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ORACLE'S ACQUISITION OF PEOPLESOFT: *U.S. V. ORACLE*

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INTRODUCTION

On June 6, 2003, the Oracle Corporation made an unsolicited cash tender offer for all the outstanding shares of PeopleSoft, Inc. Oracle and PeopleSoft are enterprise software companies that develop, manufacture, market, distribute, and service software products designed to assist businesses manage their operations. Together with SAP AG, they are the three largest companies in the industry. Oracle's total revenues in fiscal year 2004 were $10.1 billion, while PeopleSoft and SAP AG had total revenues in 2003 of $2.3 billion and $8.0 billion, respectively. As discussed in detail below, all three firms produce enterprise resource planning (ERP) software that enables companies to operate their human resources, finances, supply chains, and customer relations.

In February 2004, the U.S. Department of Justice (DOJ), together with the states of Connecticut, Hawaii, Maryland, Massachusetts, Michigan, Minnesota, New York, North Dakota, Ohio, and Texas (plaintiffs) filed suit to enjoin permanently Oracle's acquisition of PeopleSoft.[1] The case raises several interesting antitrust issues. The DOJ's case was founded on the theory that the merger would adversely affect ERP buyers because of unilateral competitive effects.[2] That is, the DOJ did not assert that the merger would lead to tacit or explicit collusion, but rather that the merger would cause the merging parties to cease competing, which would adversely affect customers for whom the two companies' products were the first and second choices (holding constant rivals' competitive strategies). In particular, the DOJ argued that buyers procured ERP

[1] The February 26, 2004 complaint and other relevant legal documents and trial exhibits are available at http://www.usdoj.gov/atr/cases/oracle.htm. Since the DOJ was the lead party among the plaintiffs, we will frequently refer to the DOJ in representing the arguments of the plaintiffs.

[2] U.S. Department of Justice & Federal Trade Commission, Horizontal Merger Guidelines (1992, rev. 1997), reprinted in 4 Trade Reg. Rep. (CCH) ¶ 13,104, at § 2.2 (hereinafter "Horizontal Merger Guidelines").

software in a manner appropriately modeled by auction theory, and the proposed merger would eliminate PeopleSoft as a bidder. As part of its analysis, one of the DOJ's experts presented a merger simulation model based on auction theory. *United States v. Oracle* represents the first case in which a merger simulation was used in court. What should be the role of merger simulations in analyzing the competitive effects of horizontal mergers? In particular, what should be the role of market definition in merger simulations of unilateral effects cases? The DOJ and Oracle also relied extensively on customer testimony in providing evidence pertaining to market definition and the likely competitive effects of the proposed merger. What should be the role of customer testimony in analyzing these two issues?

After a trial in U.S. District Court for the Northern District of California, Judge Vaughn Walker ruled on September 9, 2004 that the DOJ had not proven its case that the proposed merger would violate U.S. antitrust law. The DOJ announced on October 1, 2004, that it would not appeal Judge Walker's decision. In December 2004, PeopleSoft's Board of Directors accepted Oracle's $10.3 billion offer.

MARKET BACKGROUND: ENTERPRISE APPLICATION SOFTWARE

The proposed merger of Oracle and PeopleSoft raised concerns about software products belonging to the broad category commonly called "enterprise application software" (EAS), of which ERP is one type. These products are used to automate the performance of necessary business functions. Important segments (or "pillars") include the following: (1) "Human resources management" (HRM) software, which automates payroll services, recruiting, training, and benefits administration; (2) "Financial management systems"

(FMS) software, which automates the general ledger, accounts payable and receivable, and asset management; (3) "Supply chain management" (SCM) software, which assists in the control of inventory, manufacturing, and distribution; and (4) "Customer relations management" (CRM) software, which manages the entire life cycle of a sale, from the development of customer prospects to customer support and service. Each pillar may contain from 30 to 70 modules. Some companies sell suites containing modules from more than one pillar. Such combinations of pillars are referred to as ERP suites. Typically, an ERP suite is a collection of packaged software that integrates most of a firm's data across most of its activities. When an individual pillar is sold on a stand-alone basis, it is known as a "point solution" or "best-of-breed solution."

Businesses vary greatly in size, complexity, and the efficiency of the embedded or legacy information technology infrastructure used to support their operations. As a result, businesses vary greatly with respect to the features that they value in ERP and their willingness to pay for these features. A product that meets the requirements of one large, multinational corporation with global operations may not meet the requirements of another large, multinational corporation or the requirements of a small, single-establishment business. For these reasons, ERP software exhibits considerable product differentiation, with vendors often focusing on the requirements of specific industries (or "verticals") such as banking, healthcare, and government. Vendors also differ with respect to the types of software that they develop, with some firms focusing on off-the-shelf products that serve the requirements of smaller firms with relatively simple business operations, and with others focusing on complex, customizable software and ancillary services designed to meet the specific requirements of large, complex enterprises

(LCEs).[3] For LCEs, the fees to license and maintain ERP software are often only 10% to 15% of the total cost of ownership, which also includes the costs of personnel training, consulting, and integrating the new program with the customer's legacy software and databases.

Large firms that purchase complex, customizable software typically rely on competitive bids to procure solutions to their business requirements. Such firms identify a relatively small number of vendors that are capable of meeting their requirements, send them requests for proposals (RFPs), and engage in protracted negotiations with the vendor(s) that submit the most attractive initial responses.

THE DOJ'S CASE

Competitive Effects Theory

The DOJ began by distinguishing three categories of EAS: (1) "off-the-shelf" PC-based products suitable for many small businesses; (2) relatively inexpensive software with limited capability that must be professionally installed and maintained and is suitable for "mid-market" firms; and (3) "high-function enterprise software" required by "enterprise customers" or LCEs. High-function products support thousands of simultaneous users and tens of thousands of simultaneous transactions, integrate seamlessly across pillars (specifically, HRM and FMS modules), and are sufficiently flexible to support the unique business processes of each LCE.

[3] "Customizable software" means that the software can be configured to fit a customer's requirements. This does *not* mean that the fundamental software code is modified for a given customer. The software that Oracle, for example, sells to a large, multinational company is identical to the software it sells to a small company. "Customization" is achieved through the use of software settings that can be configured to match a customer's requirements.

Critical features of high-function enterprise software include the ability to support business operations that span (1) multiple jurisdictions with multiple currencies and languages; (2) multiple legal entities or divisions within the business; and (3) multiple lines of business. High-function enterprise software is also distinguished by (1) its total cost of ownership, which amounts to millions of dollars; (2) the relatively long period (e.g., several months) taken by customers to make a purchase decision; and (3) the difficulty in implementing the software. Enterprise customers will not consider vendors that cannot provide continuous technical support and continuous enhancements to the product's capabilities over its long life. LCEs are also unwilling to consider vendors that lack a track record of successful implementation of high-function enterprise software suites.

The typical procurement cycle of large, complex enterprises includes the following steps: the enterprise analyzes and identifies its requirements; determines the expected return on investment and prepares a budget; forms a selection committee; establishes detailed functional requirements; issues a Request for Information (RFI) to pre-screen possible vendors; issues RFPs to qualified vendors; arranges for demonstrations from three to five qualified vendors; receives bids; negotiates price and terms with two to three vendors; and then selects a final vendor.

Based on this description of the products and how they are procured, the DOJ focused on high-function products and argued that the primary rivals were Oracle, PeopleSoft, and SAP AG's United States subsidiary, SAP America Inc. Plaintiffs, thus, viewed the case as a "three-to-two" merger[4] in which:

[4] Plaintiffs' Post-Trial Brief, p. 1.

> Unlike consumer products with uniform pricing, competition in this case involves a bidding process that is separate for each customer. Copious evidence documents the fact that discounts vary considerably across customers, depending on the particular circumstances of each customer and the competition to supply each customer. Systematic analysis of Oracle's data on E-Business Suite sales and from its discount approval forms and sales representative survey reports indicates that Oracle discounts significantly more than otherwise when in competition with PeopleSoft. Because the price competition to sell high function HRM and FMS software is specific to the particular customer, the effects of the merger differ across customers according to the significance of the head-to-head competition between Oracle and PeopleSoft.[5]

Based on this analysis, the DOJ determined that buyers procured ERP software in a manner appropriately modeled by auction theory. Since the merger would eliminate PeopleSoft as an independent bidder, the DOJ argued that Oracle would be able to win post-merger procurements with higher bids.

The DOJ did not present evidence at trial regarding possible adverse welfare effects resulting from coordinated effects. However, in its post-trial brief, the DOJ briefly addressed the likelihood that the proposed merger would lead to increased prices via coordinated effects. The DOJ observed that coordination was likely given the high concentration in the relevant markets, and noted further that concentration in winner-

[5] Plaintiffs' Post-Trial Brief, p. 33.

take-all competitions for individual customers could take the form of an allocation of customers.

Market Definition

The DOJ applied standard principles of market delineation as set forth in the *Horizontal Merger Guidelines*. In particular, the DOJ defined two relevant product markets: high-function HRM and high-function FMS enterprise software. Pre-configured versions of these software modules sold to mid-market firms were excluded from the relevant market on the grounds that these versions would not meet the requirements of LCEs and, thus, would not constrain the prices charged to these customers. The relevant geographic market was defined to be the United States, based on the DOJ's claim that a hypothetical monopolist consisting of all U.S. sellers of high-function HRM or high-function FMS would find it profitable to increase prices by a small but significant and nontransitory amount. The DOJ also argued that sellers engaged in price discrimination in the relevant markets.[6] However, the DOJ did not use the price discrimination approach described in the *Horizontal Merger Guidelines* to define the relevant markets.

In support of this market definition, the DOJ's case offered several strands of evidence. Reports by independent market research firms were cited in support of the view that mid-market software is not a good substitute for high-function software and in support of the DOJ's conclusions regarding market participants. The "Big 5" consulting firms are often used by LCEs to assist in structuring and managing the procurement

[6] Price discrimination is the practice of charging different prices for similar products when the price differences do not reflect underlying differences in cost.

process for EAS.[7] The DOJ pointed to two senior executives of Big 5 firms who supported the DOJ's market definition and the list of market participants. Evidence from Oracle, including its descriptions of the industry, its customer surveys, and its plans to gain share in the "mid-market" were also cited in support of the DOJ's market definition. Evidence from PeopleSoft (a market participant) and from Microsoft (alleged to be a new entrant) was also cited in support of the view that mid-market software was unsuitable for many LCEs. Evidence from PeopleSoft's acquisition of JD Edwards, a producer of mid-market software, was also offered in support of the view that mid-market software was not a substitute for the products required by LCEs. Finally, the DOJ relied on the results of a merger simulation model that found that the proposed merger would result in price increases of 13% to 30% for high-function HRM software and 5% to 11% for FMS software.[8]

The DOJ characterized these market definitions as appropriate for identifying the main economic forces that constrain prices. The plaintiff concluded that differences in the products of Oracle, PeopleSoft, and SAP America were much smaller than the differences between these firms' products and those of other software vendors. The plaintiff considered whether mid-market software was a close substitute for high-function HRM and FMS products, and reached the conclusion that this software was outside the relevant product market. The DOJ also concluded that self-supply, legacy systems, outsourcing, Microsoft's new products, freeware, and "point solutions" were not sufficiently close substitutes to be included in the market.

[7] The Big 5 consulting firms serving enterprise software customers are Accenture, BearingPoint, Cap Gemini, Ernst & Young, and IBM Global Services.

[8] The simulation model was based on auction theory. It was developed by one of this chapter's authors (McAfee), who was retained by the DOJ to analyze the likely competitive effects of the proposed merger.

The plaintiff also analyzed "Discount Authorization Forms" produced by Oracle, and found that competition from PeopleSoft was identified 122 times as the justification offered by Oracle salespeople in their requests for authorization to provide selected discounts. SAP America, the next most cited firm, was listed only 81 times. The DOJ concluded that these data supported a product market definition limited to high-function FMS and HRM software sold to LCEs.

Market Structure

The plaintiff assigned market shares using sales data produced by Oracle, PeopleSoft, and third parties. Transactions below $500,000 were excluded on the grounds that they were likely to be for mid-market products outside the relevant market. For FMS software, total sales amounted to $114 million in 2003. PeopleSoft had a share of 32%, and Oracle had a share of 17%. SAP America, the only large rival, had a share of 39%. In addition, AMS had a market share of 10%, Microsoft a share of 2%, and SCT a share of 1%. The merger increased the Herfindahl-Hirschman Index (HHI) by 1,064 points, resulting in a post-merger HHI of 3,994.

For HRM software, total sales in 2003 were $129 million. Market shares were 51% for PeopleSoft and 18% for Oracle, with an additional 29% for SAP America, 2% for SSA, 1% for Lawson, and 0.4% for SCT. The merger increased the HHI by 1,802 points, resulting in a post-merger HHI of 5,497.

Accordingly, the DOJ argued that the market was highly concentrated, with three large firms (Oracle, PeopleSoft, and SAP America) and a small competitive fringe; in essence, the proposed transaction was a three-to-two merger. The fringe firms were

characterized as producing differentiated products that appealed to few customers, with no competitive influence beyond these customers.

Evidence on Competitive Effects

The DOJ focused on the likely unilateral effects of the proposed merger. The process of matching a LCE's unique requirements with specific features of the vendors' software could result in unique transactions with unique prices. An analysis of confidential Oracle business records indicated that vendors gained a great deal of relevant information during the competition to serve a customer. Similarly, an analysis of Oracle's business records showed that prices for the same software sold at the same time depended on factors other than cost, thus establishing the ability of vendors to price discriminate.

To quantify the anticompetitive effects of the merger, the plaintiff undertook three independent analyses using three different data sources. The three approaches taken were (1) a statistical analysis of transactions databases maintained by the merging parties; (2) price regressions; and (3) a simulation model based on auction theory.

(1) A statistical analysis of transactions data

The transactions databases showed that Oracle competed more frequently with PeopleSoft and with SAP America in the larger deals, i.e., the deals more likely to include the high-function software at issue. Also, Oracle was found to win less often when PeopleSoft was a competitor than when it was not a competitor. Similarly, PeopleSoft was found to win more often when Oracle was not a competitor. The results suggested a localized product space in which Oracle and PeopleSoft were each other's closest competitors.

(2) Price regressions

The DOJ performed a regression analysis of the price discounts offered by Oracle for its "E-Business Suite." The regression showed how Oracle's discounts varied depending on the presence or absence in a given procurement competition of PeopleSoft, JD Edwards, SAP America, Siebel, and niche producers. When PeopleSoft (or any other vendor) was present in a procurement competition, a binary (or "dummy") variable was set equal to one, and when it was absent, the dummy variable was set equal to zero. The regression was run for 37 transactions with sales greater than $500,000 (see Table 1). The coefficient for the PeopleSoft variable was 0.097. This coefficient means that Oracle offered a 9.7 percentage point greater discount in procurements in which PeopleSoft competed than Oracle's regression-weighted average discount in procurements in which PeopleSoft did not compete. The regression implies that when there are no competitors to Oracle (so that each dummy variable equals zero), Oracle's average discount off its list prices equals 62.5%, i.e., the constant term in the regression. When PeopleSoft is the only additional competitor, Oracle's discount increases on average by 9.7 percentage points (the coefficient on the dummy variable for PeopleSoft) to 72.2%. This interpretation of the regression is consistent with Judge Walker's statement that "when Oracle competes against PeopleSoft for the sale of Oracle's E-Business Suite, the consumer obtains a 9.7 [percentage point] greater discount than when Oracle competes against no one in selling the suite."[9]

However, the competitive effect of PeopleSoft's presence goes beyond this special case. The regression shows that PeopleSoft's presence increased Oracle's

[9] *United States v. Oracle*, p. 1169.

discounts by 9.7 percentage points on average compared to *all* procurements in which PeopleSoft did not compete. For example, in procurements in which Oracle competed against SAP America alone, Oracle increased its discount by a smaller amount than when it competed against both SAP America and PeopleSoft. In the later case, Oracle's total discount equals the coefficient on the PeopleSoft variable (9.7 percentage points) plus the coefficient on the SAP America variable (9.7 percentage points) plus the coefficient on the constant term (62.5 percentage points), for a total discount of 81.9 percent. Thus, the regression is not limited to quantifying only the additional discount offered by Oracle when it competes against PeopleSoft compared to the discount Oracle offers when it competes against no one in selling the suite.[10]

[10] The more general interpretation of the regression results appears to have been missed in subsequent comments on the Oracle case. Coleman (2005) incorrectly concludes that "one of the DOJ's expert witnesses, provided estimates of the differences in Oracle's discounts when PeopleSoft was present versus when *no* competitors were present and showed that discounts were higher with PeopleSoft than with no competitors. . . . [T]his finding does not provide information as to whether the competition between PeopleSoft and Oracle was unique because it does not show that discounts were higher than when other competitors were present."

Table 1

Dependent Variable: Percentage Price Discount on Oracle's E-Business Suite (standard errors in parentheses) [p values in square brackets]	
PeopleSoft	0.097 (0.049) [0.056]
JD Edwards	0.071 (0.058) [0.228]
SAP America	0.097 (0.074) [0.197]
Siebel	0.030 (0.051) [0.561]
Niche	-0.052 (0.044) [0.248]
$500k < Deal < $1M	-0.015 (0.043) [0.723]
Constant	0.625 (0.040) [<.001]
R^2	0.287
N	37

3. Merger simulation model

The price effects of a merger can be measured quantitatively through a merger simulation (Werden, 2005). A simulation uses data from the market, e.g., prices and quantities, to calibrate an economic model of competitor interaction. Once calibrated, the model can give quantitative estimates of important economic parameters; in particular, a properly developed model yields parameters that describe the level of prices in the market depending on the number of competitors. One can then simulate the price effects of a

merger by removing one competitor and then predicting post-merger price levels using the original parameters from the model.

Because market data are used to estimate an underlying economic model, the estimated effects of a merger depend upon the model chosen to represent the market. Although there a number of alternative models, three canonical economic models are primarily used in merger simulations: Bertrand, Cournot, and auctions. Each model uses a different set of rules that describes the choices available to firms. In a Bertrand model, typically used for markets in which firms sell differentiated products, competitors simultaneously choose prices such that those prices maximize their profits given the prices chosen by all other firms. A Bertrand equilibrium exists when no firm can increase its profits by changing its price. In a Cournot model, typically used for markets in which firms sell homogeneous products, firms simultaneously choose quantities such that those quantities maximize their profits given the quantity choices of all other firms. A Cournot equilibrium exists when no firm can increase its profits by changing its output. There are several types of auctions. In a merger context, auctions generally take the form of a procurement auction in which firms compete by offering to supply a product, with the lowest bid winning the auction.

In a Bertrand model, a firm's price depends on the demand elasticity that firm faces.[11] The more inelastic the demand, the higher will be its markup. A merger simulation analyzes consumers' substitution patterns between firms to predict the demand elasticity that the combined firm would face, and hence predict its post-merger prices. With Cournot, a firm's price is a function of the market demand elasticity and the firm's

[11] Specifically, a firm's "price-cost margin" (price minus marginal cost, all divided by price) equals the inverse of the demand elasticity for its product.

market share, with a higher market share implying a higher price.[12] A simulation based on the Cournot model estimates the market elasticity of demand and uses it with post-merger market shares to predict prices. Finally, with an auction model, while the prices in some particular auctions may not change as a result of a merger (which can occur when the merging firms' products are not the buyer's first and second choices), the reduced number of suppliers can increase the winning bid. As described below, an auction model was used in the merger simulations in the Oracle case.

Merger simulation uses standard economic tools and, properly applied, is firmly grounded on the facts of the relevant market. As such, it avoids problems associated with descriptive analyses based on an expert's intuition. It also can avoid the often difficult issue of market delineation required by a traditional merger analysis (see discussion below). While a merger simulation requires decisions about which products to include, the relevant elasticities will still account for any competitive effects associated with products excluded from the analysis. Merger simulation, however, is dependent on the appropriateness of the underlying economic model. Indeed, since no model perfectly describes a market, picking the correct model involves evaluating the salient features of the market, matching them to a model, and then testing the model against the data.

The merger simulation model used by the DOJ was based on an English auction (i.e., an ascending-price, open-outcry auction) model because that model allows for the presence of multiple bidders and multiple rounds. The analysis used a complete information model in which each software vendor knew the value that the buyer placed on each vendor's product. In this model, a buyer's valuation of the i^{th} competitor's

[12] With Cournot, the price-cost margin equals the firm's market share divided by the market elasticity of demand.

software product was assumed to be V^{α_i} where $\alpha_i > 0$, and V was assumed to be uniformly distributed over [0,1]. Given α_i for all competitors, the relative probability that each competitor will win can be calculated. Alternatively, given market shares, the relative values of the α_i can be calculated.

The merger simulation used the market shares mentioned above to calculate the relative values of the α_i. The simulation depended in part on an assumption regarding how much of the value of a software product accrues to the buyer and how much accrues to the seller in the form of the sales price to obtain the absolute values of the α_i. The DOJ used a range of values for this parameter, from 50% of the value accruing to the buyer to 90% of the value accruing to the buyer. The merger simulation based on the estimated parameters showed that the price of FMS software in deals greater than or equal to $500,000 likely would increase by 5% (using the 50% accrual assumption) to 11% (using the 90% accrual assumption). According to the simulation, the price of HRM software in such deals likely would increase by 13% (using the 50% accrual assumption) to 28% (using the 90% accrual assumption).

ORACLE'S ARGUMENTS

Market Definition

Oracle's defense identified demand and supply factors that constrained the prices of the products at issue. Oracle argued that the markets defined by the DOJ were too narrow in both their geographic and product dimensions. For geographic markets, the defendant applied the Elzinga-Hogarty (1973) test to PeopleSoft's data on sales of FMS and HRM software to non-North American customers and to SAP America's sales of the relevant

products to North American customers. The test is based on the physical flow of products between regions, using two measures of a region's openness: LIFO (little in from outside) and LOFI (little out from inside), which are defined as follows:

$$LIFO = \frac{\text{local consumption from local supply}}{\text{all local consumption}},$$

$$LOFI = \frac{\text{local consumption from local supply}}{\text{all local supply}}.$$

Elzinga and Hogarty suggest that a given region constitutes a geographic market if both ratios exceed 75% or if the average of the two ratios exceeds 90%. Based on this test and other evidence, Oracle argued for a worldwide market. Oracle also cited a European Commission decision regarding the proposed acquisition that found the relevant geographic markets for high-function FMS and HMR were worldwide (European Commission 2004, para. 179).

Oracle criticized the DOJ's product market definition for lacking precision and for appearing to work backwards with the aim of limiting the market to customers of Oracle, PeopleSoft, and SAP America. The defendant claimed that many of these customers were not similarly situated, and that the DOJ's market definition did not account for important forces that constrained price. Among these forces were incumbent or legacy systems, outsourcing, and other firms such as AMS and Lawson that had been excluded by the DOJ. Oracle provided examples of LCEs that utilized each of these alternatives.

The defendant also took issue with the DOJ claim that sellers in the relevant markets engaged in price discrimination. Oracle argued that buyers were large, sophisticated customers who would not let vendors gain the critical information

necessary to implement profitable price discrimination. In support of these arguments, Oracle's expert cited research showing that a monopolist must correctly guess customers' willingness to pay more than 90% of the time in order for price discrimination to be profitable (Hausman, Leonard, and Vellturo 1996).

Oracle did not attempt to define the relevant product markets, instead arguing that the DOJ's definition was incorrect and that the properly defined product market would have been broader than the market defined by the DOJ.

Theory and Evidence on Competitive Effects

Oracle observed that, in a large majority of cases, customers chose to limit the number of competitors in the final round of the procurement cycle to one or two firms, and thus the perceived lack of competition (even before the merger) was only apparent. For the purpose of negotiating the final contracts, customers possessed sufficient buyer power to ensure that they obtained lower prices, and additional negotiations with a second or third vendor might not provide any additional benefit. Accordingly, bargaining theory, rather than auction theory, provided the appropriate framework for analyzing likely competitive effects of the proposed merger. Bargaining theory is based on the work of Nobel prize winner John Nash (1950 and 1953), who showed that under reasonable conditions two parties with equal bargaining power will negotiate an outcome in which each player gets half the total incremental gains from cooperation to both players. This outcome maximizes the product of the gains accruing to the two parties from their deal.

Oracle asserted that the negotiations in question did not resemble English auctions in any important manner. In a large majority of the deals, buyers reduced the number of

potential suppliers to one or two. Because an auctioneer would not so limit the number of bidders, Oracle concluded that the buyers used their bargaining power and their value as reference customers, rather than an auction, to obtain low prices. Oracle noted that variation in prices, terms, and conditions among customers may reflect differences in negotiating skills and other related factors (such as whether the negotiation occurred at the end of a quarter or year).

With respect to the DOJ's regressions, Oracle noted that the coefficient for SAP America was the same as the coefficient for PeopleSoft, and concluded that the regression provided no support for the claim that PeopleSoft was a closer competitor to Oracle than was SAP America. Defendant's use of the regression suggested that Oracle and PeopleSoft did not constitute a "localized node" in product space. Oracle also argued that the DOJ's regression was improperly specified because it did not control for the number of competitors present in each competition.

Oracle ran an alternative regression that included dummy variables for PeopleSoft, JD Edwards, and SAP America, and additional dummy variables for one competitor to Oracle in a given procurement (i.e., two competitors in total), two competitors to Oracle, and three competitors to Oracle (see Table 2). Oracle observed that SAP America and PeopleSoft continued to have very similar effects on Oracle's discounts, i.e., their regression coefficients were similar. The DOJ responded that Oracle's regression was unreliable because the dummy variables for the number of competitors to Oracle were highly correlated with the dummy variables for the individual firms. Indeed, when the dummy variables for Siebel and niche competitors were

included in Oracle's regression, the dummy variables formed a linear combination and the regression could not be estimated.

Table 2

Dependent Variable: Percentage Price Discount on Oracle's E-Business Suite (standard errors in parentheses) [p values in square brackets]	
PeopleSoft	0.1015 (0.0542) [0.0714]
JD Edwards	0.0575 (0.0789) [0.4718]
SAP America	0.0975 (0.0812) [0.2396]
1 Competitor	-0.0086 (0.0544) [0.8762]
2 Competitor	-0.0471 (0.0666) [0.4851]
3 Competitor	0.0241 (0.1404) [0.8648]
$500k < Deal < $1M	-0.0098 (0.0436) [0.8235]
Constant	0.6238 (0.0469) [<.0001]
R^2	0.2695
Root MSE	0.1204
N	37

Oracle also criticized the plaintiffs' use of customer declarations, claiming that they were subject to "selection" bias—the declarations were not from a random sample of Oracle's customers, but rather from a sample selected to help make the prosecution's

case. Oracle also clamed that by redesigning their products to be more attractive to the industries and customers that (hypothetically) would face increased prices after the merger, firms such as SAP America and Lawson would defeat any price increase imposed by the merged firm.

Finally, the defendant argued that it was not enough for the DOJ to establish that the proposed transaction was a three-to-two merger. In Oracle's view, the plaintiffs had to establish that the merged firm would have dominance given the differentiated nature of the relevant products, and the plaintiffs had failed to do so.

Efficiencies

The defendant noted that in hostile acquisitions the acquiring company cannot perform detailed analyses of synergies. Oracle argued, however, that the merger would give rise to significant reductions in sales and marketing costs. Since these costs are variable, the savings would have a significant effect in disciplining prices after the merger.

JUDGE WALKER'S DECISION

Judge Walker ruled against the plaintiffs and in favor of defendant Oracle. His fundamental conclusion was as follows:

> The court finds that the plaintiffs have wholly failed to prove the fundamental aspect of a unilateral effects case—they have failed to show a "node" or an area of localized competition between Oracle and PeopleSoft. In other words, plaintiffs have failed to prove that there are a significant number of customers (the "node") who regard Oracle and PeopleSoft as

> their first and second choices. If plaintiffs had made such a showing, then the court could analyze the potential for exercise of monopoly power over this "node" by a post-merger Oracle or the ability of SAP or Lawson to reposition itself within the node in order to constrain such an exercise of monopoly power.

Market Definition

In his decision, Judge Walker noted that high-function enterprise software, as defined by the plaintiffs, had no recognized meaning in the industry.[13] He concluded that there was no bright-line test to separate "large" customers from "mid-market customers," and he found that plaintiffs had not established that ERP vendors distinguished among these customers based on the amount they spent in an ERP purchase. Judge Walker summarized the characteristics of products sold by Oracle, PeopleSoft, and SAP America, Lawson, AMS, Microsoft, and best-of-breed vendors, as well as outsourcing services offered by firms such as Accenture and ADP, and found that the products were differentiated.

The judge noted that the plaintiffs' case relied on customer witnesses, system integrator and industry witnesses, and their economic experts. The judge concluded that the testimony of the customer witnesses was largely unhelpful in defining markets for high-function HRM and FMS software because the customers offered little, if any, testimony on what they would do if Oracle increased prices post-merger. The judge concluded:

[13] *United States v. Oracle*, p. 1102.

> There was little, if any, testimony by these [company] witnesses about what they would or could do or not do to avoid a price increase from a post-merger Oracle. To be sure, each testified, with a kind of rote, that they would have no choice but to accept a ten percent price increase by a merged Oracle/PeopleSoft. But none gave testimony about the cost of alternatives to the hypothetical price increase a post-merger Oracle would charge: e.g., how much outsourcing would actually cost, or how much it would cost to adapt other vendors' products to the same functionality that the Oracle and PeopleSoft products afford.[14]

In contrast, the judge found the testimony of Oracle's customer witnesses more useful, since it was concrete and described specific actions that would be taken if prices were raised.

The judge found that the DOJ's market concentration statistics suffered from several shortcomings. First, the DOJ based its calculations on all transactions greater than $500,000. The judge concluded that the sample of transactions considered was too small and that no attempt was made to separate the HRM and FMS sales from the bundles in which they were sold.

The judge noted that the DOJ stated that there was no "quantitative metric" that could be used to identify high-function products, yet the DOJ concluded that there was "something different" about the products at issue. The judge concluded that plaintiffs had not proven that the relevant product market was limited to high-function FMS and HRM software. He determined that products provided by outsourcing firms, mid-market

[14] *United States v. Oracle*, p. 1131.

vendors such as Lawson and AMS, Microsoft (in conjunction with BearingPoint), and best-of-breed solutions could not be excluded from the relevant product market. The judge also found that legacy FMS and HRM systems (i.e., systems that a customer had in place prior to acquiring new systems) should be excluded from the relevant product market. With respect to the geographic market, the judge found that the Elzinga-Hogarty test was a valid method for establishing the geographic extent of the market, and determined that the test (as applied by the defendant) supported a worldwide market for the products in question. Given his findings regarding the relevant product and geographic markets, the judge concluded that the market share and concentration statistics presented by the DOJ were inapplicable to the antitrust analysis of the proposed transaction.

Competitive Effects

The judge observed that there is little case law on the analysis of the unilateral effects of a merger. The judge cited the *Horizontal Merger Guidelines* for a discussion of the "necessary elements of a unilateral effects claim involving differentiated products under section 7."[15] The Guidelines state that two conditions must be shown for a finding of significant unilateral effects in a differentiated products merger:

> Substantial unilateral price elevation in a market for differentiated products requires that there be a significant share of sales in the market accounted for by consumers who regard the products of the merging firms as their first and second choices, and that repositioning of the non-parties'

[15] *United States v. Oracle*, p. 1117.

> product lines to replace the localized competition lost through the merger be unlikely. The price rise will be greater the closer substitutes are the products of the merging firms, i.e., the more the buyers of one product consider the other product to be their next choice.[16]

The judge found this discussion incomplete because it emphasized the relative closeness of buyers' first and second choices, and not the relative closeness of other alternatives in the market. He proposed four factors that would together constitute a differentiated products unilateral effects claim: (1) the products of the merging firms must be differentiated; (2) they must be close substitutes; (3) other products must be sufficiently different from the merging firms' products that a merger would make a small but significant and nontransitory increase in price (SSNIP) profitable; and (4) product repositioning by non-merging firms must be unlikely. Of critical importance in the case, the judge elaborated on these conditions, stating as follows: "In a unilateral effects case, a plaintiff is attempting to prove that the merging parties could unilaterally increase prices. Accordingly, a plaintiff must demonstrate that the merging parties would enjoy a post-merger monopoly or dominant position, at least in a 'localized competition' space."[17]

Against this conceptual background, the judge found that plaintiffs failed to establish the existence of a "node" or area of localized competition between Oracle and PeopleSoft. Specifically, plaintiffs had not established that a significant number of customers (the node) regarded Oracle and PeopleSoft as their first and second choices. Judge Walker criticized the plaintiffs for failing to use "thorough econometric techniques

[16] Horizontal Merger Guidelines, at § 2.21.

[17] *United States v. Oracle*, p. 1118.

such as diversion ratios showing recapture effects" that might have met his four-prong test for unilateral effects.

The judge also commented on the three competitive effects analyses of the DOJ. In evaluating the plaintiff's analysis of Oracle's Discount Authorization Forms and regression analysis, which indicated that competition from PeopleSoft often resulted in larger Oracle price discounts, the judge noted that this evidence was offered in isolation and was not compared to similar information from PeopleSoft and SAP America Discount Authorization Forms. He concluded that the analysis established only that Oracle and PeopleSoft often competed vigorously with each other. The analysis did not establish that this competition was any more intense than that between Oracle and SAP America or between PeopleSoft and SAP America. As such, Judge Walker concluded that the analysis did not establish the necessary node or localized competition space.[18] The judge concluded that the DOJ's merger simulation model based on English auctions was unreliable because it was based on unreliable market shares, as he had previously determined in his analysis of the DOJ's proposed market definition.

Finally, the judge noted that the plaintiffs presented no evidence at trial regarding coordinated effects, yet they included a section on coordinated effects in their post-trial brief. He noted that coordination would be difficult because the products were highly differentiated and because the market lacked price transparency. Given the absence of any evidence in the record regarding tacit market division, the judge concluded that the allegations of coordinated effects were without merit.

[18] *United States v. Oracle*, p. 1169.

Efficiencies

The judge found that Oracle had not presented sufficient evidence to substantiate and verify its estimate of merger-specific efficiencies.

CONCLUSIONS AND AFTERMATH

There are two important points of disagreement between the DOJ's position and the judge's decision. First, plaintiffs disagreed with the decision on the required elements of a unilateral effects case in a merger involving differentiated products. Plaintiffs argued, as set forth in the *Horizontal Merger Guidelines*, that two conditions must be met: "Substantial unilateral price elevation in a market for differentiated products requires that there be [1] a significant share of sales in the market accounted for by consumers who regard the products of the merging firms as their first and second choices, and that [2] repositioning of the non-parties' product lines to replace the localized competition lost through the merger be unlikely."[19]

In contrast, the judge concluded that four elements were required to make such a showing: (1) the products of the merging firms must be differentiated; (2) they must be close substitutes; (3) other products must be sufficiently different from the merging firms' products that a merger would make a SSNIP profitable; and (4) product repositioning by non-merging firms must be unlikely. In addition, Judge Walker concluded that in order to "prevail on a differentiated products unilateral effects claim, a

[19] Horizontal Merger Guidelines, at § 2.21.

plaintiff must prove a relevant market in which the merging parties would have essentially a monopoly or dominant position."[20]

The judge's characterization of the likely competitive effects of mergers in differentiated products markets has been criticized by a number of economists. They have argued that the judge's conclusion that "a plaintiff must prove a relevant market in which the merging parties would have essentially a monopoly or dominant position" is incorrect in the context of standard analyses of differentiated products mergers. As Werden (2006) comments: "For a merger to produce significant price increases, the merging brands must be next-closest substitutes from the perspective of a significant number of individual customers. But when viewed from the perspective of all customers collectively, the merging brands need not be especially close substitutes." Thus, the merging parties need not have "essentially a monopoly or dominant position" in order to find it profitable to impose a SSNIP in a differentiated products market. Shapiro (2005, p. 15) comments that the judge "appears to be taking a Section 2 notion of market power, namely monopoly power or dominance, and porting that over to a Section 7 context. Economists recognize, however, that market power is a matter of degree; there are weaker versions of market power than monopoly power. [The judge] is conflating the two."

Moreover, if the judge's third condition above were satisfied (i.e., if the merging firms would profitably implement a SSNIP), then, by the smallest market principle,[21] the

[20] *United States v. Oracle*, p. 1123.

[21] Horizontal Merger Guidelines, at § 1.11. Market definition begins by defining relatively narrow product and geographic markets and expanding those until a small but significant and nontransitory price increase becomes profitable. The smallest market principle is that the relevant market is generally defined to be the smallest product and geographic markets for which the price increase becomes profitable.

products of the merging firms would be a separate antitrust market, and the combined firm would have a monopoly in the "localized competition" space of interest, as well as a dominant position in a relevant market. The additional conditions specified by the judge for determining a post-merger monopoly or dominant position would then be redundant. Under the conditions specified by Judge Walker, the combination would be a merger to monopoly, the *primae facie* case for banning the merger would be met, and any additional analysis of unilateral effects apparently would be unnecessary.

Second, the plaintiffs disagreed with the decision on how the presence of price discrimination affects the analysis of unilateral effects. Plaintiffs viewed the case as a "three-to-two" merger[22] in which "competition in this case involves a bidding process that is separate for each customer. . . . Because the price competition to sell high function HRM and FMS software is specific to the particular customer, the effects of the merger differ across customers according to the significance of the head-to-head competition between Oracle and PeopleSoft."[23] Thus, according to the plaintiffs' position, each procurement was, from an economic perspective, an auction in which the price was set independently of other such auctions, in large part because arbitrage is impossible. The logical conclusion of this analysis is that each procurement contest or auction constitutes a separate market.

In contrast, the judge focused on the product differentiation aspect of the merger and criticized plaintiffs for failing to use "thorough econometric techniques such as diversion ratios showing recapture effects" that might have met his test for finding unilateral effects. However, in the context of independent auctions, the anticompetitive

[22] Plaintiffs' Post-Trial Brief, p. 1.

[23] Plaintiffs' Post-Trial Brief, p. 33.

effects of a proposed merger could occur regardless of the diversion ratios between different products. The diversion ratio measures the fraction of sales lost by one product when its price (to all customers) rises that is subsequently recaptured by a second product, holding the price (to all customers) of the second product constant. In a price-discrimination market where "the price competition . . . is specific to the particular customer," the merged firm can increase prices to individual customers by different amounts. In markets with such individualized pricing, the diversion ratio, which assumes prices are increased to all buyers, plays no role.

An interesting aspect of the Oracle case is its implication for the role of market definition in future unilateral effects cases. Economic analyses of the competitive effects of mergers in unilateral effects cases can rely, as in the Oracle case, on simulations. As noted by Walker (2005) and Werden (2005), in principle merger simulations do not require that relevant antitrust markets be delineated. Indeed, in his opinion, Judge Walker stated: "Merger simulation models may allow more precise estimations of likely competitive effects and eliminate the need to, or lessen the impact of, the arbitrariness inherent in defining the relevant market."[24]

However in practice, merger simulations often are calibrated to real markets, which can require (1) the identification of all relevant competitors and (2) their market shares, both of which require a delineation of the relevant market. As Budzinski and Christiansen (2007, pp. 155-156) conclude: "In practice, the 'inherently arbitrary' task of delineating the relevant markets cannot automatically be avoided by the implementation of merger simulation models. Ironically, the court [in *United States v. Oracle*] rejected

[24] *United States v. Oracle*, p. 1122.

the simulation model exactly because [the court found] it did not consider all relevant competitors and failed to include all the relevant products—in other words, the results of the simulation model were rejected because of a precedent inadequate market delineation." Thus, although in principle merger simulations reduce or eliminate the necessity to delineate relevant antitrust markets, the practical application of those methods appears to necessitate at least some consideration of relevant antitrust markets.

With respect to the role of customer testimony, the lesson of *Oracle* is that such testimony should be as detailed as possible on the subject of actions that customers likely would take in response to price increases. Customer testimony can be an effective complement to economic analysis. However, as Heyer (2007) observes, customers of merging firms may choose to be "rationally ignorant"—it may not be rational for customers to become knowledgeable about the ways in which the merger might harm them in the future given the costs and benefits of acquiring that information. Also the economic incentives of direct purchasers, who may be manufacturers or distributors, may differ from those of final consumers. Moreover, customers may be reticent to state their views publicly since that could result in the disclosure of confidential business information.

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