the prevention of breaches of contract. It makes, therefore, for the security of business transactions and helps to make possible the vast structure of credit, upon which so large a part of our modern philosophy depends.<sup>6</sup>

Corbin thus advanced a theory of general deterrence. Unlike the criminal law,<sup>7</sup> however, "that damages must be paid" is not designed to reduce to zero the attractiveness of the possible gain through breach of contract. Since breach of contract is almost never a crime, since punitive or exemplary damages are rarely awarded, and since specific performance is an exception rather than the rule, the compulsive or punitive aspects of contract remedies are minimized.<sup>8</sup> Thus the prospect of liability for damages is simply one factor that the promisor considers when calculating whether losses through breach are likely to exceed the gains from reallocating resources to new bargains.

Some have doubted the impact of this factor,<sup>9</sup> while others ap-

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TRACTS § 90 (Tent. Draft No. 2, 1965) (remedy granted for breach may be limited as justice requires); Comment, *Once More into the Breach: Promissory Estoppel and Traditional Damage Doctrine*, 37 U. CHI. L. REV. 559 (1970). See also Fuller & Perdue, *The Reliance Interest in Contract Damages* (pts. 1 & 2), 46 YALE L.J. 52, 373 (1936-1937); Henderson, *Promises Grounded in the Past: The Idea of Unjust Enrichment and the Law of Contracts*, 57 VA. L. REV. 1115 (1971).

<sup>6</sup> 5 A. CORBIN, CONTRACTS § 1002, at 34 (rev. ed. 1964).

<sup>7</sup> See H. PACKER, THE LIMITS OF THE CRIMINAL SANCTION 41 (1968). See also F. ZIMRING, PERSPECTIVES ON DETERRENCE (1971); Andenaes, *The General Preventive Effects of Punishment*, 114 U. PA. L. REV. 949 (1966); Hart, *The Aims of the Criminal Law*, 23 LAW & CONTEMP. PROB. 401, 404-06 (1958); Griffiths, Book Review, 79 YALE L.J. 1388 (1971).

<sup>8</sup> This point is well made in Farnsworth, *Legal Remedies for Breach of Contract*, 70 COLUM. L. REV. 1145, 1146-47, 1149-60 (1970) [hereinafter cited as Farnsworth]. See also Ball & Friedman, *The Use of Criminal Sanctions in the Enforcement of Economic Legislation: A Sociological View*, 17 STAN. L. REV. 197 (1965); Rice, *Exemplary Damages in Private Consumer Actions*, 55 IOWA L. REV. 307, 308-19 (1969).

<sup>9</sup> But even in the simple cases where the gamble both of establishing breach and

parently reject deterrence as an important purpose of contract remedies. Professor Allan Farnsworth, for example, has concluded that our remedial system is not "directed at compulsion of promisors to prevent breach" but rather at "relief to promisees to redress breach." The question is not how to encourage men to keep promises; rather it is, "How can men be encouraged to deal with those who make promises?" The answer is, "By protecting their expectations in the event of breach."<sup>10</sup> From this perspective the primary purpose of contractual remedies is compensation, not deterrence.

The litany of compensation for breach of contract is well known to every first year law student. The primary objective of contract damages is "to put the injured party in as good a position as that in which he would have been put by full performance."<sup>11</sup> In short, the plaintiff may recover the value of the defendant's promised performance. In general, this includes any loss resulting in the ordinary course of events from the breach. More precisely, damages will be given "for the net amount of the losses caused and gains prevented by the defendant's breach in excess of the savings made possible."<sup>12</sup> Translated into market terms, the plaintiff may recover his investment made in the bargain (reliance) and the net gain prevented by the breach (expectation).<sup>13</sup>

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of making proof of full indemnifiable loss is reduced to a minimum, it is an open secret that a contract breaker rarely stands to lose as much by his breach as he would by performance. And the more deliberate the breach, the more apt he is to gain.

Mueller, *Contract Remedies: Business Fact and Legal Fantasy*, 1967 Wis. L. REV. 833, 835. See Macaulay, *Non-Contractual Relations in Business: A Preliminary Study*, 28 AM. SOCIOLOGICAL REV. 55 (1963), where the author concludes that in many business exchanges the role of legal sanctions is small. Various nonlegal sanctions may of course deter breach where continuing exchange relationships are involved.

<sup>10</sup> Farnsworth 1147.

<sup>11</sup> RESTATEMENT OF CONTRACTS § 329, comment *a* (1933); *accord*, UNIFORM COMMERCIAL CODE § 1-106(1) [hereinafter cited as UCC]; *Abrams v. Reynolds Metals Co.*, 340 Mass. 704, 166 N.E.2d 204 (1960). The goal, then, is "not the mere restoration to a former position, as in tort, but the awarding of a sum which is the equivalent of performance of the bargain." C. McCORMICK, *HANDBOOK ON THE LAW OF DAMAGES* 561 (1935). The reasons for this policy are the need to protect what Professor Lon Fuller has called the promisee's "hidden reliance"—his lost opportunity costs (Fuller & Perdue, *supra* note 5, at 57-66), and the need to support the market as a working institution. See Birmingham, *Breach of Contract, Damage Measures, and Economic Efficiency*, 24 RUTGERS L. REV. 273 (1970); Hartzler, *The Business and Economic Functions of the Law of Contract Damages*, 6 AM. BUS. L.J. 387, 388-97 (1968).

<sup>12</sup> RESTATEMENT OF CONTRACTS § 329 (1933). See *A.R.A. Mfg. Co. v. Pierce*, 86 Ariz. 136, 341 P.2d 928 (1959).

<sup>13</sup> This recovery is well illustrated in construction contracts when the owner repudiates while the builder is in mid-performance. The contractor usually may recover an amount represented by the contract price less the estimated cost to complete the job. His recovery includes the profit that he would have earned by full performance and the per-

The apparent simplicity of the litany is belied by a number of "reasonable" limitations upon the scope of recovery and by the difficulties inherent in applying rubrics to particular cases. First, the plaintiff cannot recover any loss which at the time of contracting was not reasonably foreseeable by the defendant as the probable result of breach. *Hadley v. Baxendale*<sup>14</sup> still lives. Second, upon the defendant's breach the plaintiff must take reasonable steps to avoid the consequences of that breach; the plaintiff has a duty to mitigate his damages.<sup>15</sup> Third, if the plaintiff has decided to litigate and has selected an appropriate remedy, problems of proof remain. In addition to proving that the breach caused the loss complained of,<sup>16</sup> the plaintiff must establish his loss with reasonable certainty—a difficult task when formulas measuring loss by the difference between contract and market price are not applicable.<sup>17</sup> Although it is usually stated that the defendant has the burden of proving the plaintiff's failure to mitigate damages,<sup>18</sup> his actual burden may often be difficult to predict, the matter being complicated by the complexity of the issues as well as by a limited access to sources of proof.<sup>19</sup> As the architects of the first *Restatement of Contracts* conceded, the difficulties involved in measuring loss frequently foreclose the attainment of remedial

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formance expenditures actually incurred up to the time of repudiation. *See, e.g.*, *Peter Kiewit Sons' Co. v. Summit Constr. Co.*, 422 F.2d 242, 260-64 (8th Cir. 1969); *M. & R. Contractors & Builders, Inc. v. Michael*, 215 Md. 340, 138 A.2d 350 (1958); Patterson, *Builder's Measure of Recovery for Breach of Contract*, 31 COLUM. L. REV. 1286 (1931). For a full discussion of the limitations and difficulties of this approach, see Farnsworth 1160-75.

<sup>14</sup> 156 Eng. Rep. 145 (Ex. 1854). The expansion and contraction of this doctrine in England is illustrated in *Victoria Laundry (Windsor) LD v. Newman Indus. LD*, [1949] 2 K.B. 528 (C.A.) (expansion), and *The Heron II* (*Koufos v. C. Czarnikow, LTD.*), [1967] 3 All E. R. 686 (H.L.) (contraction). A recent "hardline" American decision is *Keystone Diesel Engine Co. v. Irwin*, 411 Pa. 222, 191 A.2d 376 (1963). *See* UCC § 2-715(2); RESTATEMENT OF CONTRACTS § 330 (1933); Farnsworth 1199-1210.

<sup>15</sup> *See* Farnsworth 1183-1199.

<sup>16</sup> Some courts have stated that the breach must be a substantial factor in bringing about the loss. *E.g.*, *Krauss v. Greenberg*, 137 F.2d 569, 571-72 (3d Cir. 1943), *cert. denied*, 320 U.S. 791 (1944); *see* *F.M.C. Corp. v. Strebeck*, 196 So. 2d 74 (Miss. 1967).

<sup>17</sup> *See* *Farmers Cooperative Ass'n v. Phillips*, 241 Ark. 28, 405 S.W.2d 939 (1966); *Valley Die Cast Corp. v. A.C.W., Inc.*, 25 Mich. App. 321, 181 N.W.2d 303, 310 (1970); RESTATEMENT OF CONTRACTS § 331 (1933); C. McCORMICK, *supra* note 11, §§ 25-32; Comment, *Lost Profits as Contract Damages: Problems of Proof and Limitations on Recovery*, 65 YALE L.J. 992 (1956). Recent cases have refused to deny recovery simply because the elements of alleged lost profits were complex and somewhat speculative. *See* *Locke v. United States*, 283 F.2d 521, 524-25 (Ct. Cl. 1960); *Air Technology Corp. v. General Elec. Co.*, 347 Mass. 613, 199 N.E.2d 538 (1964).

<sup>18</sup> *E.g.*, *Holland v. Green Mountain Swim Club, Inc.*, 470 P.2d 61, 63 (Colo. App. 1970).

<sup>19</sup> *See, e.g.*, *Liberty Navigation & Trading Co. v. Knoshita & Co.*, 285 F.2d 343 (2d Cir. 1960), *cert. denied*, 366 U.S. 949 (1961); *Apex Metal Stamping Co. v. Alexander & Sawyer, Inc.*, 48 N.J. Super. 476, 138 A.2d 568 (App. Div. 1958); *Allen, Heaton & McDonald, Inc. v. Castle Farm Amusement Co.*, 151 Ohio St. 522, 86 N.E.2d 782 (1949).

purposes "with any near approach to exactness."<sup>20</sup> The cumulative effect of the limitations upon recovery tends to favor the contract breacher. As Farnsworth has remarked, "All in all, our system of legal remedies for breach of contract, heavily influenced by the economic philosophy of free enterprise, has shown a marked solicitude for men who do not keep their promises."<sup>21</sup>

The extent to which this solicitude tends to discourage dealings with those who make promises or to induce aggrieved parties to pursue questionable nonlegal sanctions when breach occurs is a matter of conjecture. Nevertheless, the suggestion that the quantum of contract remedies is inadequate when measured against the stated purpose of compensation is distressing. The views of some economists on the freedom to breach a contract further complicate the problem.<sup>22</sup> According to Professor Robert Birmingham, a lawyer-economist, contract remedies should encourage rather than discourage breach of contract when the defendant can gain from the reallocation of resources and the plaintiff is fully reimbursed for his lost bargain and any transaction costs incurred.<sup>23</sup> This approach explicitly rejects transactional security as the ultimate policy objective, the notion that a deliberate, calculated breach should be penalized, and the thesis that the defendant should be made to account to the plaintiff for any net gains realized through breach.<sup>24</sup> It is justified by a concept of economic efficiency that would encourage the "optimal reallocation of factors of production and goods without causing material instability of expectations"<sup>25</sup> and would permit the bound party confronted with a more attractive opportunity to buy his freedom by offering to share his gain with the promisee. Thus the deterrent effect of potential damage liability depends upon a

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<sup>20</sup> RESTATEMENT OF CONTRACTS § 329, comment *a* (1933). On the other hand, it has been stated that any damage formula is "improvidently invoked if it defeats a common sense solution" (525 Main St. Corp. v. Eagle Roofing Co., 34 N.J. 251, 254, 168 A.2d 33, 34 (1961)) and that fairness to the litigants is the "ultimate test of the correctness of an award" (*id.* at 258, 168 A.2d at 36).

<sup>21</sup> Farnsworth 1216.

<sup>22</sup> In this setting, the question is how much restraint is likely to be imposed, not whether the breach is right or wrong. The probability of "protective reaction" as opposed to the morality of breach—this is the "empirical" scope of freedom. See Oppenheim, *Freedom—An Empirical Interpretation*, in NOMOS IV: LIBERTY 274-88 (C. Friedrich ed. 1962).

<sup>23</sup> Birmingham, *supra* note 11. While "transaction costs" are not clearly defined, they apparently include all post-breach costs that would be incurred in pursuing a claim to payment or a satisfied judgment. See Leff, *Injury, Ignorance and Spite—The Dynamics of Coercive Collection*, 80 YALE L.J. 1, 5-26 (1970); cf. UCC § 2-710.

<sup>24</sup> The most forceful argument in favor of disgorging the net gain is made in Dawson, *Restitution or Damages?*, 20 OHIO ST. L.J. 175 (1959).

<sup>25</sup> Birmingham, *supra* note 11, at 292.

cold, economic calculus unlaced from the morality of promise keeping or the policy of transactional security.

The dilemma is clearly posed. Nonlegal pressures aside, the greater the prospect of quick and adequate recovery by the plaintiff, the less likely it is that nonperformance will be considered worthwhile by the promisor. If the promisor, however, can improve his economic position by breach and if the promisee, because of an inadequate quantum of recovery or excessively high transactions costs, is not likely to seek or to obtain full compensation for his loss, the search for economic efficiency is confused by a problem of distributive justice. Whether one views the ultimate purpose of contract remedies as encouraging dealings with those who make promises or encouraging economic efficiency, the achievement of either depends upon an adequate quantum of remedy and the effectiveness of the remedial system.

Quite apart from the factors that may influence an individual decision to sue,<sup>26</sup> the effectiveness of our remedial system, always difficult to measure, turns on a variety of systemic considerations. Involved in almost every civil dispute are the availability of self-help remedies, the incentives and capacity of the aggrieved party, accessibility to forums other than courts, the cost and delay of litigation, the quality of the trial court, and enforcement problems once a judgment is obtained.<sup>27</sup> More closely related to this article is the problem of proving damages caused by breach. Depending upon the choice of standards for measuring loss, the allocation of burdens of proof, the quantity and complexity of the evidence, and the receptiveness of the court to efforts by the parties to liquidate damages in advance of breach, the plaintiff may face even more obstacles on the road to a satisfied judgment. In short, both the costs of using the legal system and the difficulty of establishing the amount of loss are critical factors in the decision whether to sue.<sup>28</sup>

Against this backdrop we shall try to demonstrate, through the use of economic cost theory, a more exact way to measure loss in a commer-

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<sup>26</sup> See, e.g., H. HAVIGHURST, *THE NATURE OF PRIVATE CONTRACT* 63-86 (1961).

<sup>27</sup> This general problem is well discussed in L. FRIEDMAN, *supra* note 3, at 198-215.

<sup>28</sup> Professor Arthur Leff calls such considerations the cost of due process, which is high for four reasons:

First, due process demands that at the outset the court and its officers be wholly ignorant of what happened and it is expensive to educate them . . . . Second, the process of education cannot proceed on a generalized (mass-produced) basis; each case is theoretically hand-crafted. Third, save in a court of small claims it is usually specialists (e.g., lawyers) who do the crafting. Fourth, because the courts do not allocate docket space by competitive bidding between plaintiffs, the creditor with the largest claim at stake must take his place in a "queue" behind plaintiffs with smaller claims.

Leff, *supra* note 23, at 8.

cial transaction between professional businessmen. First, we shall present a fact situation involving a contract for the sale of manufactured goods which has been repudiated by the buyer before performance is completed. Second, assuming that the seller has properly stopped performance, we shall ascertain what damages the seller could recover under the Uniform Commercial Code (UCC). The recoverability of overhead as damages will be emphasized. Third, we shall apply economic cost theory to the same problem and compare our results with those obtained under the legal analysis. Finally, we shall evaluate the differences in recovery in light of the purpose and effectiveness of contract remedies and on the basis of this evaluation propose an appropriate interpretation of the relevant UCC provisions.

## II

### SELLER'S RECOVERY OF OVERHEAD: LEGAL ANALYSIS

#### A. *The Business Setting*

Spartin Company manufactures paper products for computer operations, including data cards, print-out paper, and teletype ribbon. A single product firm, Spartin operates under an absorption or full costing accounting system.<sup>29</sup> In 1971 its annual sales were \$500,000 and its net profit after recovery of all fixed and variable costs was \$125,000. During this period, Spartin's fixed capacity costs—its manufacturing overhead including executive salaries, labor, insurance, and plant support—totalled \$50,000.<sup>30</sup>

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<sup>29</sup> Under this system, (also called job order costing), a production lot is defined, the direct labor and material costs (variable) traceable to that lot are identified, a portion of the non-traceable (fixed) overhead expenses is added, and the total amount is divided by the number of product units in the lot. This system is used to measure the cost of goods sold, to measure inventories, and to facilitate external financial reporting. Under an alternative system, called variable or direct costing, unit cost is defined as the average variable cost of manufacturing the product. Fixed overhead costs are excluded. Although this system is not recommended for external financial reporting, it arguably provides better data for managerial decisions and evaluations. See I. KELLER & W. FERRARA, *MANAGEMENT ACCOUNTING FOR PROFIT CONTROL* 688-724 (2d ed. 1966); G. SHILLINGLAW, *COST ACCOUNTING: ANALYSIS AND CONTROL* 79-93, 177, 189-95, 197-98 (rev. ed. 1967). To simplify analysis, Spartin has more or less arbitrarily been classified as a single product firm.

<sup>30</sup> Assume that Spartin's "production lot" is its estimated capacity to produce during one year and that the Blippo contract is one product unit. Manufacturing overhead here includes those costs that either are not or cannot be traced to the Blippo contract. They are common costs incurred to support the "production lot" and are not necessarily proportional to the volume of production activity. Manufacturing overhead consists of costs that do not vary in proportion to short run changes in production volume. G. SHILLINGLAW, *supra* note 29, at 373.

In January 1972, Spartin negotiated a contract with Blippo, Inc. for the manufacture and sale of graphite impregnated data cards for a fixed price of \$50,000. Delivery was promised in installments over a twelve-month period. At the time of contracting, Spartin's job cost figures looked like this:

(1) Variable costs	
(a) estimated materials required for manufacturing	\$22,500
(b) one new skilled employee, hired for one year	\$10,000
(2) Fixed overhead allocated to the contract on the basis of predetermined burden rates <sup>31</sup>	\$ 5,000
(3) Estimated net profit on the job	\$12,500
Total:	\$50,000

By February 1, 1970, Spartin had purchased for \$5,000 the graphite required for the contract and hired the new employee for \$10,000 on a one-year contract. On February 5, before any other expenditures and before any deliveries or payments were made, Blippo communicated a deliberate and unexcused repudiation to Spartin. After some discussion, it became clear that Blippo would not retract the repudiation.

### B. *Recovery Under the UCC*

Since Blippo repudiated a contract for the sale of specially manufactured goods, remedial questions are governed by article 2 of the UCC.<sup>32</sup> Under section 2-704(2), whether Spartin should complete performance or stop work will depend upon "the exercise of reasonable commercial judgment for the purposes of avoiding loss and of effective realization." Presumably it would be commercially reasonable for Spar-

<sup>31</sup> Allocation of fixed overhead to particular jobs is necessary to price goods so as to recover these costs. Although any allocation is more or less arbitrary and its accuracy dependent upon relative volume, stability difficulties are eased by predetermining burden rates from cost averages in normal periods of operation. *See id.* at 82-83, 207-222, 687-689; *cf. Vitex Mfg. Corp. v. Caribtex Corp.*, 377 F.2d 795, 798 (3d Cir. 1967) (prorata allocation is an analytical construct not normally bearing direct relationship to any individual transaction). There is no single phase of determining the cost of manufacturing more elusive or difficult to measure than the allocation of overhead to a particular contract. *See Gordon Form Lathe Co. v. Ford Motor Co.*, 133 F.2d 487, 500 (6th Cir.), *aff'd*, 320 U.S. 714 (1943). The allocation process is a matter frequently disputed in government contracts (*e.g.*, *Peninsular Chemresearch, Inc.*, A.S.B.C.A. No. 14383, 71-2 CCH BD. CONT. APP. DEC. ¶ 9066 (Aug. 30, 1971) and sometimes poses antitrust questions. *See Schwartz, Mandatory Patent Licensing of Air Pollution Control Technology*, 57 VA. L. REV. 719, 727-36 (1971) (price discrimination).

<sup>32</sup> *See* UCC §§ 2-102, 2-105(1), 2-703.

tin to cancel the contract, cease manufacture, resell any unusable materials for scrap or salvage value, and seek damages.<sup>33</sup>

What would these damages be? Assume that Spartin has excess capacity—that is, that Spartin could have satisfied additional demand for a similar product even though Blippo had not repudiated. Spartin would therefore have no duty to mitigate damages by reallocating to another job the productive capacity released by the breach,<sup>34</sup> but it would be required to make reasonable efforts to salvage or reallocate the specific labor and materials already obtained for the job. Let us further assume that (1) the \$5,000 supply of graphite cannot reasonably be reallocated or resold within the foreseeable future and (2) the new employee hired at \$10,000 a year is reassigned for the balance of his contract, without a decrease in pay, to a recently vacant job paying \$6,000 per year. Therefore, of the \$15,000 in variable costs incurred before the breach, \$6,000 can be avoided by transferring the employee, but \$9,000 is not salvageable. All things being equal, Spartin should at the very least recover this amount from Blippo.<sup>35</sup>

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<sup>33</sup> Since Blippo did not retract the repudiation (*id.* § 2-611(1)), Spartin can resort to the remedies made available in § 2-703, one of which is cancellation (*id.* § 2-610(b)). In most cases it would be reasonable and perhaps necessary to stop work and to salvage. *See* Farnsworth 1184-85. After repudiation, however, the seller might arrange a resale contract with a third party, complete and deliver the goods in process, and seek damages based upon the difference between the original contract price and the resale price under § 2-706(1). *Id.* §§ 2-704(1)(b), 2-706(2). The damages resulting from such a course of action are likely to be less than if the seller stopped work and sued under § 2-708(2). *See* Buchman v. Millville Mfg. Co., 17 F.2d 983 (2d Cir. 1937). The commercial reasonableness of a decision to complete manufacture of special goods without a resale contract, however, might be subject to question. If after completion a resale could not reasonably be completed, the appropriate remedy would be an action for the price which, if successful, would increase rather than mitigate the buyer's liability. UCC § 2-709(1)(b).

<sup>34</sup> *See, e.g.,* Locks v. Wade, 36 N.J. Super. 128, 114 A.2d 875 (App. Div. 1955); Harris, *A Radical Restatement of the Law of Seller's Damages: Sales Act and Commercial Code Results Compared*, 18 STAN. L. REV. 66, 80-83 (1965). *But see* Crane Iron Works v. Cox & Sons, 28 F.2d 328 (3d Cir. 1928); 38 YALE L.J. 676 (1929).

<sup>35</sup> A leading pre-Code case is Perfecting Serv. Co. v. Product Dev. & Sales Co., 259 N.C. 400, 415-17, 131 S.E.2d 9, 21-22 (1963), where the court stated that, subject to a duty to mitigate damages by reasonable salvage efforts, the seller could recover at a minimum the reasonable expenditures for labor and materials to the extent wasted when performance was stopped. *See* Madrigale v. Corrone, 5 Conn. Cir. 521, 527-28, 258 A.2d 102, 105-06 (Circ. Ct. App. Div. 1968); Apex Metal Stamping Co. v. Alexander & Sawyer, Inc., 48 N.J. Super. 476, 138 A.2d 568 (App. Div. 1958); Comment, *A Suggested Revision of the Contract Doctrine of Anticipatory Repudiation*, 64 YALE L.J. 85, 105-09 (1954). Under the Code, the matter is less than clear. *See* Peters, *Remedies for Breach of Contracts Relating to the Sale of Goods Under the Uniform Commercial Code: A Roadmap for Article Two*, 73 YALE L.J. 199, 273-75 (1963). Assuming that § 2-708(2) applies, the same result can be achieved by reading "due allowance for costs reasonably incurred" to protect reliance expenditures, and by invoking § 2-704(2) to handle the mitigation problem. *See* Harris, *supra* note 34, at 102-04. In addition to consistency with pre-Code law, this approach finds strong support

What about lost profits? At common law and under section 64(4) of the Uniform Sales Act, courts agreed that lost profits of a seller in Spartin's position were not to be measured by the difference between the contract price and the market price at the time and place of delivery. Instead, the seller could recover as lost profits the difference between the contract price and the cost of performance, the latter to be determined by the sum of expenditures actually incurred at the time of breach and the estimated cost to complete the contract.<sup>36</sup> The seller had the burden of proving the expense that would have been incurred had there been no repudiation.<sup>37</sup> The courts divided on how to treat overhead which had been allocated to the contract. The treatment was critical, for if the repudiation was held to "save" the overhead expense, it was deducted from the contract price to reach the lost profit figure. A few courts took this position apparently unconcerned that the seller would be forced to reallocate the fixed cost to other units of production.<sup>38</sup> On the other hand, if overhead was treated as a fixed cost not

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in construction contract cases where the owner repudiates before the builder has completed performance. For representative cases and discussion on measure of recovery, proof, and mitigation, see *Peter Kiewit Sons' Co. v. Summit Constr. Co.*, 422 F.2d 242, 260-64 (8th Cir. 1969) (expenditures plus lost profit); *Autrey v. Williams & Dunlop*, 343 F.2d 730 (5th Cir. 1965) (expenditures only); *Dade County v. Palmer & Baker, Eng'rs*, 339 F.2d 208 (5th Cir. 1965) (loss contract); *Farnsworth* 1160-65.

<sup>36</sup> *E.g.*, cases cited in note 35 *supra*.

<sup>37</sup> That is, the savings realized by the breach. See C. McCORMICK, *supra* note 11, § 174; Harris, *A General Theory for Measuring Seller's Damages for Total Breach of Contract*, 60 MICH. L. REV. 577 (1962); Comment, *Lost Profits as Contract Damages: Problems of Proof and Limitations on Recovery*, 65 YALE L.J. 992 (1956); Comment, *supra* note 35, at 105-09; Note, *Seller's Recovery When Buyer Repudiates Before Completion of Manufacture*, 99 U. PA. L. REV. 229, 230-31 (1950); note 51 *infra*.

<sup>38</sup> *E.g.*, *Wilhelm Lubrication Co. v. Bratrud*, 197 Minn. 626, 632-34, 268 N.W. 634, 636-37 (1936); *Worrell & Williams v. Kinnear Mfg. Co.*, 103 Va. 719, 49 S.E. 988 (1905). The reasoning was that since overhead was part of the total cost of manufacturing, it should be deducted to the extent "reasonably applicable to the undelivered portion." *Perfecting Serv. Co. v. Product Dev. & Sales Co.*, 259 N.C. 400, 415-16, 131 S.E.2d 9, 21-22 (1963). See *C.W. Rantoul Co. v. Claremont Paper Co.*, 196 F. 305 (1st Cir. 1912); *Detroit Fireproofing Tile Co. v. Vinton Co.*, 190 Mich. 275, 157 N.W. 8 (1916); C. McCORMICK, *supra* note 11, § 165, at 644, § 173, at 661-62. That such fixed costs allocated to defendant's contract would have to be recovered from other customers was a matter of little concern. See *A. Lenobel, Inc. v. Senif*, 252 App. Div. 533, 300 N.Y.S. 226 (2d Dep't 1937), *modified*, 253 App. Div. 813, 1 N.Y.S.2d 1022 (2d Dep't 1938) (argument is "specious"). When a government contract is terminated for convenience in the "best interest" of the United States, the termination settlement does not include overhead allocated to uncompleted work. According to the language of the Termination for Convenience of the Government Clause, 32 C.F.R. § 8.701 (e)(ii) (1971), the unabsorbed fixed overhead is not reimbursable and must be reallocated elsewhere. See, *e.g.*, *Nolan Bros., Inc. v. United States*, 437 F.2d 1371 (Ct. Cl. 1971); *Technology, Inc.*, A.S.B.C.A. No. 14083, 71-2 CCH BD. CONT. APP. DEC. ¶ 8956 (June 28, 1971); *Fairchild Stratos Corp.*, A.S.B.C.A. No. 9169, 67-1 *id.* ¶ 6225 (March 20, 1967), *aff'd on reconsideration*, 68-1 *id.* ¶ 7053 (May 29, 1968); Trueger, *Terminations-Cost Principles and Costing Procedures*, 129 J. ACCOUNTANCY, June 1970, at 59.

saved by the breach, it would not be deducted from the contract price and therefore would be recoverable as a "gross" profit prevented by the breach. A number of courts have taken this position,<sup>39</sup> and the result has been supported by the commentators.<sup>40</sup> The assumption is that if overhead is not recoverable the seller must reallocate it to other work and thus reduce that work's profitability. Put another way, the seller will be in a worse overall profit position than if the contract had been fully performed.

In the Spartin case, at the time of contracting Spartin estimated that variable costs of \$32,500 would be incurred and allocated \$5,000 in fixed overhead to the contract, a total estimated cost of \$37,500. At the time of repudiation, Spartin had incurred \$15,000 in variable costs and was planning on recovering the \$5,000 overhead allocation under the Blippo contract. Assuming all estimates to be accurate, if overhead is treated as an expense saved, Spartin's lost profit recovery would be the contract price (\$50,000) less the sum of the actual reliance (\$15,000) and the expenses saved (\$17,500 plus \$5,000, or \$22,500), which totals \$12,500. If overhead is not deducted, the "profit" figure would increase by \$5,000 to \$17,500. In either case, the total recovery for breach of contract would be the profit figure, however computed, plus the actual reliance expenditure as adjusted for salvage and reasonable allocation, some \$9,000. If overhead is not deducted, therefore, Spartin would recover a grand total of \$26,500.<sup>41</sup>

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<sup>39</sup> *E.g.*, *Vitex Mfg. Corp. v. Caribtex Corp.*, 377 F.2d 795 (3d Cir. 1967); *Apex Metal Stamping Co. v. Alexander & Sawyer, Inc.*, 48 N.J. Super. 476, 138 A.2d 568 (App. Div. 1958); *Jessup & Moore Paper Co. v. Bryant Paper Co.*, 297 Pa. 483, 147 A. 519 (1929); *see Peter Kiewit Sons' Co. v. Summit Constr. Co.*, 422 F.2d 242, 265 (8th Cir. 1969); *Distillers Distrib. Corp. v. J.C. Millett Co.*, 310 F.2d 162 (9th Cir. 1963) (distributorship); *Oakland Calif. Towel Co. v. Sivils*, 52 Cal. App. 2d 517, 126 P.2d 651 (1st Dist. 1942) (service contract); *Coast Indus., Inc. v. Noonan*, 4 Conn. Cir. 333, 231 A.2d 663 (Circ. Ct. App. Div. 1966) (construction contracts); *cf. Harris & Harris Constr. Co. v. Crain & Denbo, Inc.*, 256 N.C. 110, 124-25, 123 S.E.2d 590, 600-01 (1962) (plaintiff failed to prove that defendant's delay caused increase in overhead).

<sup>40</sup> *E.g.*, 5 A. CORBIN, *supra* note 6, § 1038; R. NORDSTROM, *LAW OF SALES* § 177 (1970); Note, *supra* note 37, at 229; 19 CASE W. RES. L. REV. 375 (1968); 12 RUTGERS L. REV. 634 (1959); note 41 *infra*.

<sup>41</sup> Since to establish lost profits the seller must prove what savings were realized, at least one well reasoned case has held that he also bears the burden on the issue whether a contested overhead cost was in fact saved by the breach. *Apex Metal Stamping Co. v. Alexander & Sawyer, Inc.*, 48 N.J. Super. 476, 486-87, 138 A.2d 568, 573-74 (App. Div. 1958). *See Schubert v. Midwest Broadcasting Co.*, 1 Wis. 2d 497, 85 N.W.2d 449 (1957). Professor Robert Harris has stated:

The distinguishing mark of all components in this category [variable overhead costs, called "multicontract assets"] is the fact that precise valuation is almost always impossible in the rough-and-tumble of litigation. For this reason courts normally adopt one of two alternative courses. Sometimes they impose upon

Arguably, Spartin should recover this amount under UCC section 2-708(2)<sup>42</sup> although, as many commentators have noted, a certain amount of stretching and tugging of that section is required.<sup>43</sup> After work has been stopped with no completed goods on hand, neither resale under section 2-706 nor an action for the price under section 2-709 is available, and the contract-market price formula of section 2-708(1)

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plaintiff the burden of proving the value of such items, but ease the burden by accepting highly imprecise evidence as sufficient to avoid nonsuit. On other occasions they do not require any proof by the plaintiff as to this value, which is the practical equivalent of a finding that abandonment did not result in any saving.

Either of these courses is preferable to insisting that plaintiff offer precise proof of the value of his saved multicontract assets, because this would almost always result in limiting him to nominal damages. . . . [T]he courts should require plaintiff to prove the value of saved multicontract assets, but permit him to carry the burden by evidence which, albeit not precise, errs in defendant's favor. The only difference between treatment of items in this category and items in the three other categories [assets yet to be acquired, real property on hand, services and personalty on hand] where plaintiff also has the burden of proof is that "speculative" or "uncertain" evidence of the value of multicontract assets should be tolerated.

Harris, *supra* note 34, at 73-74. Harris supports the recovery of fixed overhead allocated to the contract and not saved by the breach. *Id.* at 102-04; Harris, *supra* note 37, at 588-92; Harris, *A Radical Restatement of the Law of Seller's Damages: Michigan Results Compared*, 61 MICH. L. REV. 849, 860-65, 882-83 (1963); Harris, *A Radical Restatement of the Law of Seller's Damages: New York Results Compared*, 34 FORDHAM L. REV. 23, 32-36 (1965).

<sup>42</sup> If the measure of damages provided in subsection (1) is inadequate to put the seller in as good a position as performance would have done then the measure of damages is the profit (including reasonable overhead) which the seller would have made from full performance by the buyer, together with any incidental damages provided in this Article (Section 2-710), due allowance for costs reasonably incurred and due credit for payments or proceeds of resale.

UCC § 2-708(2).

<sup>43</sup> Professor Ellen Peters has observed that § 2-708(2) is the only Code provision remotely applicable to the problem and that it "at best points a court in the direction of lost profits as the measure of damages for a seller who justifiably stops production." Peters, *supra* note 35, at 274. Harris asserts that § 2-708 gives no guidance on some very critical valuation questions—for example when to use the contract-market price formula of § 2-708(1) or the components approach of § 2-708(2)—and concludes that "[w]hile it is possible . . . to get sane results despite the language, it is unduly difficult." Harris, *supra* note 34, at 108. Professor Robert Nordstrom agrees that § 2-708(2) is the applicable section when a buyer has repudiated prior to the time that the goods are complete (R. NORDSTROM, *supra* note 40, § 177) and recent cases tend to support this conclusion. See Anchorage Centennial Dev. Co. v. Van Wormer & Rodrigues, Inc., 443 P.2d 596 (Alas. 1968); Detroit Power Screwdriver Co. v. Ladney, 25 Mich. App. 478, 181 N.W.2d 828 (1970). In Vitex Mfg. Corp. v. Caribtex Corp., 377 F.2d 795 (3d Cir. 1967), and Coast Indus., Inc. v. Noonan, 4 Conn. Cir. 333, 231 A.2d 663 (Circ. Ct. App. Div. 1966), § 2-708(2) was cited to support a components approach although a contract for sale of goods was not involved. See also Distribu-Dor, Inc. v. Karadani, 11 Cal. App. 3d 463, 90 Cal. Rptr. 231 (3d Dist. 1970) (middleman as a "special" circumstance); Chicago Roller Skate Mfg. Co. v. Sokol Mfg. Co., 185 Neb. 515, 177 N.W.2d 25 (1970) (returned goods without a market); Royal Store Fixture Co. v. Bucci, 48 Pa. D. & C.2d 696 (Philadelphia County Ct. 1969) (seller failed to prove either cost of manufacture or the contract price).

would not "put the seller in as good a position as performance would have done."<sup>44</sup> Thus under UCC section 2-708(2), Spartin's measure of recovery is its unsalvageable reliance expense,<sup>45</sup> plus the "profit (including reasonable overhead) which the seller would have made from full performance by the buyer," plus incidental damages under UCC section 2-710. This interpretation preserves the pre-Code approach and reinforces the decisions which treat overhead as a reimbursable cost rather than a savings realized. Overhead, however, must be "reasonable"; there is to date no authoritative application of this limitation.<sup>46</sup>

### III

#### SELLER'S RECOVERY OF OVERHEAD: ECONOMIC COST THEORY

##### A. *A Note by Way of Summary and Transition*

In the Spartin case \$5,000 of overhead was allocated to the Blippo contract. Although the allocation of overhead through predetermined rates to a particular contract has aspects of both arbitrariness and subjectivity,<sup>47</sup> we shall assume that this allocation took into account the possibility that the allocation of fixed costs might change with unanticipated variations in production but that Spartin's overhead expenditure remained constant during the period in question. Spartin's expansible capacity, therefore, would be achieved solely by using different amounts of variable resources. Under the prevailing legal analysis, the \$5,000 is not deducted from the contract price as a savings realized and is therefore recoverable from Blippo. The primary reason is that a denial of recovery would force Spartin to reallocate the overhead cost to other work, thereby increasing the cost of those jobs and presumably reducing overall profitability since each unit must then bear a greater portion of the aliquot share of overhead. Thus Spartin

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<sup>44</sup> UCC § 2-708(2). "Such a seller has never been able to measure his losses by the difference between contract and market, since the salvage value of unfinished goods obviously bears no rational relationship to the seller's contemplated investment in the contract." Peters, *supra* note 35, at 273. See Harris, *supra* note 34, at 70-72, 86-87. But see Jagger Bros. v. Technical Textile Co., 202 Pa. Super. 639, 198 A.2d 888 (1964).

<sup>45</sup> That is, "due allowance for costs reasonably incurred and due credit for payments or proceeds of resale." UCC § 2-708(2).

<sup>46</sup> Nordstrom has suggested that the limitation is designed "to allow the seller recovery for any items which reasonably can be classified as overhead," rather than to control overhead which is either too high or too low. R. NORDSTROM, *supra* note 40, § 177, at 540. Another possibility is that the limitation was intended to control the allocation of overhead to particular contracts, that is, the allocation must be reasonable in light of generally accepted accounting principles.

<sup>47</sup> See note 31 *supra*.

would be in a worse position because of breach than if Blippo had fully performed and the purpose of compensatory damages would not be achieved.

The purpose of this article is to test the accuracy of this legal analysis through the application of economic cost theory.<sup>48</sup> Whether such analysis is correct under economic cost theory depends upon two conditions at the time of contracting: (1) the competitive character of the market, and (2) the stage of production in which Spartin finds itself. The existence of these factors can be determined by the relationship between the market price and Spartin's average cost curves.

To illustrate, consider figure 1 and assume that the market is purely competitive,<sup>49</sup> that is, price is not influenced by this seller's actions. At the time of contracting the seller's average fixed costs (overhead) will decrease proportionately for every additional unit of production secured. Put another way, as volume increases the seller can spread his fixed costs over more units to produce cost savings. On the other hand, the seller's average variable cost (*AVC*) and average total cost

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<sup>48</sup> Our analysis is based upon microeconomic theory and uses production and cost theory; we have prepared a list of sources that supply more detailed discussion. See generally A. ALGHIAN & W. ALLEN, *EXCHANGE AND PRODUCTION THEORY IN USE* 197-311 (1969); C. ALLEN, J. BUCHANAN & M. COLBERG, *PRICES, INCOME, AND PUBLIC POLICY* 271-345 (2d ed. 1959); J. BAIN, *PRICE THEORY* 83-266 (1952); W. BAUMOL, *ECONOMIC THEORY AND ECONOMIC ANALYSIS*, 250-70, 311-37 (2d ed. 1965); K. BOULDING, *ECONOMIC ANALYSIS* 475-567 (rev. ed. 1948); I. K. BOULDING, *ECONOMIC ANALYSIS: MICROECONOMICS* 375-444 (4th ed. 1966); A. BRAFF, *MICROECONOMIC ANALYSIS* 47-208 (1969); S. CARLSON, *A STUDY ON THE PURE THEORY OF PRODUCTION* (1956); W. CARTER & W. SNAVELY, *INTERMEDIATE ECONOMIC ANALYSIS* 93-199 (1961); J. CLARK, *COMPETITION AS A DYNAMIC PROCESS* 118-77 (1961); C. FERGUSON, *MICROECONOMIC THEORY* 162-250 (rev. ed. 1969) [hereinafter cited as FERGUSON]; J. HENDERSON & R. QUANDT, *MICROECONOMIC THEORY: A MATHEMATICAL APPROACH* 42-124 (1958) [hereinafter cited as HENDERSON & QUANDT]; R. LEFTWICH, *THE PRICE SYSTEM AND RESOURCE ALLOCATION* (1966) [hereinafter cited as LEFTWICH]; E. MANSFIELD, *MICROECONOMICS: THEORY AND APPLICATIONS* 114-85 (1970); P. SAMUELSON, *ECONOMICS: AN INTRODUCTORY ANALYSIS* 357-611 (8th ed. 1970); G. STIGLER, *THE THEORY OF PRICE* 104-94 (3d ed. 1966).

<sup>49</sup> A purely competitive market exists when the following conditions are met: (1) firms produce a homogenous commodity and consumers are identical from the seller's point of view in that there are no advantages or disadvantages associated with selling to a particular consumer; (2) both firms and consumers are numerous and the sales to or purchases from each individual unit are small in relation to the aggregate volume of transactions; (3) both firms and consumers possess perfect information about prevailing price and current bids and they take advantage of every opportunity to increase profits and utility respectively; (4) entry into and exit from the market is free for both firms and consumers. See FERGUSON 192-95; HENDERSON & QUANDT 86-87. Under these purely competitive assumptions, demand is perfectly elastic. Cf. note 65 *infra*.

Although few economists insist that pure competition characterizes markets in the United States, the model of pure competition provides a starting point for analysis of that segment of the market in which competition does exist (see LEFTWICH 23-24), permits accurate explanation and prediction of real world phenomena, and frequently works as a theoretical model of economic process. See FERGUSON 185.

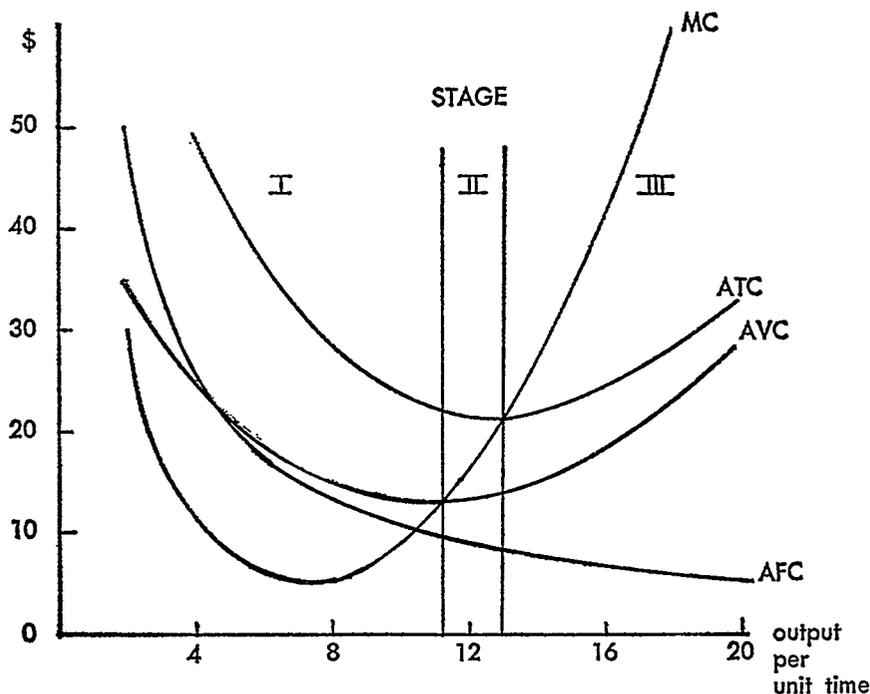


FIGURE 1. Short run average and marginal cost functions.

(*ATC*) will be decreasing or increasing depending upon the volume of production. Initially, average variable cost will decrease, but at some point in overall operation it will begin to rise.<sup>50</sup> When the increase in average variable cost equals and exceeds the per unit decrease in average fixed cost (*AFC*), average total cost will begin to rise. Still assuming a purely competitive market, if at the time of contracting both average fixed and variable costs are decreasing, the seller is in what we call stage I. If average variable cost is increasing but average total cost is still decreasing, then the seller is in what we call stage II. If average

<sup>50</sup> Average variable cost will decrease at first because of increased efficiency or because additional resources can be procured at lower prices. Assume, for example, that a certain factory is designed to employ approximately 100 workers. Further assume that labor is the only variable resource. If only one worker is employed, the output will be extremely small. If one additional person is employed, the output will more than double because of the resultant division and specialization of labor. If the doubling of variable cost results in a greater than proportionate increase in output, average variable cost decreases. Throughout stage I, the added variable cost results in a more than proportionate increase in output and average variable cost decreases. At some point, however, the addition of more workers will result in less output per worker, largely because of the law of diminishing returns. See note 60 *infra*. At this point, average variable cost begins to increase. See LEFTWICH 135; C. McCONNEL, *ECONOMICS: PRINCIPLES, PROBLEMS, AND POLICIES* 442-43 (3d ed. 1966).

variable cost is rising and average total cost is either constant or rising, so that increases in average variable cost equal or exceed the per unit decrease in average fixed cost, then the seller is in what we call stage III.

Our thesis is that if the seller is in stage III, the allowance of overhead as damages will put him in a better overall position than if the buyer had fully performed. In stage III relieving the seller of the necessity of incurring increasing variable costs will at least equal the savings that the seller could have achieved if permitted to spread overhead costs to particular units of production covered by the contract. Put another way, since average variable costs increase more than average fixed costs decrease in stage III, the reallocation of overhead to other work upon breach, although increasing the aliquot share of overhead costs to some extent, will be exceeded by the savings in not having to incur the projected variable costs. Thus for the seller in stage III, which is the most likely place for the rational firm seeking to recover total costs and earn a profit,<sup>51</sup> the recovery of overhead results in overcompensation because it places the seller in a better overall profit position than could have been achieved by full performance.

Before applying economic cost theory to the Spartin case, we shall briefly examine the theory which forms the basis for these costs curves.

### B. Cost of Production

A seller's decision to contract for the sale of goods is determined by the cost of production and its relationship to the revenue expected to be generated by the contract.<sup>52</sup> Production costs for a particular

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<sup>51</sup> Two factors motivate a seller to prefer stage III. First, in stage I, under the purely competitive market assumptions, market price is less than the average variable cost. Thus if the seller chooses to operate he will not even be able to recover all of his additional costs of production. In stage II the seller can recover all of his variable costs and some portion of his fixed or overhead costs. But unless he can recover all of the fixed costs, he will not make additional investments in fixed resources. Once the fixed resources are exhausted, the seller should pursue some alternative enterprise. In stage III the seller will be able to recover all of his fixed and variable costs.

Second, the seller will maximize profits in stage III by producing the level of output at which price is equal to marginal cost. At this same price if the firm elects to operate in stage I instead of stage III, it will maximize losses. This should effectively preclude stage I operation for the rational seller who is interested in operating his business at a profit. In stage II, under purely competitive conditions the seller can only minimize losses by production. See LEFTWICH 162-65.

<sup>52</sup> In the short run, the seller's decision to contract will rest on whether or not the price of the product will cover the average variable cost. If market price is equal to average variable cost, it makes no difference whether the seller produces or not. If market price is less than average variable cost, the seller will minimize losses by discontinuing production. If average variable cost is less than market price, the seller should produce since he can thereby recover all of his variable costs and have some excess to defray the

seller are affected by both the physical relationship between input of resources and output of products and the combination of resources used.<sup>53</sup> In addition, the seller is subject to market influences such as general price increases or decreases, government action either establishing minimum wages or wage freezes, and legislative enactments or judicial decisions which affect the conditions of production. The total cost incurred by a seller is the net result of his decisions to produce subject to the influence of the factors affecting production costs.<sup>54</sup>

As we have seen, the total costs incurred by a seller can be classified as total fixed costs and total variable costs. Total fixed costs refers to all costs that a seller cannot vary during the relevant time period. These fixed costs determine capacity in the seller's production lot, and plant capacity determines the upper limit of the volume of production that the seller is capable of processing.<sup>55</sup> It is assumed that Spartin in the relevant short run period would not acquire additional plant capacity but would achieve expansible capacity solely by using different quantities of variable resources. Under this assumption, total fixed cost is the equivalent of overhead referred to in judicial opinions.<sup>56</sup>

Total variable costs refers to obligations of the seller which are incurred as the direct result of decisions to produce different numbers of product units. Expenditures on such items as labor, raw materials, and

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fixed expenses. If market price is higher than the average total cost, which includes both overhead and variable expenses, the seller can maximize profits by production if marginal revenue is equal to marginal cost. See LEFTWICH 160; G. STIGLER, *supra* note 48, at 134-39.

<sup>53</sup> The physical relationship between resources and output is represented by the production function. The combination of resources used is represented by the seller's expansion path. These equations plus the cost equation for the resources used can be combined into a single equation in which cost is stated as a function of the level of output plus the cost of fixed inputs. See HENDERSON & QUANDT, 55-62.

<sup>54</sup> See, e.g., G. STIGLER, *supra* note 48, at 187.

<sup>55</sup> The quantities of the fixed resources used determine the size of the seller's plant. Plant capacity sets the upper limit to the amount of output the seller is capable of producing in the short run. The seller can vary his output up to that limit by increasing or decreasing the quantity of variable resources used. Changes in plant capacity can be achieved by changing the quantities of the fixed resources used—but only in the long run. See LEFTWICH 130.

<sup>56</sup> Total fixed costs refers to the entire cost obligation of the seller for fixed resources. In economic terms, a resource that is irretrievably committed to the production process becomes a fixed cost. For example, if chemicals are applied to a growing crop, at the moment of application they become a fixed cost. Similarly, once an employee is engaged under a contract for a definite period of time, this labor becomes a fixed cost. See *id.* at 129. But neither labor nor raw materials are usually considered to be overhead expenses, since the level of either can usually be altered in the short run. See note 29 *supra*. In the Spartin problem, the graphite purchased and the additional employee engaged are examples of "lost" costs and not included as overhead. See note 41 *supra*. But to facilitate theoretical development of this analysis it is assumed that these costs remained variable and no other fixed resources were acquired.

transportation are usually considered to be variable.<sup>57</sup> Total variable cost necessarily increases as the number of production units increases since larger quantities of variable resources are required and hence larger cost obligations are incurred.<sup>58</sup>

Table 1 is an illustrative presentation of the total costs of a seller with different levels of production of a product.

TABLE 1  
TOTAL COST

Quantity of Output	Total Fixed Costs	Total Variable Costs	Total Costs
1	\$100	\$ 40	\$140
2	100	70	170
3	100	85	185
4	100	96	196
5	100	104	204
6	100	110	210
7	100	115	215
8	100	120	220
9	100	126	226
10	100	134	234
11	100	145	245
12	100	160	260
13	100	180	280
14	100	206	306
15	100	239	339
16	100	280	380
17	100	330	430
18	100	390	490
19	100	461	561
20	100	544	644

For convenience fixed costs (overhead) are constant at one hundred dollars for the relevant time period. The variable cost data have been selected to reflect the cost relationship usually assumed by economists<sup>59</sup>

<sup>57</sup> See LEFTWICH 129. *But see* note 29 *supra*.

<sup>58</sup> See LEFTWICH 132-33.

<sup>59</sup> It is usually assumed that the average variable cost curve is U-shaped. This characteristic U-shape is the result of the relative efficiency with which variable resources are used in the production of successively larger units of output in the short run, and of the relative efficiency of successively larger plants in the long run. *See, e.g., id.* at 135, 143; FERGUSON 180-83. If different assumptions are made concerning the conditions of production, the shape of the cost curve will change. If it is assumed, for example, that the appropriate production function is the Cobb-Douglas production function, the average cost curve will not have the U-shape. *See* A. BRAFF, *supra* note 48, at 79-82; FERGUSON 149; note 60 *infra*.

and thus to show increased efficiency in the utilization of resources over a portion of the range of production. Once production reaches the eleven-unit level, however, progressively larger outputs use these variable resources less efficiently.<sup>60</sup> Although total cost concepts reflect the same kind of information as average cost, they are not generally used for planning purposes, but find their greatest utility in deriving average cost for the seller.<sup>61</sup>

Average cost is a useful tool both in planning production and in evaluating the influence of changes or disruptions of the productive process. Average costs can be derived by dividing the relevant total costs by the corresponding level of production.<sup>62</sup> The average total costs in table 2 have been derived from the total costs in table 1. The average fixed costs, average variable costs, and average total costs were derived from fixed cost, variable costs, and total costs respectively. Figure 1 expresses cost as a function of output and graphically relates the information in table 2.

These cost concepts provide the basic framework that will be utilized to determine the seller's stage of production and the propriety of overhead compensation. Further elaboration on these concepts is integrated into subsequent sections in order to relate theory to actual remedial problems.

### C. *Rational Areas of Production*

#### 1. *Purely Competitive Market*

Under purely competitive conditions, market price equals marginal revenue and is constant for all levels of output offered by a seller. Although the necessary conditions for the existence of a purely competitive market do not frequently occur, substantial competition often does exist and the assumption of pure competition provides a convenient basis for analysis.<sup>63</sup> With the exception of one partial relaxation of the assumption of pure competition in the subsequent section,<sup>64</sup> further departures

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<sup>60</sup> Relative efficiency in the use of variable resources in the short run results from the law of diminishing returns, which states that if the input of one resource is increased by equal increments per unit of time while inputs of other resources are held constant, total production will increase but beyond some point the resulting increases will become smaller and smaller. See LEFTWICH 99-101. In the long run, relative efficiency in the use of variable resources results from the efficiency with which plants of various sizes use variable resources. See *id.* at 143-44; FERGUSON 180-83.

<sup>61</sup> See LEFTWICH 134.

<sup>62</sup> *Id.* at 135.

<sup>63</sup> See note 49 *supra*.

<sup>64</sup> See notes 69-72 and accompanying text *infra*.

TABLE 2  
AVERAGE COSTS

Quantity of Output	Average Fixed Costs	Average Variable Costs	Average Total Costs
1	\$100.00	\$40.00	\$140.00
2	50.00	35.00	85.00
3	33.33	28.33	61.66
4	25.00	24.00	49.00
5	20.00	20.80	40.80
6	16.67	18.33	35.00
7	14.29	16.43	30.72
8	12.50	15.00	27.50
9	11.11	14.00	25.11
10	10.00	13.40	23.40
11	9.09	13.18	22.27
12	8.33	13.33	21.66
13	7.69	13.85	21.54
14	7.14	14.72	21.86
15	6.67	15.93	22.60
16	6.25	17.50	23.75
17	5.88	19.41	25.29
18	5.55	21.67	27.22
19	5.26	24.27	29.53
20	5.00	27.20	32.20

from this assumption would contribute unnecessary complexity to our analysis.<sup>65</sup>

The rational area of production includes levels of output at which the rational firm could choose to produce at alternative prices. Under purely competitive conditions the lower limit to the rational area of production is established by the minimum point on the average variable cost curve, \$13.18 in figure 1. This is the minimum price at which a seller could be induced to produce at all.<sup>66</sup> At lower prices, the seller does not even recover all of his variable expenses and would minimize his losses by choosing not to incur them—that is, by ceasing production.

<sup>65</sup> If it is assumed, for example, that the seller's market is not purely competitive, the demand curve for the seller's product is no longer perfectly elastic and thus not equivalent to marginal revenue. See note 49 and accompanying text *supra*. The income from an additional unit is no longer  $p$  but is  $p\left(1 + \frac{1}{Ed}\right)$ , where  $p$  = price and  $Ed$  = elasticity of demand. In order to avoid the additional complexity involved in using a demand curve that is not perfectly elastic, we assume for this analysis the purely competitive market. See LEFTWICH 184-86.

<sup>66</sup> See note 52 *supra*.

In stage II under purely competitive conditions, prices are such that the seller will minimize losses by continuing production but are not sufficiently high to permit the seller to recover all of his costs of production.<sup>67</sup> In economic terminology, any return which exceeds the variable cost is called a return to fixed resources and includes both the return of any portion of the fixed costs (overhead) and, when prices are sufficiently high, overhead plus a profit. At any price level which permits a return to fixed resources, the seller, at least in the short run, minimizes losses by continuing production. In figure 1, the seller will operate in stage II when prices are between \$13.18 and \$21.54.

When the price in figure 1 exceeds \$21.54, the beginning of stage III, the return to fixed resources includes a full return of the aliquot share of overhead expenses plus a profit. In stage III the seller can potentially maximize profits by production of additional output.

In summary, the results of producing in the three stages of production in a purely competitive market are as follows: (1) in stage I the seller minimizes losses by choosing not to produce at all since he would not even recover all of his added expenditure required to produce the output; (2) in stage II the seller has some return to fixed resources and minimizes losses by producing in the short run; (3) in stage III the seller recovers all of his expenses and thus can potentially maximize profits by producing.

Since in either stages I or II the best the seller could hope to do is minimize losses, and since only in stage III will he enjoy a profit, the seller with a profit motive will obviously prefer stage III. The seller operating in any other stage is at a competitive disadvantage.<sup>68</sup>

## 2. *Market Not Purely Competitive*

Where the market is not purely competitive, a seller will maximize his profits or minimize his losses by producing at any time when there is

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<sup>67</sup> Stage II was defined in section III(A) of the text as that portion of the seller's range of production between the minimum points of his average variable cost curve and his average total cost curve. In this range of production in a purely competitive market, market price is less than average total costs at all possible outputs. Thus the seller will always incur losses. But if market price is greater than average variable cost the seller will minimize losses by production. Total receipts exceed total variable costs and thus production reduces losses to an amount less than total fixed cost. See LEFTWICH 163-64.

<sup>68</sup> The optimum scale for the production of any level of output is the plant with a short run average cost curve tangent to the long run average cost curve at that level of output. A plant of any other size will produce outputs at higher per unit costs than the optimum scale of plant. *Id.* at 147-48. Under conditions of pure competition sellers will build the optimum scale of plant. Other plants have higher costs and will operate at a competitive disadvantage. The seller should then operate at the level of output at which marginal cost equals marginal revenue. *Id.* at 147, 162. This will always occur in stage III.

an available market sufficiently large to permit sales of output at a market price greater than or equal to average variable cost.<sup>69</sup> Consequently, a seller may operate in all three stages of production.

The first requirement for the seller to operate in stage I is that prices be maintained at a level higher than the level that would exist in a purely competitive market.<sup>70</sup> Either under this condition or if the seller would minimize losses by continuing production, stage II operation is justified. Prices above the purely competitive level can result from such factors as the number of sellers in the market, the incidence of government price supports, or the existence of a particularly advantageous contract fixing the price.

A second requirement for operation in stages I or II is that the seller be faced with a limited demand for his product, or that he have incorrectly estimated the market potential for his product. Under these conditions, the seller, if he survives, will adjust his capacity and will thereafter operate in stage III.<sup>71</sup>

Given these restrictions, it seems unlikely that a seller will operate in either stages I or II. Although the seller would maximize profits from the existing plant by so operating, he would always attempt to reduce his capacity in order to operate in stage III since the seller who operates in either stages I or II is at a competitive disadvantage.<sup>72</sup>

#### D. *Propriety of Overhead Recovery Under Economic Cost Theory*

Under economic cost theory the propriety of allowing overhead as damages for breach of contract depends upon two conditions at the time of contracting: the competitive character of the market and the stage of production in which the seller finds himself. The stage of production can readily be determined from the particular seller's cost curves. A detailed determination of the competitive character of the seller's market would require an examination of the demand sector of the economy. For purposes of this analysis, however, competitive character can be de-

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<sup>69</sup> In a market that is not purely competitive, demand is no longer equivalent to marginal revenue. The price may be sufficiently high to justify operation in all three stages of production. The seller may even maximize profits from his existing plant in stages I or II and thus have no incentive to operate in stage III. *See, e.g., id.* at 186-89; FERGUSON 220-50. When this occurs, the seller can still improve his competitive position by reducing his plant capacity so that the short run average cost curve is tangent to the long run average cost curve at that level of output. *See* note 68 *supra*. It is only when the market will not permit the seller to sell sufficient output to reach at least the minimum point on his long run average cost curve that the seller will continue to operate in stages I or II. *See* FERGUSON 176-79; LEFTWICH 141-48, 190-93.

<sup>70</sup> *See, e.g.,* LEFTWICH 186-89.

<sup>71</sup> *See* notes 68 & 69 *supra*.

<sup>72</sup> *See* note 68 *supra*.

terminated by comparing the relative level of market prices to the average variable cost for the stage I seller and the average total cost for the stage II seller. The comparison is not necessary for the stage III seller, since the competitive character of the market does not affect the propriety of his overhead recovery. When the market price is higher than the average variable cost for the stage I seller or the average total cost for the stage II seller at the relevant level of output, the market is not purely competitive. If the market price for the relevant level of output is lower than the average variable cost for the stage I seller or the average total cost for the stage II seller, the market can be treated as though it were purely competitive. Let us now combine stages of production with competitive character to test, in general, the propriety of overhead recovery.

### 1. *Stage I Seller and the Character of Competition*

In stage I, both the average fixed and average variable cost curves are decreasing at the time of contracting. Under purely competitive conditions, it is unlikely that the rational seller would choose to produce in stage I because the contract price will not cover even the variable expenses incurred in production, not to mention overhead. If, however, a contract was entered into under these conditions and breached by the buyer, the stage I seller still should not recover overhead. Although the savings lost through the inability to spread overhead to additional units of production would not be equalled or exceeded by the savings retained by elimination of additional variable costs, the projected loss on full performance precludes reimbursement for fixed costs. In a noncompetitive market, however, the rational seller would operate in stage I if the market price exceeded average variable cost, which is the purely competitive price ceiling. Upon breach, then, the seller should recover unsalvaged variable costs plus all of the overhead allocated to the contract and, depending upon the relationship of the contract price to average variable and average total cost curves, these costs plus any lost profit.

### 2. *Stage II Seller and the Character of Competition*

In stage II, the average variable cost curve is increasing but the average total cost curve is still decreasing. Under purely competitive conditions, the rational seller might choose to produce in stage II since the contract price, even though less than average total cost, would cover all variable costs incurred and some portion of the aliquot share of overhead. No profit, however, could be earned because the market price

would not exceed average total cost. However, upon breach by the buyer, the seller should recover as damages all overhead allocated to the contract plus variable costs actually incurred up to the breach, subject to an adjustment for any loss that would have been suffered on full performance. In a noncompetitive market, the price may be higher than average total cost. Thus upon full performance the seller would have recovered all of the costs plus a profit. Upon breach, the seller should recover only that part of the overhead allocated to the contract which is not neutralized by the savings he retains in being relieved of incurring variable costs, and because full performance would not produce a loss.

### 3. *Stage III Seller and the Character of Competition*

In stage III both the average total and average variable cost curves are rising. Under both purely competitive and noncompetitive conditions, the market price will exceed average total cost and the seller, by full performance, may recover all fixed and variable costs plus some profit. Upon breach, however, the loss to the seller in being unable to spread overhead to another unit of production is neutralized or exceeded by the savings realized in being relieved of the need to incur variable costs for full performance. This is because the average fixed cost curve is decreasing and the average variable cost curve is increasing. Thus if the seller is not harmed by the inability to spread overhead further, overhead recovery upon breach by the buyer results in overcompensation and is inconsistent with the primary purpose of compensatory damages.

## E. *Application of Economic Cost Theory*

### 1. *The Vitex Case*

In *Vitex Manufacturing Corp. v. Caribtex Corp.*,<sup>73</sup> the Vitex Corporation was engaged in the business of chemically treating cloth for duty free importation into the United States. For this purpose, Vitex maintained a plant in the Virgin Islands and was entitled to process a specified quantity of material under the Virgin Islands quota system. Caribtex was in the business of importing cloth into the Islands, securing its processing, and exporting it to the United States.

In the fall of 1963 Vitex, with an unused portion of its quota but no customers, closed its plant. Caribtex acquired some Italian wool and the parties entered a contract in which Vitex agreed to process 125,000 yards of the Caribtex woolen material. Subsequently, Vitex reopened its Virgin Islands plant, ordered the necessary materials, recalled its

<sup>73</sup> 377 F.2d 795 (3d Cir. 1967).

work force, and made the necessary preparations to begin performance. Caribtex repudiated before performance had started, and Vitex brought suit to recover lost profits. The Third Circuit, after stressing the difference between fixed and variable costs, upheld the recovery of overhead as necessary to put the seller in the same position as if full performance had occurred, noting that "the successful businessman must set his prices at sufficient levels to recoup all his expenses, including overhead, and to gain profits."<sup>74</sup>

The economic cost theory developed in this article provides a framework for critical evaluation of the propriety of this overhead recovery. As previously suggested, recovery of part or all of the overhead upon breach by the buyer is proper only if the seller is in a market that is not purely competitive in stages I or II, or in a market that is purely competitive in stage II subject, however, to adjustment for losses that the seller would have incurred on full performance. In those situations the rational seller would not contract unless the price was sufficiently high to recover all of his variable costs and have some return to his fixed resources, as either an aliquot share of overhead or as profits. Even so, the seller would be at a competitive disadvantage in stages I or II<sup>75</sup> and would continue there only if faced with a limited demand for his product. Presumably, the rational buyer would contract on this basis only if he had no choice in selecting the seller or if he were unable to contract at a price that would exist in a purely competitive market.

Although the *Vitex* opinion recites no facts conclusive as to the seller's stage of production or the competitive character of the market, the probabilities are that *Vitex* was in stage III of a noncompetitive market. First, *Vitex* may have already processed sufficient quantities of wool to place it in stage III for the relevant time period before closing the plant. This suggestion is reinforced by the incentive to operate in stage III rather than stages I or II.<sup>76</sup> Second, the character of the market is indicated by the fact that to meet the needs of Caribtex, *Vitex* opened a plant previously closed for lack of orders. Limited demand is strong evidence of a noncompetitive market. Based upon these data, economic cost theory would not support the recovery of overhead.

Without sufficient data, however, conclusions based upon probabilities as to what rational sellers and buyers would do are rather thin. In fact, because of limited demand and excess capacity,<sup>77</sup> *Vitex* may very

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<sup>74</sup> *Id.* at 798. See note 39 *supra*.

<sup>75</sup> See notes 68-70 and accompanying text *supra*.

<sup>76</sup> *Vitex* could improve its competitive position by reducing plant capacity and thereby operate in stage III. See note 69 *supra*.

<sup>77</sup> A typical excess capacity case is *Jessup & Moore Paper Co. v. Bryant Paper Co.*,

well have been in either stage I or stage II in a noncompetitive market even though the rational seller would have preferred to be elsewhere. The point is that the court's conclusion based upon legal analysis would be consistent with economic cost theory only under a limited set of circumstances; the probabilities are against the existence of those circumstances in *Vitex*. This fact and the potential clash between legal reasoning and economic reality<sup>78</sup> prompt a return to the *Spartin* case.

## 2. *The Spartin Case*

To avoid the uncertainties in *Vitex*, it is necessary to estimate empirically the seller's cost curves. Actual cost curves comparable to those in figure 1 can be estimated from a seller's cost and output data, such as that contained in the appendix.<sup>79</sup> These curves will assume various shapes for different sellers depending upon the efficiency with which resources are used, the importance to the seller of economies of size, and the time period under consideration.<sup>80</sup>

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297 Pa. 483, 147 A. 519 (1929). The lower court found that prior to the Bryant contract the seller was producing 22 cooks of soda pulp per day and had a 26-cook capacity. To perform the Bryant contract, the plaintiff would have been required to produce 24½ cooks per day. The lower court found that the same number of men were required to complete the smaller number of cooks as would be needed to supply the larger number. It further determined that general expenses would not be increased if the plant operated at the increased capacity. On these facts the Pennsylvania Supreme Court held that the plaintiff's recovery should not be reduced by deducting charges necessarily involved in the general operation of the business from the profit he would have received from performance. In other words, the court held that excess capacity did not require the treatment of overhead as a cost saved since the breach meant that other units now had to carry a greater share of the general expenses than they would had the contract been fully performed.

This reasoning seems to assume that excess capacity cannot exist in stage III. But the rational seller will prefer to operate in stage III between the levels of output at which average cost reaches a minimum and the level at which marginal cost equals marginal revenue. See LEFTWICH 140, 141-48, 162, 188. There may be excess capacity for this seller because of normal fluctuations in the market demand. Excess capacity can also exist if the seller has an average cost curve which reaches a minimum and is constant throughout the relevant range of production. See, e.g., FERGUSON 180-83, 260-62. An example could be the seller of fixed price items referred to in UCC § 2-708(2), Comment 2, whose products are in limited demand but who has an unlimited supply for sale. The constant level of average total cost occurs because the advantage gained by spreading average fixed cost is exactly offset by increases in average variable cost. The minimum level of average total cost marks the beginning of stage III. Since at least for the relevant range of outputs there are no economic incentives for the seller to limit his output, this seller has excess capacity for a wide range of levels of output. Significantly, at all levels of output in stage III this seller should not receive an overhead recovery.

<sup>78</sup> There is also a potential clash between economic cost theory and generally accepted accounting principles if the latter are used to justify the *Vitex* result. See 19 CASE W. RES. L. REV. 375 (1968).

<sup>79</sup> APPENDIX (Table A).

<sup>80</sup> FERGUSON 180-83; HENDERSON & QUANDT 46, 58; LEFTWICH 138, 141, 144.

The Spartin case has been developed from the cost and output data contained in the appendix. The cost curves in figure 2 and the corresponding equations were derived using the statistical technique and the econometric methods discussed in the appendix.<sup>81</sup>

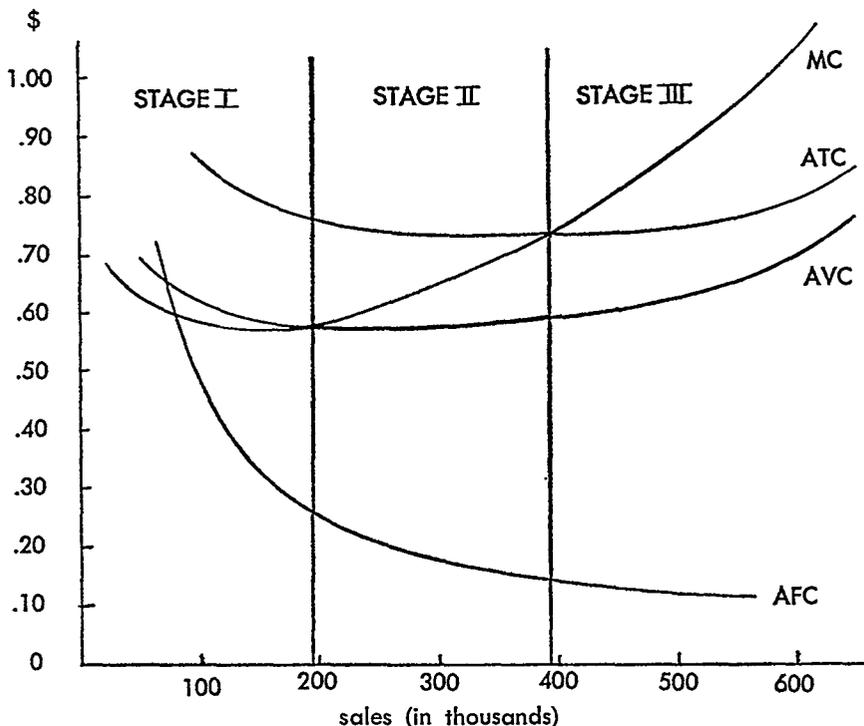


FIGURE 2. Spartin's average and marginal cost functions.

Assume that Spartin's cost curves, displayed in figure 2, were first prepared after the repudiation by Blippo. Spartin's average variable cost equation was found to be as follows:  $AVC = 0.6 - (0.25 \times 10^{-6})V + (0.7 \times 10^{-12})V^2$ . The minimum point can be found graphically (figure 2) or by setting the first derivative of average variable cost with respect to output equal to zero and solving for the volume of output.<sup>82</sup> The minimum point is determined to be at a level of output of \$180,000 and marks the beginning of stage II of production. Spartin's average cost equation is  $AC = \frac{\$50,000}{V} + 0.6 - (0.25 \times 10^{-6})V + (0.7 \times 10^{-12})V^2$ . The minimum point on the average cost curve is at approxi-

<sup>81</sup> APPENDIX (third and fourth equations).

<sup>82</sup> See HENDERSON & QUANDT 265-67.

mately the \$400,000 value of output (figure 2)<sup>83</sup> which marks the beginning of stage III of production. Spartin's level of output prior to the Blippo contract was \$500,000. This places Spartin in stage III of production (figure 2). Since no stage III seller should recover overhead, the \$5,000 overhead element in Spartin's remedy should be deducted from gross profits.<sup>84</sup>

Why this is so can be demonstrated graphically from figure 2 or numerically by solving the appropriate average cost or average variable cost equation for values of  $V$  to obtain the figures used herein. At the time of contracting with Blippo, Spartin had a total revenue of \$500,000 and total costs, fixed and variable, of \$375,000 for a total profit of \$125,000, or 25 percent of total sales. If Spartin had completed the Blippo contract, total revenue would have increased by \$50,000 to \$550,000, and total costs would have increased by the additional variable costs incurred, some \$45,863 to \$420,863. The \$5,000 overhead figure, while allocated to the contract, would not of course increase total costs. Thus, at the completion of the Blippo contract, Spartin would have had a total profit of \$129,137, some 23 per cent of total sales. Although net profit increased by \$4,137, the decrease in the ratio of profit to sales was caused by the incurring of increasing variable costs in stage III. Suppose, however, that Blippo repudiated the contract before Spartin had incurred any variable costs and that the court, looking at Spartin's cost curves, awarded lost profit in the amount of \$4,137, the difference between the contract price of \$50,000 and the estimated but saved variable costs of \$45,863. Here Spartin's total revenue would increase by \$4,137 to \$504,137, and its total costs would remain constant at \$375,000—since no new variable costs were in fact incurred and overhead remained fixed. The total profit at this point would be \$129,137, the same figure that would exist if Spartin were permitted to complete the Blippo contract. However, the percentage of profit after repudiation is 24 percent, although the percentage of profit had the contract been completed would be 23 percent. This illustrates dramatically the savings in being relieved of the necessity to incur increasing variable costs. It also confirms that if, upon repudiation and the recovery of net gains prevented, Spartin's overall profitability is the same as would have been produced by complete performance, the addition of overhead to the recovery would put Spartin in a better profit position than would have been achieved by full performance. Put another way, even though full performance would have reimbursed Spartin for the fixed and variable

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<sup>83</sup> *Id.*

<sup>84</sup> See note 39 *supra*.

costs involved, Spartin can, upon repudiation, absorb the fixed costs allocated to the contract without affecting overall profitability. This result would not be significantly altered by adding to total revenue and total cost the \$9,000 in unsalvageable reliance, which should also be recovered as damages.

The empirically estimated cost curves can be used for another purpose. Spartin expected to make a \$12,500 profit on the Blippo contract. Cost curves can be used to determine whether or not these expectations were realistic. In stage III, variable costs increase more than the overhead expenses decrease when additional output is produced. Consequently, the per unit cost that Spartin would have incurred in performing the Blippo contract would have been higher than the per unit cost that it had incurred at its former levels of production. Unless Spartin anticipated this increase in average cost, its expected profit at the time of contracting was unrealistically high. The extent to which any seller actually considers the possibility that the efficiency of his production will drop with an increase in volume would be difficult to establish. Fortunately actual proof in the Spartin case is not necessary because cost curves are available. At the \$500,000 level of production which existed prior to the Blippo contract, Spartin had a net profit of \$125,000 (total revenue minus total cost for 1971).<sup>85</sup> At the \$550,000 level of production which would have resulted from performance by Blippo, Spartin would have earned a profit of \$129,137 (total revenue minus total cost for the level of output that would have resulted from the Blippo contract). After deducting overhead, the profit prevented by the Blippo breach was \$4,137. If the remedy seeks only to put the aggrieved party in as good a position as he would have obtained from performance, the lost profit which Spartin should recover would be \$4,137 and not the \$12,500 which it anticipated at the time of contracting.<sup>86</sup>

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<sup>85</sup> The total revenue of a firm selling in a purely competitive market is derived by the number of units he sells ( $q$ ) multiplied by the fixed price ( $p$ ) per unit he receives. His profit is the difference between total revenue and total cost:

$$\pi = pq - C$$

The first order conditions for profit maximization require that each input be utilized up to a point at which the value of the additional output equals price. A firm can increase its profit as long as the addition to revenue from the employment of the additional unit of input exceeds its cost.

This analysis assumes that the second order conditions for profit maximization are also met. See HENDERSON & QUANDT 53. If the market is not purely competitive, the procedure for determining profit is the same except that the price and cost elements in the equation must then be adjusted to reflect the elasticity of demand and supply respectively.

<sup>86</sup> Since the second equation in the Appendix is the basis for determining the level of fixed costs, it is not necessary to rely on subjective classifications of costs as either overhead or variable or on arbitrary allocations of overhead to a particular contract. Further-

Reliance on the change in total revenue minus total cost to determine the actual profit that Spartin lost by virtue of the breach provides an objective basis to determine the extent to which Spartin's expectations would have been fulfilled if Blippo had fully performed. Damages can thereby be limited to the recovery necessary to place the seller in as good but no better position than would have resulted from full performance.

Using a purely legal analysis we concluded that Spartin's recovery under section 2-708(2) would be \$26,500. Based upon the data for Spartin contained in the appendix and the application of economic cost theory, this amount should be reduced by the \$5,000 overhead figure, since Spartin is a stage III seller, and by the further amount of \$8,363, the extent to which the anticipated profit was unrealistic. Consequently \$13,137, not \$26,500 is the amount required to put Spartin "in as good a position as if the other party had fully performed."

#### CONCLUSION

The overhead dilemma is most sharply posed when the buyer repudiates a contract for the sale of manufactured goods and the seller, after properly stopping performance, seeks damages under UCC section 2-708(2).<sup>87</sup> Under economic cost theory, overhead recovery is proper only when the seller at the time of contracting is either in a noncompetitive market in stages I or II, or in a purely competitive market in stage II, subject to adjustment for losses that would have been incurred upon full performance. It is not proper for the stage III seller since the savings realized from not having to incur variable costs equal or exceed the loss from being unable to spread fixed costs over one more unit of production. The overall profitability of the firm will not be reduced by reallocating these fixed costs to other units of production. Thus,

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more, this approach does not require reliance on an accountant correctly labeling an item as a fixed or variable cost. Instead, costs are analyzed as they apply to the particular seller and according to the extent to which expenses are either fixed or variable in his productive processes. By using this approach, the remedy can compensate for differences in the internal organization of different sellers' businesses. By objectively classifying costs as fixed or variable, it is possible to compensate this seller for his particularized damages without the risk that the remedy will put him in a better position than he would have obtained from performance.

<sup>87</sup> If the seller completes performance, or has completed goods on hand and resells them under UCC § 2-706(1), or recovers the price under § 2-709, the overhead initially allocated to the contract need not be reallocated to other contracts. The total costs incurred will be reimbursed up to the contract price, with profit depending upon both the competitive character of the market and the seller's lost volume. Cf. Harris, *supra* note 34, at 76-87.

unless the "reasonable overhead" language of UCC section 2-708(2) is interpreted to deny overhead recovery to the stage III seller,<sup>88</sup> the damage award will put the seller in a better overall profit position than he would have gained from full performance.

Under this interpretation, new problems of proof are presented for the seller. In addition to proving variable costs saved with reasonable certainty,<sup>89</sup> the seller will be required to produce empirically estimated cost curves to refute the probability that he is operating in stage III. These curves are also relevant in determining both the competitive character of the market and the extent to which the estimate of net profit prevented was realistic. Since only the seller has ready access to the data necessary to develop these curves, the burden of production should arguably fall on him. A failure to produce these curves, then, should limit the seller's recovery to variable costs actually incurred at the time of breach, as adjusted for reasonable salvage and reallocation to other jobs.<sup>90</sup>

A full use of economic cost theory in the Spartin case would require the seller to justify losses claimed as a result of breach in the light of overall business operations for some relevant period. The critical test is the change in overall profitability, if any, as measured by the difference between total revenue and total costs at the time of contracting and at the time of repudiation. The result in the Spartin case would be (1) the recovery of less damages than permitted under the prevailing legal analysis, and (2) seemingly more complicated problems of proof. Both effects tend to confirm Farnsworth's conclusions about the solicitude afforded contract breachers by the legal system, and to aggravate the fairness problem that arises when the cost of proving actual losses is excessively high. In light of these effects, should economic cost theory prevail in a case like Spartin?

The answer to this question compels a return to basic considera-

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<sup>88</sup> See note 46 *supra*.

<sup>89</sup> See notes 17 & 37 *supra*. The accuracy of the plaintiff's proof of costs saved by the breach may always be contested by the defendant. See *Peter Kiewit Sons' Co. v. Summit Constr. Co.*, 422 F.2d 242, 260-64 (8th Cir. 1969).

<sup>90</sup> See note 35 *supra*. If the variable costs incurred plus the savings realized by the breach exceed the contract price, the reliance expenditures should be reduced in proportion to the total loss projected upon full performance. See *Dade County v. Palmer & Baker Eng'rs, Inc.*, 339 F.2d 208 (5th Cir. 1965). But see *Peters, supra* note 35, at 274 (§ 2-708(2) offers no guidance for loss contract). A crafty plaintiff may avoid the consequences of a losing bargain by suing for restitution rather than on the contract. See, e.g., *Acme Process Equip. Co. v. United States*, 347 F.2d 509 (Ct. Cl. 1965), *rev'd on other grounds*, 385 U.S. 138 (1966); Childres & Garamella, *The Law of Restitution and the Reliance Interest in Contract*, 4 Nw. U.L. REV. 433 (1969); Nordstrom, *Restitution on Default and Article Two of the Uniform Commercial Code*, 19 VAND. L. REV. 1143 (1966).

tions of purpose and efficiency in contract remedies. If the purpose of contract remedies is compensation for loss caused by, rather than punishment for, breach, economic cost theory provides a more exact measurement of that loss.<sup>91</sup> In the Spartin case, for example, it undercuts the assumption of some courts and commentators that the reallocation of overhead to other units of work will necessarily decrease overall profitability. Unless deterrence of breach through overcompensation is adopted as an explicit policy objective, the search for greater accuracy in measuring actual loss should not, by itself, be a cause for alarm. If greater accuracy demonstrates less loss than had previously been thought to occur, the value in encouraging economic efficiency through the breaching buyer's reallocation of resources is not necessarily outweighed by considerations of fairness to the seller.<sup>92</sup>

If, however, economic analysis increases the cost and difficulty of proving losses which in fact were caused by the breach, a problem of distributive justice is posed. It can be argued with some persuasion that courts should avoid the particularization required by economic analysis, and thus interpret UCC section 2-708(2) to support recovery whenever overhead has reasonably been allocated to a particular contract through generally accepted accounting principles. Any overcompensation produced by this rough approximation of loss is justified by the reduction in the cost and complexity of proof. This argument may be countered in two ways. First, the impact of requiring the seller to establish the reasonableness of overhead under economic cost theory can be modified by subtle judicial allocations of the burden of coming forward with particular evidence<sup>93</sup> and by a purposeful use of the notion that uncertainty in proof of damages caused by the breach should be resolved against the breacher.<sup>94</sup> Second, as more sellers use economic cost theory for planning purposes and as more empirically estimated cost curves

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<sup>91</sup> See, e.g., Leonard, *The Measurement of Damages: An Economist's View*, 31 OHIO ST. L.J. 687 (1970); Nordstrom, *Toward a Law of Damages*, 18 CASE W. RES. L. REV. 86, 101-02 (1966).

<sup>92</sup> Harris has argued that "there is no abstract guiding principle of contract damage measurement making deterrence of breach a goal." Harris, *supra* note 34, at 95. *But see* note 6 *supra*. See also *Gorco Constr. Co. v. Stein*, 256 Minn. 476, 99 N.W.2d 69 (1959) (punishment for breach without regard to extent of harm caused is unjust and unnecessary remedy).

<sup>93</sup> See note 41 *supra*.

<sup>94</sup> "The law only requires that some reasonable basis of computation be used, and will allow damages so computed even if the result reached is only an approximation. . . . " "The most elementary conceptions of justice and public policy require that the wrongdoer shall bear the risk of the uncertainty which his own wrong has created. . . ."

*Distribu-Dor, Inc. v. Karadanis*, 11 Cal. App. 3d 463, 470, 90 Cal. Rptr. 231, 236 (3d Dist. 1970), quoting *Allen v. Gardner*, 126 Cal. App. 2d 335, 340, 272 P.2d 99, 102 (1954).

become available through increased use of programming techniques, the process of proof may over time become easier.<sup>95</sup> In fact, the increased use of economic cost theory in business and the paucity of litigation in recent years may suggest that rational sellers, perceiving themselves in stage III, recognize that they have suffered little loss from breach by the buyer.

On balance we have concluded that in the absence of a complete revision of UCC section 2-708(2),<sup>96</sup> the phrase "profit (including reasonable overhead)" should be interpreted to require the seller to prove entitlement to overhead under economic cost theory. The main disadvantage of this interpretation is that until empirically estimated cost curves become an integral part of a seller's operations, the increased complexity of proof may decrease the effectiveness of contract remedies in this commercial setting. The off-setting advantage of an economic cost theory interpretation of section 2-708(2) is that it may compel particular sellers and buyers to negotiate liquidated damage clauses which are responsive to actual rather than presumed business realities. Section 2-718(1) provides:

Damages for breach by either party may be liquidated in the agreement but only at an amount which is reasonable in the light of the

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<sup>95</sup> Production and cost functions, developed from technical information supplied by engineers or agrarian scientists, are widely available through new computer techniques and are used extensively in several sectors of the economy. See Walters, *Production and Cost Function: An Econometric Survey*, 31 *ECONOMETRICA* 1 (1963). See also Furubotn, *Engineering Data and the Production Function*, 55 *AM. ECON. REV.* 512 (1965); Kurz & Manne, *Engineering Estimates of Capital-Labor Substitution in Metal Machinery*, 53 *AM. ECON. REV.* 662 (1963). Use of empirically derived inferences from economic data has become a widespread and important practice in economic analysis. See Fisher, *The Existence of Aggregate Production Functions*, 37 *ECONOMETRICA* 553 (1969).

<sup>96</sup> A revision of § 2-708(2) should include the following changes:

(1) More clarity as to when the "measure of damages provided in subsection (1) is inadequate to put the seller in as good a position as performance would have done," especially in cases when the seller under a repudiated contract for the manufacture and sale of goods reasonably stops work;

(2) More precision in the measurement of lost profit;

(3) A statement that overhead allocated to the contract under generally accepted accounting principles is recoverable only when the gains prevented by inability to spread overhead over additional units of production exceed the savings realized in avoiding variable costs;

(4) A statement that the seller shall recover reasonable costs of performance incurred up to the time of breach, adjusted for savings realized from reallocation of materials or labor to other work or the proceeds of any salvage or scrap resale;

(5) A statement that any overhead or reasonable performance costs otherwise recoverable shall be reduced in proper proportion to any loss that the seller would have suffered upon full performance of the contract.

anticipated or actual harm caused by the breach, the difficulties of proof of loss, and the inconvenience or nonfeasibility of otherwise obtaining an adequate remedy. A term fixing unreasonably large liquidated damages is void as a penalty.

The scope and effectiveness of this provision are not yet entirely clear.<sup>97</sup> Nevertheless, if the seller's cost data and the impact of breach are uncertain, and the parties negotiate, say, a formula for the proration of overhead based upon the stage of performance at breach<sup>98</sup> or a fixed amount for net profit prevented "which is reasonable in the light of the anticipated or actual harm caused by the breach," the agreed remedy should stand up in ensuing litigation. There have been some indications that courts are more receptive to negotiated remedies under circumstances where high transaction costs impair remedial effectiveness.<sup>99</sup> Thus the period of transition from the prevailing legal analysis to economic cost theory could be bridged by the use of particularized liquidated damage clauses which reduce the complexity of proof and make more certain the price to be paid by the buyer for breach of contract. Increased judicial receptiveness to liquidated damage clauses in these circumstances can reinforce the purpose and efficiency of contract remedies and facilitate the search for more exact methods of measuring actual loss.

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<sup>97</sup> Peters has suggested that § 2-718(1) is "not likely to be of much comfort to the seller," although "no more than reasonable correspondence between stipulated amount and actual or anticipated injury" is required. Peters, *supra* note 35, at 278. The case law under § 2-718 is sparse and inconclusive. See *Denkin v. Sterner*, 10 Pa. D. & C.2d 203 (York County C.P. 1956) (agreement permitting seller to recover price upon repudiation by buyer held penalty absent evidence as to condition or status of goods or resale market); *Northwestern Motor Car, Inc. v. Pope*, 51 Wis. 2d 292, 187 N.W.2d 200 (1971) (liquidated damage clause invoked by new car dealer presumptively valid and not subject to demurrer). For discussion of pre-Code case law, see Macneil, *Power of Contract and Agreed Remedies*, 47 CORNELL L.Q. 495, 499-513 (1962); Sweet, *Liquidated Damages in California*, 60 CALIF. L. REV. 84, 106-09 (1972).

<sup>98</sup> See *Challenge-Cook Bros. v. Lantz*, 256 Cal. App. 2d 536, 64 Cal. Rptr. 239 (1st Dist. 1967) (overhead based upon percentage of contract price); note 38 *supra*. But see *Gorco Constr. Co. v. Stein*, 256 Minn. 476, 99 N.W.2d 69 (1959) (effort to liquidate overhead recovery unenforceable since item subject to ready proof and no evidence offered of reasonable relation to actual loss).

<sup>99</sup> E.g., *Broderick Wood Prods. Co. v. United States*, 195 F.2d 433, 438 (10th Cir. 1952) (tendency of clause is to promote performance and amicably adjust in advance matters which if settled in courts would often involve difficulty, uncertainty, delay, and expense); *Knutton v. Cofield*, 273 N.C. 355, 160 S.E.2d 29 (1968) (clause regarded as liquidated damages rather than penalty enforceable even though "no actual damages are suffered"). Commentators also favor expanded use of negotiated damage clauses between professionals. See Dunbar, *Drafting the Liquidated Damage Clause—When and How*, 20 OHIO ST. L.J. 221, 231-32, 234-35 (1959); Mueller, *supra* note 9, at 838; Sweet, *supra* note 97, at 85-90, 144.

## APPENDIX

## STATISTICAL ESTIMATION OF COST FUNCTIONS

Cost functions expressing cost as a function of output can be empirically estimated from periodic cost and output data for a seller. The data in table A are actual data collected from a Virginia industry and are assumed to be Spartin's cost data. Although similar data collected from a single seller should have less variability than industry data and would be preferable, industry data are useful here for illustrative purposes.

TABLE A  
HISTORICAL COST AND OUTPUT DATA

Year	Total Sales	Total Cost
1953	\$112,000	\$ 95,000
1954	153,000	114,000
1955	174,000	139,000
1956	186,000	147,000
1957	225,000	162,000
1958	246,000	172,000
1959	277,000	214,000
1960	302,000	223,000
1961	341,000	242,000
1962	387,000	271,000
1963	405,000	302,000
1964	439,000	316,000
1965	471,000	341,000
1966	531,000	398,000
1967	587,000	467,000
1968	600,000	473,000

The shape of the cost functions is reflected by the degree of the equation which expresses the cost relationships of the seller and the coefficients of the variables in the equation. The shape of the average variable cost and average total cost functions for a particular seller will be useful in this analysis because they indicate the level of output at which the minimum average variable cost is obtained, the beginning of stage II, and the level of output at which average total cost begins to increase, the beginning of stage III.

#### A. *Statistical Model*

Average cost functions will have the typical U-shape shown in figure 1 when the total cost equation is a third degree polynomial. It is hypothesized that a third degree total cost equation will explain the variation in total cost with respect to the different levels of output for Spartin's periodic data in table A. The statistical significance (or economic importance) of the estimated coefficients for this model will test the correctness of this hypothesis.

1. *First Equation*

Assuming least squares multiple regression analysis<sup>100</sup> is the appropriate statistical method to be employed to explain the variation of cost for the different levels of output, the model to be used becomes:

$$TC = b_0 + b_1V + b_2V^2 + b_3V^3$$

where

$TC$  = total cost

$V, V^2, V^3$  = linear, quadratic, and cubic effects of dollar volume of output on total cost

$b_0$  = the fixed cost

$b_1, b_2, b_3$  = the effect on total cost of a one unit change in  $V, V^2, V^3$  respectively

Basically, least squares multiple regression analysis will fit a total cost curve to the periodic data in such a fashion that the sums of squares owing to error will be minimized. This statistical technique permits the estimation of the coefficient of multiple determination, the  $R^2$  statistic, which indicates the extent to which the variables included in the model explain the total variation in cost. The  $R^2$  statistic can be tested for statistical significance<sup>101</sup> to indicate the extent to which variations in the dependent variable (cost) are related to variations in the independent variables (volume).

Least squares analysis provides estimates of the  $b_0, b_1, b_2$  and  $b_3$  parameters which can be tested for statistical significance (or economic importance) and thereby used to determine whether the hypothesized model is the appropriate model to explain the variations in cost. Confidence intervals<sup>102</sup> around the estimates of each of the coefficients not only indicate the range within which the actual cost of producing a given level of output may vary because of error not explained by the variables in the model, but also indicate the authoritativeness of the cost estimate and determine the outside limits to remedial considerations.

<sup>100</sup> An introduction to the least squares method is contained in I J. LI, *STATISTICAL INFERENCE* 279 (1964). A more useful discussion for purposes of this study is contained in R. ANDERSON & T. BANCROFT, *STATISTICAL THEORY IN RESEARCH* 153 (1952); J. JOHNSTON, *ECONOMETRIC METHODS* 3 (1963).

<sup>101</sup> The word "significance" has a technical meaning in statistics. In general, it is used in connection with the rejection of a hypothesis. The meaning of the word significance depends on the hypothesis tested. J. JOHNSTON, *supra* note 100, at 22; I J. LI, *supra* note 100, at 210. In this analysis, "significant" and "highly significant" refer to statistical significance at the five percent and one percent levels of statistical significance respectively for the student's  $t$  test. Student's  $t$  tests of statistical significance are discussed in J. JOHNSTON, *supra* note 100, at 115; I J. LI, *supra* note 100, at 146.

<sup>102</sup> Confidence intervals reflect the degree of confidence that the estimated coefficient would be the true coefficient if the entire population were known. Confidence intervals show the confidence that one can justifiably have that the actual value is between the upper and lower confidence limits. R. ANDERSON & T. BANCROFT, *supra* note 100, at 232; J. JOHNSTON, *supra* note 100, at 115; I J. LI, *supra* note 100, at 158.

## B. Regression Results

### 1. Second Equation

The total cost equation estimated by the model in the first equation is as follows:

$$TC = 50,000 + 0.6V - (0.25 \times 10^{-6})V^2 + (0.7 \times 10^{-12})V^3$$

This regression equation explained 97.8% of the variation of the total cost data. The coefficient of multiple determination is highly significant indicating that there is a relationship between the dependent variable and the independent variables. This equation leaves only 2.2% of the variation of cost unexplained by the variables chosen.

The student's *t* test<sup>103</sup> indicated that the  $b_0$  and  $b_1$  coefficients were highly significant. The coefficient of  $b_2$  was negative and not significant. The coefficient of  $b_3$  was positive and not significant. Although the estimates of the coefficients for the  $V^2$  and  $V^3$  variables were not statistically significant, they are economically important and should be included in the total cost equation.<sup>104</sup>

### 2. Third Equation

Given the total cost equation for Spartin in the second equation the average variable cost equation becomes:

$$AVC = 0.6 - (0.25 \times 10^{-6})V + (0.7 \times 10^{-12})V^2$$

### 3. Fourth Equation

The average cost equation derived is:

$$AC = \frac{\$50,000}{V} + 0.6 - (0.25 \times 10^{-6})V + (0.7 \times 10^{-12})V^2$$

The remedial significance of these cost equations is fully discussed in the text.

<sup>103</sup> See note 101 *supra*.

<sup>104</sup> A paradoxical situation frequently arises in testing the significance of the partial regression coefficients when the independent variables are highly correlated. The regression sum of squares owing to the combined effect of two variables may be significant although the additional sum of squares owing to either of the variables alone is not significant. When this happens it is important to realize that a partial regression coefficient is the total regression coefficient of the dependent variable on an adjusted independent variable. The non-significance of both additional sums of squares indicates that if one independent variable is included in the regression equation the other is no longer needed to predict the dependent variable. This does not mean that neither of them is necessary. See 2 J. LI, *supra* note 100, at 110.

To handle this situation, there are several alternatives. When estimating the coefficients for cost functions, arguably the appropriate alternative is to include both variables when the estimated coefficients have the correct signs to give the cost equation the hypothesized U-shape. Although not statistically significant, the coefficients have important economic implications when applied to a particular firm.