

Inferring Boundary Conditions in the Delaware

Tight shale plays exhibit multi-year transient flow periods

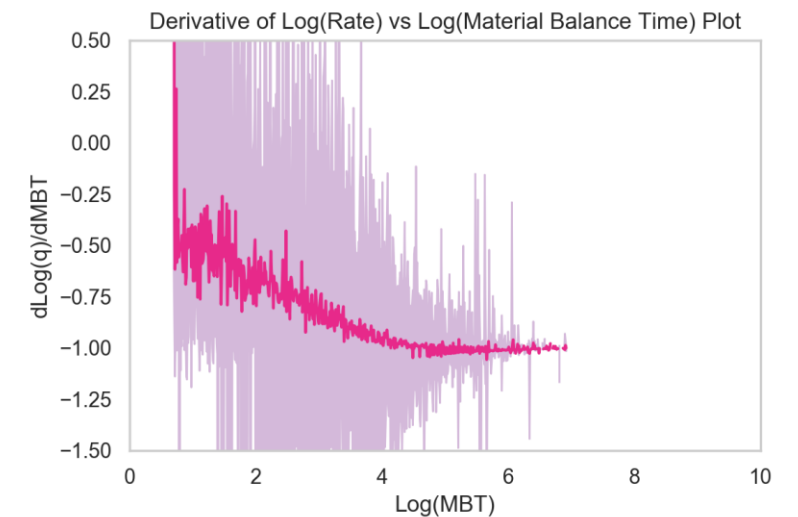
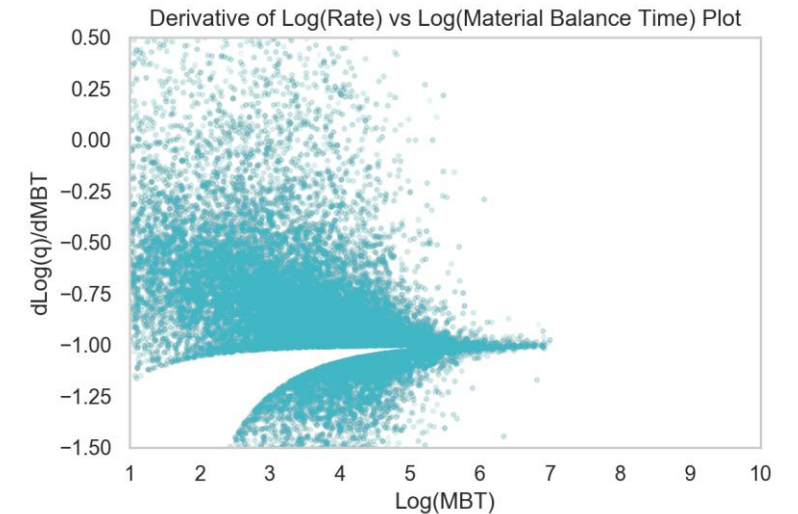
Reserves estimates are often optimistic without an understanding of when production transitions to boundary-dominated flow

Low resolution in publicly-available production data

Is there a way to estimate the probability of when a well will experience boundary conditions?

Use statistical bootstrapping and large data sets to create a synthetic probability distribution from production diagnostic plots

Horizontal completions after 1/1/2003, Permian Basin, bootstrapped data set

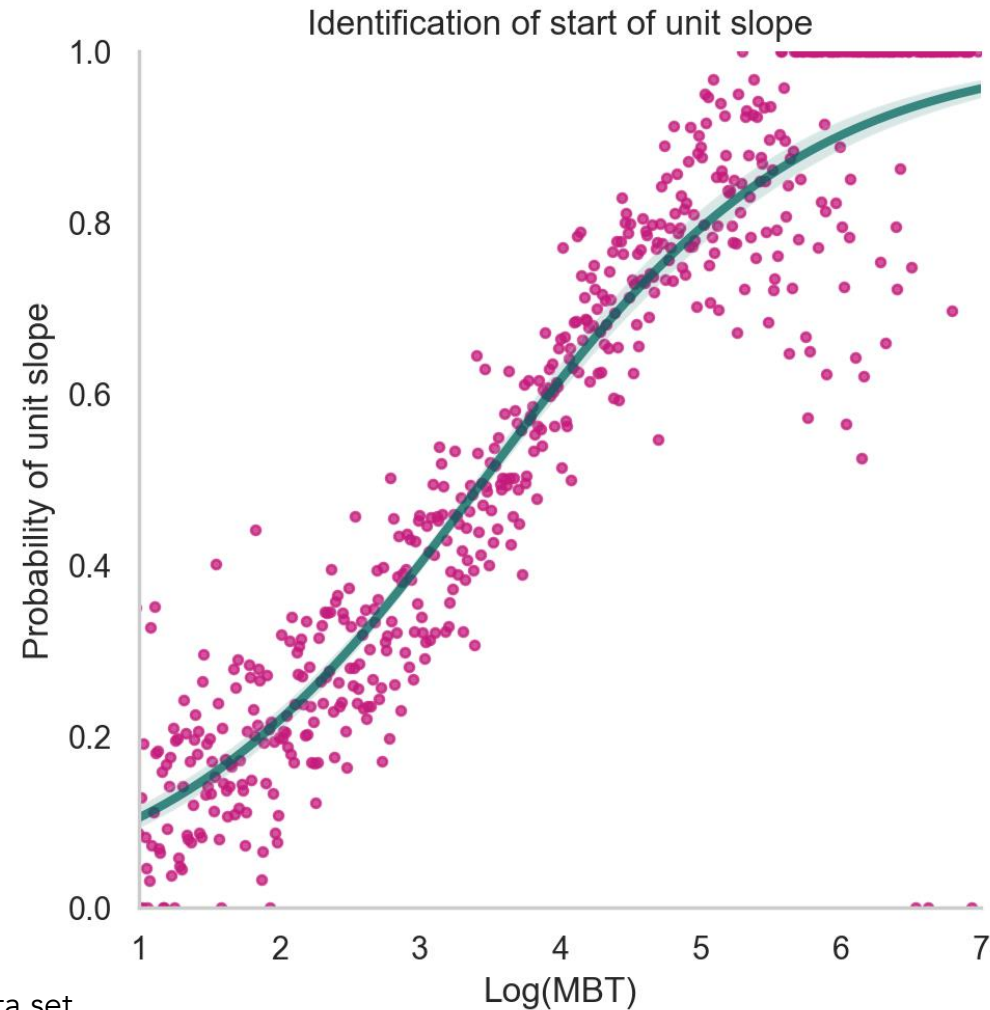


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Average Wolfcamp A well in the Permian Basin has a 50% chance of reaching boundary-influenced flow before 2 years of production (85% by year 4)

Given increasing frac sizes, downspacing, and legacy production, there is risk that it could be earlier than the historic data suggests

Which operators are considering how spacing, completions, and operations interact?



Horizontal completions after 1/1/2003, Permian Basin, bootstrapped data set