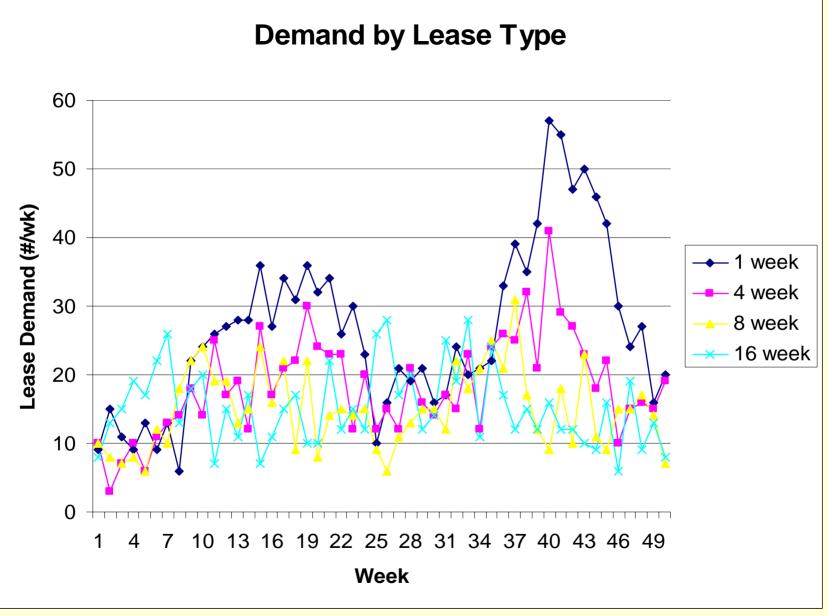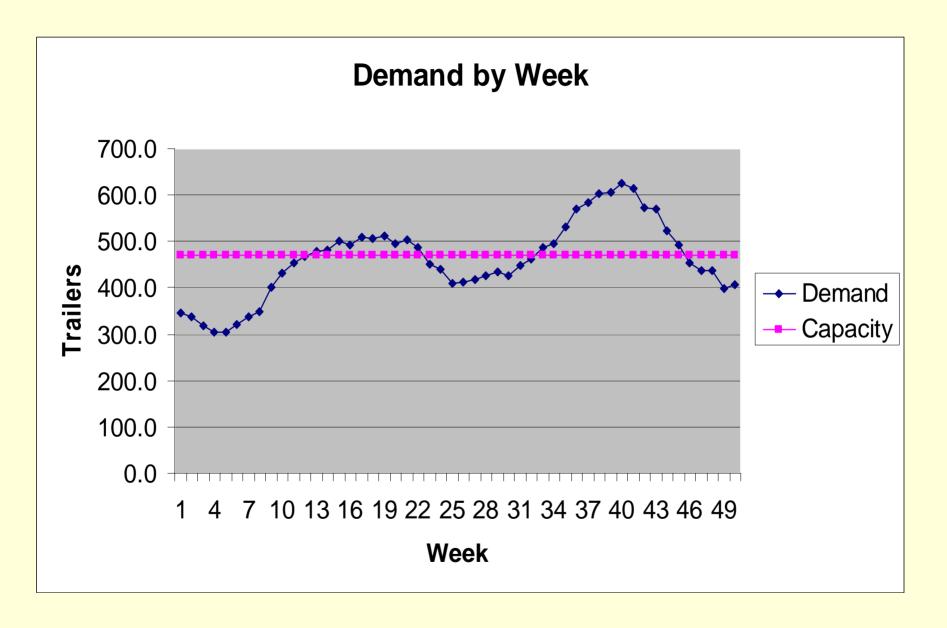# Transportation National Group

- Objectives
  - Explore issues related to application of revenue management ideas to new context
  - Identify differences & similarities relative to traditional settings of airlines, hotels
  - Illustrate types of analyses for evaluation of revenue management in leasing context

What are the characteristics of TNG?

- Very competitive; Commodity product; Price taker

- Highly capital intensive

- Seasonal business, varies by region

- Leases range from few days to months

- Subsidiary to Financial services company

Demand by Lease Type

Legend:
- 1 week
- 4 week
- 8 week
- 16 week

X-axis: **Week**
Y-axis: **Lease Demand (#/wk)**

Demand by Week

Assessment of current practices

- ROI is the dominant performance metric
- Decision making is decentralized
- Not clear how one way leases handled, as well as rebalancing moves
- In peak season, do not fill all demand; turn away more short term leases
- Giving priority to longer leases increases utilization but does it increase revenue?

How might revenue management apply?

- No advance reservations
- No obvious market segmentation
- Can control availability of leases by duration
- Might control availability by type of account or itinerary
- But concern about screwing up what is already working OK

Evaluation of the revenue opportunity

- Suppose no uncertainty
    - How to compare leases of different durations?
    - How to find maximum possible revenue?

- How to apply in light of uncertainty?
    - Ability to forecast prices and demands?
    - Probabilistic analyses

d_{it} *demand for lease i in week t*

x_{it} *number of leases of type i to accept in week t*

r_{it} *revenue for accepting lease of type i in week t*

y_t *number of trailers in inventory at start of week t*

$$Max \sum_{t=1}^{52} \sum_{i=1}^{4} r_{it} x_{it}$$

$$s.t.$$

$$x_{it} \le d_{it} \qquad \forall i, t$$

$$y_t - \sum_{i=1}^{4} x_{it} \ge 0 \qquad \forall t$$

$$y_{t+1} = y_t - \sum_{i=1}^{4} x_{it} + x_{1,t-1} + x_{2,t-4} + x_{3,t-8} + x_{4,t-16} \qquad \forall t$$

$$x_{it}, y_t \ge 0$$

Findings

- Can increase revenue by 4.4%
- Can increase ROI from 12.5% to 13.1%

	Demand	Accepted	Optimal
One week	1319	877	1188
Four week	918	776	894
Eight week	746	703	623
Sixteen wk	762	725	744

LP provides shadow price for each week: the marginal value of having one additional trailer for that week

WEEK	SHADOW PRICE
9/7/97	$0.0
9/14/97	$297.5
9/21/97	$287.3
9/28/97	$50.4
10/5/97	$350.0
10/12/97	$360.4
10/19/97	$423.5
10/26/97	$111.3
11/2/97	$402.5
11/9/97	$251.7
11/16/97	$287.3
11/23/97	$0.0

Can use shadow prices to get minimum daily rate to accept lease for each duration of lease

WEEK	SHADOW PRICE	ONE WEEK: MIN RATE	4 WEEK: MIN RATE	8 WEEK: MIN RATE
9/7/97	$0.0	0	$22.7	**$33.6**
9/14/97	$297.5	**$42.5**	35.2	**40.8**
9/21/97	$287.3	41.0	37.4	**39.9**
9/28/97	$50.4	7.2	**42.3**	**39.9**
10/5/97	$350.0	**50.0**	44.5	39.1
10/12/97	$360.4	**51.5**	46.4	32.8
10/19/97	$423.5	**60.5**	42.5	26.4
10/26/97	$111.3	15.9	37.6	18.8
11/2/97	$402.5	**57.5**	33.6	16.8
11/9/97	$251.7	36.0	19.3	9.6
11/16/97	$287.3	41.0	10.3	5.1
11/23/97	$0.0	0	0	0

Steps for Implementation

- Need detailed data to get estimates of weekly demand and prices at each branch

- Branch managers will need help and training in setting lease controls

- Need run pilots to gain experience and develop credibility