Research question

- Are relation specific investments determinants of the contract length (duration) between coal suppliers (mines) and electric utilities (downstream buyers of upstream mines)?
- Assumption: Risk aversion is not an important determinant of the structure of vertical relationships in this industry
Terms Defined

- **Risk Aversion**: A description of an investor who, when faced with two investments with a similar expected return (but different risks), will prefer the one with the lower risk.

- **Spot Market**: A commodities or securities market in which goods are sold for cash and delivered immediately.
**Contract Duration**: The length of time to which the parties agree *ex ante* (before the event) to abide by the terms of a contract.

**Transaction Cost**: A cost incurred in making an economic exchange.
Three types of transaction-specific investments

- A) Site Specificity
- B) Physical Asset Specificity
- C) Dedicated Assets

These types of transaction-specific investments influence the duration of the contract.
Site Specificity

- Site Specificity: The buyer and seller are in a “cheek-by-jowl” investment relationship with one another to minimize inventory. Once sited the assets are highly immobile.
- This type of transaction-specific investment is especially vulnerable to ex post opportunism, therefore long term contracts are a necessity.
Physical Asset Specificity

- Physical Asset specificity: When one or both parties to the transaction make investments in equipment and machinery that involves design characteristics specific to the transaction which have lower values in alternative uses.
- Ex post opportunism problems are related to coal quality, least cost supply technology and transportation alternatives.
East versus West

- East
  - Homogeneous coal quality
  - Many small underground mining operations
  - Small transport distances

- West
  - Heterogeneous coal quality
  - Large mining operations
  - Large transport distances

Long duration contracts are preferable in the west versus short contracts in the east.
Dedicated Assets

- Dedicated assets: General investments by a supplier that would not otherwise be made but for the prospect of selling a significant amount of the product to a particular customer.
- Contract Duration depends on the quantity contracted for. The greater the quantity the longer the contract will be.
Williamson (1983)’s variables of interest in coal-utility vertical relationships:

- Site specificity
- Physical asset specificity
- Dedicated assets
- Human asset specificity

Left hand side:
Contract duration = time agreed ex-ante to abide btw parties

Variables defined as RHS determinants of contract length fro the empirical analysis:
- Mine mouth
- Regional dummy
- Annual quantity
Location of coal in US

Source: Blake Shurtz, April 2008 email
### Table 3: Contract Duration

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>277 Sample</th>
<th>169 Sample</th>
<th>2SLS Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOG-DURATION (1)</td>
<td>LOG-DURATION (2)</td>
<td>LOG-DURATION (3)</td>
</tr>
<tr>
<td>QUANTITY</td>
<td>0.4289 (0.0573)</td>
<td>0.4091 (0.0040)</td>
<td>0.4091 (0.0040)</td>
</tr>
<tr>
<td>QUANTITY-SQUARED</td>
<td>0.0024 (0.00030)</td>
<td>0.0020 (0.00030)</td>
<td>0.0020 (0.00030)</td>
</tr>
<tr>
<td>LOG-QUANTITY</td>
<td>4.4206 (0.3742)</td>
<td>4.2080 (0.4069)</td>
<td>4.2080 (0.4069)</td>
</tr>
<tr>
<td>MINE-MOUTH</td>
<td>0.5057 (0.0425)</td>
<td>0.4942 (0.0453)</td>
<td>0.4942 (0.0453)</td>
</tr>
<tr>
<td>MIDWEST</td>
<td>15.9583 (1.9106)</td>
<td>16.3532 (1.9426)</td>
<td>16.3532 (1.9426)</td>
</tr>
<tr>
<td>WEST</td>
<td>1.5104 (2.0279)</td>
<td>1.6216 (2.0570)</td>
<td>1.6216 (2.0570)</td>
</tr>
<tr>
<td>PLANT PROPORTION</td>
<td>5.9856 (1.2346)</td>
<td>5.6456 (1.3406)</td>
<td>5.6456 (1.3406)</td>
</tr>
<tr>
<td>UTILITY PROPORTION</td>
<td>5.6108 (1.2586)</td>
<td>5.6391 (1.2751)</td>
<td>5.6391 (1.2751)</td>
</tr>
<tr>
<td>PLANT/UTILITY</td>
<td>0.6142 (0.1323)</td>
<td>0.6544 (0.1401)</td>
<td>0.6544 (0.1401)</td>
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<tr>
<td>Constant</td>
<td>3.9134 (0.8109)</td>
<td>3.9134 (0.8109)</td>
<td>3.9134 (0.8109)</td>
</tr>
<tr>
<td>Corrected R-squared</td>
<td>0.61</td>
<td>0.60</td>
<td>0.60</td>
</tr>
<tr>
<td>Observations</td>
<td>277</td>
<td>277</td>
<td>277</td>
</tr>
</tbody>
</table>

* OLS estimates. Standard errors of coefficient estimates are shown in parentheses.
Data

- Cross-section for year 1979
- 277 observations of coal vertical contracts
- Cross-sectional variation in contract length in the data:
  - 15% vertically integrated mines and utilities
  - 15% spot market transactions
  - 70% contracts with length between 1 and 5 years
Table 3 Analysis

**OLS Estimates (Table 3):**

- A Mine mouth plant has contract length predicted to be 16 years longer than those contracts of other plants.
- Regional location matters, and east coast contracts have 3-5 years shorter duration than west and mid west.
- If Annual quantity contracted increases by an extra 1 million tons, it leads to a 13 year increase in contract duration.

- This shows evidence that there exists quasi-rents associated with asset specificity, site specificity, etc in transactions between coal mines and utilities, and more for coal mines and mine mouth power plants (site specific).
Conclusion

• The results provide strong support for the view that buyers and sellers make longer commitments to the terms of future trade at the contract execution stage, and rely less on repeated bargaining, when relationship-specific investments are more important.
# West vs. East Coast Contracts

<table>
<thead>
<tr>
<th>West Coast</th>
<th>East Coast</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Longer Contracts</td>
<td>• Shorter Contracts</td>
</tr>
<tr>
<td>• Market power</td>
<td>• Spot market</td>
</tr>
<tr>
<td>• Fewer Mines</td>
<td>• Lots of mines (Greater Competition)</td>
</tr>
<tr>
<td>• Coal not homogeneous</td>
<td>• Homogenous coal</td>
</tr>
<tr>
<td>• Higher Transportation Costs</td>
<td>• Better railroad system</td>
</tr>
<tr>
<td>(Poor Transportation Alternatives)</td>
<td></td>
</tr>
</tbody>
</table>
Main Points

- Contracts basically simply get longer as we move from East to West.
- Mine-mouth plants tend to have longer-term contracts.
- The greater the annual quantity of coal contracted for, the longer the duration of a contract.
The End