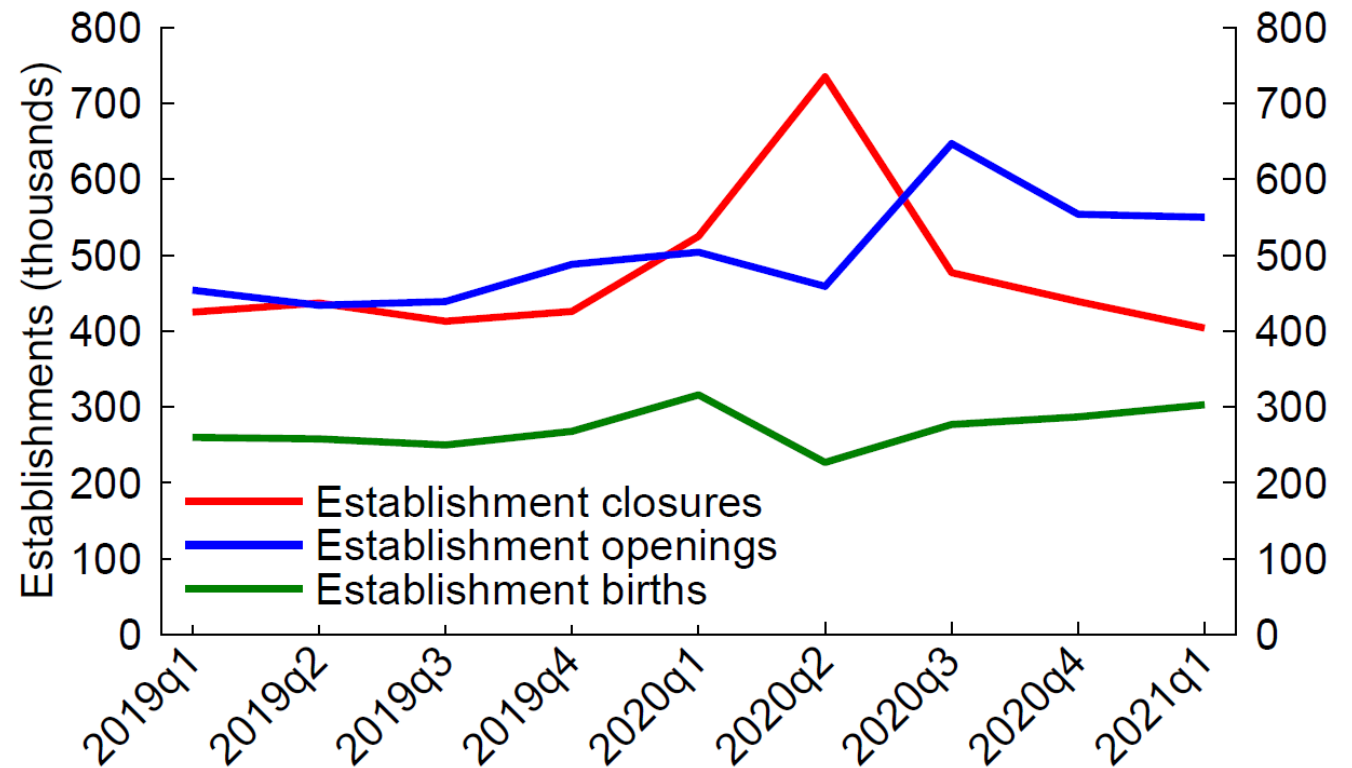


# Sensible estimate? BED data through 2020q4

- Surge in *closures* with peak in 2020q2
- Surge in *openings* starting in 2020q3
- Dip in *births* in 2020q2, rising thereafter
  - Death data only available through 2020q1
- Can we infer deaths from closures and openings?



Source: BLS Business Employment Dynamics. Seasonally adjusted.

See Crane, Decker, Flaaen, Hamins-Puertolas, and Kurz (2021)

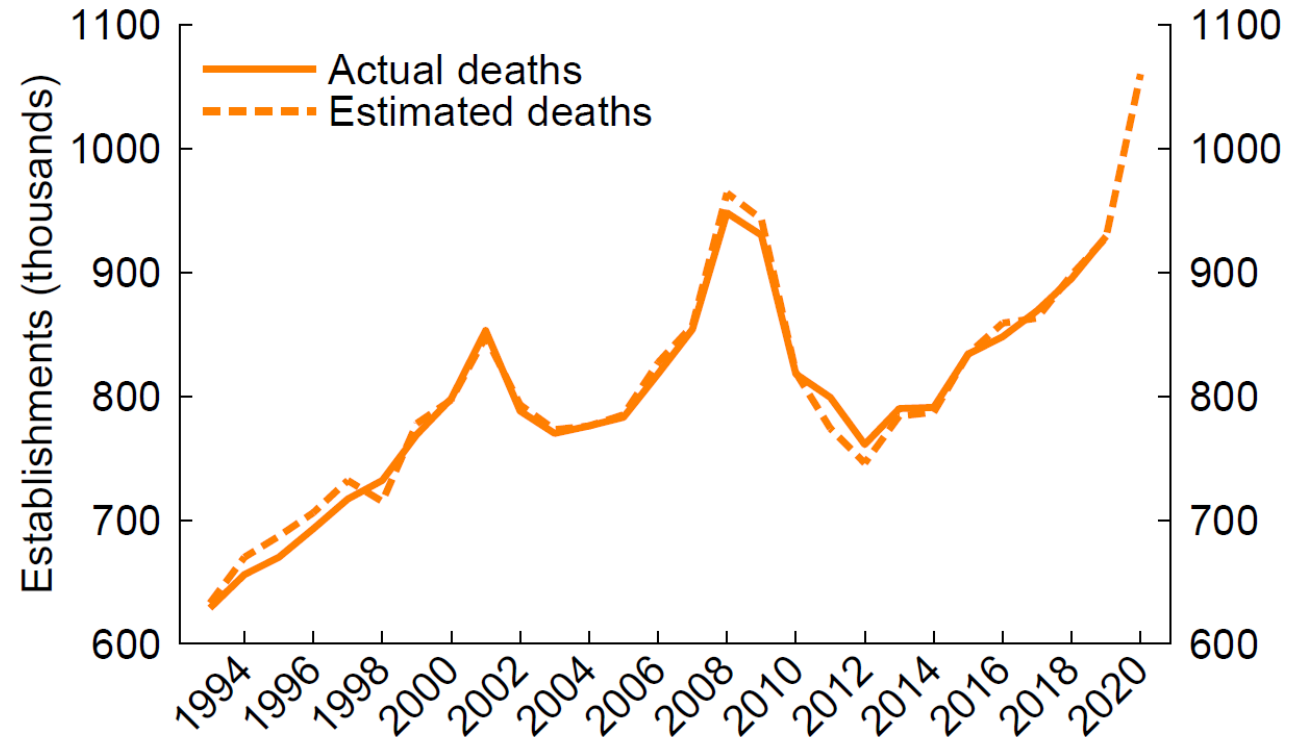
# BED-based estimates

- Reopenings = openings – births
- Assume

$$\sum_{q=2020q1}^{2020q4} deaths_q = \sum_{q=2020q1}^{2020q4} closures_q - \sum_{q=2020q2}^{2021q1} reopenings_q$$

# Evaluating BED-based estimates

- In 2019, estimated deaths are 928,000 versus 929,000 actual
- 1993-2019 RMSE = 10,000
- Implies 1.06 million deaths in 2020
  - **190,000 excess deaths** versus 2015-2019 average



Source: BLS Business Employment Dynamics, author estimates.