

Design Criteria for Energy Market Prices

Energy Price Formation
Senior Task Force
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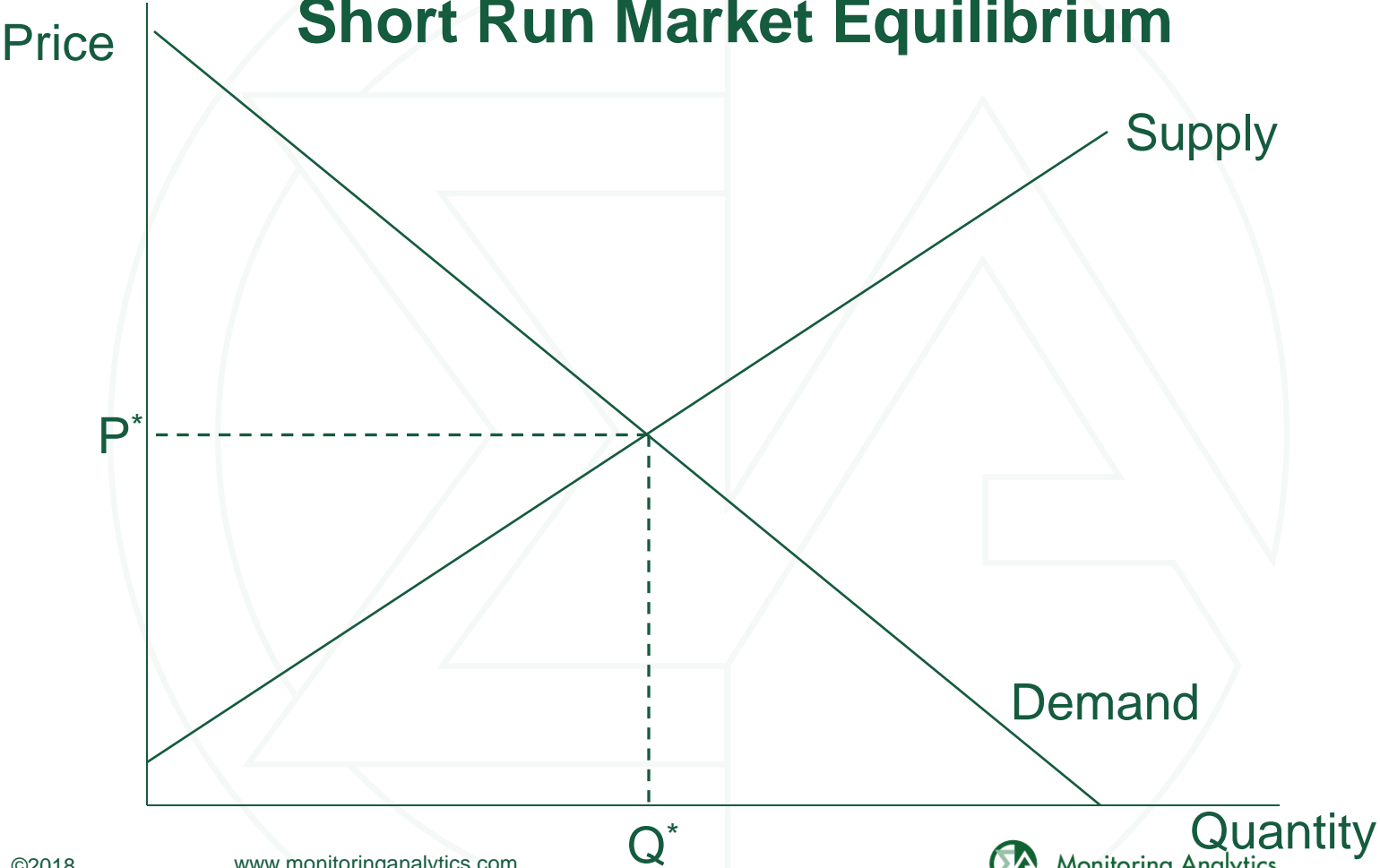


Monitoring Analytics

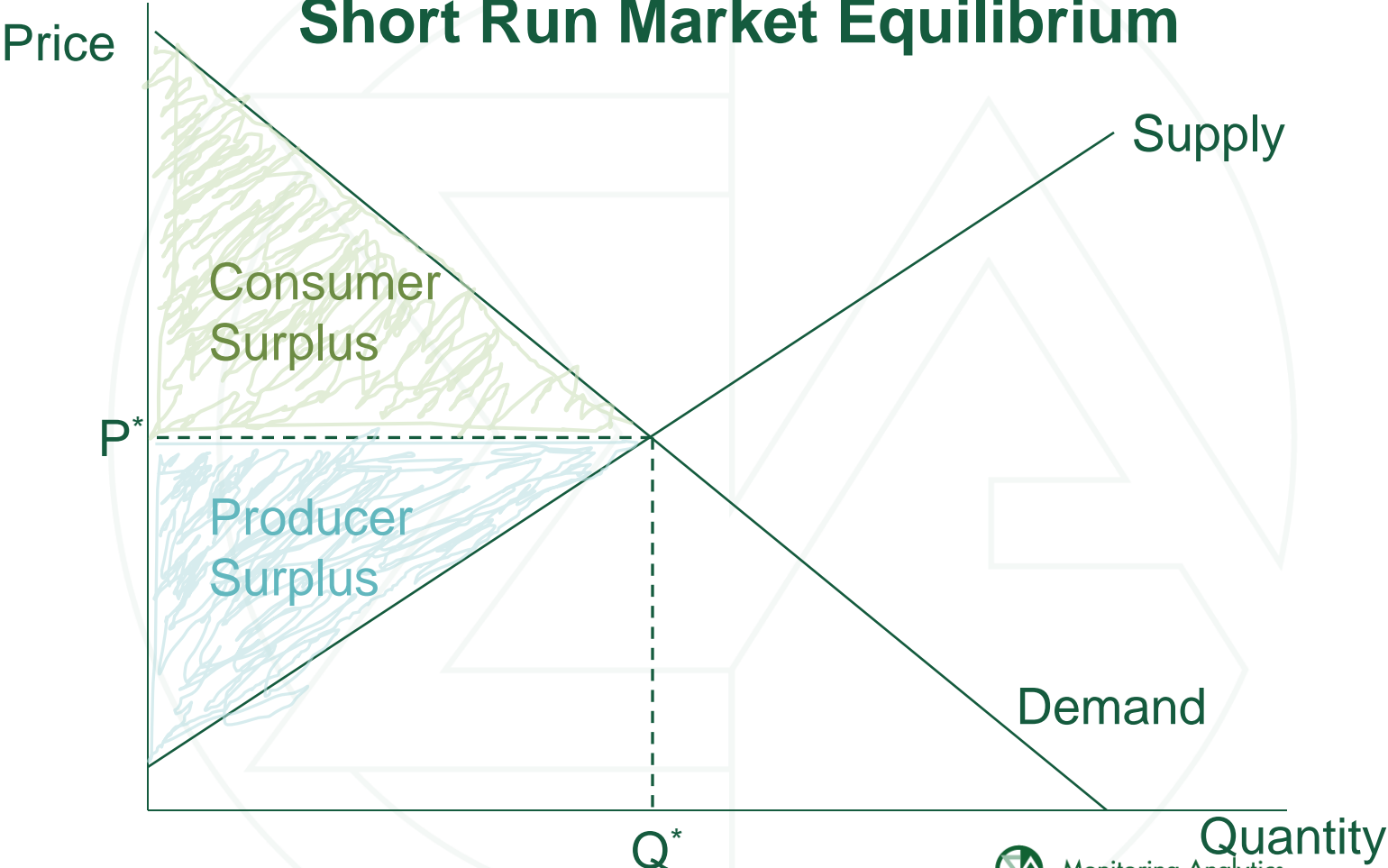
Market Pricing Principles

- **A market is a set of interactions between buyers and sellers.**
- **Market prices are determined by the buyers' valuations and sellers' costs.**
- **Competitive market prices are determined on the margin.**
- **Sellers who cannot supply at the price determined on the margin, do not sell.**
- **Buyers whose value of the product is less than the market price, do not purchase.**

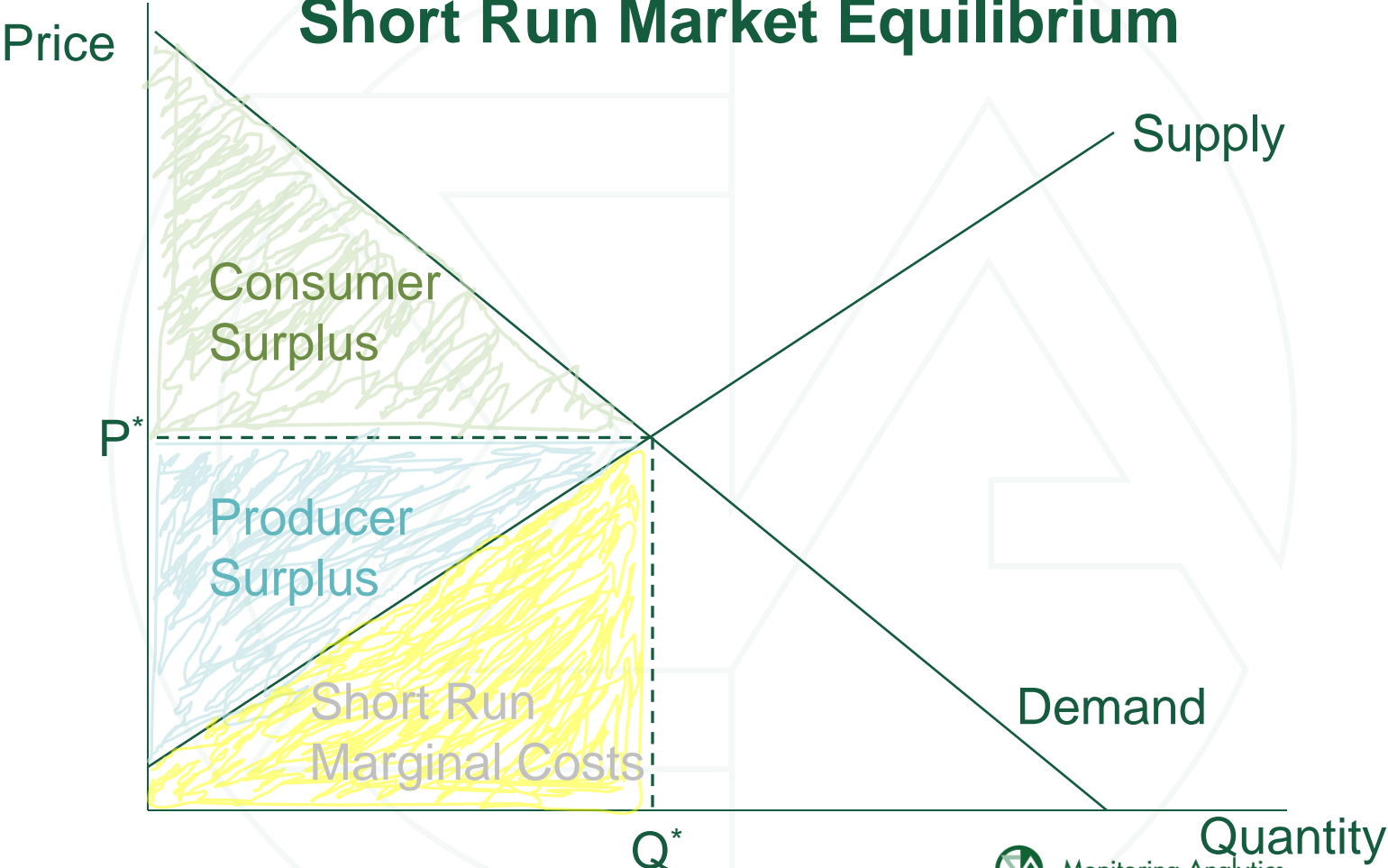
Short Run Market Equilibrium



Short Run Market Equilibrium



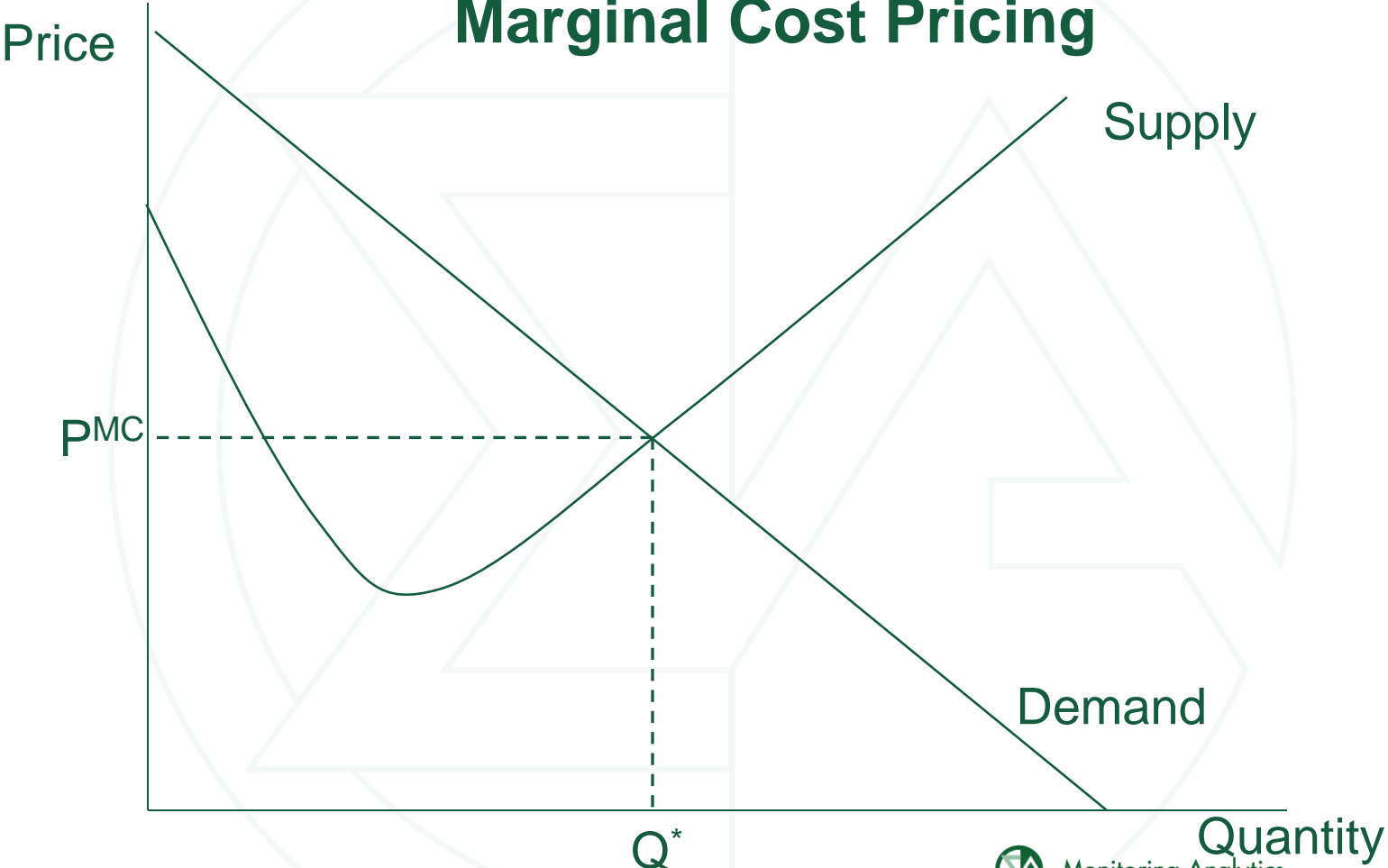
Short Run Market Equilibrium



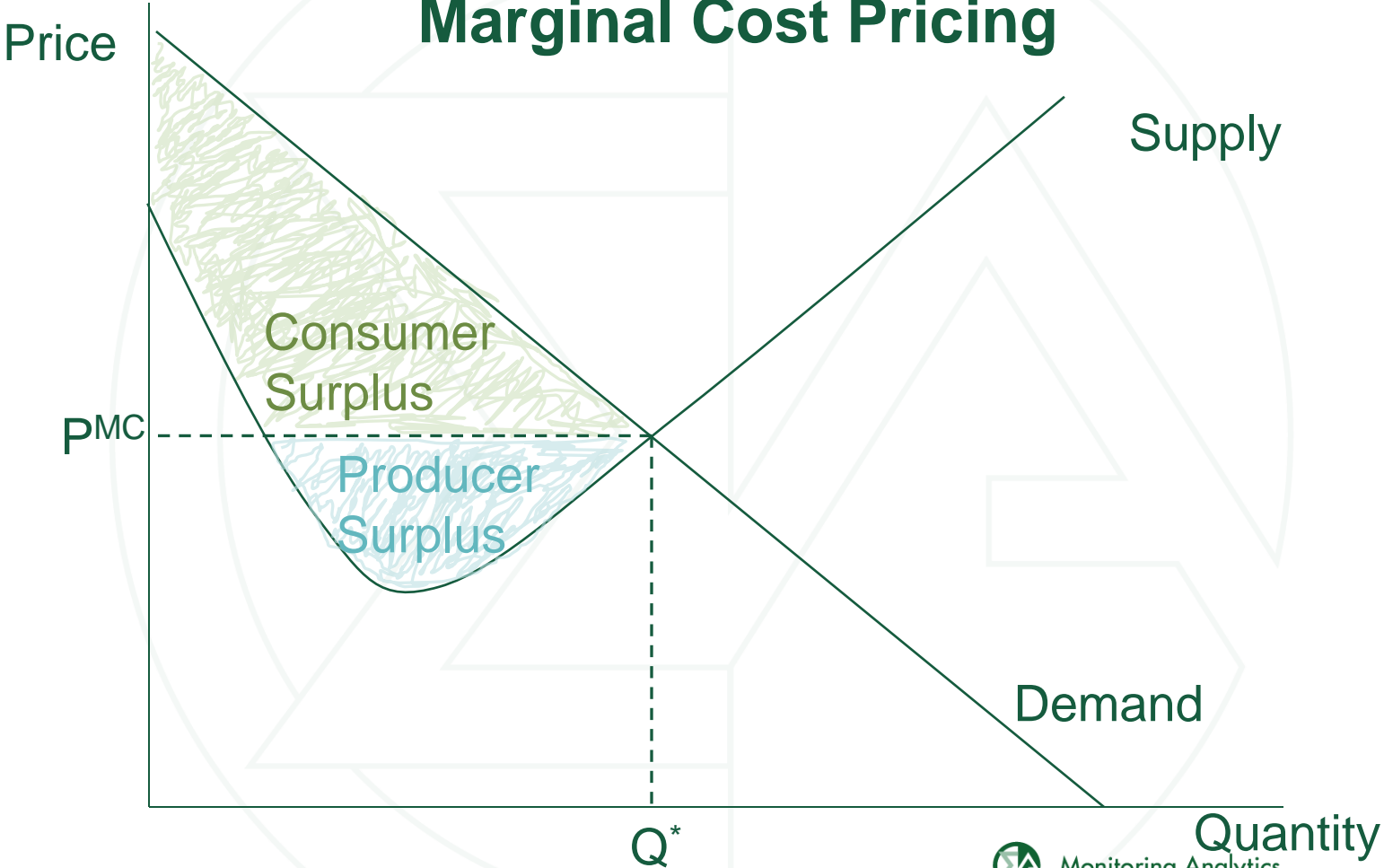
Supply Curve Convexity

- **Efficient means both**
 - Cost minimizing
 - Consumer and producer surplus maximizing
- **With significant increasing returns to scale in production, marginal cost pricing may not support an efficient market outcome.**
- **An efficient market requires coordinated intervention.**
 - Uplift is a form of coordination.
 - Marginal cost pricing with uplift results in efficient market outcomes.

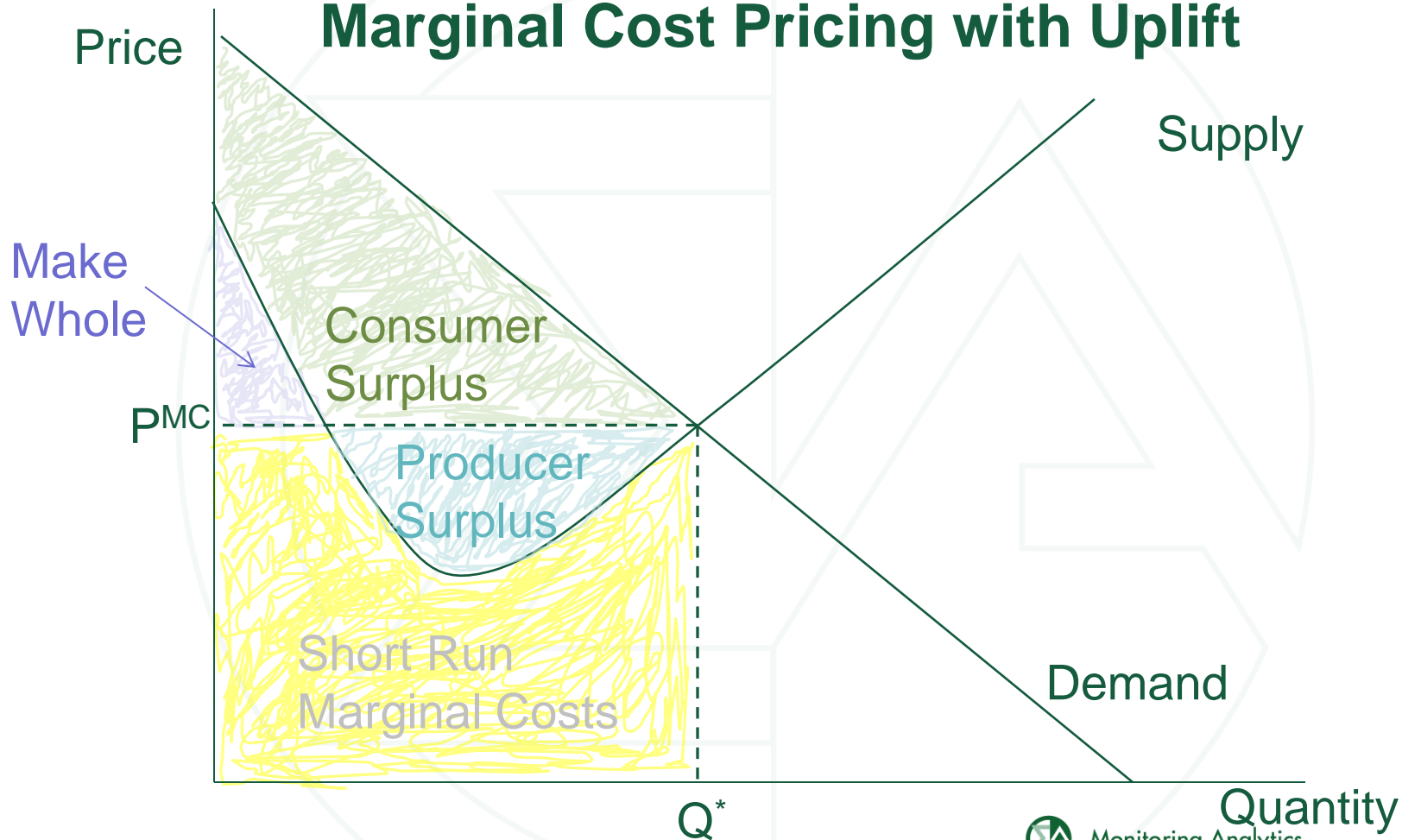
Marginal Cost Pricing



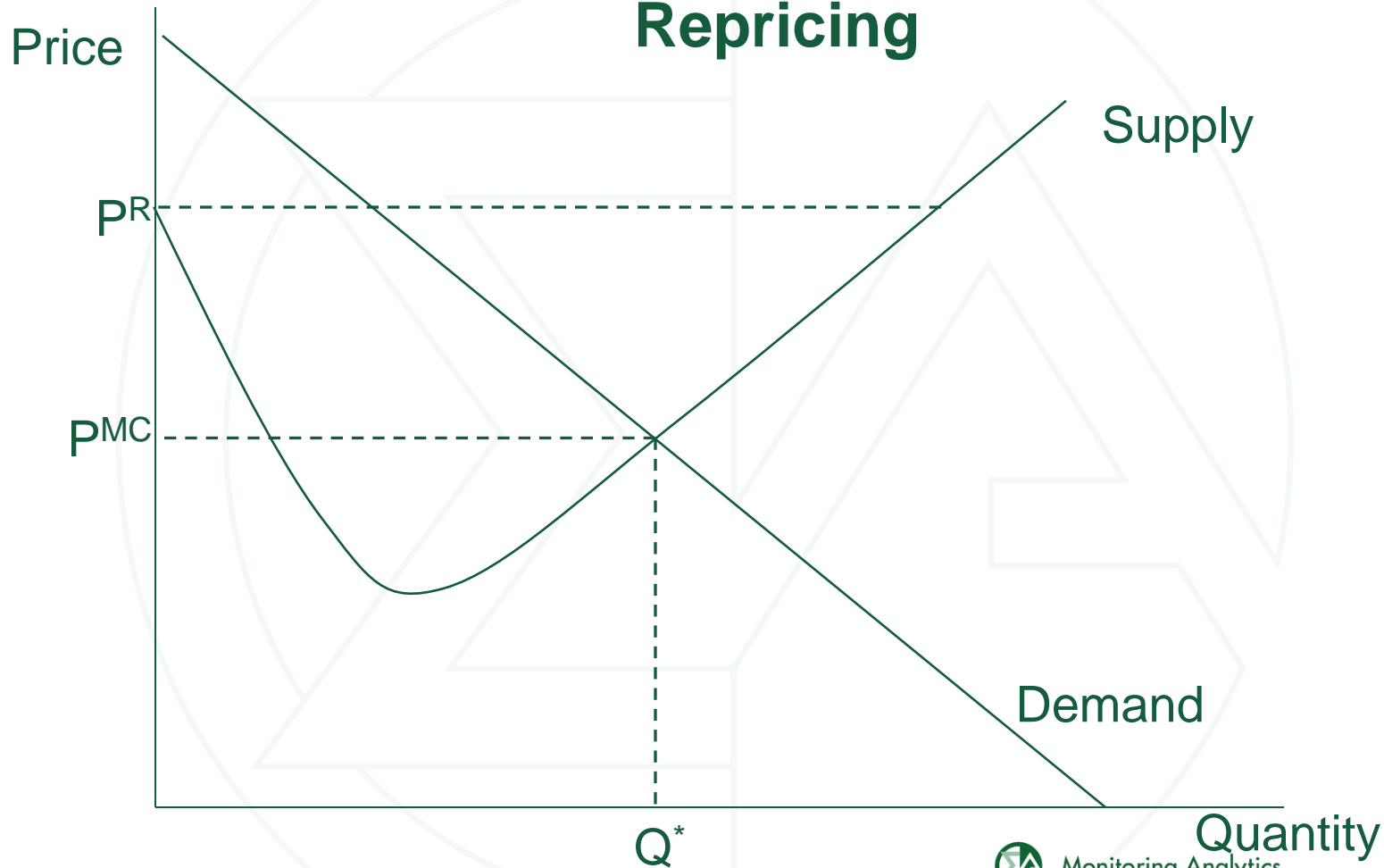
Marginal Cost Pricing



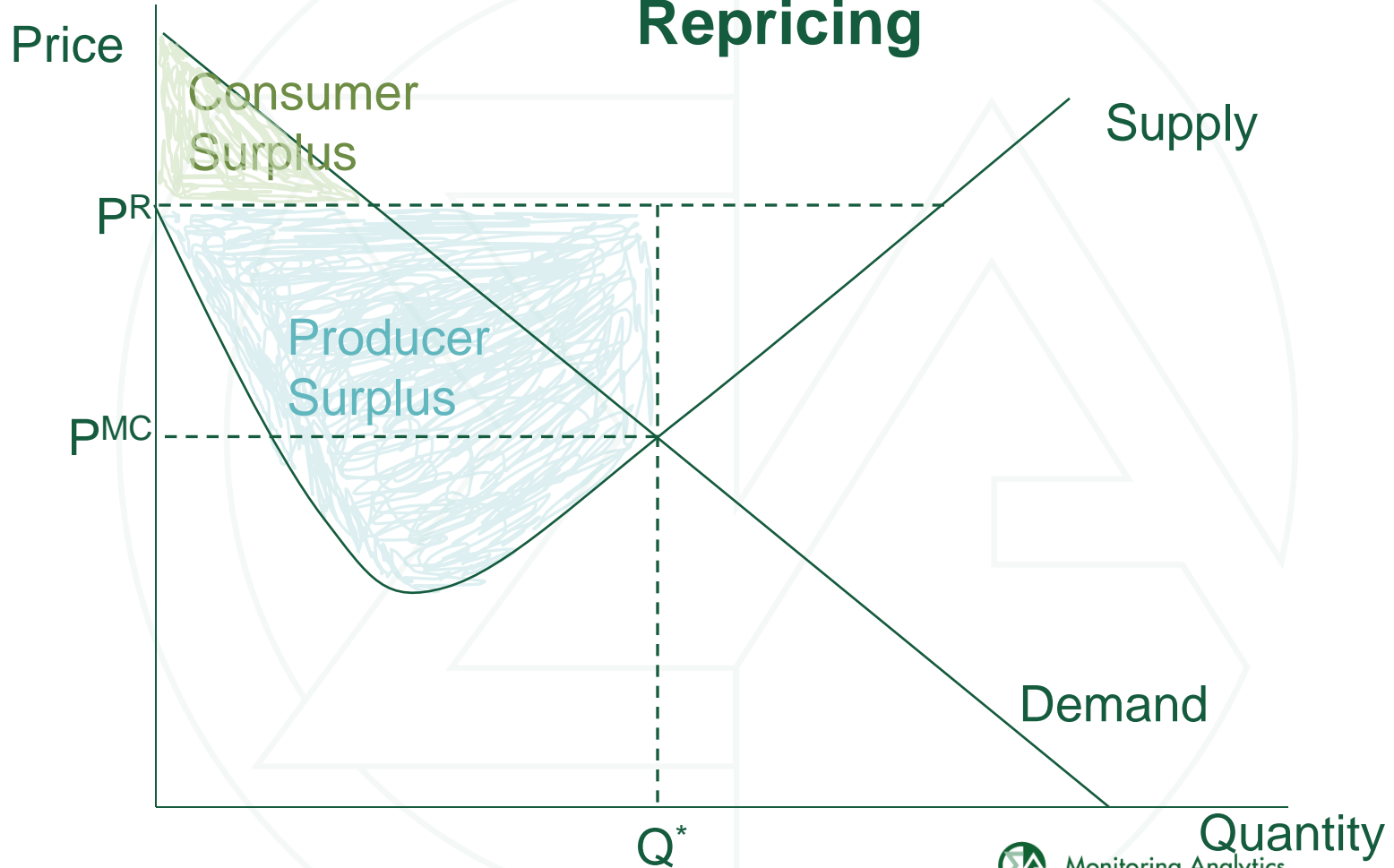
Marginal Cost Pricing with Uplift



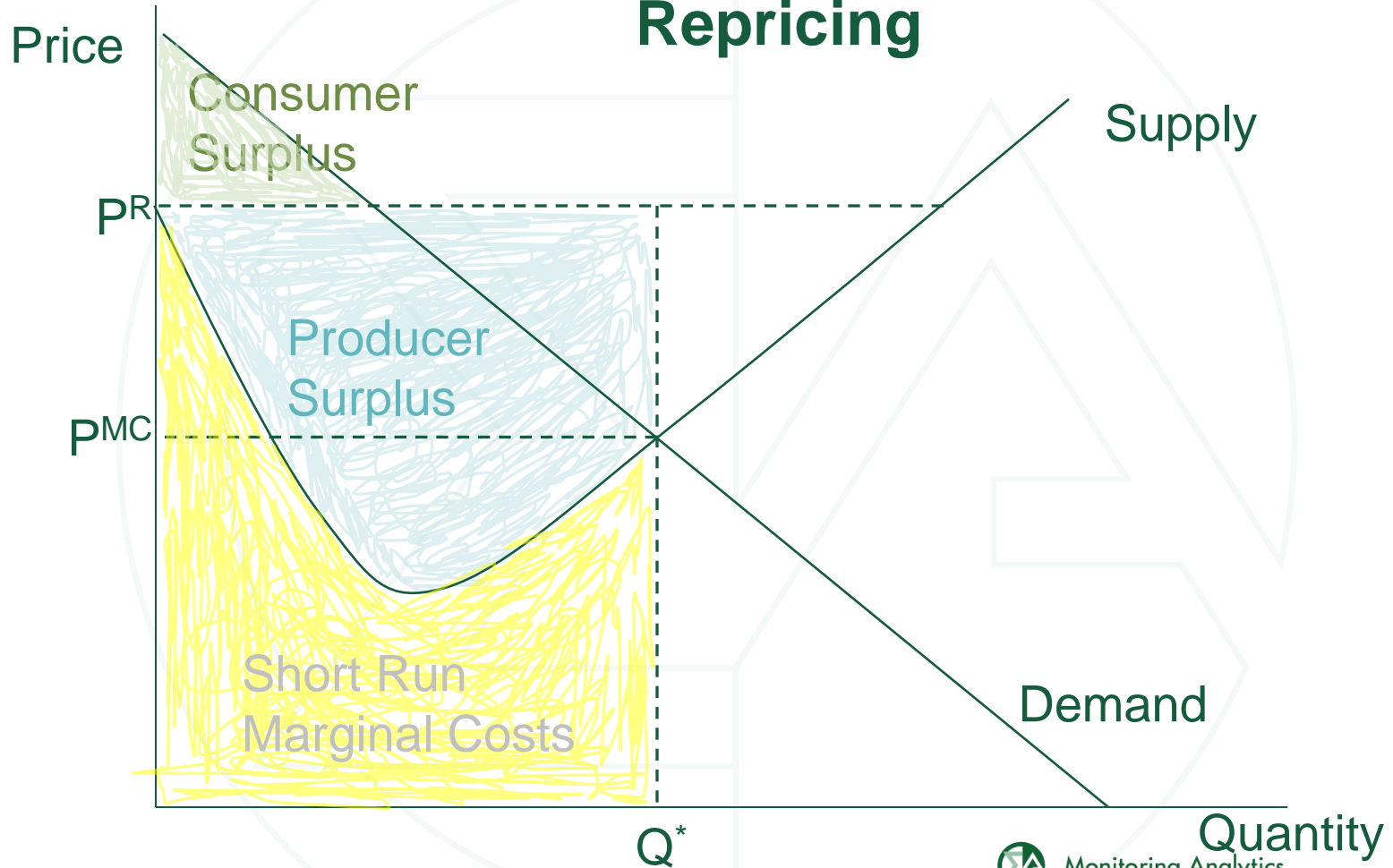
Repricing



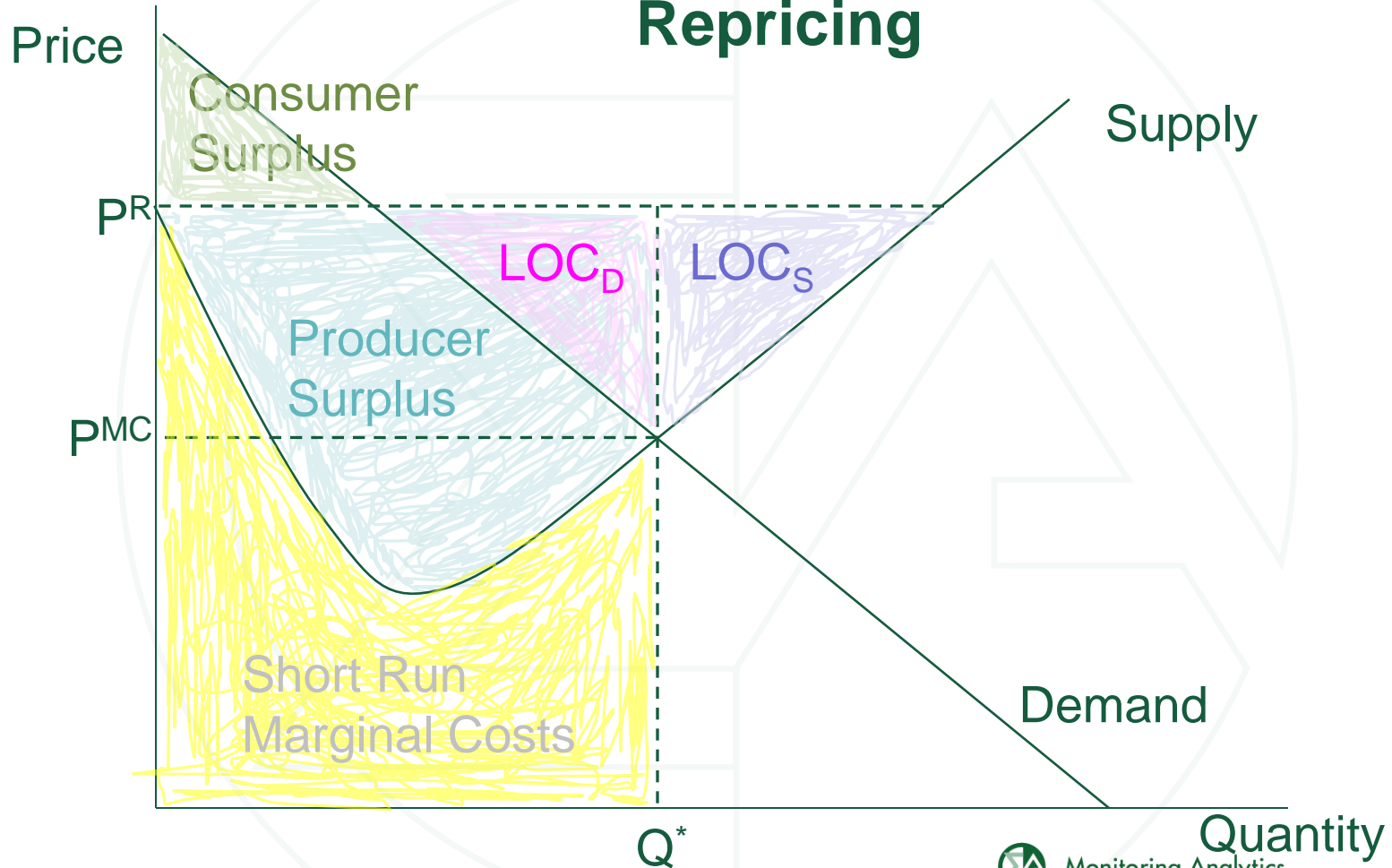
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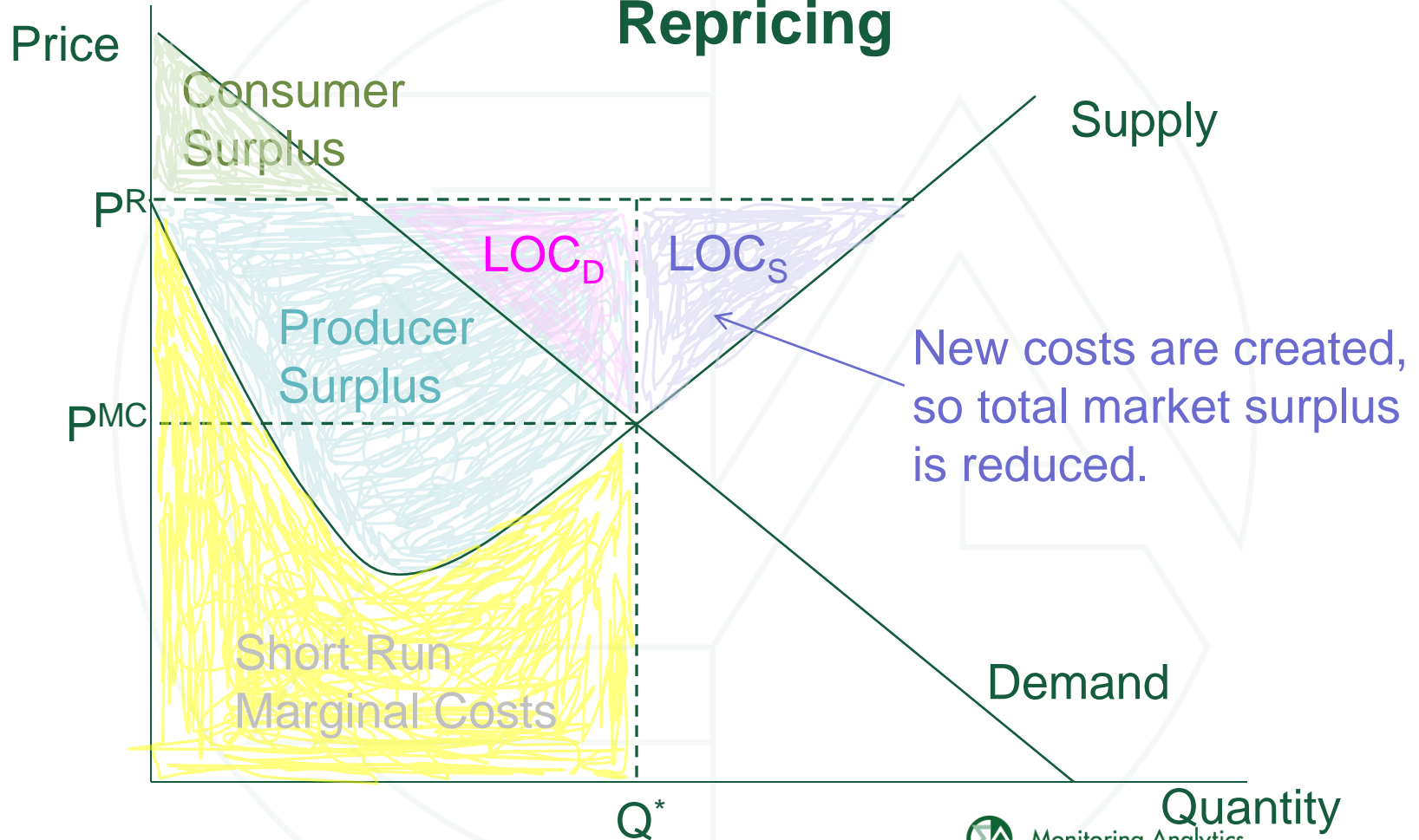
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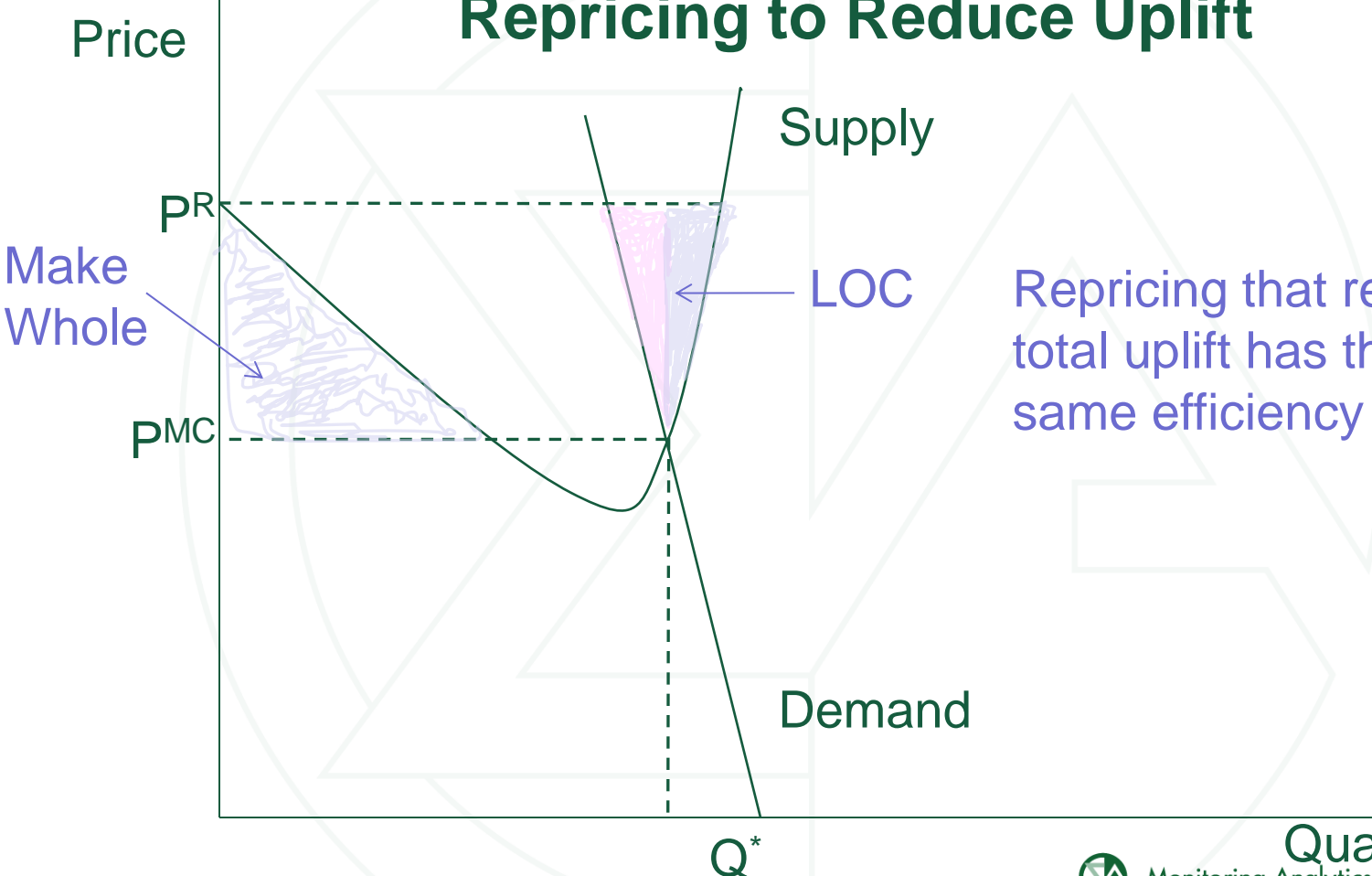
Repricing



Repricing



Repricing to Reduce Uplift



Repricing that reduces total uplift has the same efficiency loss.

Assumptions in Repricing

- **The behavior of producers and consumers will not change due to repricing.**
- **Uplift payments provide the same quality signal for efficient behavior on the margin as prices.**
- **The size of the reduction in uplift is large enough to justify the change.**
- **The Market Monitor does not agree that these assumptions are valid.**



Better to Address Underlying Issues Directly

- **Problems are really about scarcity and reserves.**
- **Conservative operations mean commitments can exceed modelled reserve requirements.**
- **Prices fall when operator commits a resource in real time because commitment causes supply to exceed load plus reserves.**
- **Pricing operator actions to cause the reserve requirement to reflect the actual requirement that PJM is committing to cover.**

FERC Price Formation Goals

- (1) maximize market surplus for consumers and suppliers;**
- (2) provide correct incentives for market participants to follow commitment and dispatch instructions, make efficient investments in facilities and equipment, and maintain reliability;**
- (3) provide transparency so that market participants understand how prices reflect the actual marginal cost of serving load and the operational constraints of reliably operating the system; and**
- (4) ensure that all suppliers have an opportunity to recover their costs.**



Proposed Design Criteria

- **Energy prices signal efficient short run energy market behavior on the margin**
- **Full reflection of operational reliability requirements included in the market**
- **Maximize market surplus for consumers and suppliers**



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