Hybrid Forecasting & Fare Adjustment at Lower Load Factor

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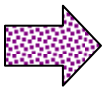
Objectives

- ***Previous studies showed that fare adjustment combined with hybrid forecasting yields little, if any, improvements from hybrid forecasting alone.***

- ***It was observed that the base load factor was high (87%) and that fare adjustment might be more suited for a lower demand.***



Hence, analyzed the incremental benefits of fare adjustment in Network S4 at a lower demand factor.

Presentation Outline

Airline 2 & 4 Using Standard Forecasting

- Different Frat5's at a demand factor of 0.8
- Different demand factors for Frat5c

Airline 2 & 4 Using Hybrid Forecasting

Simulation Set-Up: Fare Adjustment with 4 scaling factors

Simulations are run in the network S4 with Airline 1 using DAVN with different forecasters. The demand factor used to be 0.9 in previous simulations. It is now set to 0.8.

Airline 1 – DAVN with

- Standard Forecasting
- Hybrid Forecasting with different frat5's
- Hybrid Forecasting & Fare Adjustment with different frat5's & scaling factors

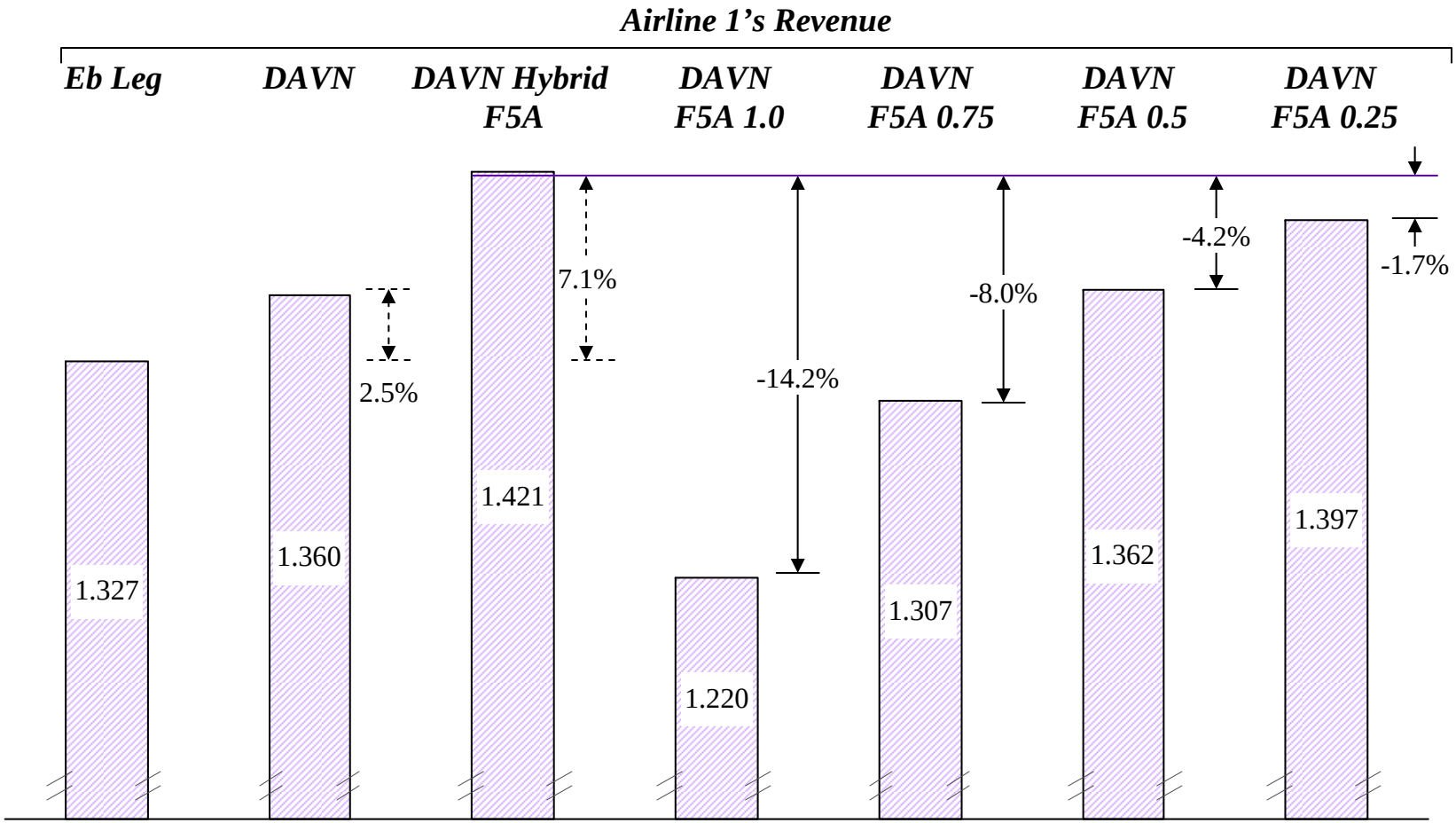
Airline 2 – DAVN with Standard Forecasting

Airline 3 – AT90

Airline 4 – DAVN with Standard Forecasting

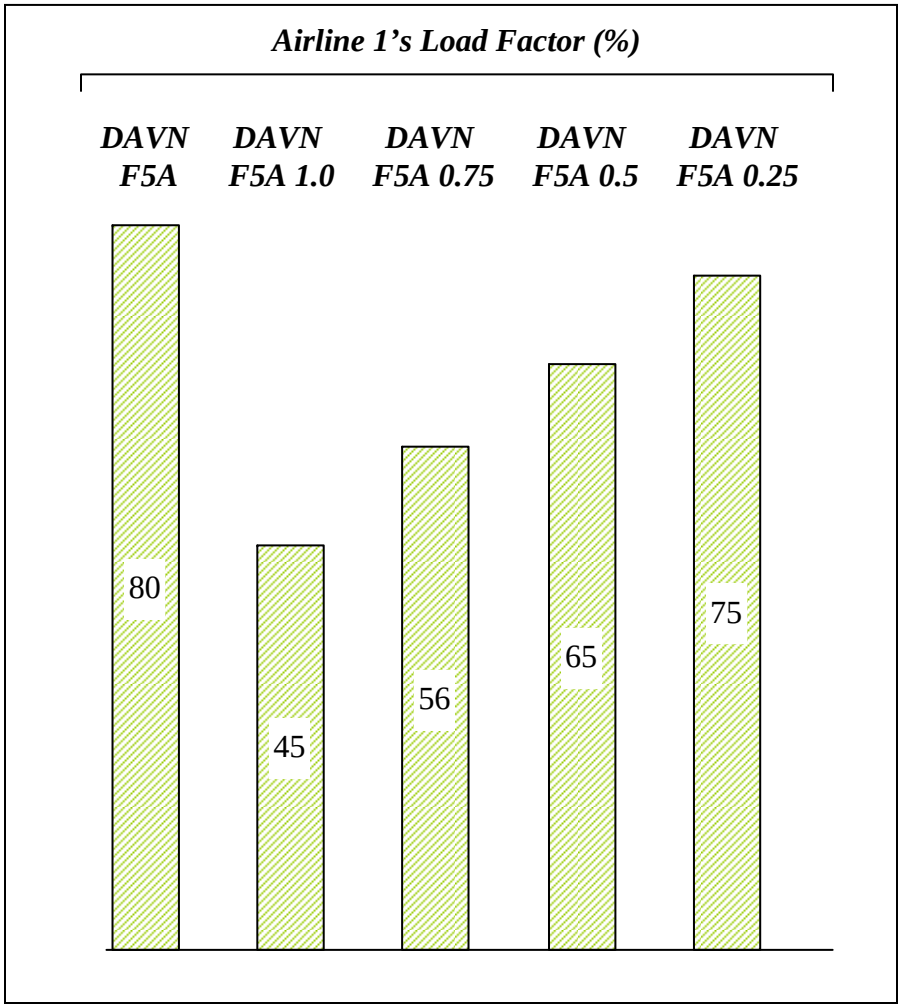
Frat5a & DM 0.8 – Airline 1's Revenue

Fare adjustment does not provide any increase in revenue from hybrid forecasting alone.

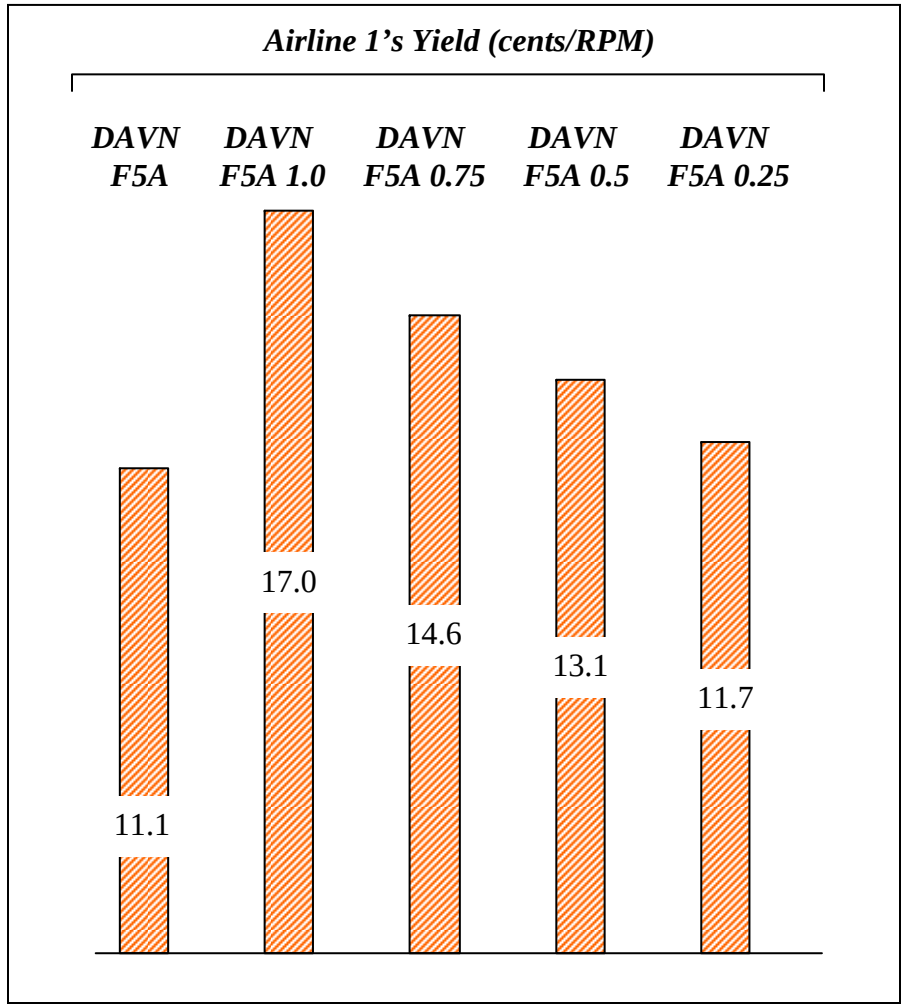


Frat5a & DM 0.8 – Airline 1's Load Factor & Yield

The load factors are much lower with fare adjustment.

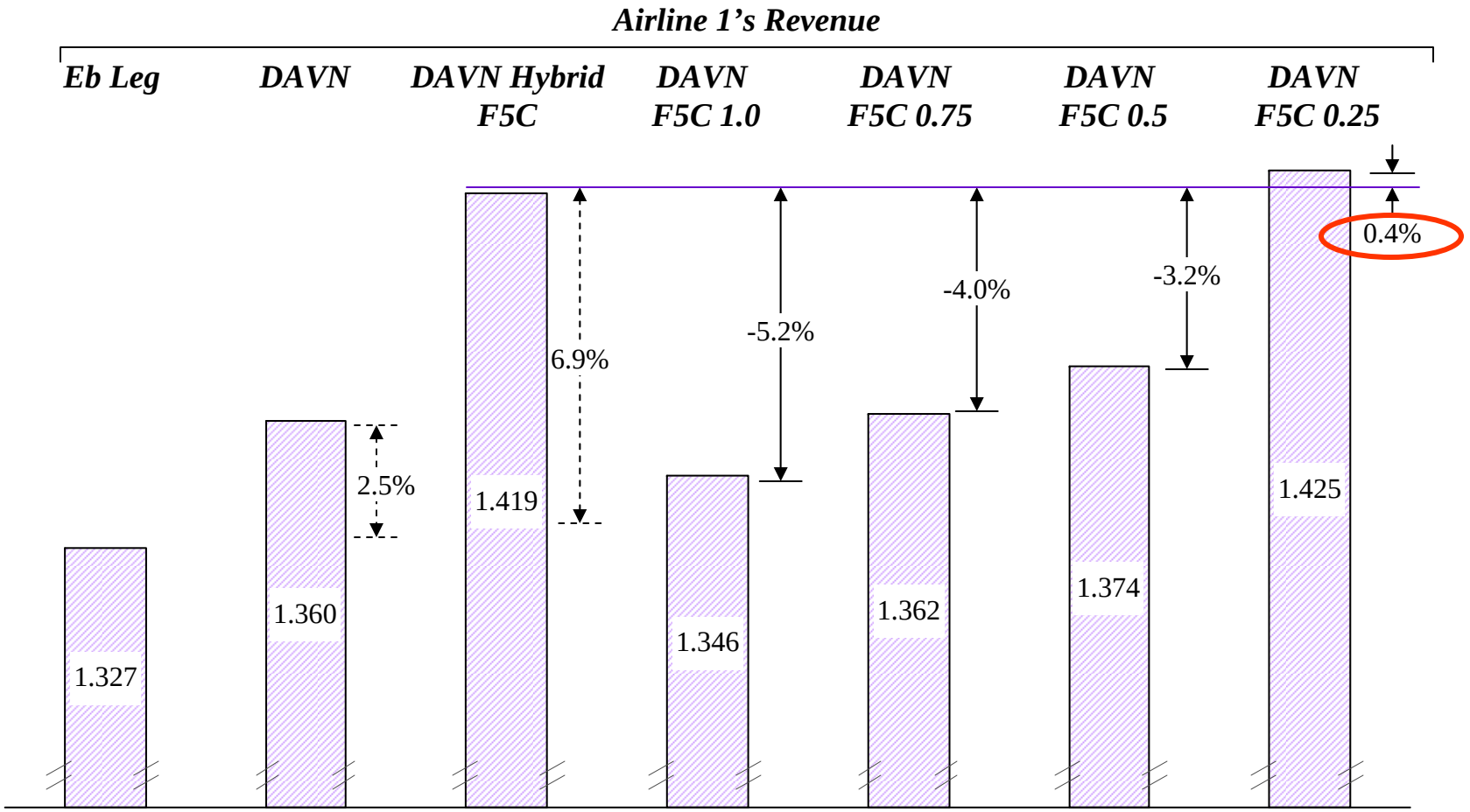


The yield decreases with the scaling factor, but remains higher than with hybrid alone.



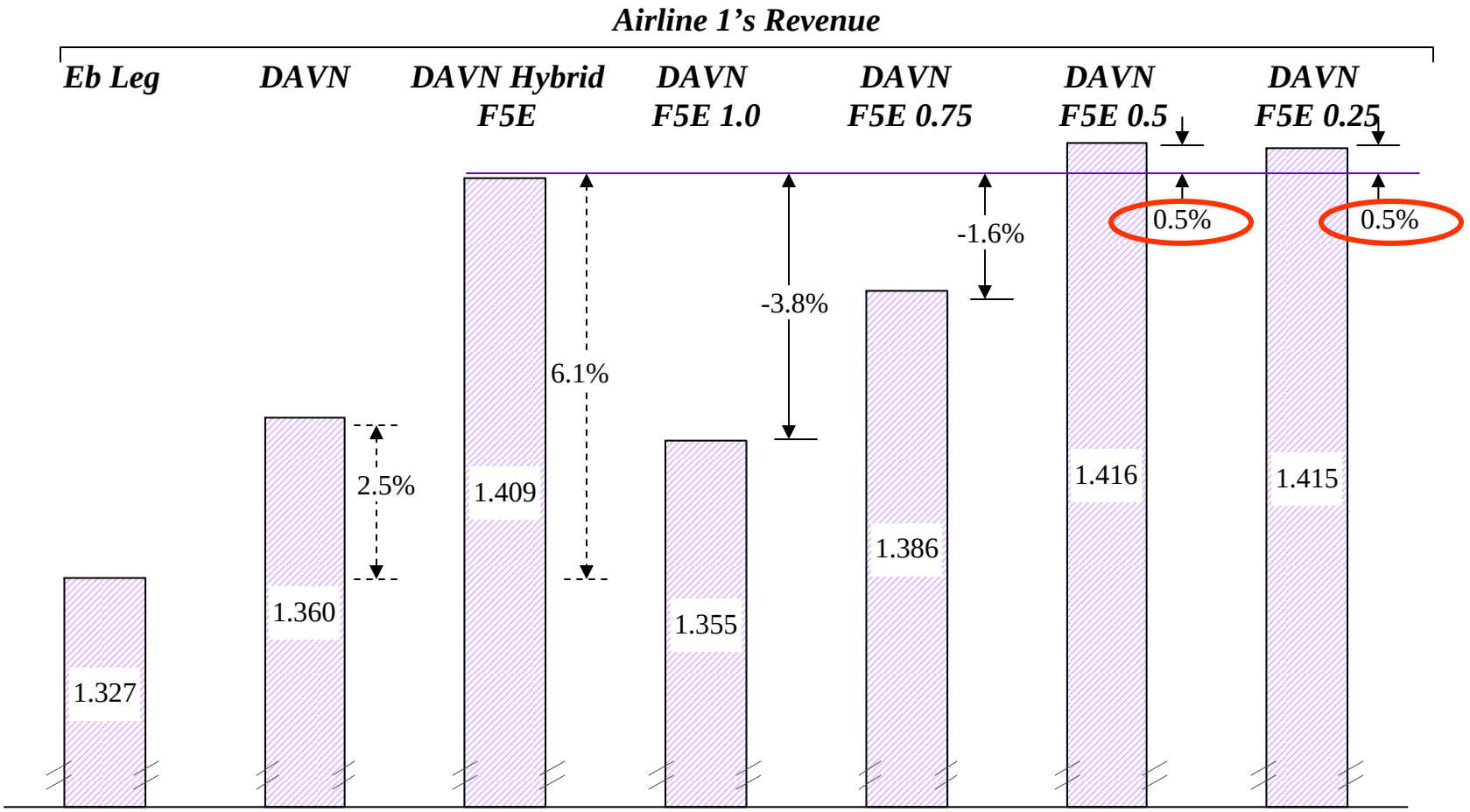
Frat5c & DM 0.8 – Airline 1's Revenue

Fare adjustment performs slightly better than hybrid forecasting with a scaling factor of 0.25. The same observation was true when the demand factor was higher (0.9).

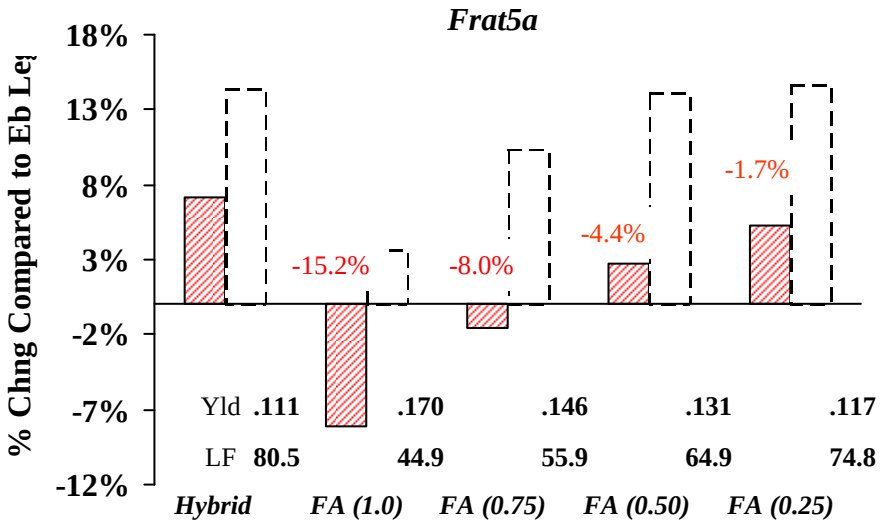


Frat5e & DM 0.8 – Airline 1's Revenue

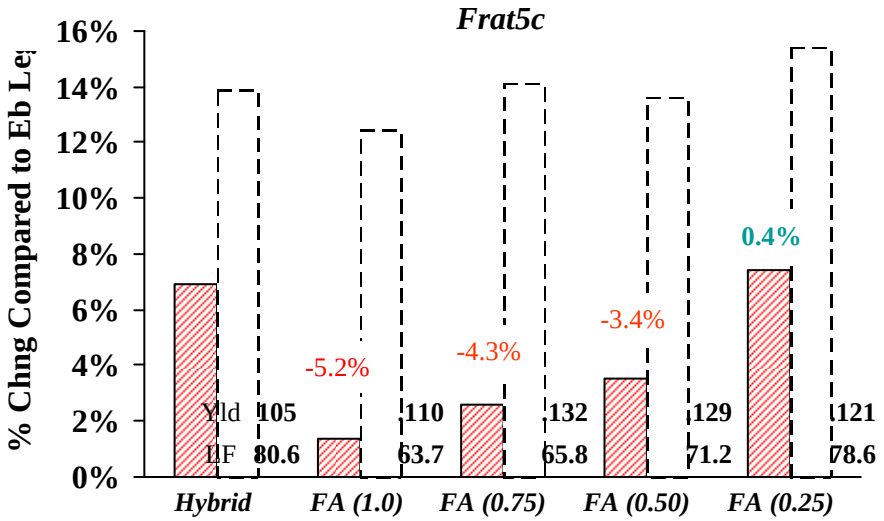
Additional revenues are generated with the two lowest scaling factors but the increase remain modest (0.5%).

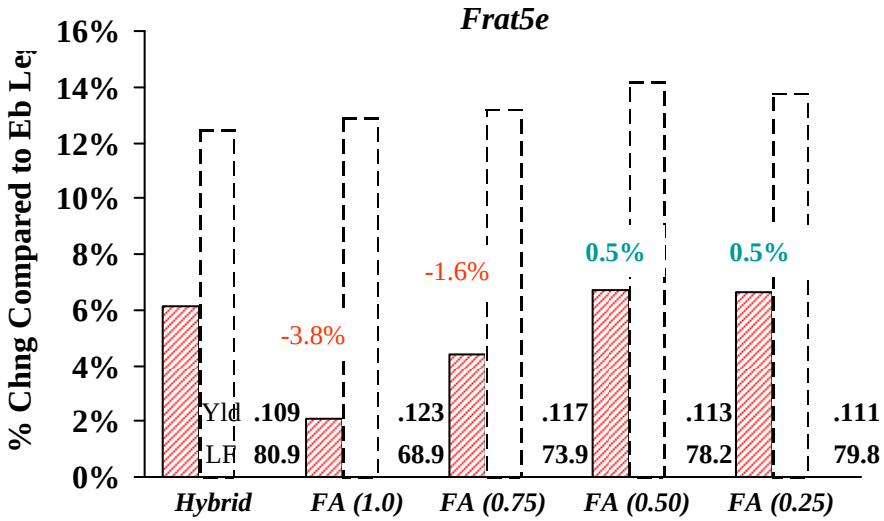


Summary of Revenue changes (DM 0.8)



- ***Revenue changes got worse with lower demand factor.***
- ***The relative performance of fare adjustment increases with lower frat5's.***
- ***The lower scaling factors yield better results.***
- ***The best scaling factor increases with lower frat5's.***

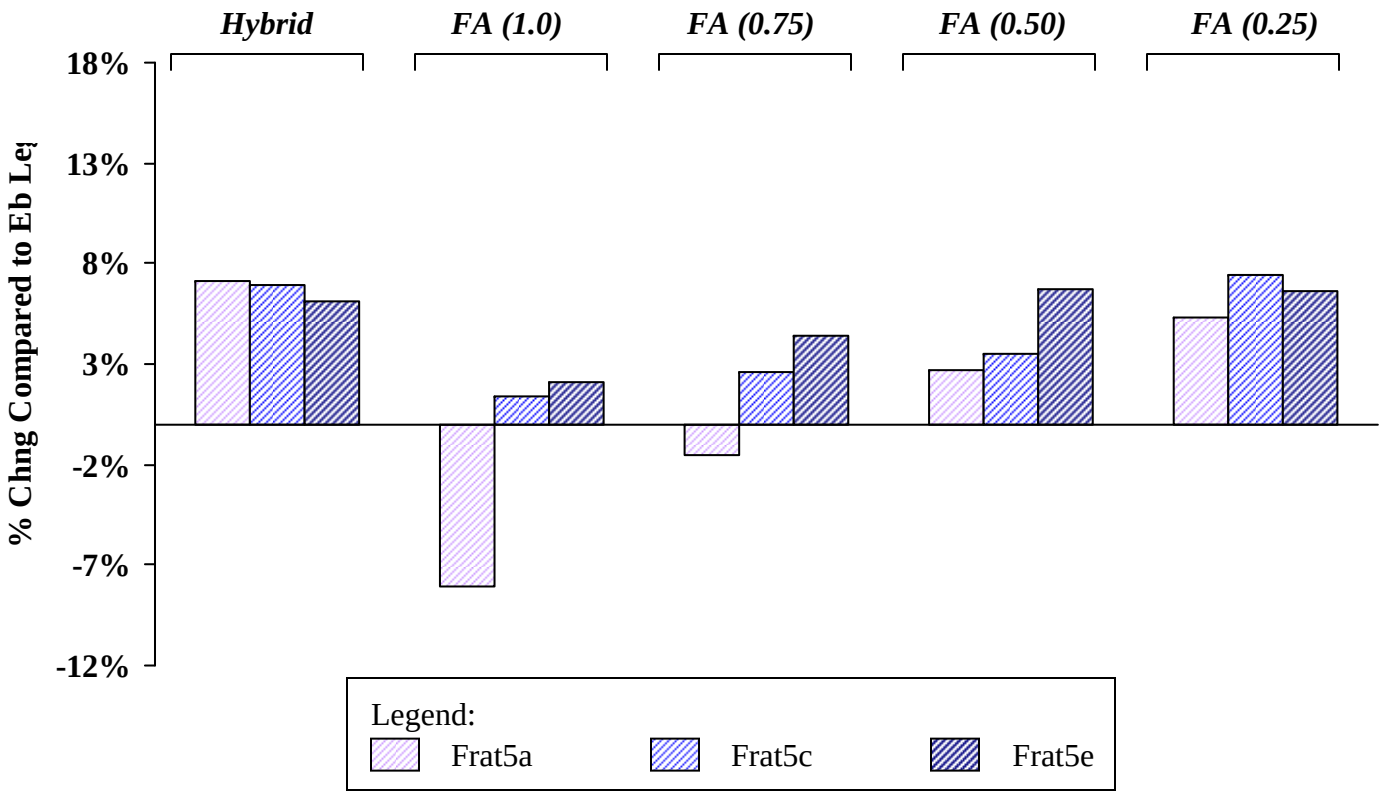




Legend: DM 0.8 DM 0.9

Summary of Revenue changes (DM 0.8)

Fare adjustment yields the best results with frat5c and a scaling factor of 0.25 (similar observation with DM 0.9): 0.4% increase from hybrid forecasting alone.



Presentation Outline

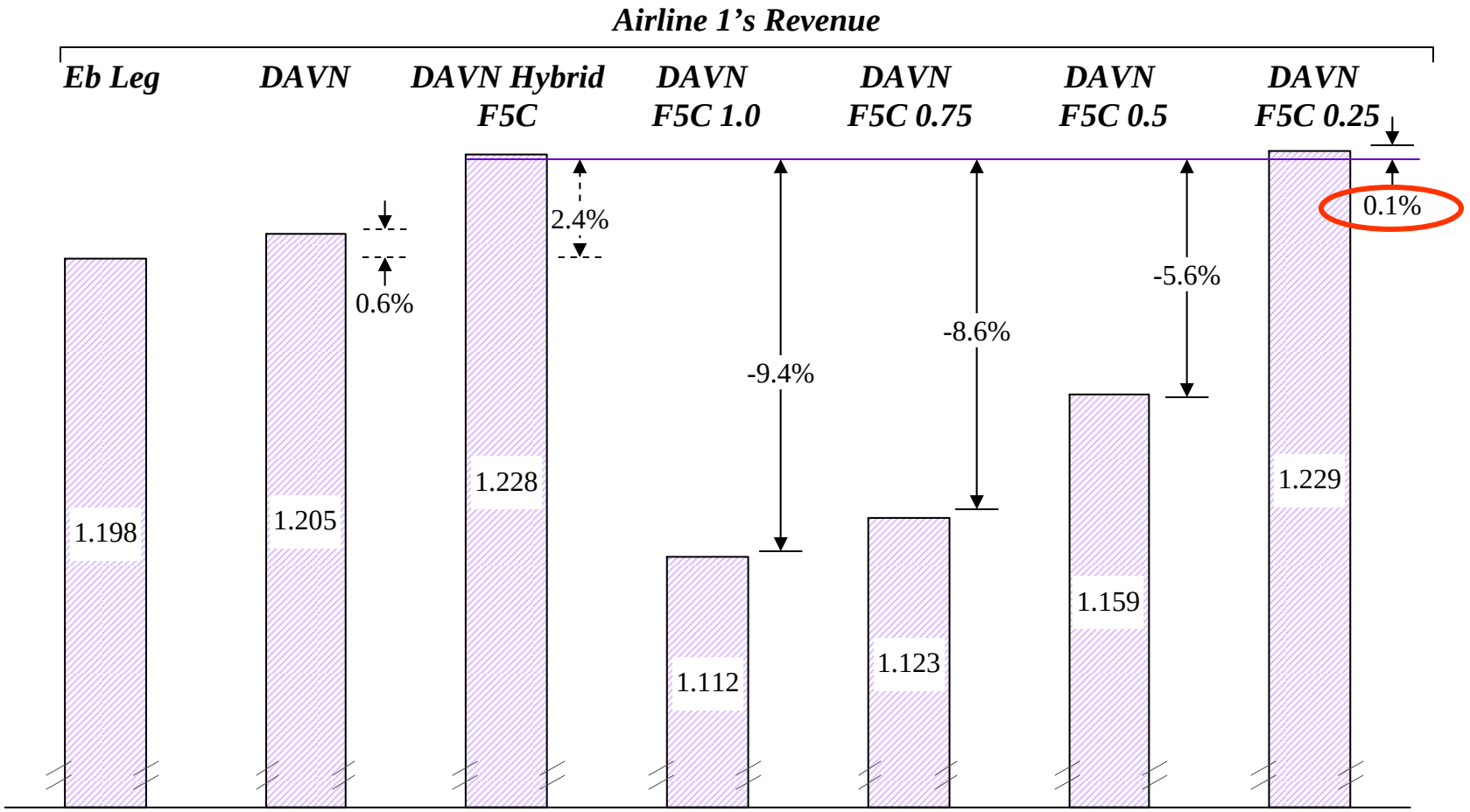
Airline 2 & 4 Using Standard Forecasting

- Different Frat5's at a demand factor of 0.8
- Different demand factors for Frat5c

Airline 2 & 4 Using Hybrid Forecasting

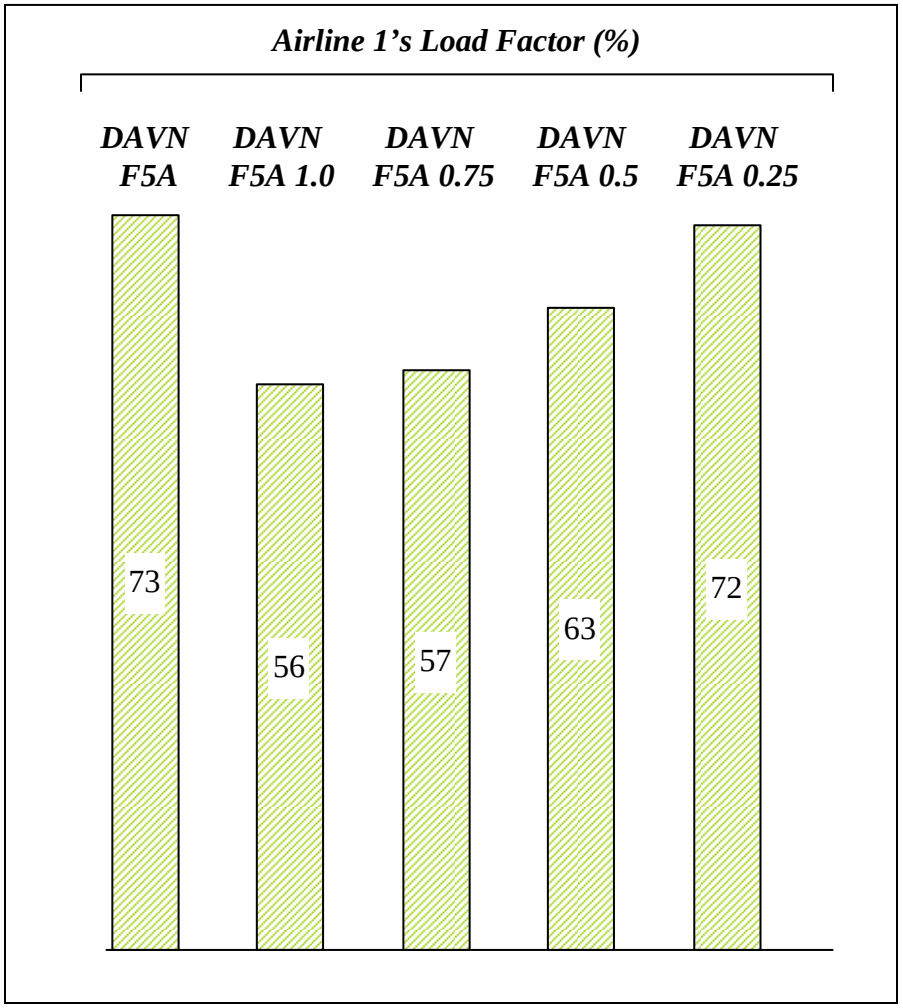
Frat5c & DM 0.7 – Airline 1's Revenue

Slight increase with a scaling factor of 0.25. The same observation was true when the demand factor was higher. The increase however decreases with demand factor.

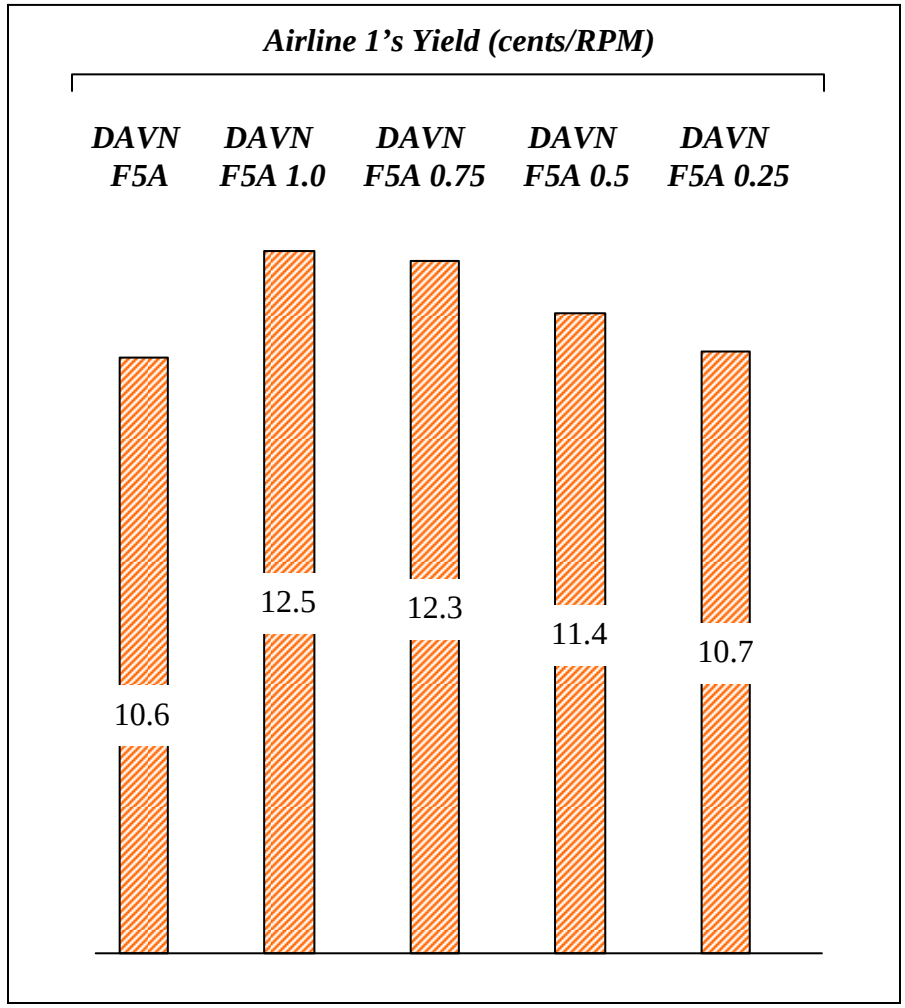


Frat5c & DM 0.7 – Airline 1's Load Factor & Yield

The load factors are much lower with fare adjustment.

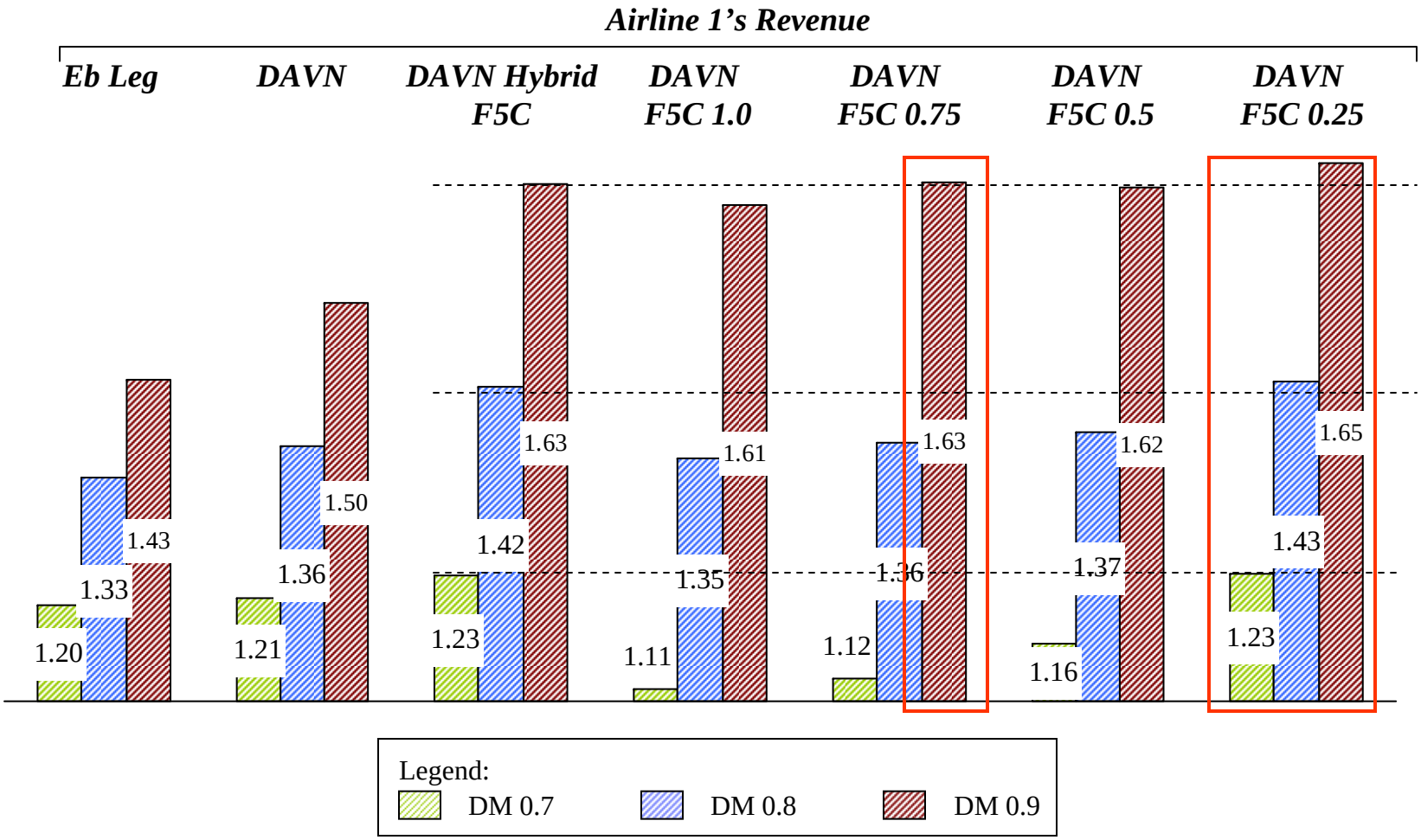


The yield decreases with the scaling factor, but remains higher than with hybrid alone.



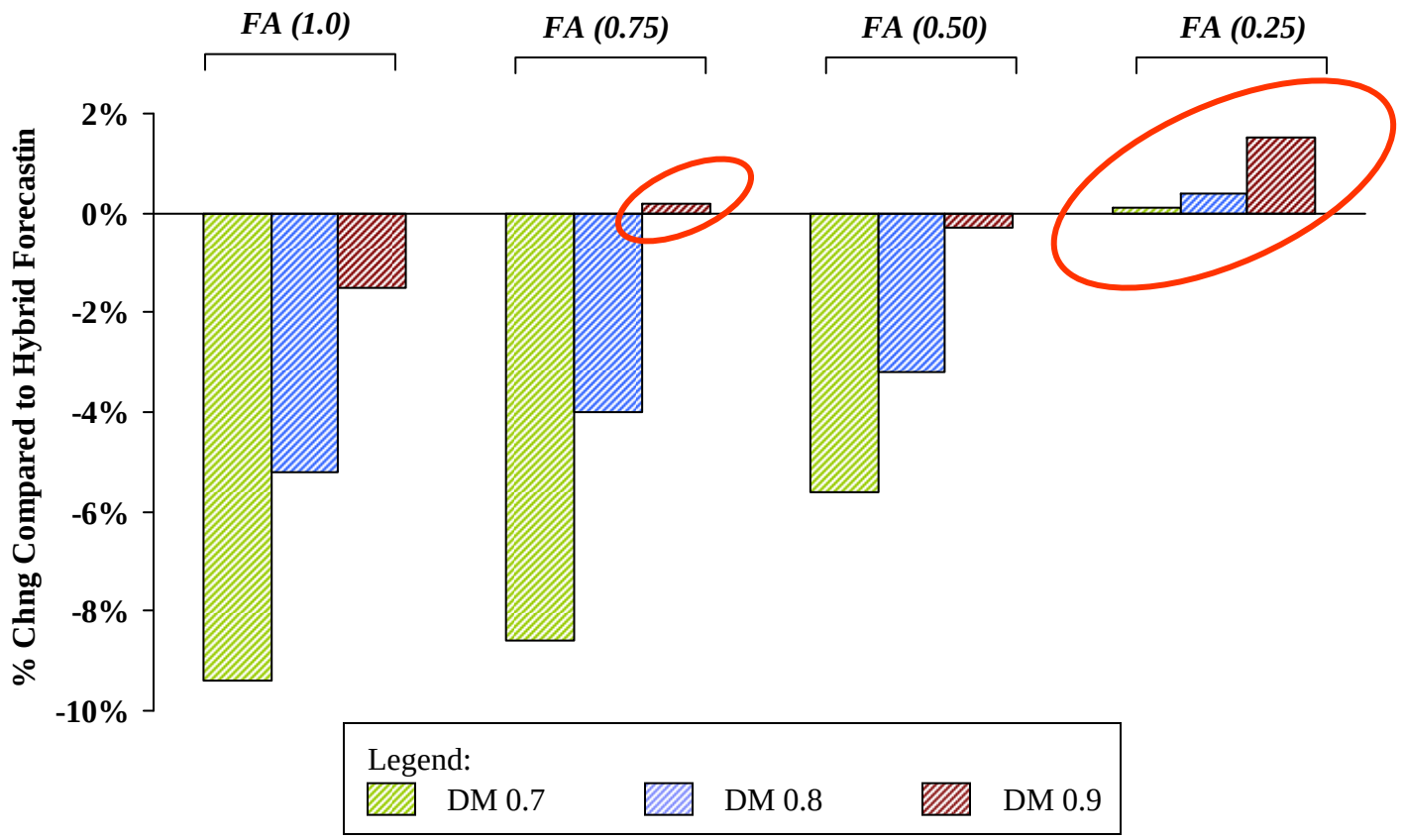
Frat5c Summary – Airline 1's Revenue

For Frat5c, fare adjustment with a scaling factor of 0.25 always outperforms hybrid forecasting, however the increase is small (0.1-1.3%)

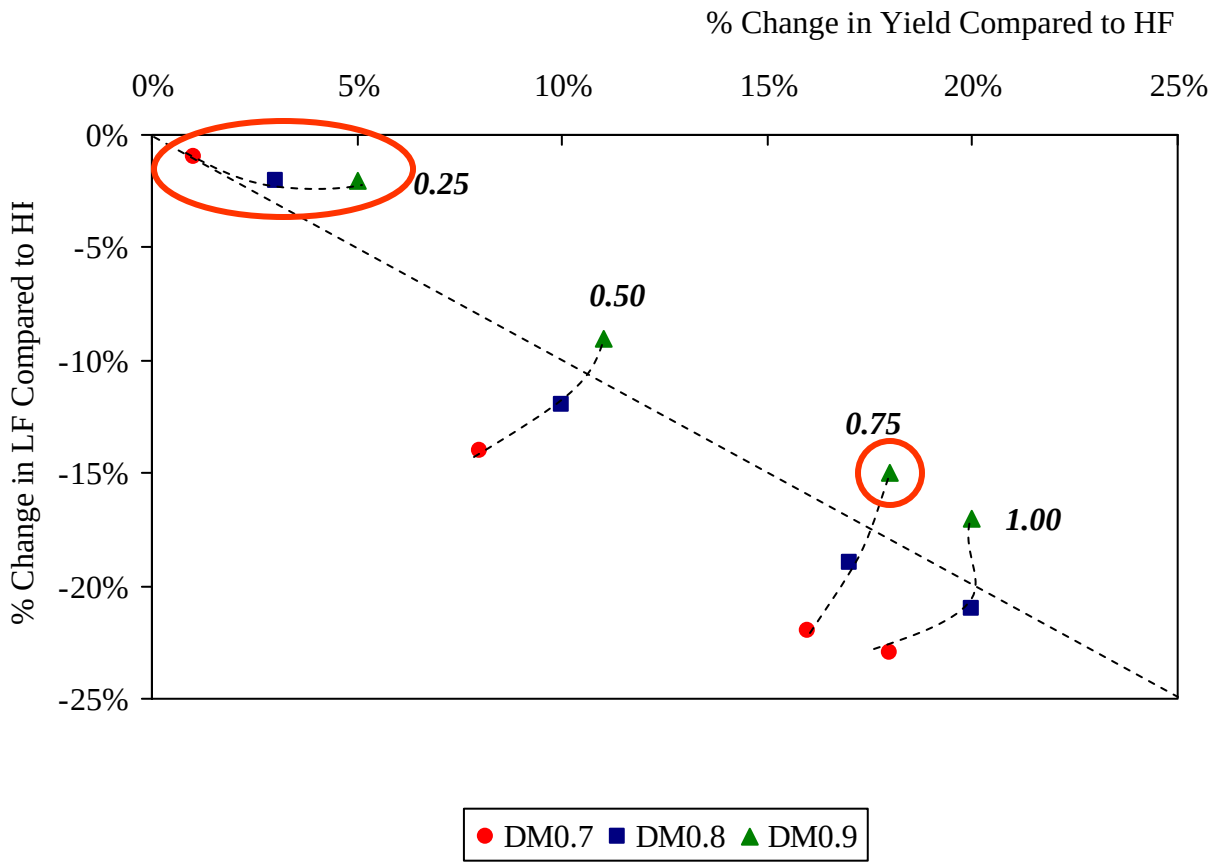


Frat5c Summary – Airline 1's Revenue

Fare adjustment does not perform better at a lower demand.



Frat5c Summary – Airline 1's Load Factor & Yield



Presentation Outline

Airline 2 & 4 Using Standard Forecasting

Airline 2 & 4 Using Hybrid Forecasting

Simulation Set-Up: Fare Adjustment with 4 scaling factors

Airline 2 & 4 now use hybrid forecasting. Simulations are still run in the network S4. The demand factor is 0.8

Airline 1 – DAVN with
- Standard Forecasting
- Hybrid Forecasting with different frat5's
- Hybrid Forecasting & Fare Adjustment with different frat5's & scaling factors

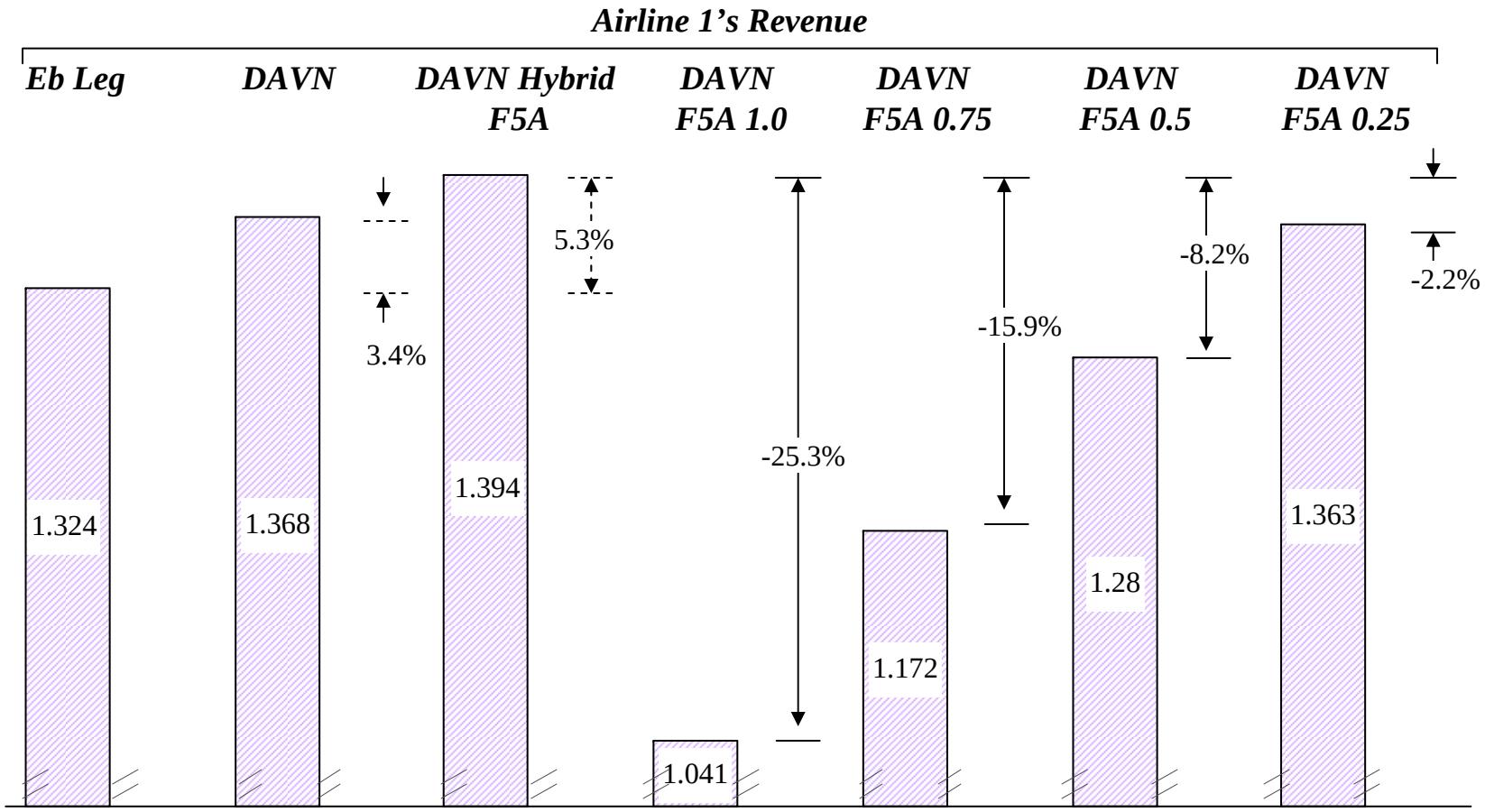
Airline 2 – DAVN with ***Hybrid Forecasting***

Airline 3 – AT90

Airline 4 – DAVN with ***Hybrid Forecasting***

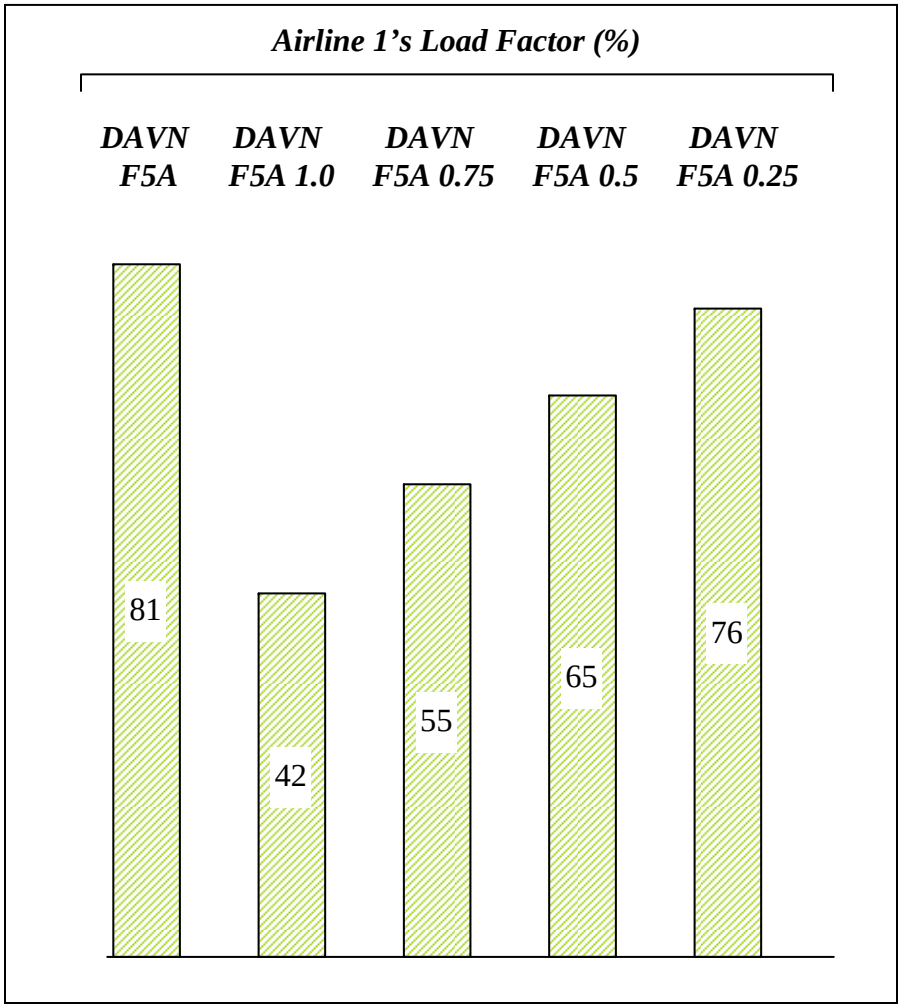
Frat5a – Airline 1's Revenue

Fare adjustment does not perform as well as hybrid forecasting alone.

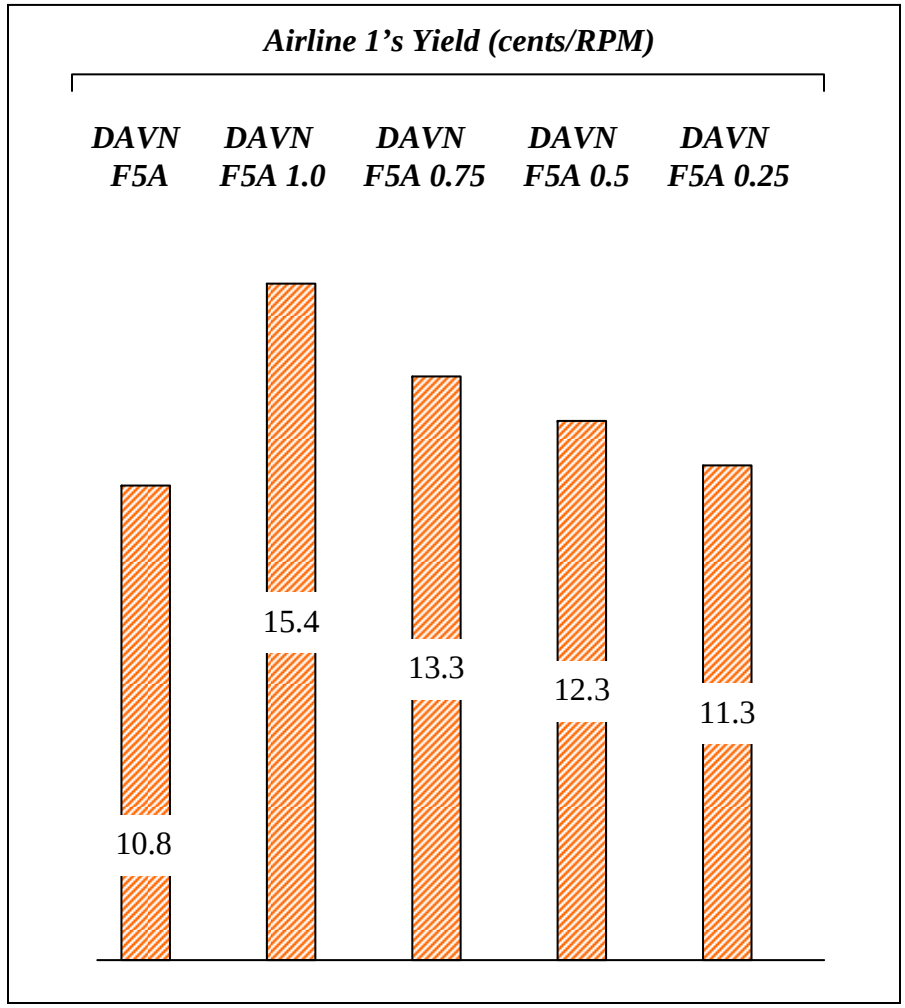


Frat5a – Airline 1's Load Factor & Yield

Sharp decrease in load factor with fare adjustment.

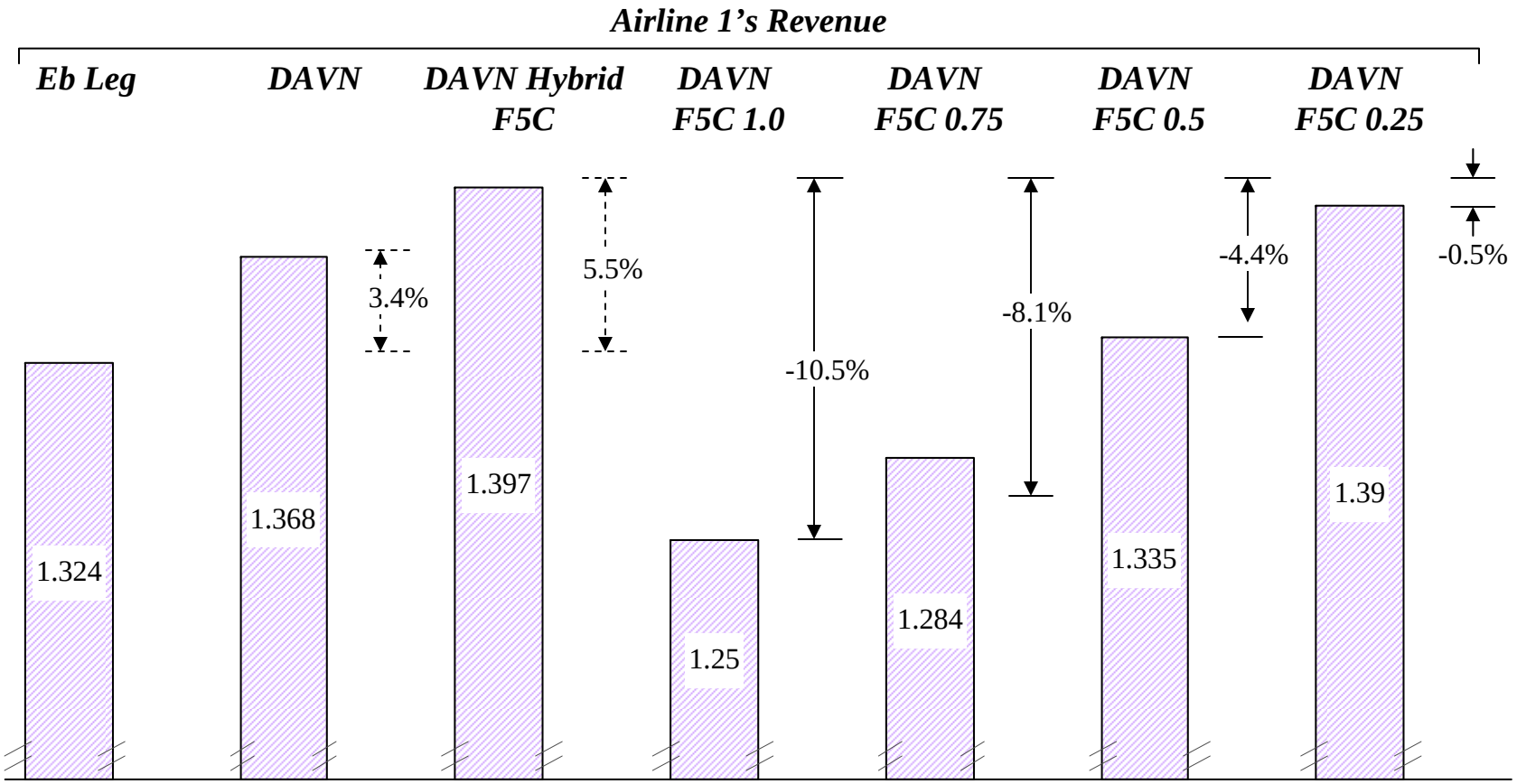


The yield decreases with the scaling factor, but remains higher than with hybrid alone.



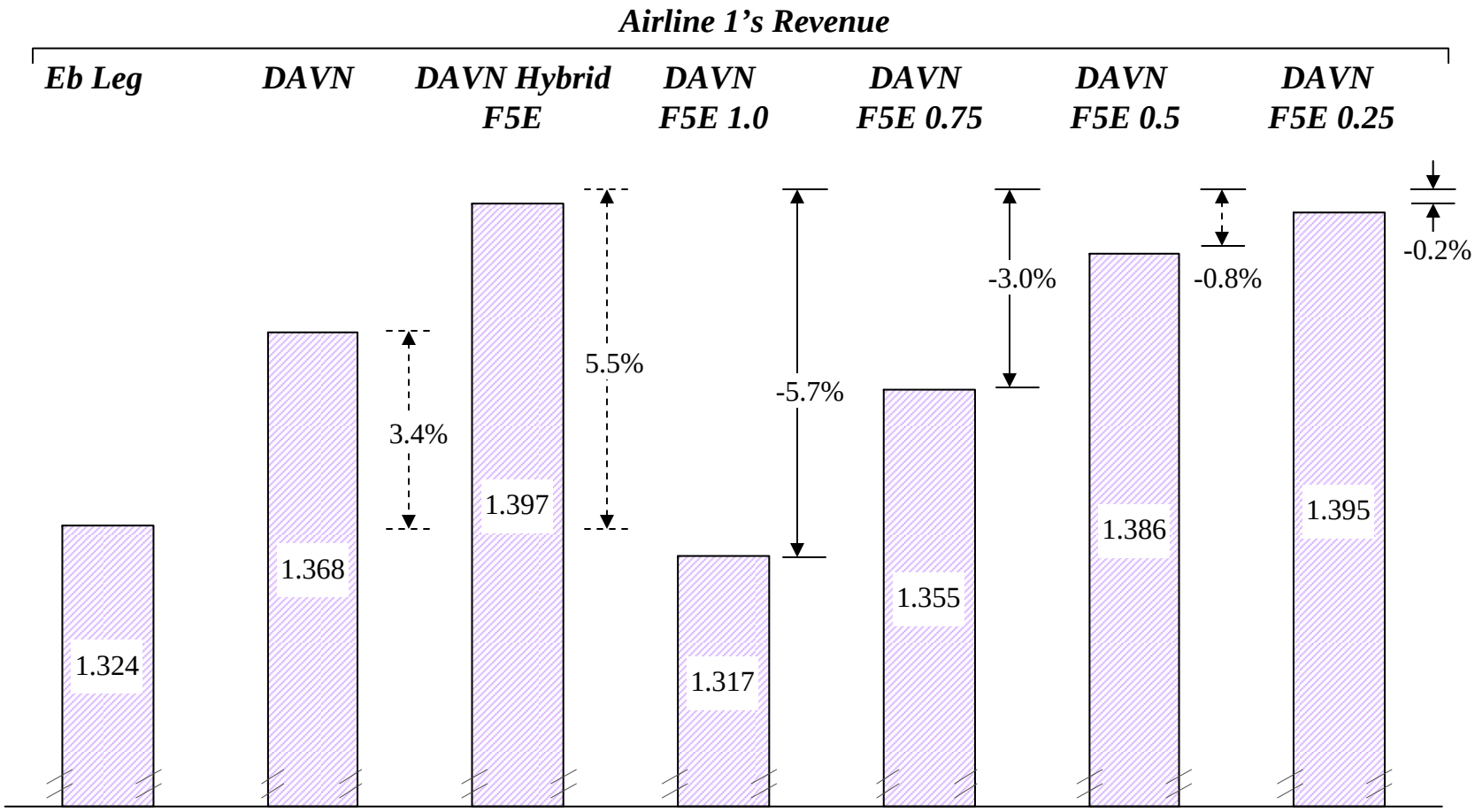
Frat5c – Airline 1's Revenue

Fare adjustment is still outperformed by hybrid forecasting.

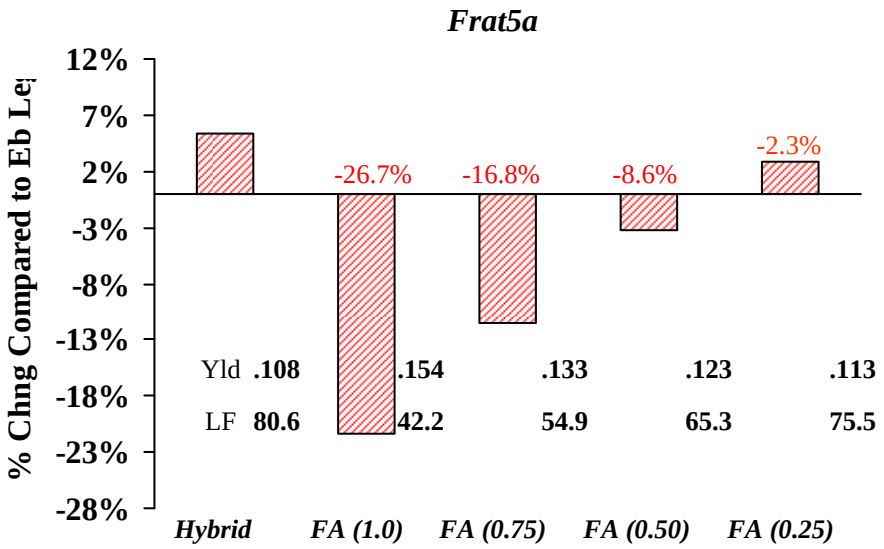


Frat5e – Airline 1's Revenue

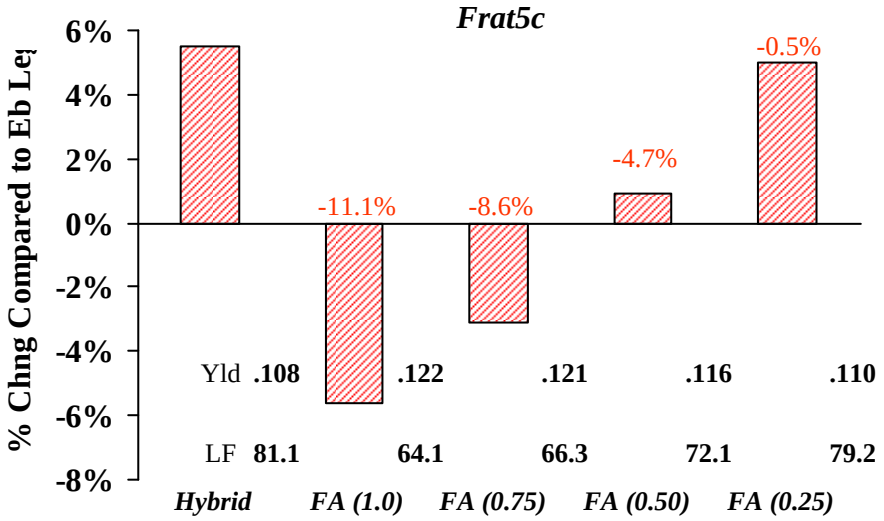
Fare adjustment still does not perform as well as hybrid forecasting alone.

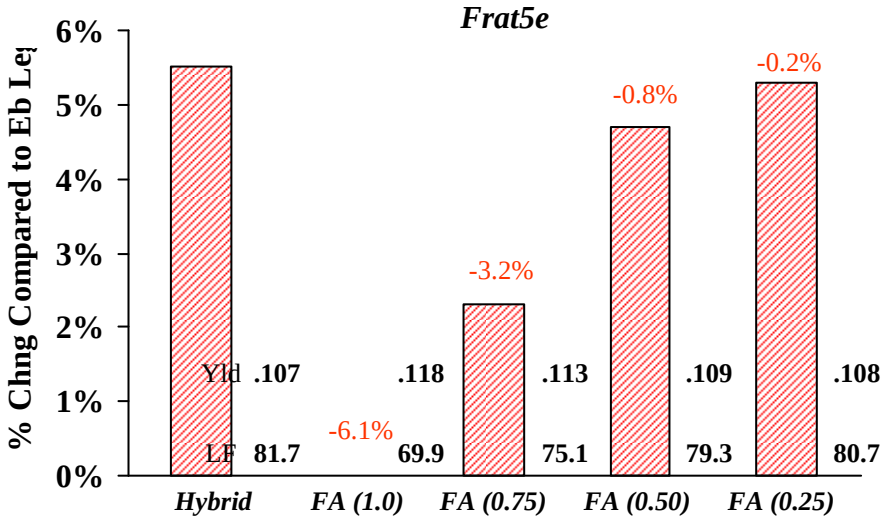


Summary of Revenue changes



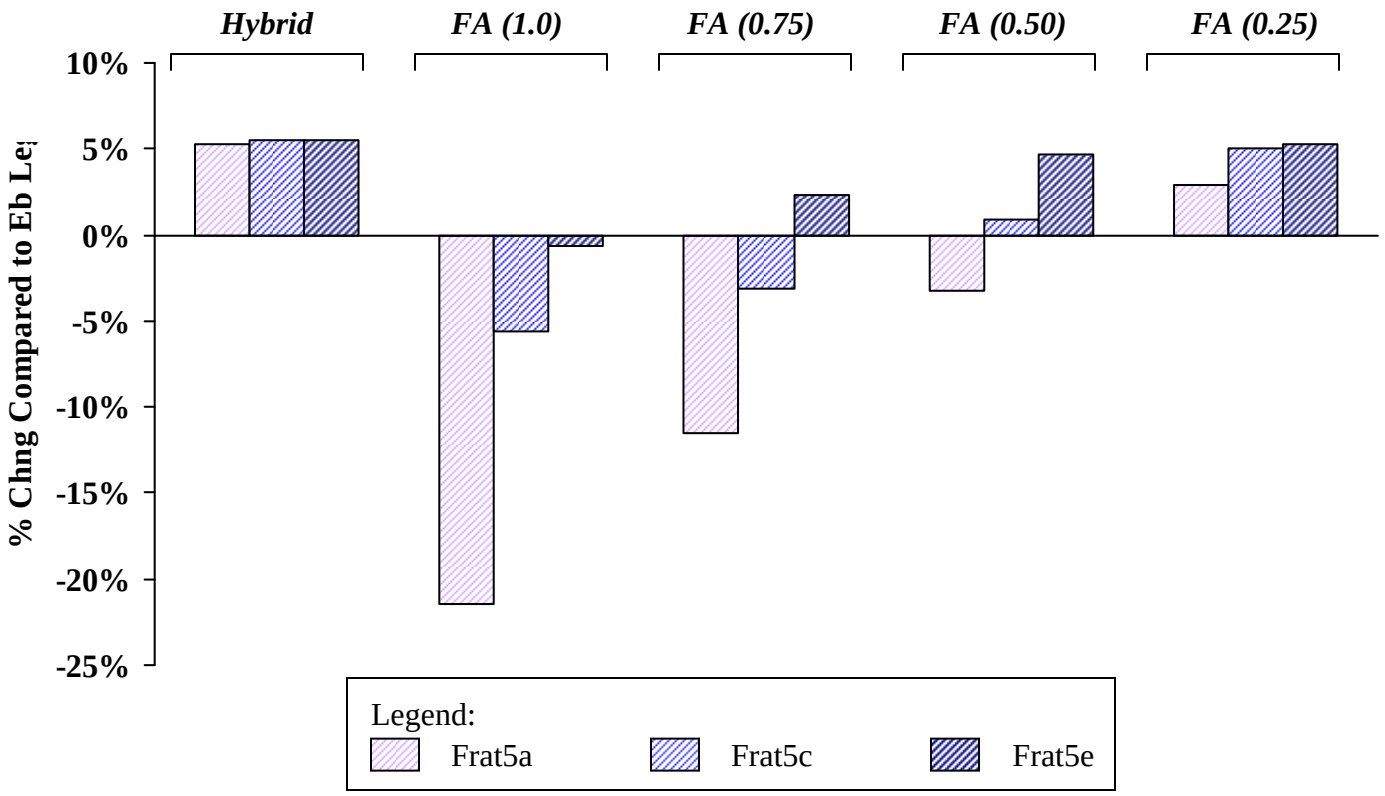
- ***The performance of fare adjustment decreases with the demand factor.***
- ***Fare adjustment does not perform as well as hybrid forecasting alone when other airlines use hybrid forecasting. However, the revenue changes improve as the scaling factor decreases.***





Summary of Revenue changes

Fare adjustment yields the best results with a scaling factor of 0.25.



Conclusion

- ***The performance of fare adjustment is not better for a lower load factor in Network S4.***
- ***Hybrid forecasting alone still provides the greatest portion of increase in revenue.***
- ***Fare adjustment combined with hybrid forecasting yields at most minimal improvements, even when no estimators are used.***