# “Small” suppliers and market power

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TPS Task Force

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Market Monitoring Unit

- "Is it appropriate to mitigate a number of small suppliers in a market with two dominant suppliers"?
  - Where the market structure provides opportunities for the supplier to exercise market power: yes.
  - To pass the three pivotal supplier test:
    - Need at least 4 suppliers
    - Need enough supply, in excess of that possessed by the combination of three tested suppliers, to meet the demand requirement.

- On the basis of market structure is it possible for small suppliers, in the presence of two dominant suppliers, to have structural market power?
  - Yes
  - “Small suppliers” can exercise market power.
    - Need to define what a small supplier is in a manner that is relevant to a structural test
    - TPS test examines the relative size of a supplier in the context of overall market structure.

# Conectiv Example: TPS result

Score should be based on tested participant's share of total supply, relative to relief required

Score > 1 a pass

**Three Pivotal Suppliers Test**
**From 4/25/06 MIC Meeting**

$$\text{TPS Test} = \frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}} > 1.00$$

TPS Test = (168.04 - 40.52 - 35.73 - Supply 3) / 101.19
Relief 101.19

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 40.52 | 0.70 | | | 24.11% | 26.33 |
| B | 35.73 | 0.70 | | | 21.26% | -9.4 |
| C | 20.68 | 0.70 | 4.26 | 71.11 | 12.31% | -30.08 |
| D | 20.51 | 0.70 | 4.43 | 71.28 | 12.21% | -50.59 |
| E | 20.14 | 0.71 | 4.8 | 71.65 | 11.99% | -70.73 |
| F | 13.05 | 0.78 | 11.89 | 78.74 | 7.77% | -83.78 |
| G | 7.47 | 0.83 | 17.47 | 84.32 | 4.45% | -91.25 |
| H | 2.72 | 0.88 | 22.22 | 89.07 | 1.62% | -93.97 |
| I | 2.57 | 0.88 | 22.37 | 89.22 | 1.53% | -96.54 |
| J | 1.87 | 0.89 | 23.07 | 89.92 | 1.11% | -98.41 |
| K | 1.11 | 0.90 | 23.83 | 90.68 | 0.66% | -99.52 |
| L | 0.52 | 0.90 | 24.42 | 91.27 | 0.31% | -100.04 |
| M | 0.40 | 0.90 | 24.54 | 91.39 | 0.24% | -100.44 |
| N | 0.36 | 0.90 | 24.58 | 91.43 | 0.21% | -100.8 |
| O | 0.28 | 0.90 | 24.66 | 91.51 | 0.17% | -101.08 |
| P | 0.11 | 0.91 | 24.83 | 91.68 | 0.07% | -101.19 |
| | 168.04 | | | | | |

Relief needed contributes to the relative importance of suppliers within a given market

# "Very" Competitive Market Structure

**Three Pivotal Suppliers Test**
**From 4/25/06 MIC Meeting**

Original supplier assumptions

$$\text{TPS Test} = \frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}} \quad > 1.00$$

TPS Test = Relief 68

Relief required is now lower

All pass TPS test

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 40.52 | 1.05 | | | 24.11% | 59.52 |
| B | 35.73 | 1.05 | | | 21.26% | 23.79 |
| C | 20.68 | 1.05 | -28.93 | 71.11 | 12.31% | 3.11 |
| D | 20.51 | 1.05 | -28.76 | 71.28 | 12.21% | -17.4 |
| E | 20.14 | 1.05 | -28.39 | 71.65 | 11.99% | -37.54 |
| F | 13.05 | 1.16 | -21.3 | 78.74 | 7.77% | -50.59 |
| G | 7.47 | 1.24 | -15.72 | 84.32 | 4.45% | -58.06 |
| H | 2.72 | 1.31 | -10.97 | 89.07 | 1.62% | -60.78 |
| I | 2.57 | 1.31 | -10.82 | 89.22 | 1.53% | -63.35 |
| J | 1.87 | 1.32 | -10.12 | 89.92 | 1.11% | -65.22 |
| K | 1.11 | 1.33 | -9.36 | 90.68 | 0.66% | -66.33 |
| L | 0.52 | 1.34 | -8.77 | 91.27 | 0.31% | -66.85 |
| M | 0.40 | 1.34 | -8.65 | 91.39 | 0.24% | -67.25 |
| N | 0.36 | 1.34 | -8.61 | 91.43 | 0.21% | -67.61 |
| O | 0.28 | 1.35 | -8.53 | 91.51 | 0.17% | -67.89 |
| P | 0.11 | 1.35 | -8.36 | 91.68 | 0.07% | -68 |
| | 168.04 | | | | | |

- How do you determine “dominant suppliers” among many?
- What criterion is appropriate to draw a distinction?

- On the basis of market structure is it possible for small suppliers, in the presence of two or three dominant suppliers, to have structural market power?
  - Yes.
  - "Small suppliers" can exercise market power.
    - Need to define what a small supplier is in a manner that is relevant to a structural test
    - TPS test examines the relative size of a supplier in the context of overall market structure.

# TPS result

Relief needed

**Three Pivotal Suppliers Test**
**From 4/25/06 MIC Meeting**

$$\text{TPS Test} = \frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}} > 1.00$$

TPS Test = Relief 101.19

Same size

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 40 | 0.47 | | | 23.89% | 26.22 |
| B | 40 | 0.47 | | | 23.89% | -13.78 |
| C | 40 | 0.47 | -18.81 | 47.41 | 23.89% | -53.78 |
| D | 10 | 0.76 | 11.19 | 77.41 | 5.97% | -63.78 |
| E | 10 | 0.76 | 11.19 | 77.41 | 5.97% | -73.78 |
| F | 10 | 0.76 | 11.19 | 77.41 | 5.97% | -83.78 |
| G | 7.47 | 0.79 | 13.72 | 79.94 | 4.46% | -91.25 |
| H | 2.72 | 0.84 | 18.47 | 84.69 | 1.62% | -93.97 |
| I | 2.57 | 0.84 | 18.62 | 84.84 | 1.54% | -96.54 |
| J | 1.87 | 0.85 | 19.32 | 85.54 | 1.12% | -98.41 |
| K | 1.11 | 0.85 | 20.08 | 86.3 | 0.66% | -99.52 |
| L | 0.52 | 0.86 | 20.67 | 86.89 | 0.31% | -100.04 |
| M | 0.40 | 0.86 | 20.79 | 87.01 | 0.24% | -100.44 |
| N | 0.36 | 0.86 | 20.83 | 87.05 | 0.22% | -100.8 |
| O | 0.28 | 0.86 | 20.91 | 87.13 | 0.17% | -101.08 |
| P | 0.11 | 0.86 | 21.08 | 87.3 | 0.07% | -101.19 |
| | 167.41 | | | | | |

Same size

Scores match

- Is it appropriate to mitigate small suppliers?
  - Where the market structure provides opportunities for the supplier to exercise market power: yes.
  - The three pivotal supplier test examines two things
    - Need at least 4 suppliers
    - Need enough supply, in excess of that possessed by the combination of three tested suppliers, to meet the demand requirement.

- On the basis of market structure it is possible for small suppliers to have structural market power?
  - Yes.
  - "Small suppliers" can exercise market power.
    - Need to define what a small supplier is in a manner that is relevant to a structural test
    - TPS test examines the relative size of a supplier in the context of overall market structure.

# Many small suppliers: TPS

**Three Pivotal Suppliers Test**
**From 4/25/06 MIC Meeting**

$$\text{TPS Test} = \frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}} > 1.00$$

TPS Test = Relief 150

Relief needed

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 10 | 0.87 | | | 6.25% | 0 |
| B | 10 | 0.87 | | | 6.25% | -10 |
| C | 10 | 0.87 | 120 | 130 | 6.25% | -20 |
| D | 10 | 0.87 | 120 | 130 | 6.25% | -30 |
| E | 10 | 0.87 | 120 | 130 | 6.25% | -40 |
| F | 10 | 0.87 | 120 | 130 | 6.25% | -50 |
| G | 10 | 0.87 | 120 | 130 | 6.25% | -60 |
| H | 10 | 0.87 | 120 | 130 | 6.25% | -70 |
| I | 10 | 0.87 | 120 | 130 | 6.25% | -80 |
| J | 10 | 0.87 | 120 | 130 | 6.25% | -90 |
| K | 10 | 0.87 | 120 | 130 | 6.25% | -100 |
| L | 10 | 0.87 | 120 | 130 | 6.25% | -110 |
| M | 10 | 0.87 | 120 | 130 | 6.25% | -120 |
| N | 10 | 0.87 | 120 | 130 | 6.25% | -130 |
| O | 10 | 0.87 | 120 | 130 | 6.25% | -140 |
| P | 10 | 0.87 | 120 | 130 | 6.25% | -150 |
| | 160 | | | | | |

# Many small suppliers: 1PS

**Single Pivotal Supplier Test**
**From 4/25/06 MIC Meeting**

>1.00

Relief needed

Relief 150

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply |
|---|---|---|---|---|---|
| A | 10 | 1.00 | | | 6.25% |
| B | 10 | 1.00 | | | 6.25% |
| C | 10 | 1.00 | 120 | 130 | 6.25% |
| D | 10 | 1.00 | 120 | 130 | 6.25% |
| E | 10 | 1.00 | 120 | 130 | 6.25% |
| F | 10 | 1.00 | 120 | 130 | 6.25% |
| G | 10 | 1.00 | 120 | 130 | 6.25% |
| H | 10 | 1.00 | 120 | 130 | 6.25% |
| I | 10 | 1.00 | 120 | 130 | 6.25% |
| J | 10 | 1.00 | 120 | 130 | 6.25% |
| K | 10 | 1.00 | 120 | 130 | 6.25% |
| L | 10 | 1.00 | 120 | 130 | 6.25% |
| M | 10 | 1.00 | 120 | 130 | 6.25% |
| N | 10 | 1.00 | 120 | 130 | 6.25% |
| O | 10 | 1.00 | 120 | 130 | 6.25% |
| P | 10 | 1.00 | 120 | 130 | 6.25% |
| | 160 | | | | |

# Many small suppliers: 3PS, competitive market structure

## Relief needed is lower

**Three Pivotal Suppliers Test**
**From 4/25/06 MIC Meeting**

$$\text{TPS Test} = \frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}} \quad >1.00$$

TPS Test = Relief 100

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 10 | 1.30 | | | 6.25% | 50 |
| B | 10 | 1.30 | | | 6.25% | 40 |
| C | 10 | 1.30 | 70 | 130 | 6.25% | 30 |
| D | 10 | 1.30 | 70 | 130 | 6.25% | 20 |
| E | 10 | 1.30 | 70 | 130 | 6.25% | 10 |
| F | 10 | 1.30 | 70 | 130 | 6.25% | 0 |
| G | 10 | 1.30 | 70 | 130 | 6.25% | -10 |
| H | 10 | 1.30 | 70 | 130 | 6.25% | -20 |
| I | 10 | 1.30 | 70 | 130 | 6.25% | -30 |
| J | 10 | 1.30 | 70 | 130 | 6.25% | -40 |
| K | 10 | 1.30 | 70 | 130 | 6.25% | -50 |
| L | 10 | 1.30 | 70 | 130 | 6.25% | -60 |
| M | 10 | 1.30 | 70 | 130 | 6.25% | -70 |
| N | 10 | 1.30 | 70 | 130 | 6.25% | -80 |
| O | 10 | 1.30 | 70 | 130 | 6.25% | -90 |
| P | 10 | 1.30 | 70 | 130 | 6.25% | -100 |
| | 160 | | | | | |

# Many small suppliers: 3PS market structure

Relief needed

**Three Pivotal Suppliers Test**
**From 4/25/06 MIC Meeting**

$$\text{TPS Test} = \frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}} > 1$$

All fail TPS

| | |
|---|---|
| TPS Test = Relief | 100 |

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 70 | 0.30 | | | 58.33% | -50 |
| B | 10 | 0.30 | | | 8.33% | -60 |
| C | 10 | 0.30 | 10 | 30 | 8.33% | -70 |
| D | 10 | 0.30 | 10 | 30 | 8.33% | -80 |
| E | 10 | 0.30 | 10 | 30 | 8.33% | -90 |
| F | 10 | 0.30 | 10 | 30 | 8.33% | -100 |
| G | | | 20 | 40 | 0.00% | -100 |
| H | | | 20 | 40 | 0.00% | -100 |
| I | | | 20 | 40 | 0.00% | -100 |
| J | | | 20 | 40 | 0.00% | -100 |
| K | | | 20 | 40 | 0.00% | -100 |
| L | | | 20 | 40 | 0.00% | -100 |
| M | | | 20 | 40 | 0.00% | -100 |
| N | | | 20 | 40 | 0.00% | -100 |
| O | | | 20 | 40 | 0.00% | -100 |
| P | | | 20 | 40 | 0.00% | -100 |
| | 120 | | | | | |

Total relief available

# Many small suppliers: 3PS and market structure

**Single Pivotal Supplier Test**
**From 4/25/06 MIC Meeting**

>1

Biggest supplier fails 1 pivot test

| | | | | | |
|---|---|---|---|---|---|
| Relief | 100 | | | | |
| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply |
| A | 70 | 0.50 | | | 58.33% |
| B | 10 | 1.10 | | | 8.33% |
| C | 10 | 1.10 | 10 | 30 | 8.33% |
| D | 10 | 1.10 | 10 | 30 | 8.33% |
| E | 10 | 1.10 | 10 | 30 | 8.33% |
| F | 10 | 1.10 | 10 | 30 | 8.33% |
| G | 0 | | 20 | 40 | 0.00% |
| H | 0 | | 20 | 40 | 0.00% |
| I | 0 | | 20 | 40 | 0.00% |
| J | 0 | | 20 | 40 | 0.00% |
| K | 0 | | 20 | 40 | 0.00% |
| L | 0 | | 20 | 40 | 0.00% |
| M | 0 | | 20 | 40 | 0.00% |
| N | 0 | | 20 | 40 | 0.00% |
| O | 0 | | 20 | 40 | 0.00% |
| P | 0 | | 20 | 40 | 0.00% |
| | 120 | | | | |

"Small" suppliers pass

# Many small suppliers: 3PS, market structure

Supply stack based on cost

Supply stack based on price

Note one “small” supplier is offering some of its capacity at P>C

Cost Points

| Supply | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|
| 70 | 0 | 0 | 0.5 | 0.25 | 0.1 | 0.15 |
| | | | | | | |
| 10 | 1 | 0 | 0 | 0 | | |
| | | | 0 | | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | | 0 | 1 | 0 | 0 | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

cumulative

Price Points

| Supply | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|
| 70 | | 0 | 0.5 | 0.25 | 0.1 | 0.15 |
| 0 | | | | 0 | | |
| 10 | 0.5 | | | 0 | 0 | 0.5 |
| 0 | | | | 0 | | |
| 10 | 1 | | | 0 | 0 | |
| 10 | 1 | | | 0 | 0 | |
| 10 | 1 | | | 0 | 0 | |
| 10 | 0 | | 1 | 0 | 0 | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

Note, largest supplier is distributed at various cost points in the supply stack

# Many small suppliers: 3PS, market structure

## Market clearing price based on cost

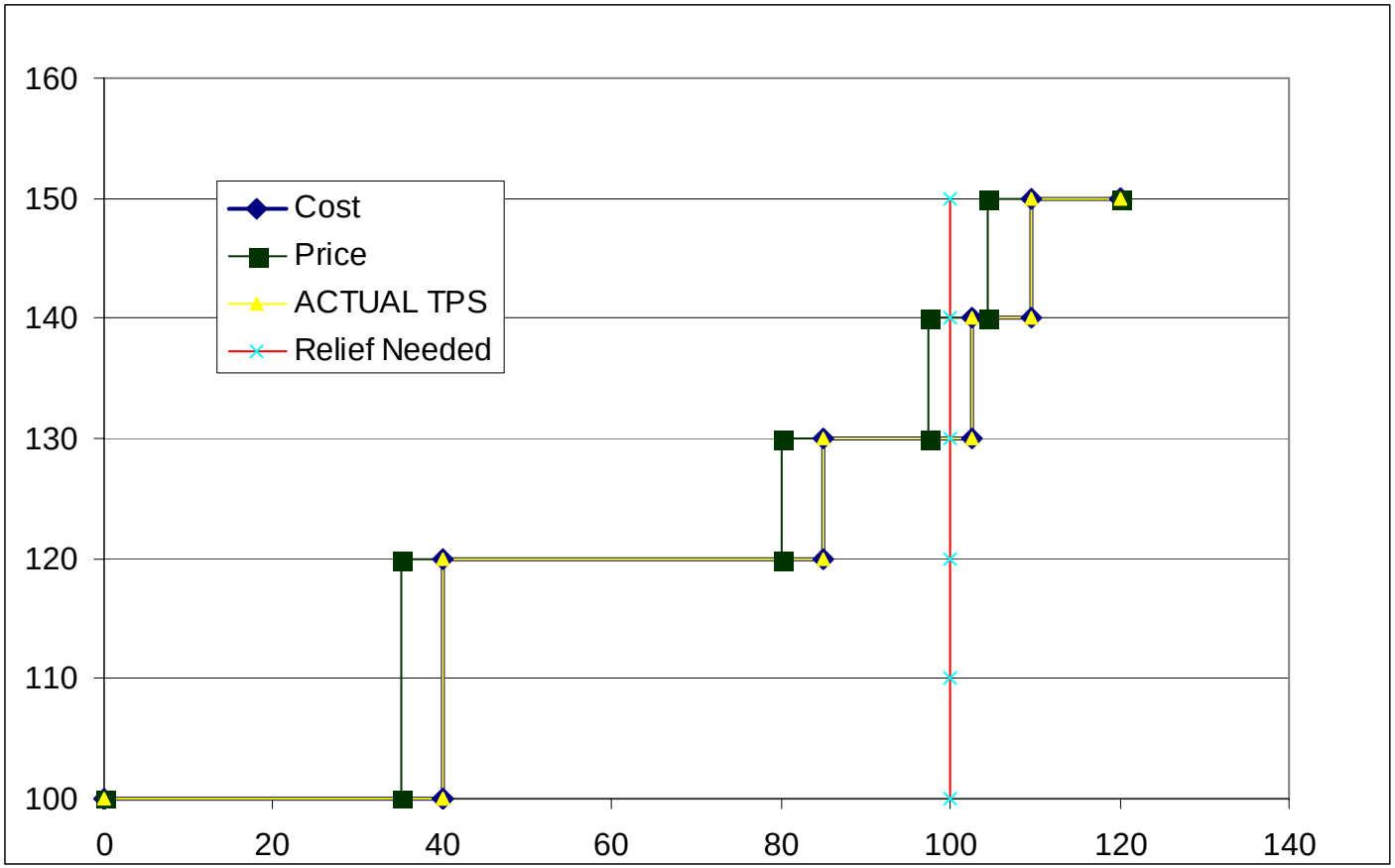
| Supplier | Cost Points $ 100.00 | $ 110.00 | $ 120.00 | $ 130.00 | $ 140.00 | $ 150.00 |
|---|---|---|---|---|---|---|
| A | 0 | 0 | 35 | 17.5 | 7 | 10.5 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 10 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 10 | 0 | 0 | 0 | 0 | 0 |
| D | 10 | 0 | 0 | 0 | 0 | 0 |
| E | 10 | 0 | 0 | 0 | 0 | 0 |
| F | 0 | 0 | 10 | 0 | 0 | 0 |
| G | 0 | 0 | 0 | 0 | 0 | 0 |
| H | 0 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 0 | 0 |
| J | 0 | 0 | 0 | 0 | 0 | 0 |
| K | 0 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 40 | 0 | 45 | 17.5 | 7 | 10.5 |
| Cumulative Supply | 40 | 40 | 85 | 102.5 | 109.5 | 120 |
| Relief Needed | 100 | 100 | 100 | 100 | 100 | 100 |
| Net Supply | -60 | -60 | -15 | 2.5 | 9.5 | 20 |
| Clearing? | 0 | 0 | 0 | 1 | 0 | 0 |
| Cleaing Price | $ - | $ - | $ - | $ 130.00 | $ - | $ - |

# Many small suppliers: 3PS, competitive market structure

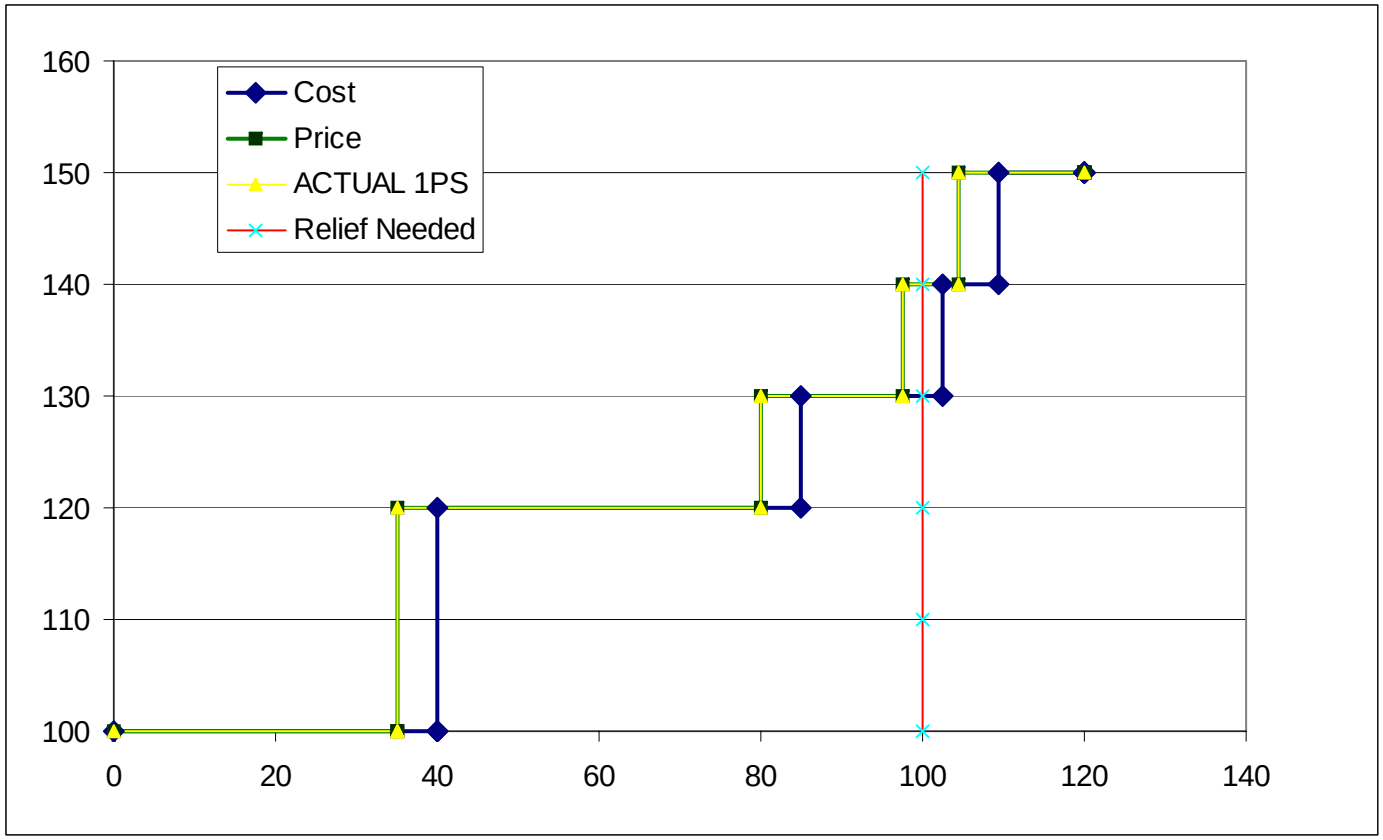
## Market clearing price based on price

| | Price Points | | | | | |
|---|---|---|---|---|---|---|
| | $ 100.00 | $ 110.00 | $ 120.00 | $ 130.00 | $ 140.00 | $ 150.00 |
| A | 0 | 0 | 35 | 17.5 | 7 | 10.5 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 5 | 0 | 0 | 0 | 0 | 5 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 10 | 0 | 0 | 0 | 0 | 0 |
| D | 10 | 0 | 0 | 0 | 0 | 0 |
| E | 10 | 0 | 0 | 0 | 0 | 0 |
| F | 0 | 0 | 10 | 0 | 0 | 0 |
| G | 0 | 0 | 0 | 0 | 0 | 0 |
| H | 0 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 0 | 0 |
| J | 0 | 0 | 0 | 0 | 0 | 0 |
| K | 0 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 35 | 0 | 45 | 17.5 | 7 | 15.5 |
| Cumulative Supply | 35 | 35 | 80 | 97.5 | 104.5 | 120 |
| Relief Needed | 100 | 100 | 100 | 100 | 100 | 100 |
| Net Supply | -65 | -65 | -20 | -2.5 | 4.5 | 20 |
| Clearing? | 0 | 0 | 0 | 0 | 1 | 0 |
| Cleaing Price | $ - | $ - | $ - | $ - | $ 140.00 | $ - |

# Many small suppliers: 3PS, competitive market structure



# Many small suppliers: 3PS, competitive market structure



# Many small suppliers: 3PS, market structure

## Supply stack based on cost

## Supply stack based on price

Note one “small” supplier is offering some of its capacity at P>C

| | Cost Points | | | | | |
|---|---|---|---|---|---|---|
| Supply | 100 | 110 | 120 | 130 | 140 | 150 |
| 70 | 0.2 | 0.2 | 0.2 | 0.2 | 0 | 0.2 |
| | | | | | | |
| 10 | 1 | 0 | 0 | 0 | | |
| | | | 0 | | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | | 0 | 1 | 0 | 0 | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

| | Price Points | | | | | |
|---|---|---|---|---|---|---|
| Supply | 100 | 110 | 120 | 130 | 140 | 150 |
| 70 | 0.2 | 0.2 | 0.2 | 0.2 | 0 | 0.2 |
| 0 | | | | 0 | | |
| 10 | 0.9 | | | 0 | 0 | 0.1 |
| 0 | | | | 0 | | |
| 10 | 0.9 | | | 0 | 0 | 0.1 |
| 10 | 0.8 | | | 0 | 0 | 0.2 |
| 10 | 0.8 | | | 0 | 0 | 0.2 |
| 10 | | | 0.9 | 0 | 0 | 0.1 |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

Note, largest supplier is distributed at various cost points in the supply stack

# Many small suppliers: 3PS, market structure

## Market clearing price based on cost

| Supplier | Cost Points $ 100.00 | $ 110.00 | $ 120.00 | $ 130.00 | $ 140.00 | $ 150.00 |
|---|---|---|---|---|---|---|
| A | 14 | 14 | 14 | 14 | 0 | 14 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 10 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 10 | 0 | 0 | 0 | 0 | 0 |
| D | 10 | 0 | 0 | 0 | 0 | 0 |
| E | 10 | 0 | 0 | 0 | 0 | 0 |
| F | 0 | 0 | 10 | 0 | 0 | 0 |
| G | 0 | 0 | 0 | 0 | 0 | 0 |
| H | 0 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 0 | 0 |
| J | 0 | 0 | 0 | 0 | 0 | 0 |
| K | 0 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 54 | 14 | 24 | 14 | 0 | 14 |
| Cumulative Supply | 54 | 68 | 92 | 106 | 106 | 120 |
| Relief Needed | 100 | 100 | 100 | 100 | 100 | 100 |
| Net Supply | -46 | -32 | -8 | 6 | 6 | 20 |
| Clearing? | 0 | 0 | 0 | 1 | 0 | 0 |
| Cleaing Price | $ - | $ - | $ - | $ 130.00 | $ - | $ - |

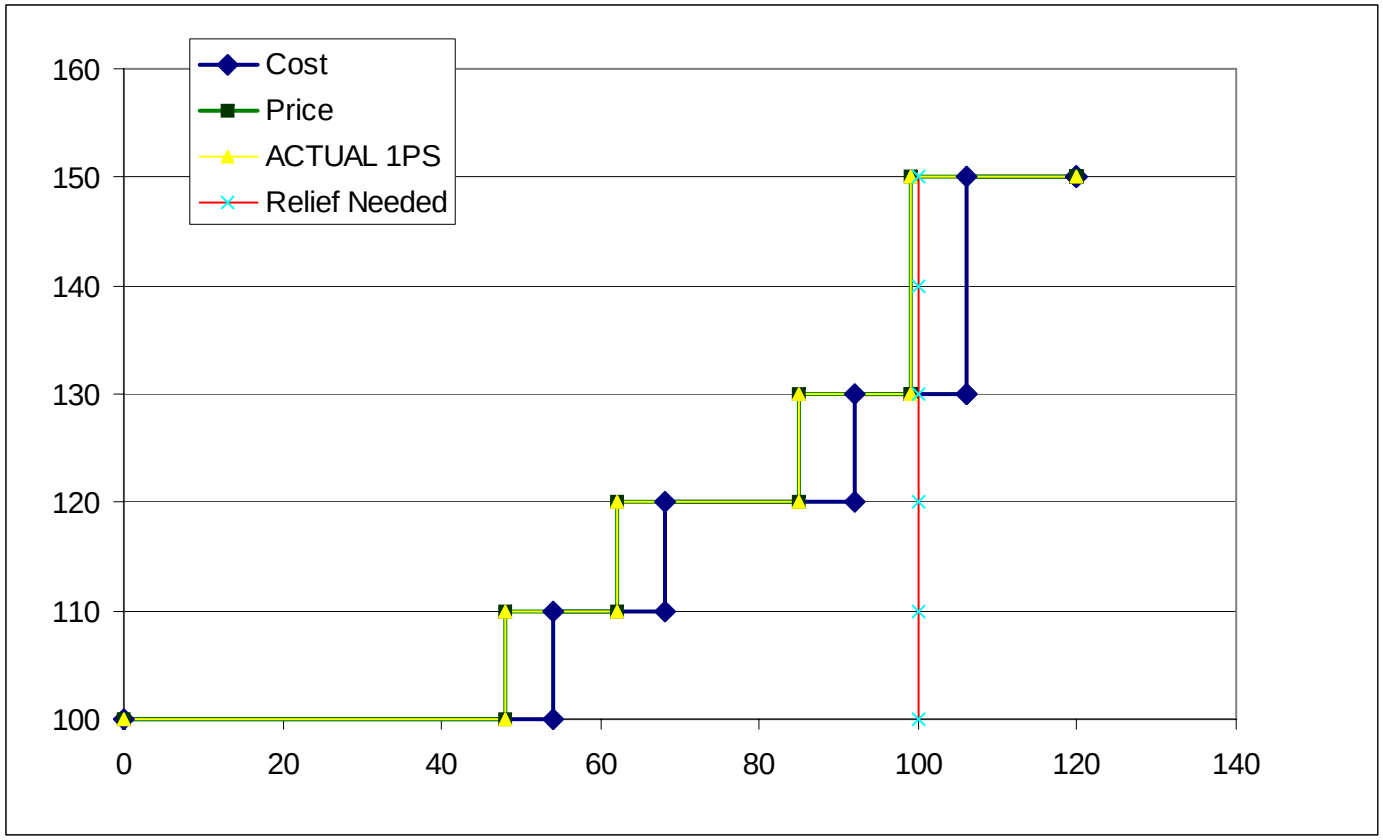
# Many small suppliers: 3PS, competitive market structure

## Market clearing price based on price

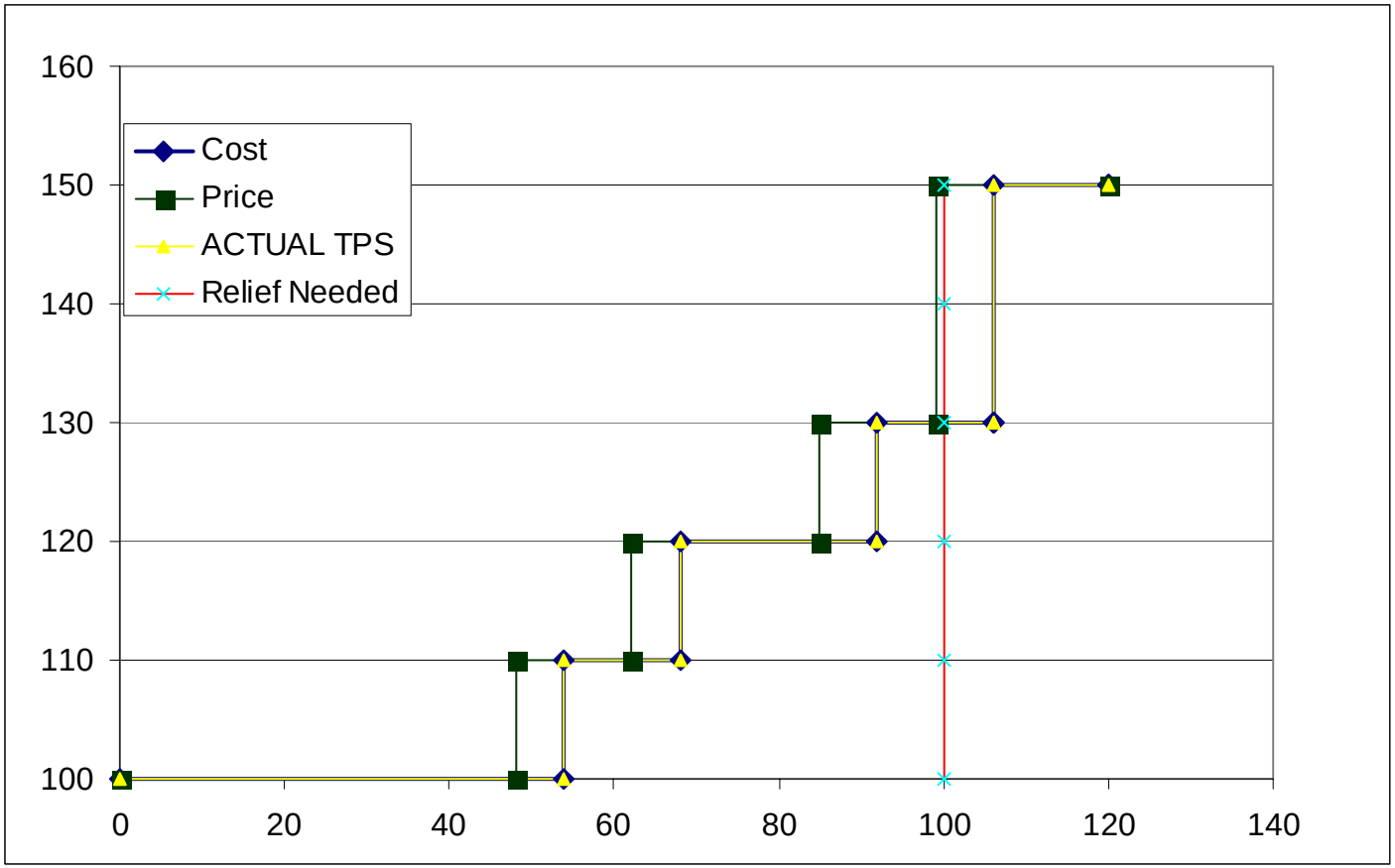
↓

| | Price Points | | | | | |
|---|---|---|---|---|---|---|
| | $ 100.00 | $ 110.00 | $ 120.00 | $ 130.00 | $ 140.00 | $ 150.00 |
| A | 14 | 14 | 14 | 14 | 0 | 14 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 9 | 0 | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 9 | 0 | 0 | 0 | 0 | 1 |
| D | 8 | 0 | 0 | 0 | 0 | 2 |
| E | 8 | 0 | 0 | 0 | 0 | 2 |
| F | 0 | 0 | 9 | 0 | 0 | 1 |
| G | 0 | 0 | 0 | 0 | 0 | 0 |
| H | 0 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 0 | 0 |
| J | 0 | 0 | 0 | 0 | 0 | 0 |
| K | 0 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 48 | 14 | 23 | 14 | 0 | 21 |
| Cumulative Supply | 48 | 62 | 85 | 99 | 99 | 120 |
| Relief Needed | 100 | 100 | 100 | 100 | 100 | 100 |
| Net Supply | -52 | -38 | -15 | -1 | -1 | 20 |
| Clearing? | 0 | 0 | 0 | 0 | 0 | 1 |
| Cleaing Price | $ - | $ - | $ - | $ - | $ - | $ 150.00 |

# Many small suppliers: 3PS, competitive market structure



# Many small suppliers: 3PS, competitive market structure



# Many small suppliers: 3PS market structure

Relief needed

TPS Test = $\frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}}$ >1

All fail TPS

| TPS Test = Relief | 100 |
|---|---|

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 35 | 0.40 | | | 29.17% | -15 |
| B | 35 | 0.40 | | | 29.17% | -50 |
| C | 10 | 0.40 | 20 | 40 | 8.33% | -60 |
| D | 10 | 0.40 | 20 | 40 | 8.33% | -70 |
| E | 10 | 0.40 | 20 | 40 | 8.33% | -80 |
| F | 10 | 0.40 | 20 | 40 | 8.33% | -90 |
| G | 10 | 0.40 | 20 | 40 | 8.33% | -100 |
| H | | | 30 | 50 | 0.00% | -100 |
| I | | | 30 | 50 | 0.00% | -100 |
| J | | | 30 | 50 | 0.00% | -100 |
| K | | | 30 | 50 | 0.00% | -100 |
| L | | | 30 | 50 | 0.00% | -100 |
| M | | | 30 | 50 | 0.00% | -100 |
| N | | | 30 | 50 | 0.00% | -100 |
| O | | | 30 | 50 | 0.00% | -100 |
| P | | | 30 | 50 | 0.00% | -100 |
| | 120 | | | | | |

Total relief available

# Many small suppliers: 3PS and market structure

Biggest suppliers fail 1 pivot test

| Relief | 100 | | | | |
|---|---|---|---|---|---|
| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply |
| A | 35 | 0.85 | | | 29.17% |
| B | 35 | 0.85 | | | 29.17% |
| C | 10 | 1.10 | 20 | 40 | 8.33% |
| D | 10 | 1.10 | 20 | 40 | 8.33% |
| E | 10 | 1.10 | 20 | 40 | 8.33% |
| F | 10 | 1.10 | 20 | 40 | 8.33% |
| G | 10 | 1.10 | 20 | 40 | 8.33% |
| H | 0 | | 30 | 50 | 0.00% |
| I | 0 | | 30 | 50 | 0.00% |
| J | 0 | | 30 | 50 | 0.00% |
| K | 0 | | 30 | 50 | 0.00% |
| L | 0 | | 30 | 50 | 0.00% |
| M | 0 | | 30 | 50 | 0.00% |
| N | 0 | | 30 | 50 | 0.00% |
| O | 0 | | 30 | 50 | 0.00% |
| P | 0 | | 30 | 50 | 0.00% |
| | 120 | | | | |

"Small" suppliers pass

# Many small suppliers: 3PS, market structure

## Supply stack based on cost

| Supply | Cost Points 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|
| 35 | 0 | 0.8 | 0 | 0 | 0 | 0.2 |
| | | | | | | |
| 35 | 0 | 0.8 | 0 | 0 | | 0.2 |
| | | | 0 | | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | 0 | |
| 10 | 1 | | 0 | 0 | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

## Supply stack based on price

| Supply | Price Points 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|
| 35 | 0 | 0.8 | 0 | 0 | 0 | 0.2 |
| 0 | | | | | | |
| 35 | 0 | 0.8 | 0 | 0 | | 0.2 |
| 0 | | | 0 | | | |
| 10 | 0 | 0 | 0 | 0 | 1 | 0 |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | | |
| 10 | 1 | 0 | 0 | 0 | 0 | |
| 10 | 1 | | 0 | 0 | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

Note one “small” supplier is offering some of its capacity at P>C

Note, largest supplier is distributed at various cost points in the supply stack

# Many small suppliers: 3PS, market structure

## Market clearing price based on cost

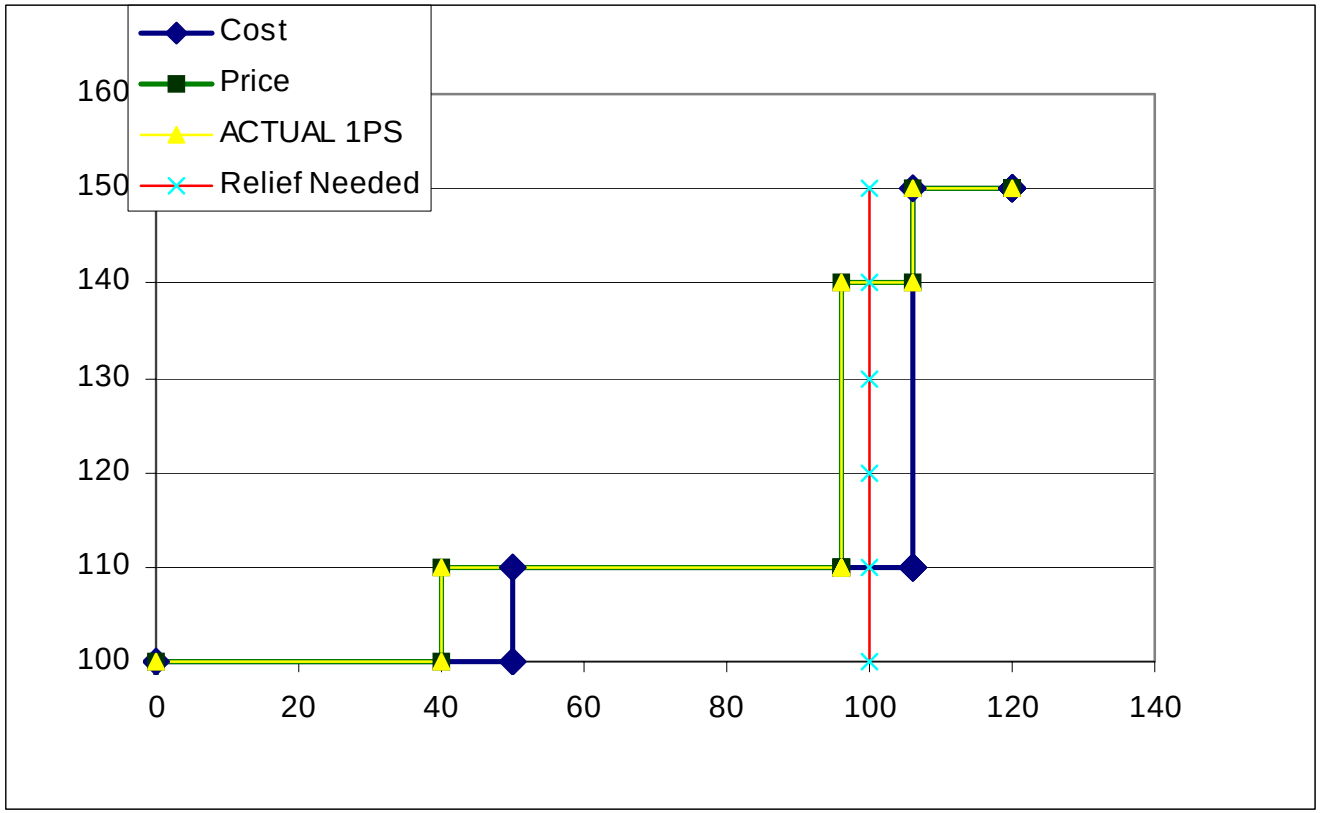
| Supplier | Cost Points $ 100.00 | $ 110.00 | $ 120.00 | $ 130.00 | $ 140.00 | $ 150.00 |
|---|---|---|---|---|---|---|
| A | 0 | 28 | 0 | 0 | 0 | 7 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 0 | 28 | 0 | 0 | 0 | 7 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 10 | 0 | 0 | 0 | 0 | 0 |
| D | 10 | 0 | 0 | 0 | 0 | 0 |
| E | 10 | 0 | 0 | 0 | 0 | 0 |
| F | 10 | 0 | 0 | 0 | 0 | 0 |
| G | 10 | 0 | 0 | 0 | 0 | 0 |
| H | 0 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 0 | 0 |
| J | 0 | 0 | 0 | 0 | 0 | 0 |
| K | 0 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 50 | 56 | 0 | 0 | 0 | 14 |
| Cumulative Supply | 50 | 106 | 106 | 106 | 106 | 120 |
| Relief Needed | 100 | 100 | 100 | 100 | 100 | 100 |
| Net Supply | -50 | 6 | 6 | 6 | 6 | 20 |
| Clearing? | 0 | 1 | 0 | 0 | 0 | 0 |
| Cleaing Price | $ - | $ 110.00 | $ - | $ - | $ - | $ - |

# Many small suppliers: 3PS, competitive market structure

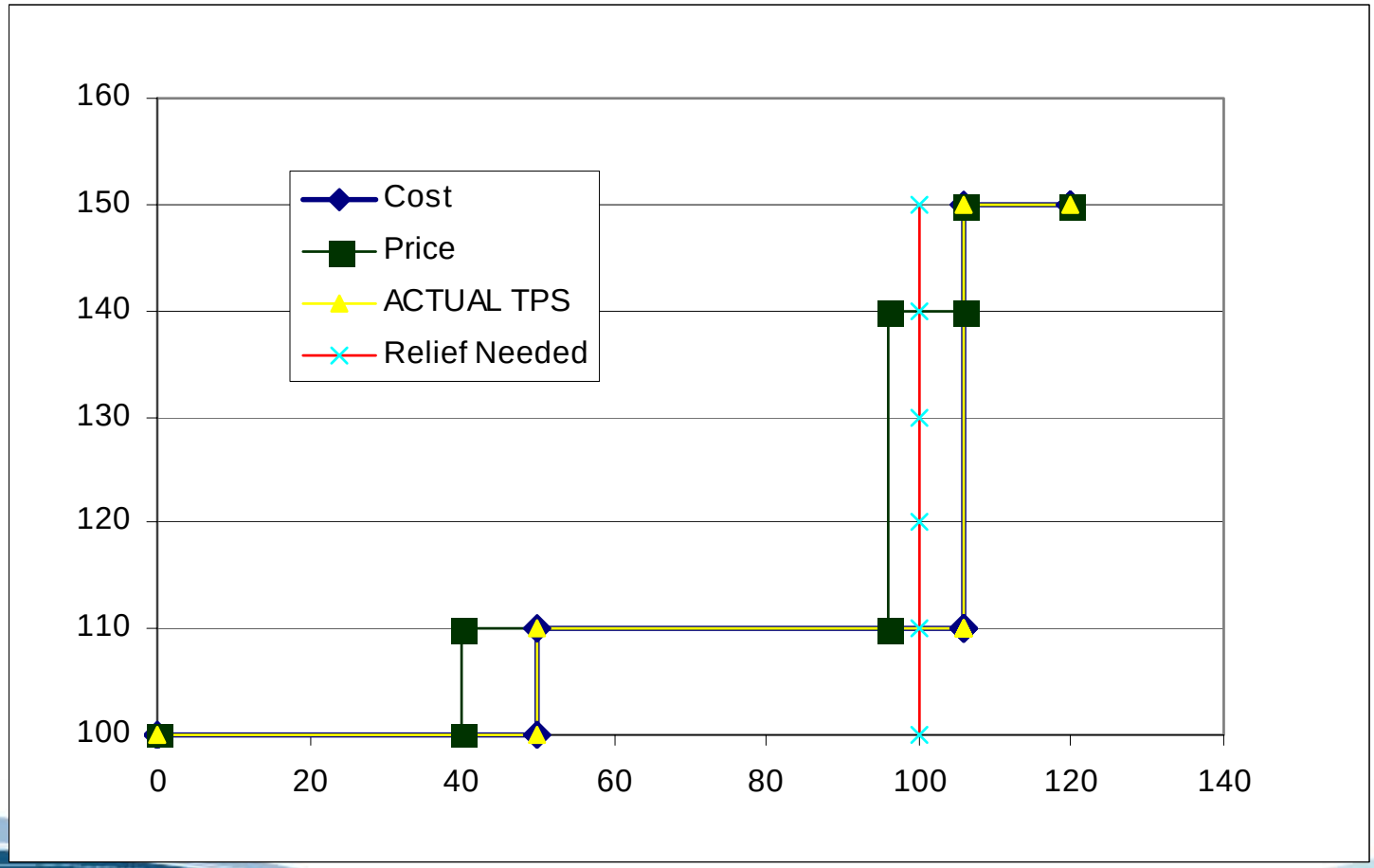
## Market clearing price based on price

| | Mkt Clearing 1 Pivot | | | | | |
|---|---|---|---|---|---|---|
| | 100 | 110 | 120 | 130 | 140 | 150 |
| A | 0 | 28 | 0 | 0 | 0 | 7 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 0 | 28 | 0 | 0 | 0 | 7 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 0 | 0 | 0 | 0 | 10 | 0 |
| D | 10 | 0 | 0 | 0 | 0 | 0 |
| E | 10 | 0 | 0 | 0 | 0 | 0 |
| F | 10 | 0 | 0 | 0 | 0 | 0 |
| G | 10 | 0 | 0 | 0 | 0 | 0 |
| H | 0 | 0 | 0 | 0 | 0 | 0 |
| I | 0 | 0 | 0 | 0 | 0 | 0 |
| J | 0 | 0 | 0 | 0 | 0 | 0 |
| K | 0 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 40 | 56 | 0 | 0 | 10 | 14 |
| Cumulative Supply | 40 | 96 | 96 | 96 | 106 | 120 |
| Relief Needed | 100 | 100 | 100 | 100 | 100 | 100 |
| Net Supply | -60 | -4 | -4 | -4 | 6 | 20 |
| Clearing? | 0 | 0 | 0 | 0 | 1 | 0 |
| Cleaing Price | $ - | $ - | $ - | $ - | $ 140.00 | $ - |

# Many small suppliers: 3PS, competitive market structure



# Many small suppliers: 3PS, competitive market structure



# Many small suppliers: 3PS market structure

Relief needed

**Three Pivotal Suppliers Test**
**From 4/25/06 MIC Meeting**

$$\text{TPS Test} = \frac{\text{Total Effective Supply - (Supply 1+ Supply 2 + Supply 3)}}{\text{Relief Demand}} > 1$$

All pass TPS

TPS Test = Relief: 78

Total relief available

| Supplier | Effective MW | Test Score | Remaining Need After A & B & ? | Remaining Supply After A & B & ? | % of effective supply | "Excess Relief Available" |
|---|---|---|---|---|---|---|
| A | 10 | 1.03 | | | 9.09% | 22 |
| B | 10 | 1.03 | | | 9.09% | 12 |
| C | 10 | 1.03 | 48 | 80 | 9.09% | 2 |
| D | 10 | 1.03 | 48 | 80 | 9.09% | -8 |
| E | 10 | 1.03 | 48 | 80 | 9.09% | -18 |
| F | 10 | 1.03 | 48 | 80 | 9.09% | -28 |
| G | 10 | 1.03 | 48 | 80 | 9.09% | -38 |
| H | 10 | 1.03 | 48 | 80 | 9.09% | -48 |
| I | 10 | 1.03 | 48 | 80 | 9.09% | -58 |
| J | 10 | 1.03 | 48 | 80 | 9.09% | -68 |
| K | 10 | 1.03 | 48 | 80 | 9.09% | -78 |
| L | | | 58 | 90 | 0.00% | -78 |
| M | | | 58 | 90 | 0.00% | -78 |
| N | | | 58 | 90 | 0.00% | -78 |
| O | | | 58 | 90 | 0.00% | -78 |
| P | | | 58 | 90 | 0.00% | -78 |
| | 110 | | | | | |

# Many small suppliers: 3PS, market structure

Supply stack based on cost

Supply stack based on price

Note one “small” supplier is offering some of its capacity at P>C

Cost Points

| Supply | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|
| 10 | | | | | | 1 |
| | | | | | | |
| 10 | | | | | | 1 |
| | | | | | | |
| 10 | 1 | | | | | |
| 10 | 0 | | | 1 | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

cumulative

Price Points

| Supply | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|
| 10 | | | | | | 1 |
| 0 | | | | | | |
| 10 | | | | | | 1 |
| 0 | | | | | | |
| 10 | 0.7 | | | 0.3 | | |
| 10 | 0 | | | 1 | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 10 | 1 | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |
| 0 | | | | | | |

Note, largest supplier is distributed at various cost points in the supply stack

# Many small suppliers: 3PS, market structure

## Market clearing price based on cost

| Supplier | Cost Points $ 100.00 | $ 110.00 | $ 120.00 | $ 130.00 | $ 140.00 | $ 150.00 |
|---|---|---|---|---|---|---|
| A | 0 | 0 | 0 | 0 | 0 | 10 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 0 | 0 | 0 | 0 | 0 | 10 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 10 | 0 | 0 | 0 | 0 | 0 |
| D | 0 | 0 | 0 | 10 | 0 | 0 |
| E | 10 | 0 | 0 | 0 | 0 | 0 |
| F | 10 | 0 | 0 | 0 | 0 | 0 |
| G | 10 | 0 | 0 | 0 | 0 | 0 |
| H | 10 | 0 | 0 | 0 | 0 | 0 |
| I | 10 | 0 | 0 | 0 | 0 | 0 |
| J | 10 | 0 | 0 | 0 | 0 | 0 |
| K | 10 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 80 | 0 | 0 | 10 | 0 | 20 |
| Cumulative Supply | 80 | 80 | 80 | 90 | 90 | 110 |
| Relief Needed | 78 | 78 | 78 | 78 | 78 | 78 |
| Net Supply | 2 | 2 | 2 | 12 | 12 | 32 |
| Clearing? | 1 | 0 | 0 | 0 | 0 | 0 |
| Cleaing Price | $ 100.00 | $ - | $ - | $ - | $ - | $ - |

# Many small suppliers: 3PS, competitive market structure

## Market clearing price based on price

↓

| | Price Points | | | | | |
|---|---|---|---|---|---|---|
| | $ 100.00 | $ 110.00 | $ 120.00 | $ 130.00 | $ 140.00 | $ 150.00 |
| A | 0 | 0 | 0 | 0 | 0 | 10 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| B | 0 | 0 | 0 | 0 | 0 | 10 |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 7 | 0 | 0 | 3 | 0 | 0 |
| D | 0 | 0 | 0 | 10 | 0 | 0 |
| E | 10 | 0 | 0 | 0 | 0 | 0 |
| F | 10 | 0 | 0 | 0 | 0 | 0 |
| G | 10 | 0 | 0 | 0 | 0 | 0 |
| H | 10 | 0 | 0 | 0 | 0 | 0 |
| I | 10 | 0 | 0 | 0 | 0 | 0 |
| J | 10 | 0 | 0 | 0 | 0 | 0 |
| K | 10 | 0 | 0 | 0 | 0 | 0 |
| L | 0 | 0 | 0 | 0 | 0 | 0 |
| M | 0 | 0 | 0 | 0 | 0 | 0 |
| N | 0 | 0 | 0 | 0 | 0 | 0 |
| O | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 | 0 | 0 |
| | 77 | 0 | 0 | 13 | 0 | 20 |
| Cumulative Supply | 77 | 77 | 77 | 90 | 90 | 110 |
| Relief Needed | 78 | 78 | 78 | 78 | 78 | 78 |
| Net Supply | -1 | -1 | -1 | 12 | 12 | 32 |
| Clearing? | 0 | 0 | 0 | 1 | 0 | 0 |
| Cleaing Price | $ - | $ - | $ - | $ 130.00 | $ - | $ - |

# Many small suppliers: 3PS, competitive market structure