

A decorative horizontal bar with a repeating pattern of red, black, and yellow segments.

2-for-2 Slot Trading in GDPs



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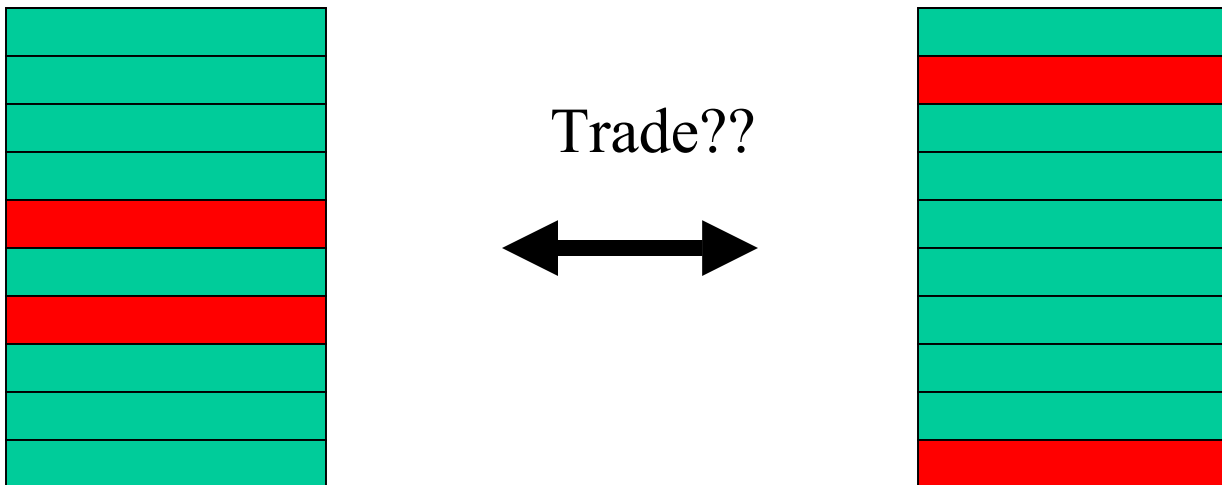
University of Maryland

College Park, MD

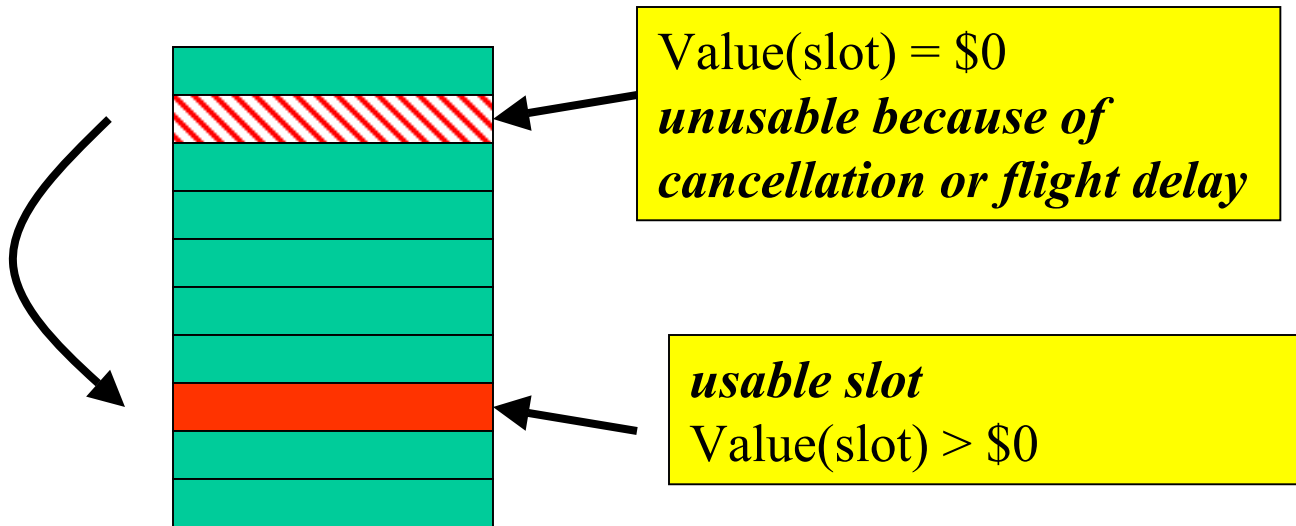
joint work with Thomas Vossen

1-for-1 trades to 2-for-2 trades

- Compression and/or slot credit substitution can be interpreted as a 1-for-1 trading system, i.e. offers involve giving up one slot and getting one in return (many offers are processed simultaneously)
- What about k-for-k or k-for-n offers, e.g. 2-for-2:

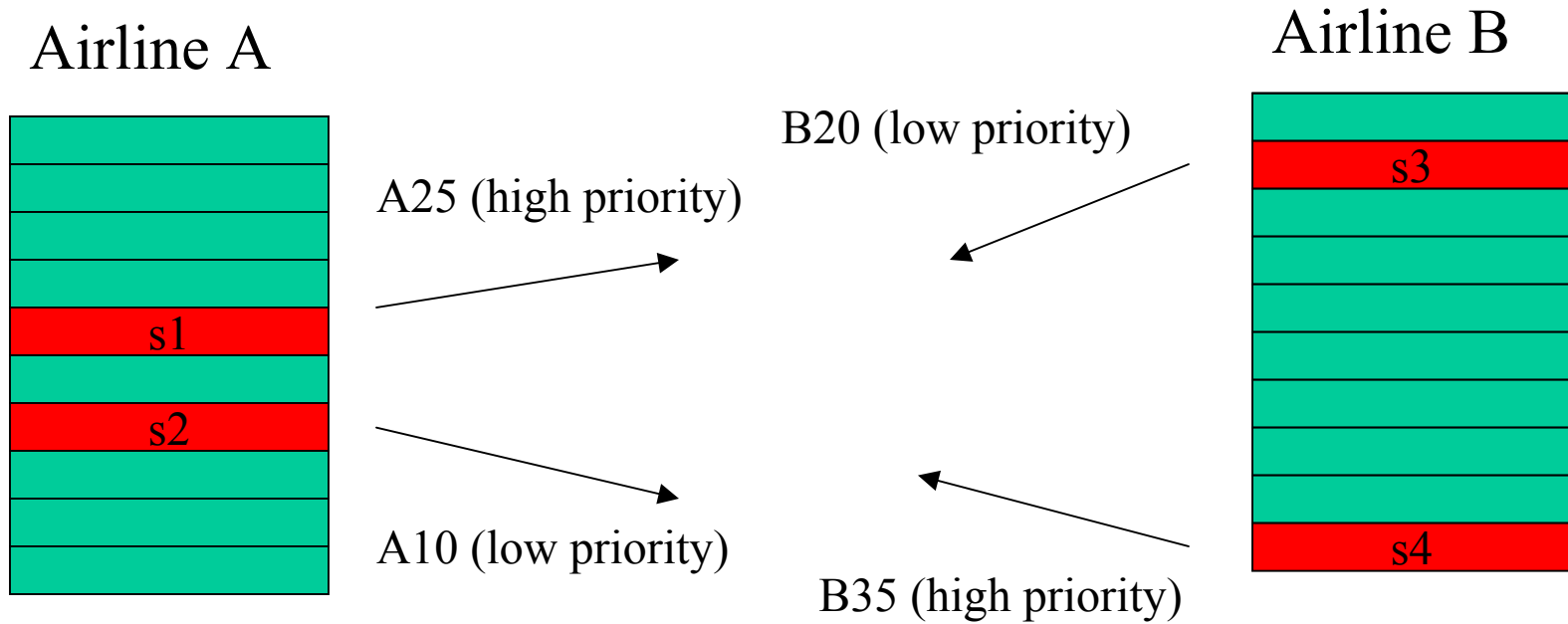


Value proposition for compression & SCS



SCS/Compression “trades” are always driven by the exchange of a slot with value 0 and a slot with value > 0!!

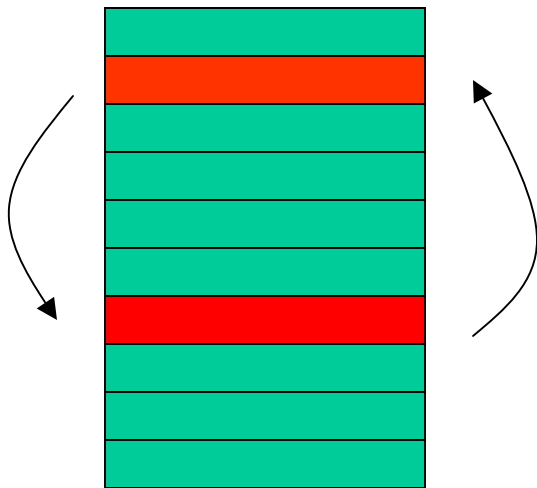
2-for-2 trades enable airlines to profit by exchanging pairs of usable slots that result in an increase in overall value to the carrier.



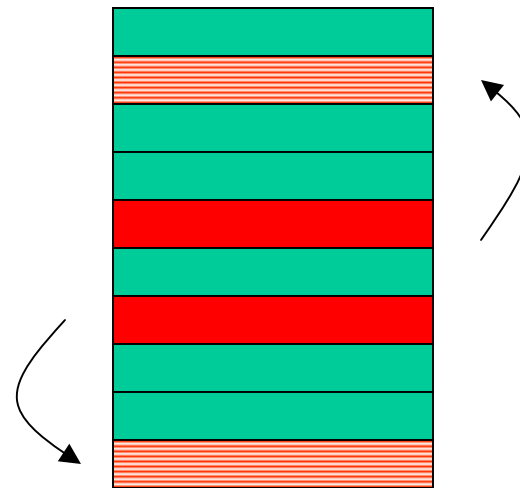
A's value proposition: $val_A(s3) - val_A(s1) + val_A(s4) - val_A(s2) = 2000 - 1500 + 300 - 500 = \300

B's value proposition: $val_B(s1) - val_B(s3) + val_B(s2) - val_B(s4) = 500 - 800 + 2500 - 1800 = \400

Another view of 2-for-2 trading: generalized substitutions



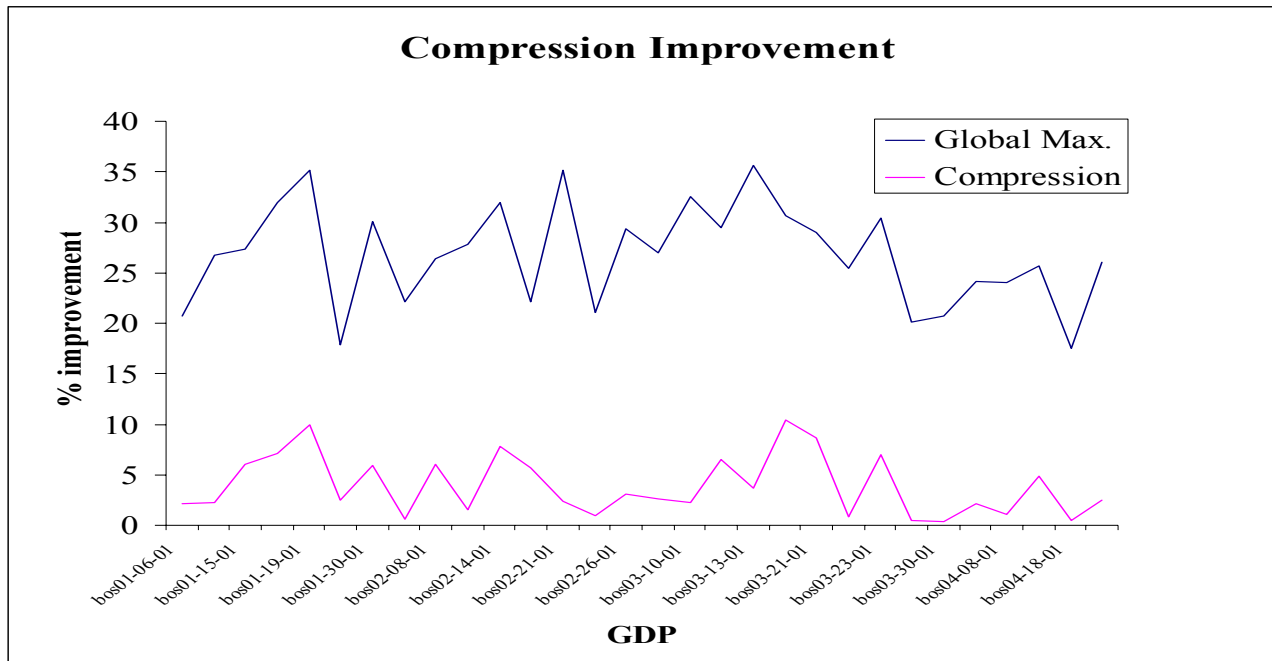
Normal Sub



Generalized Sub

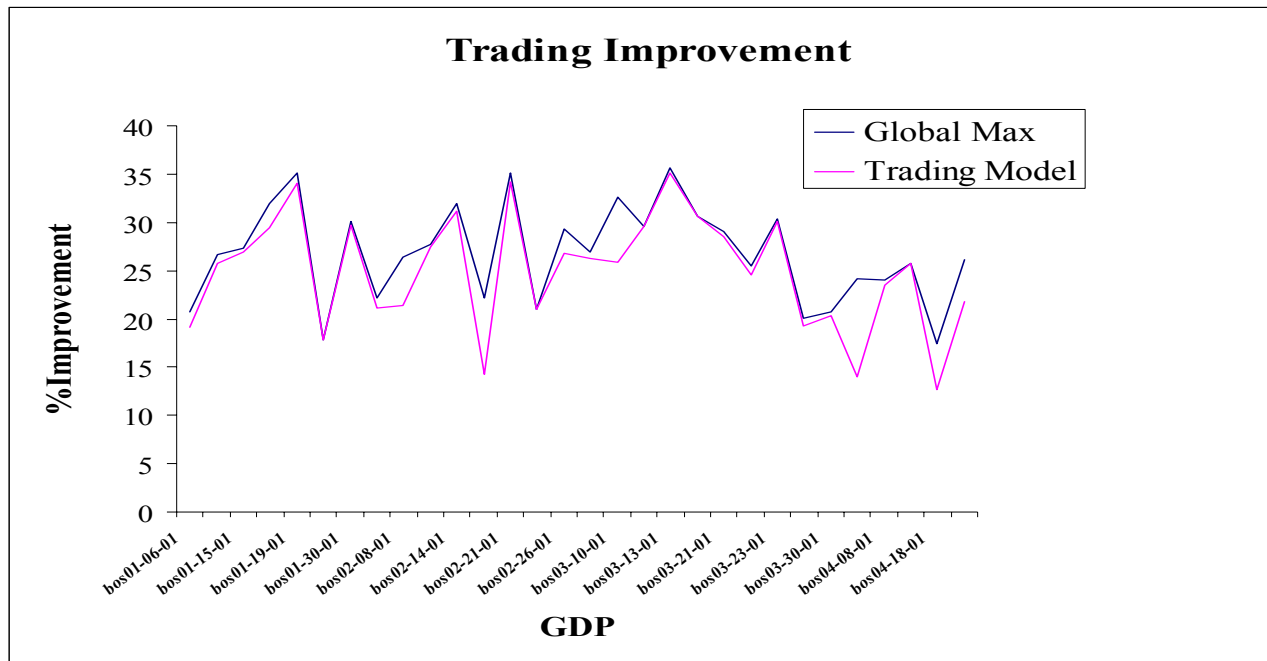
Sample airline performance function: On-Time (Flight) Performance

- Compression Benefits
 - performance improvement if compression executed after flts with excessive delay (>2hrs) are canceled



Improvement Using 2-for-2 Trading System

- 2-for-2 Trading Model:
 - proposed offers: all at-least, at-most pairs that improve on-time performance

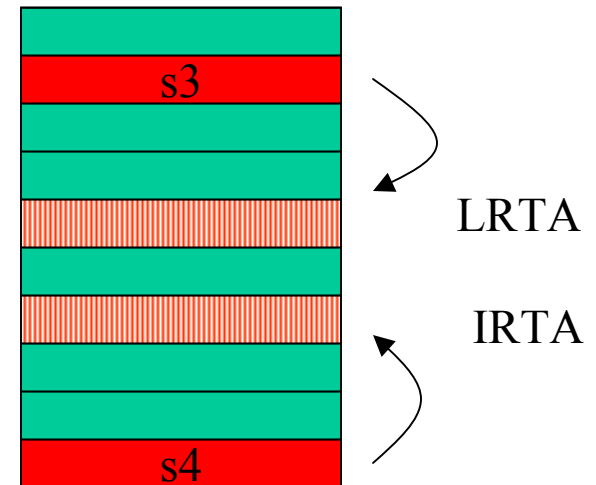


Computational Efficiency:

- 13sec avg.
- 67% solved by LP relaxation

Implementation

- Airlines specify for each flight:
 - Ideal runway time of arrival (IRTA)
 - Latest runway time of arrival (LRTA)
 - High priority flights:
 - $LRTA = CTA$; $IRTA < CTA$
 - Low priority flights:
 - $IRTA = CTA$; $LRTA > CTA$



Compression (or SCS) –like procedure looks for groups of mutually beneficial exchanges