Appendix I: Interview Items

The items listed below do not constitute an exhaustive list of the questions asked during the field work, but provide a sense of how the statements reported in the text were elicited.

Internal Organization Tell me what's involved with monitoring. Have you done it for other companies than [Firm X]? How are clinical monitors recruited and trained? How are monitors evaluated? How is their job performance tracked? Is monitor turnover an issue for your firm? Is this turnover internal (i.e. promotion), or external? How much therapeutic specialization is there for monitors? What kind of incentives do you provide to monitors? What are possible promotion paths for in-house monitors? How many monitors are working here? Are they permanent employees? Are there also temps, or contract monitors? How is project management organized? Who are the project managers? What are their background?

Interfirm Contracts Why do you outsource? Is there a firm-wide outsourcing policy or is the decision taken on a project-specific basis? Who owns the data? Who owns the molecule? How did outsourcing start in your company? How long ago? What was the initial event that triggered adoption of outsourcing? What services exactly are being outsourced? How are CROs/Central Labs selected? How important is therapeutic expertise? How are contracts drafted? How has it changed over time? Are the incentives built in the contracts for speed, quality, or both? Could you walk me through the financial negotiation with a CRO/Central Lab? Is price the most determinant characteristic of a bid? How many bids are received on average? When you deal with a CRO/Central Lab repeatedly and are happy about their performance, do you expect them to give you a lower price?

Buyer-Supplier Interactions How many CROs/Central Labs is your company dealing with? How frequent is repeat business with CROs? With Central Labs? Why? Do you ever hang out with your counterparts at the CRO/Central Lab after work? How are CROs/Central Labs monitored and evaluated? How does one deal with changes and renegotiation as the trial proceeds? Who makes the determination of whether the CRO or [Firm X] must pay for scope changes?

Relationship Outcomes Do you have Preferred Provider Agreements? How easy/hard is it to have long-term "hand-in-glove" relationships with CROs/Central Labs? Why? What are the benefits of such relationships? What are the drawbacks? Do CROs/Central Labs have reputations? How do you learn about the quality of different CROs?

Appendix II: Indices of Spending Concentration

We cross-check the field evidence pertaining to supplier churn with quantitative evidence stemming from a sample of CRO contracts made available by the research firm FastTrack, Inc. The sample contains information on 1,423 CRO contracts awarded by 61 pharmaceutical sponsors. The firms whose projects are sampled account for 26 out of the Top 30 firms, and 33 out of the Top 50 firms, where the rankings reflect R&D spending listed in annual reports to shareholders in the year 2000. While we do not have access to the frame used to sample the projects for each supplier, these data were widely used for benchmarking purposes in the industry at the time of our study, and we have no reason to believe that sampled projects differ systematically from non-sampled projects.

Following Uzzi (1996), we start by computing a Herfindahl index of spending concentration. The dollar share of each CRO supplier in the portfolio of a given Pharma buyer is computed, and the index is obtained by summing the squares of these shares, yielding a number between 0 and 1. The mean Herfindahl index is 0.34 (the distribution is graphed in Figure A1). According to this traditional measure, on average pharmaceutical firms maintain a network of exchange partners equivalent to the structure that would obtain were they to split their spending equally across three CROs.

At first blush, the Herfindahl measures might imply quite a high degree of concentration, which is at odds with the field evidence. However, this index suffers from two serious shortcomings. First, for a number of pharmaceutical companies in the samples, there are relatively few observed projects. This fact makes it difficult to distinguish "true" spending concentration (as a feature of sponsors' supplier choices) from lack of actual variation due to insufficient opportunity to observe contracts for a large number of clinical projects. Buyers who perform only a few projects will tend to exhibit high values of the Herfindahl, but that is not necessarily indicative of genuinely high concentration. Second, we may want to assess the degree to which a system exhibits "excess" density relative to some benchmark. A natural benchmark is the spending concentration that would obtain if buyers distributed their spending across suppliers according to the distribution of suppliers' market shares.

To address these issues, we use an alternative index based upon the innovative work of Ellison and Glaeser (1997). These authors derive a geography-based index of industrial concentration from a discrete choice model of location, taking into account the fact that industries vary in the size distribution of plants. Their framework can be mapped precisely onto the evaluation of spending concentration across suppliers: Each supplier choice is analogous to a plant location decision with the baseline probabilities being determined by the relative market share of the different suppliers. By observing the same pharmaceutical firm making multiple choices of suppliers, we are able to estimate the spending concentration level for each firm. The index for supplier i, γ_i, is constructed as follows:

$$\gamma_i = \frac{\sum_{s=1}^{S}(SHARE_{is} - x_s)^2 - (1 - \sum_{s=1}^{S} x_s^2)^2 \sum_{j=1}^{J_i} z_{ij}^2}{(1 - \sum_{s=1}^{S} x_s^2)(1 - \sum_{j=1}^{J_i} z_{ij}^2)}$$

where i indexes buyers, s indexes suppliers, j indexes projects, $SHARE_{is}$ measures the share of company i's contract volume allocated to supplier s, x_s measures supplier s's market share, and z_{ij} denotes the dollar share of project j in buyer i's portfolio (who performs a total of J_i projects). The mean γ_i for the sample of CRO contracts is 0.059 with a standard deviation of 0.086; essentially, the distribution is a spike near or at 0 (see Figure A2). When corrected for "fewness," spending by pharmaceutical firms in drug development appears just as concentrated as what one would expect were these companies to sprinkle their spending according to the distribution of CRO market shares.

References

Ellison, Glenn, and Edward Glaeser
1997 "Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach." Journal of Political Economy, 105: 889-927.

Uzzi, Brian
1996 "The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect." American Sociological Review, 61: 674-698.

Figure A1
Herfindahl Index of Spending Concentration

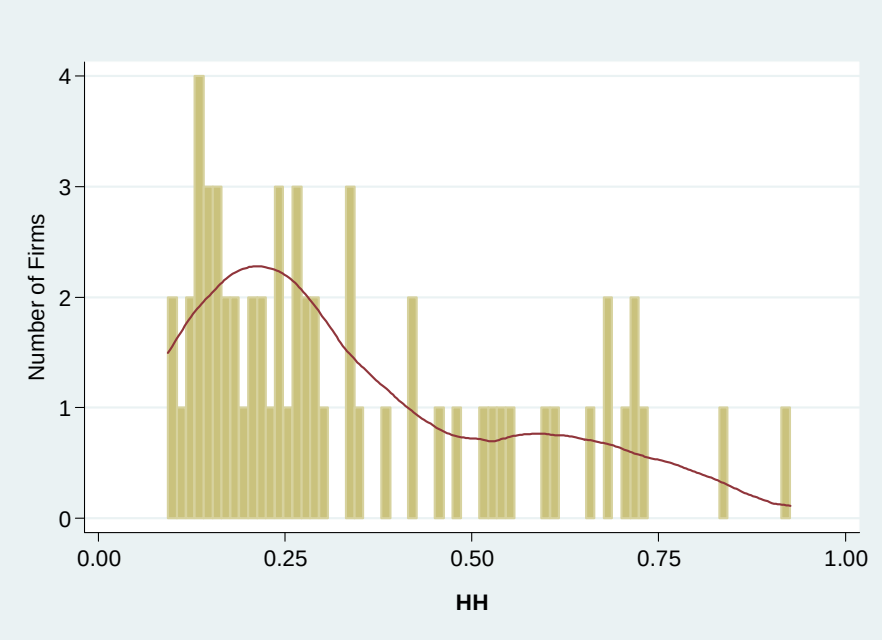

Figure A2
Ellison-Glaeser Index of Spending Concentration