EA Maven

The Monopoly Advantage in Urban Air Mobility

Our Cambridge network modelling using AeroTesseract reveals that single-operator structures deliver up to 15.7% higher profits, 10.7% better fleet utilisation, and 7.5pp stronger load factors.

Here's why the data challenges the assumption that competition is always best.

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+15.7%	+10.7%	+7.5pp	-16%
PROFIT ADVANTAGE	**FLEET UTILISATION**	**LOAD FACTOR**	**CAPEX SAVINGS**
Monopoly vs parallel	Higher flights/aircraft	Better demand capture	Lower infra cost

As the Advanced Air Mobility (AAM) industry moves toward commercial operations, a fundamental question looms over regulators, investors, and operators alike: should emerging UAM markets be structured as monopolies or opened to competition from day one?

At EA Maven we used our AeroTesseract™ dashboard to run three rigorous scenario analyses on a 10-route hub network centred on Cambridge, serving approximately 2,600 passengers per week with 4-seat eVTOL aircraft. We tested three configurations:

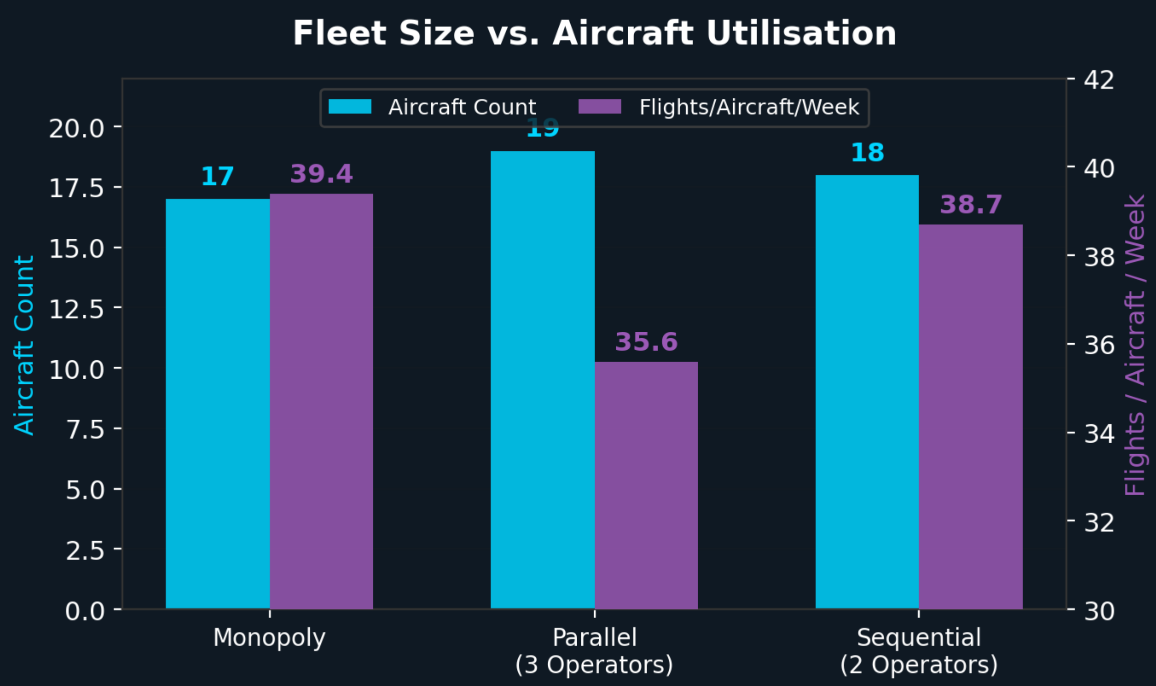
Scenario A - Monopoly: Single operator, 17 aircraft, full network optimisation across all 10 routes.

Scenario B - Parallel Competition: Three operators (1 large + 2 small) competing on the same routes. 19 aircraft total.

Scenario C - Sequential Split: Two operators with exclusive route assignments by profitability (top 5 vs next 5). 18 aircraft total.

1 Fleet Efficiency: More Aircraft, Less Output

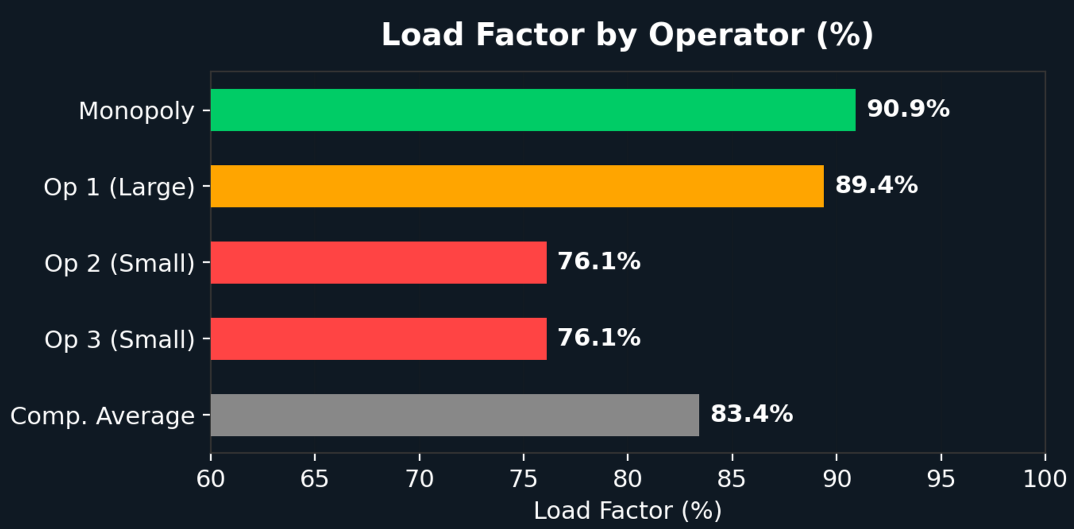
Competition requires more aircraft to serve the same demand. Parallel competition needs two extra aircraft (+11.8%), while sequential splitting requires one additional (+5.9%). Yet neither delivers proportionally more flights - parallel competition adds just 0.9% more flights with those extra aircraft.



The efficiency gap is stark:
A monopoly achieves 39.4 flights per aircraft per week versus just 35.6 under parallel competition - a 10.7% advantage from pure network optimisation. Small operators suffer most at only 34.0 flights/aircraft.

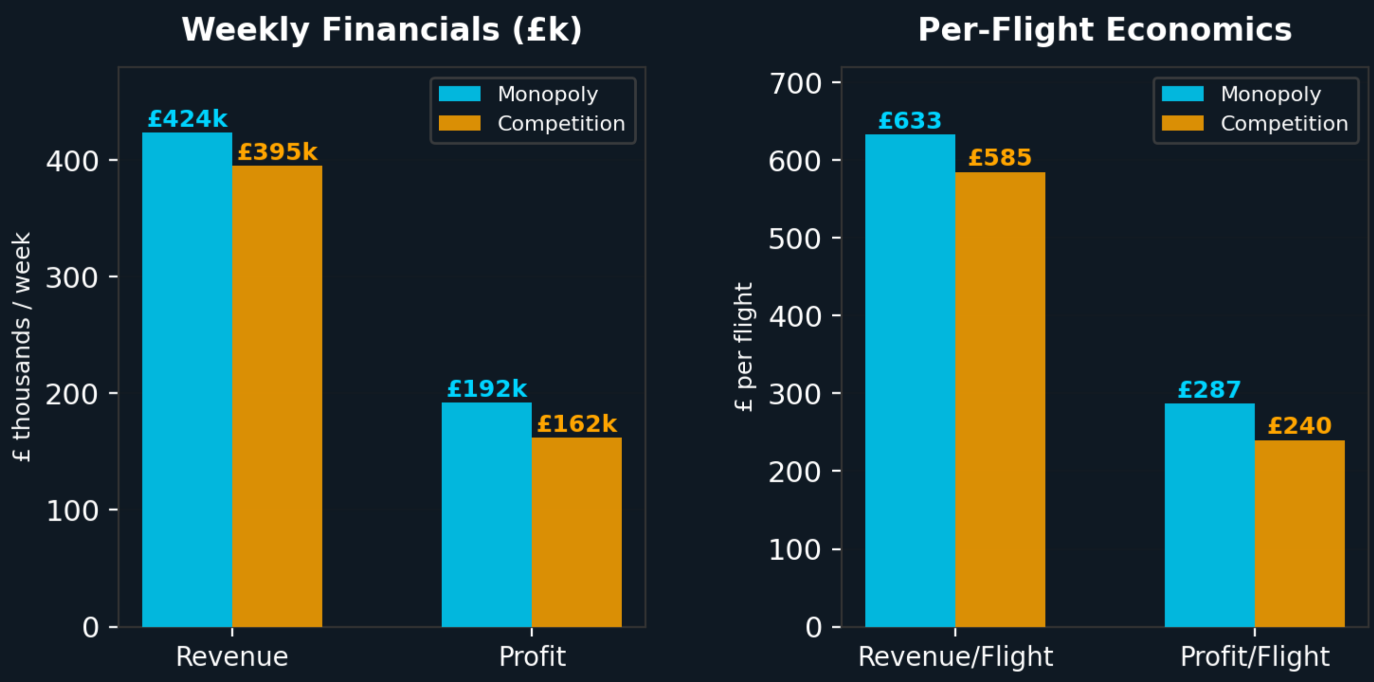
2 Load Factor: The Fragmentation Tax

When a market is split across operators, each one ends up scheduling flights that don't perfectly match aggregate demand. The monopoly achieves a 90.9% load factor and captures 95% of total demand. Under parallel competition, these figures drop to 83.4% and 83.8% respectively - driven almost entirely by the small operators struggling at just 76.1%.

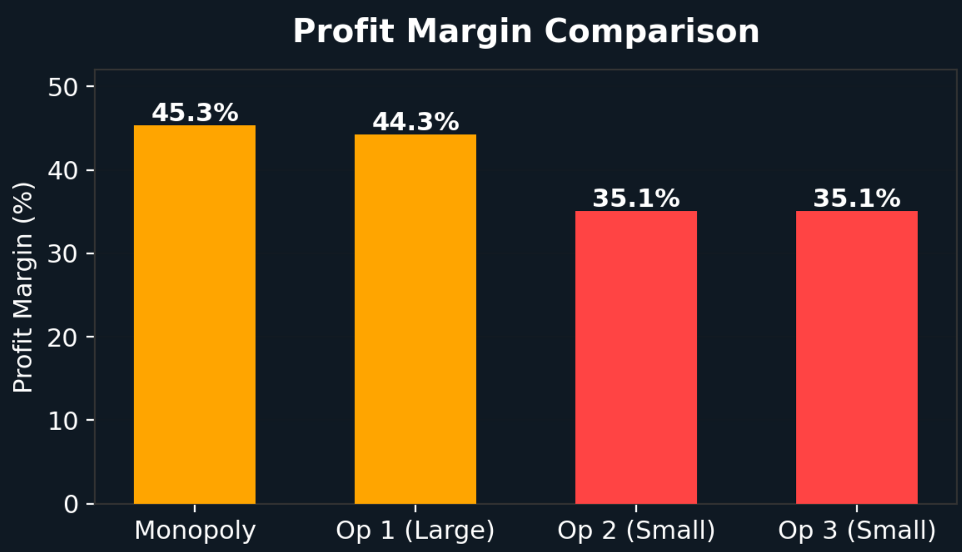


3 Financial Impact: The Bottom Line

The operational inefficiencies compound directly into financial performance. The monopoly generates £192,312 in weekly profit versus £162,078 across all three competing operators combined - a 15.7% advantage. Profit per flight drops from £287 to £240, a 16.4% reduction.



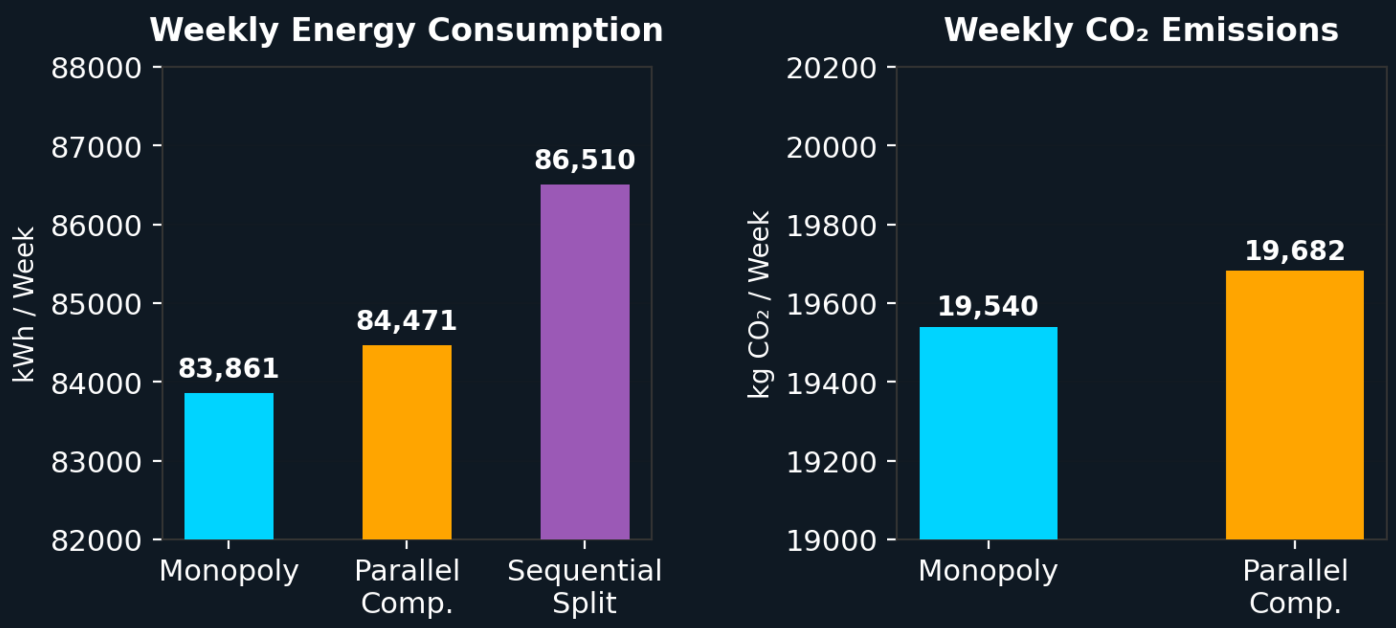
4 Profit Margins: Small Operators Under Pressure



Small operators face existential pressure:
With 35.1% margins versus the dominant operator's 44.3%, and load factors stuck at 76.1%, the two smaller operators may not be economically sustainable long-term. This isn't a stable three-player market -

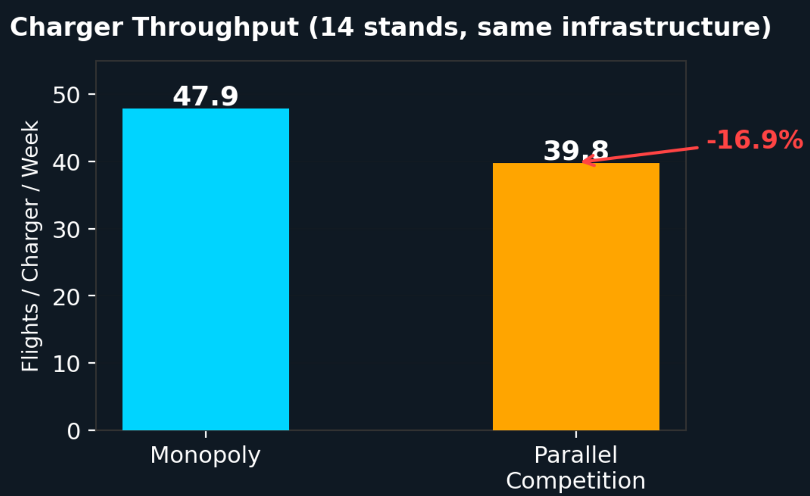
5 Energy Efficiency: The Hidden Infrastructure Cost

One of the most underappreciated dimensions of the monopoly advantage is energy. While per-flight energy consumption is virtually identical across all scenarios (approximately 125 kWh per flight), the system-level energy picture tells a very different story - and it has profound implications for grid infrastructure, charging networks, and environmental performance.



Under parallel competition, total weekly energy consumption rises by 610 kWh (+0.7%) to 84,471 kWh versus the monopoly's 83,861 kWh. The sequential split is significantly worse at 86,510 kWh - a 3.2% increase, or an additional 2,649 kWh per week. Annualised, that sequential penalty alone amounts to approximately 138 MWh of additional energy consumption to serve identical demand.

But the real story is in charging infrastructure efficiency. The monopoly achieves 47.9 flights per charger per week versus just 39.8 under parallel competition - a 16.9% throughput advantage using the same 14 charging stands. Every charger works harder and more productively under a single operator. Under competition, fragmented scheduling creates idle charging windows and conflicting peak demand patterns.



A critical insight emerges when we examine energy per block hour rather than per flight. Both the monopoly and sequential scenarios consume approximately 192.6 kWh per block hour (83,861 kWh / 435.5 hours vs 86,510 kWh / 449.1 hours). The aircraft are equally efficient in the air - the waste comes entirely from the system requiring 13.6 additional block hours per week (+3.1%) due to suboptimal scheduling, positioning flights, and the inability to rotate aircraft across the full network. Our carbon modelling quantifies this further. The monopoly avoids 17,596 kg of weekly car emissions and 2,138 kg of rail emissions, totalling 19,733 kg of surface CO_2 displaced. Under parallel competition these fall to 16,441 kg (car) and 1,998 kg (rail), just 18,438 kg total. Net of UAM emissions, the monopoly delivers 514 tonnes of annual CO_2 savings versus 449 tonnes under competition, a 65-tonne environmental cost of fragmentation.

The infrastructure implications are compounded by ground-side congestion. With multiple operators, aircraft from different fleets frequently land and sit on the ground simultaneously - particularly during peak hours when schedules overlap. This creates charging bottlenecks: more aircraft occupying stands at the same time means higher peak charger demand, requiring either more charging points to avoid queuing delays or accepting longer turnaround times. A single operator can stagger arrivals and departures across the full network to smooth charger demand; competing operators, each optimising independently, inevitably cluster their ground operations around the same peak windows.

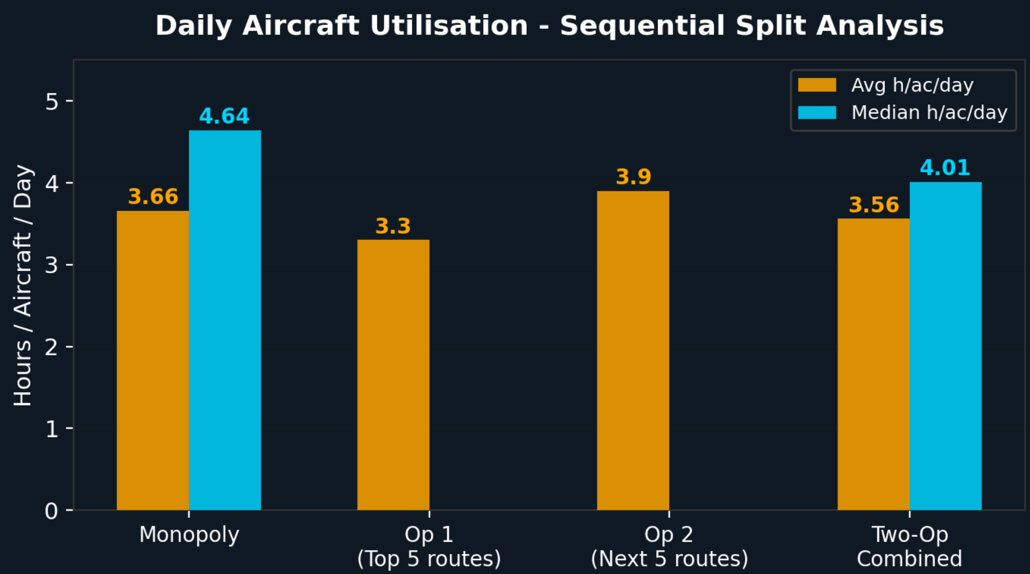
For sequential splitting, the infrastructure implications are direct: +5.9% more aircraft requires proportionally more charging infrastructure, with amplified battery throughput requirements and greater grid capacity demands.

THE ENERGY CASE FOR MONOPOLY:

(1) Lower total energy consumption from fewer aircraft and optimised scheduling.
(2) Dramatically better charger throughput (47.9 vs 39.8 flights/charger), reducing grid investment per unit of service.
(3) Unified energy procurement and coordinated charging schedules for better grid load management.
(4) At network scale, a constant 3.2% sequential overhead translates into proportionally larger absolute energy costs as networks grow.

6 Route Splitting: Better, But Still Worse

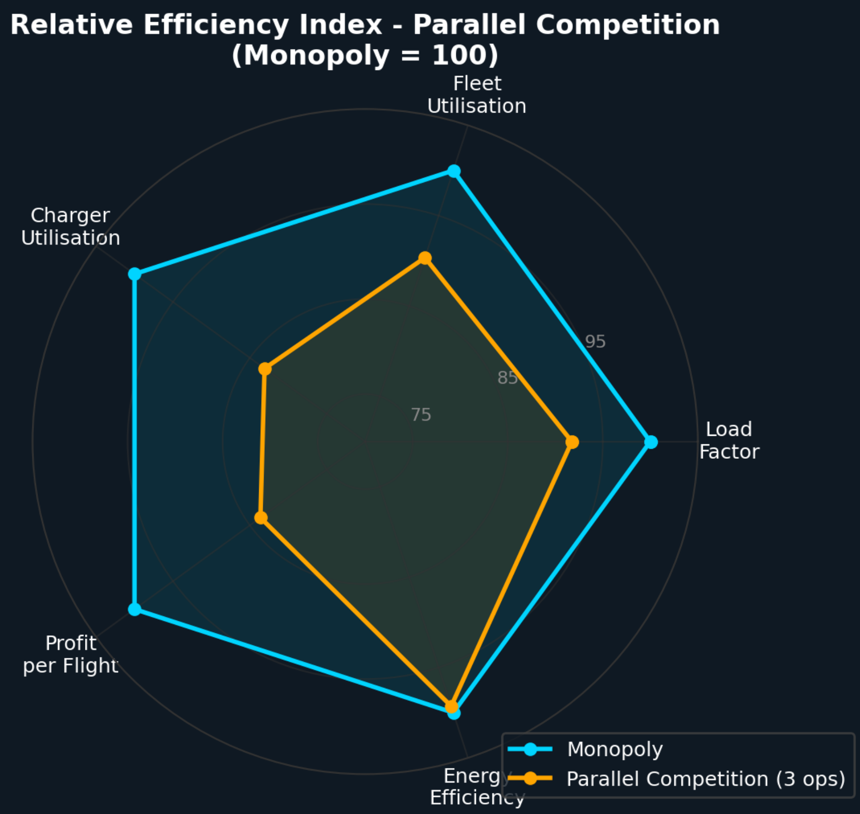
Our second analysis tested whether giving each operator exclusive routes (rather than head-to-head competition) produces better outcomes. The short answer: it's better than parallel competition, but still worse than a monopoly. Median utilisation drops 13.5% - from 4.64 to 4.01 hours per aircraft per day. Energy consumption rises 3.2% despite serving identical demand.



The fundamental problem: without cross-network route optimisation, you cannot rotate aircraft efficiently across peak and off-peak demand. Each operator must maintain separate standby capacity, leading to fleet duplication overhead.

7 The Full Picture: Parallel Competition Gap

The radar chart below normalises five key metrics from the parallel competition analysis to the monopoly baseline (= 100). Across every dimension - fleet utilisation, load factor, energy efficiency, profitability, and charger utilisation - the monopoly structure outperforms. The most severe gaps appear in profit per flight (83.6) and charger utilisation (83.1).



8 What This Means for the Industry

These findings don't mean monopoly is always the answer. But they provide strong evidence that, at the current stage of AAM market development, premature competition destroys value rather than creating it.

Greenfield Markets: Start with a regulated monopoly or single-operator franchise. Focus on proving viability before introducing competition. High infrastructure requirements favour consolidation.

Infrastructure Planning: Design for single-operator efficiency first. Build in expansion capacity for future competition, but don't over-invest from day one. Prioritise hub capacity.

Regulatory Framework: If monopoly - implement strong price regulation and service standards. If competition is mandated - require infrastructure sharing and coordinated scheduling.

Energy-Constrained Markets: The efficiency case for integrated operations is even stronger. Competition may only be sustainable where energy and infrastructure capacity is abundant.

THE BOTTOM LINE:

UAM is an industry where network effects, scheduling optimisation, and infrastructure utilisation matter enormously. A single, well-regulated operator can serve passengers better, use fewer aircraft, burn less energy, and generate stronger returns than fragmented competitors fighting over the same thin market. The question isn't whether to allow competition - it's when. And for most markets, that answer is: not yet.