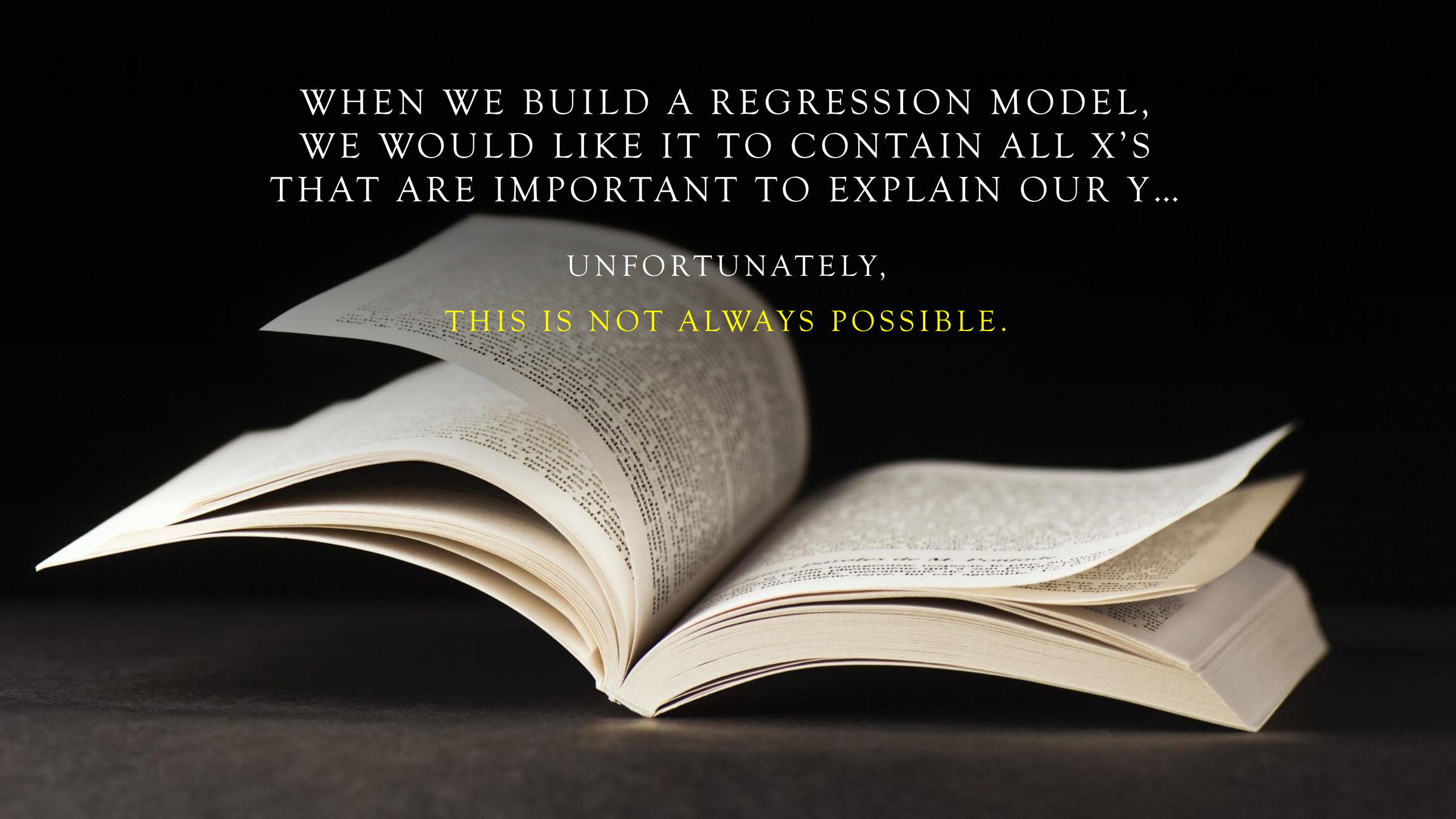
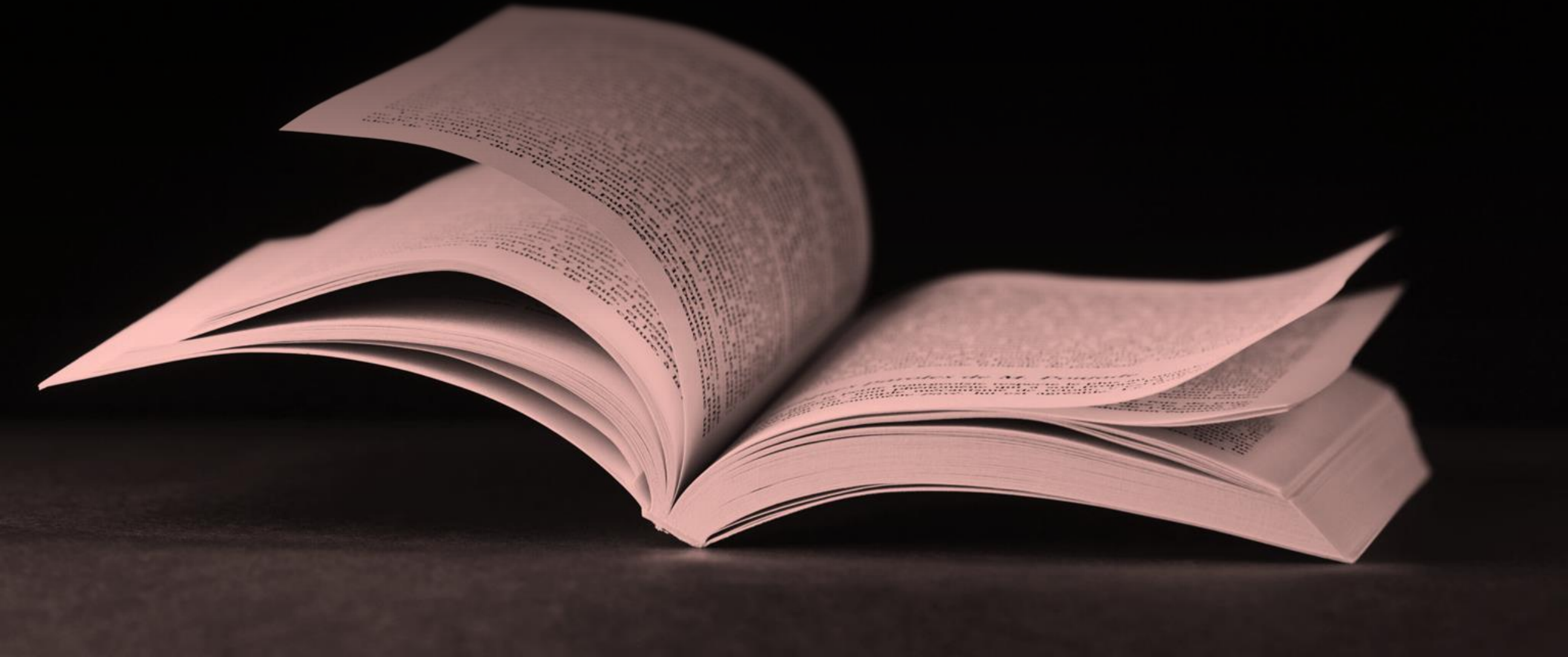

WHEN WE BUILD A REGRESSION MODEL,
WE WOULD LIKE IT TO CONTAIN ALL X'S
THAT ARE IMPORTANT TO EXPLAIN OUR Y...
UNFORTUNATELY,
THIS IS NOT ALWAYS POSSIBLE.

WHEN AN IMPORTANT X IS MISSING IN OUR MODEL, BAD THINGS CAN HAPPEN.

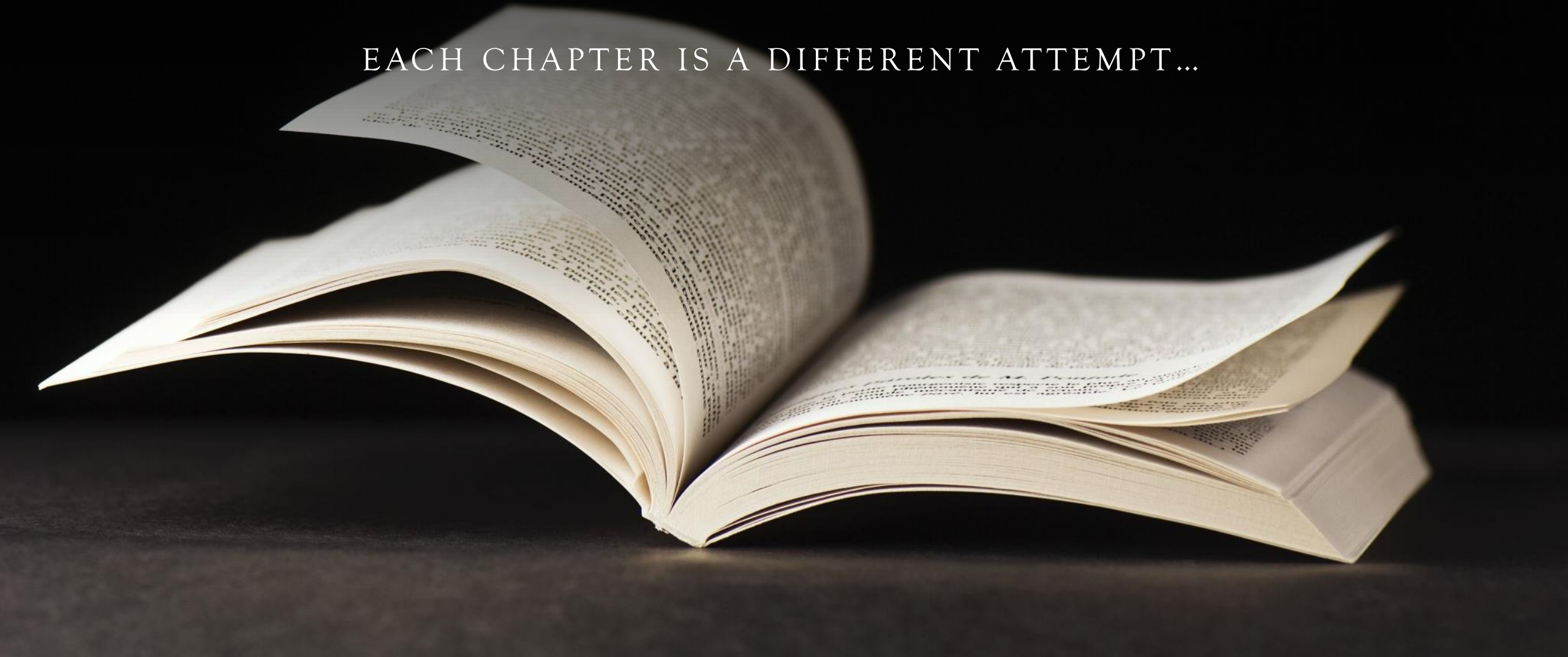


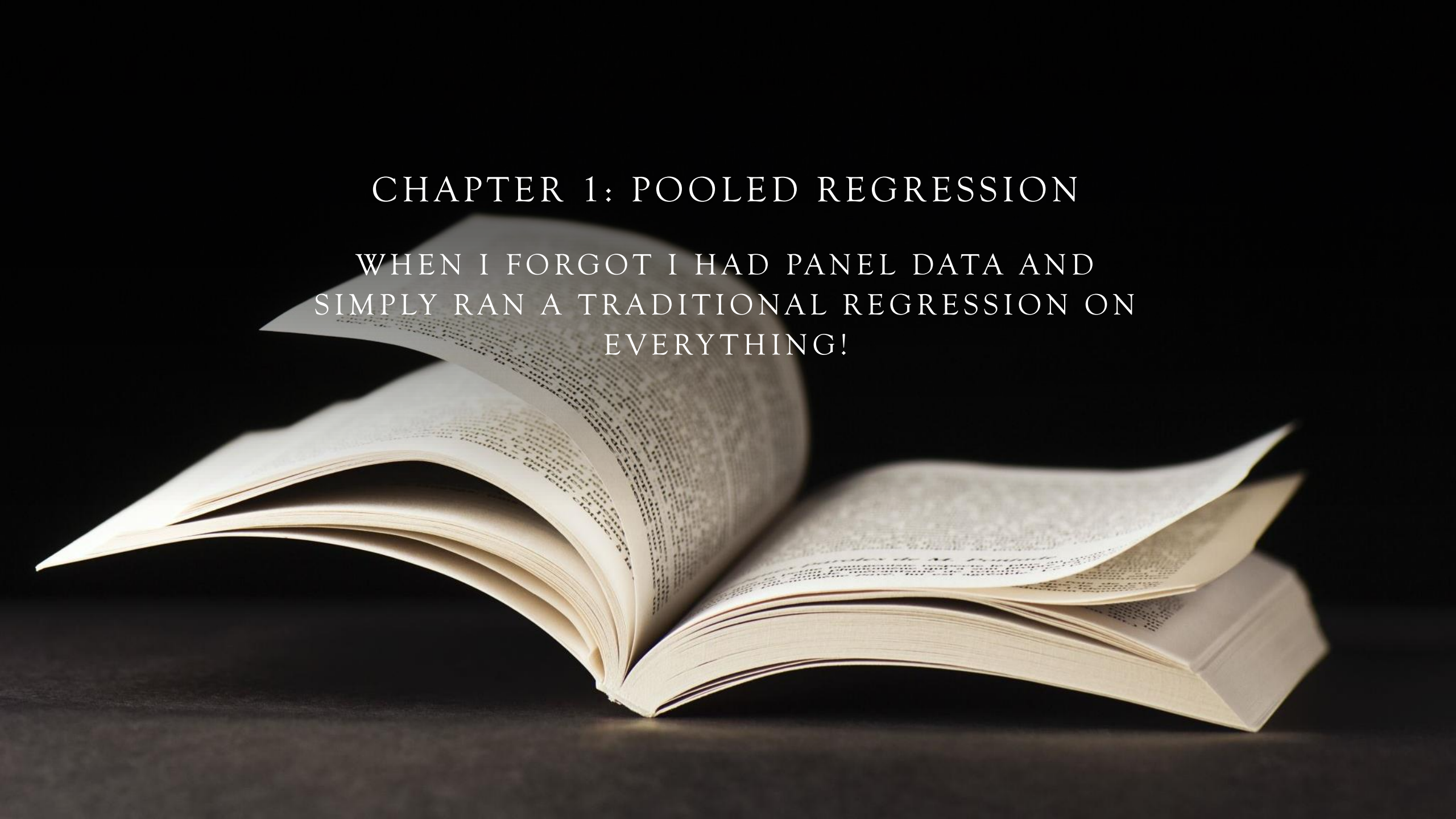
Maleficent's Theorem

A variable that wasn't invited to a regression will curse the coefficients of those that were, making them biased

OUR COURSE IS THE STORY OF HOW HUMANITY TACKLED THE CHALLENGE OF MAKING A REGRESSION MODEL WITHOUT KNOWING ALL THE X'S...

EACH CHAPTER IS A DIFFERENT ATTEMPT...



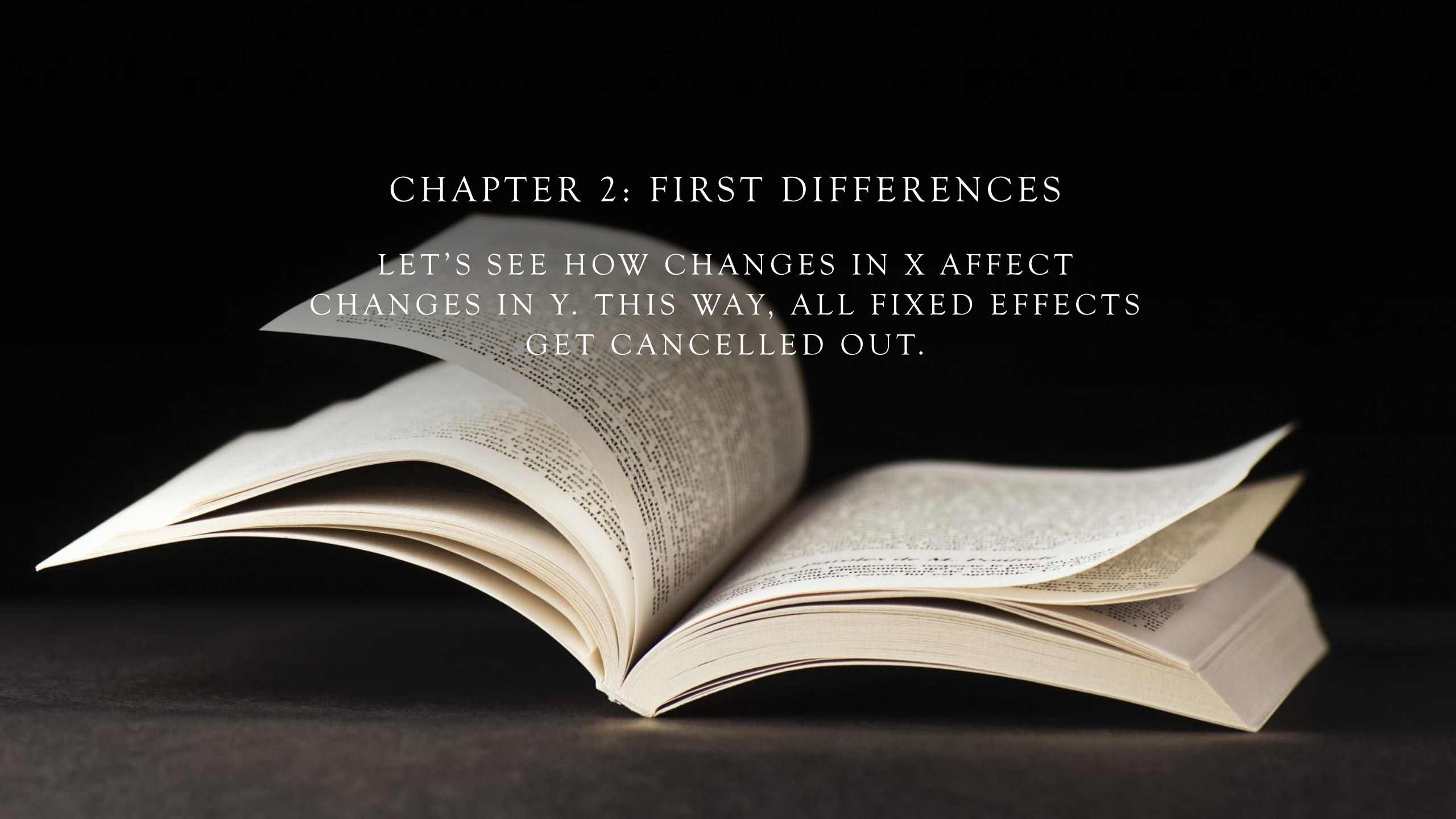


CHAPTER 1: POOLED REGRESSION

WHEN I FORGOT I HAD PANEL DATA AND SIMPLY RAN A TRADITIONAL REGRESSION ON EVERYTHING!

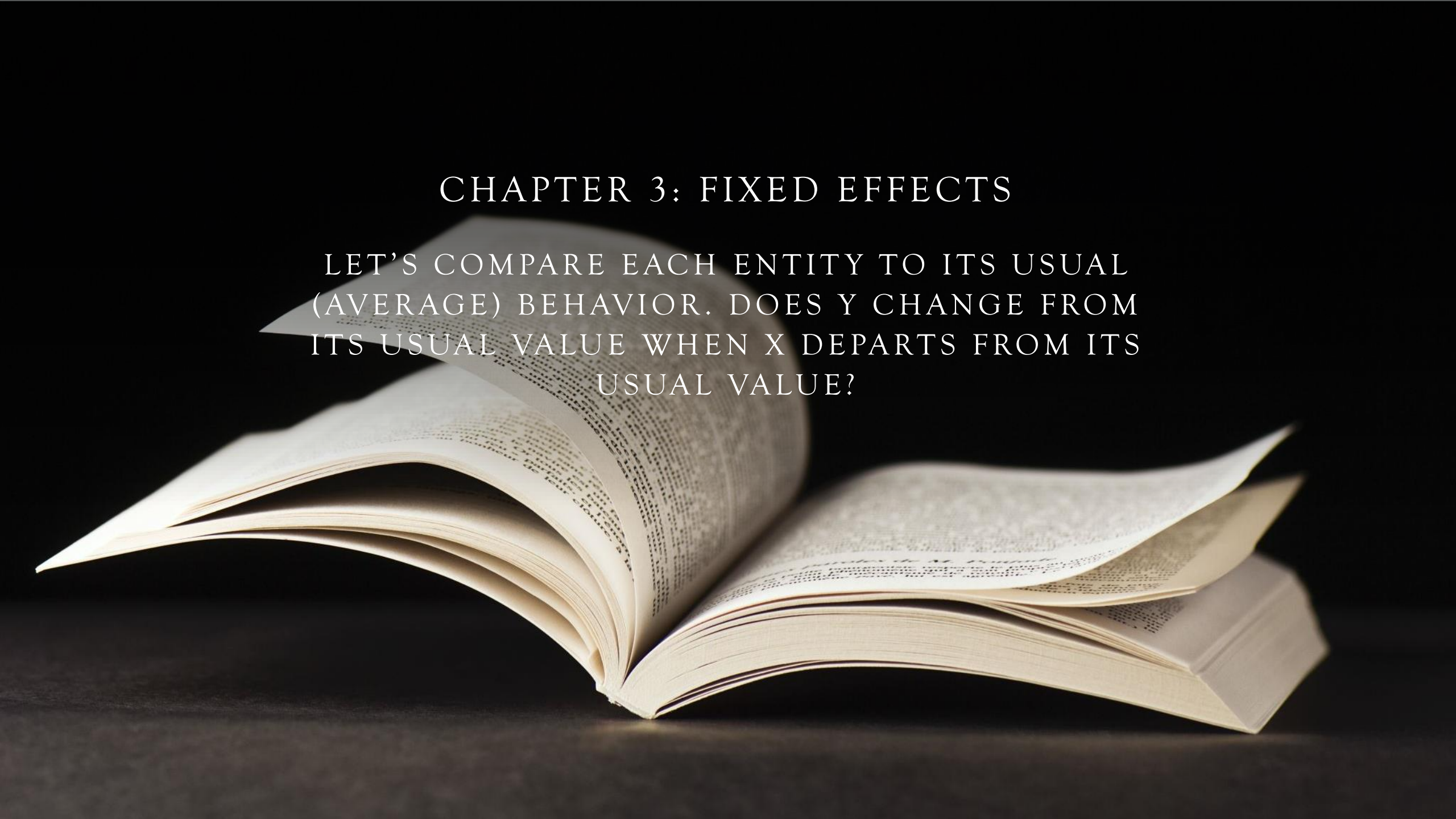
CHAPTER 2: FIRST DIFFERENCES

LET'S SEE HOW CHANGES IN X AFFECT CHANGES IN Y. THIS WAY, ALL FIXED EFFECTS GET CANCELLED OUT.



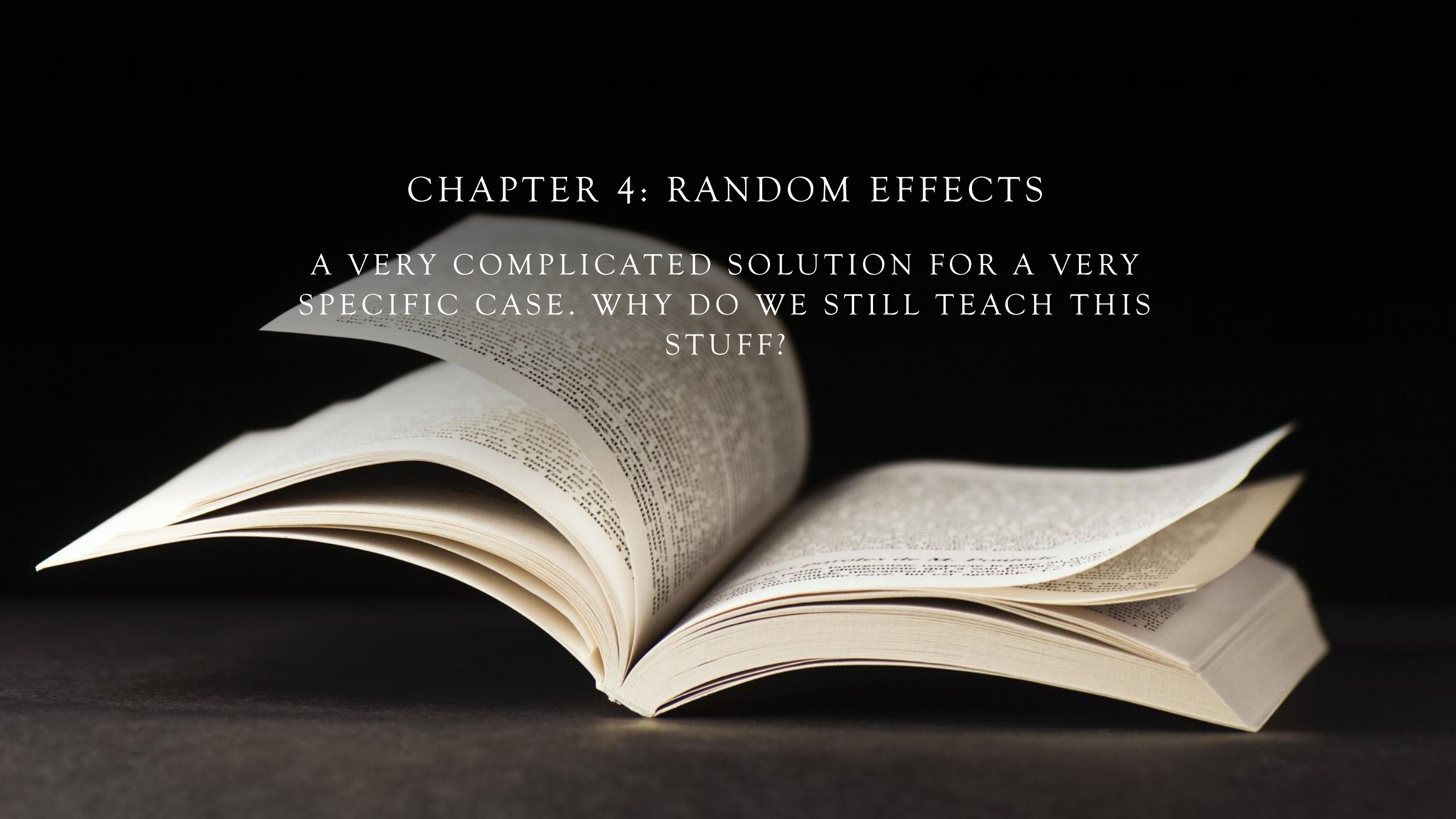
CHAPTER 3: FIXED EFFECTS

LET'S COMPARE EACH ENTITY TO ITS USUAL (AVERAGE) BEHAVIOR. DOES Y CHANGE FROM ITS USUAL VALUE WHEN X DEPARTS FROM ITS USUAL VALUE?



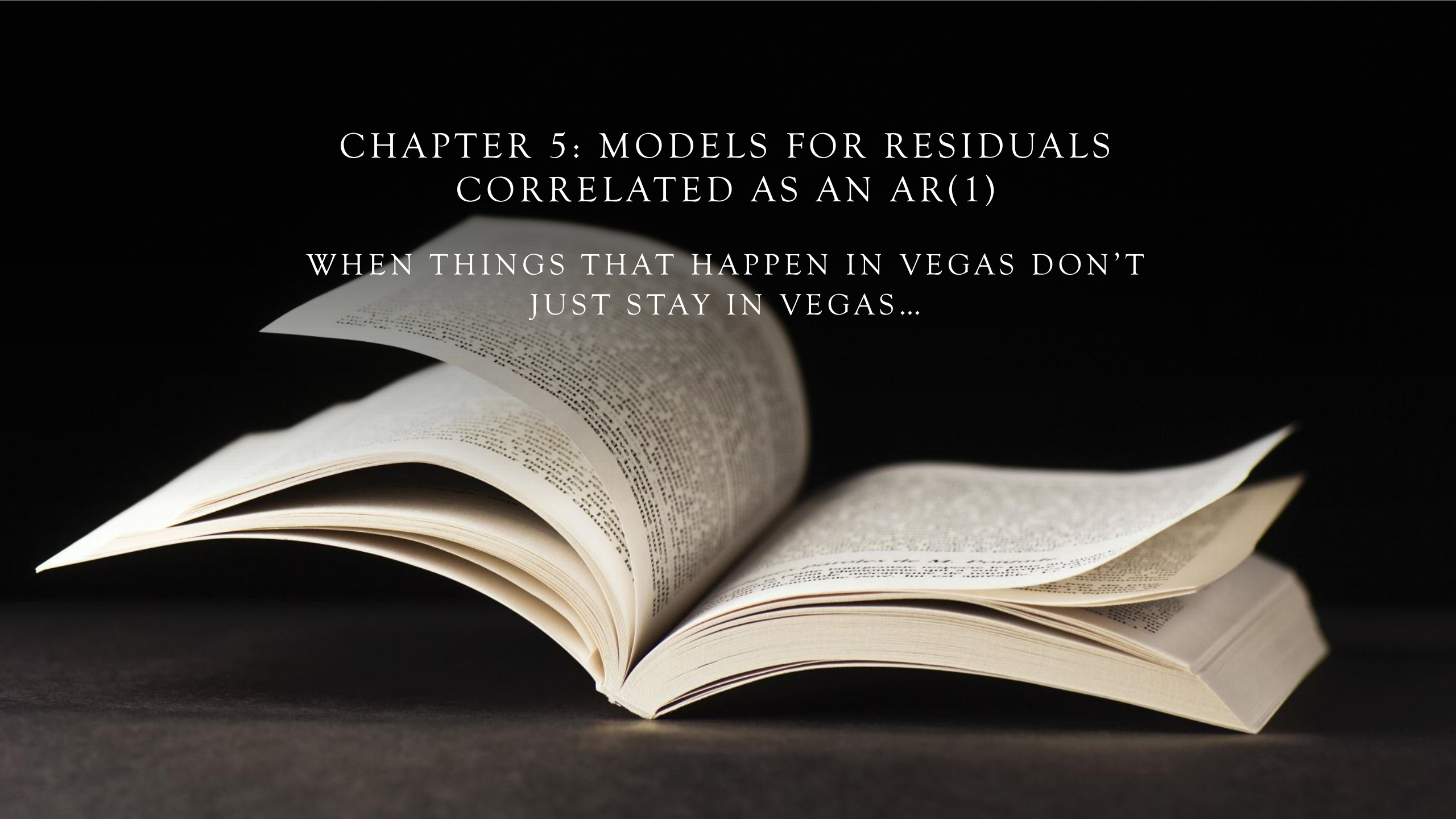
CHAPTER 4: RANDOM EFFECTS

A VERY COMPLICATED SOLUTION FOR A VERY SPECIFIC CASE. WHY DO WE STILL TEACH THIS STUFF?



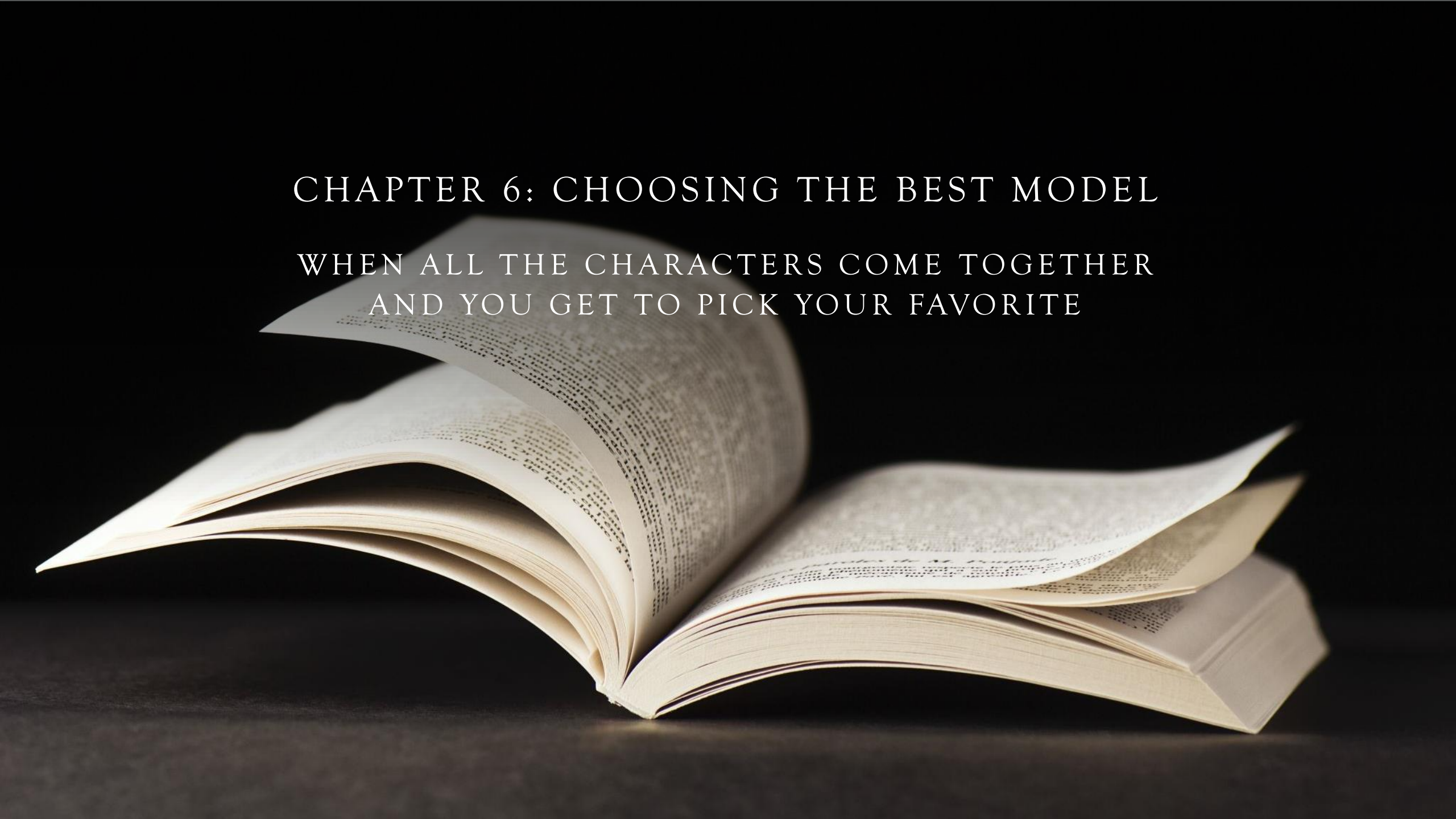
CHAPTER 5: MODELS FOR RESIDUALS CORRELATED AS AN AR(1)

WHEN THINGS THAT HAPPEN IN VEGAS DON'T JUST STAY IN VEGAS…



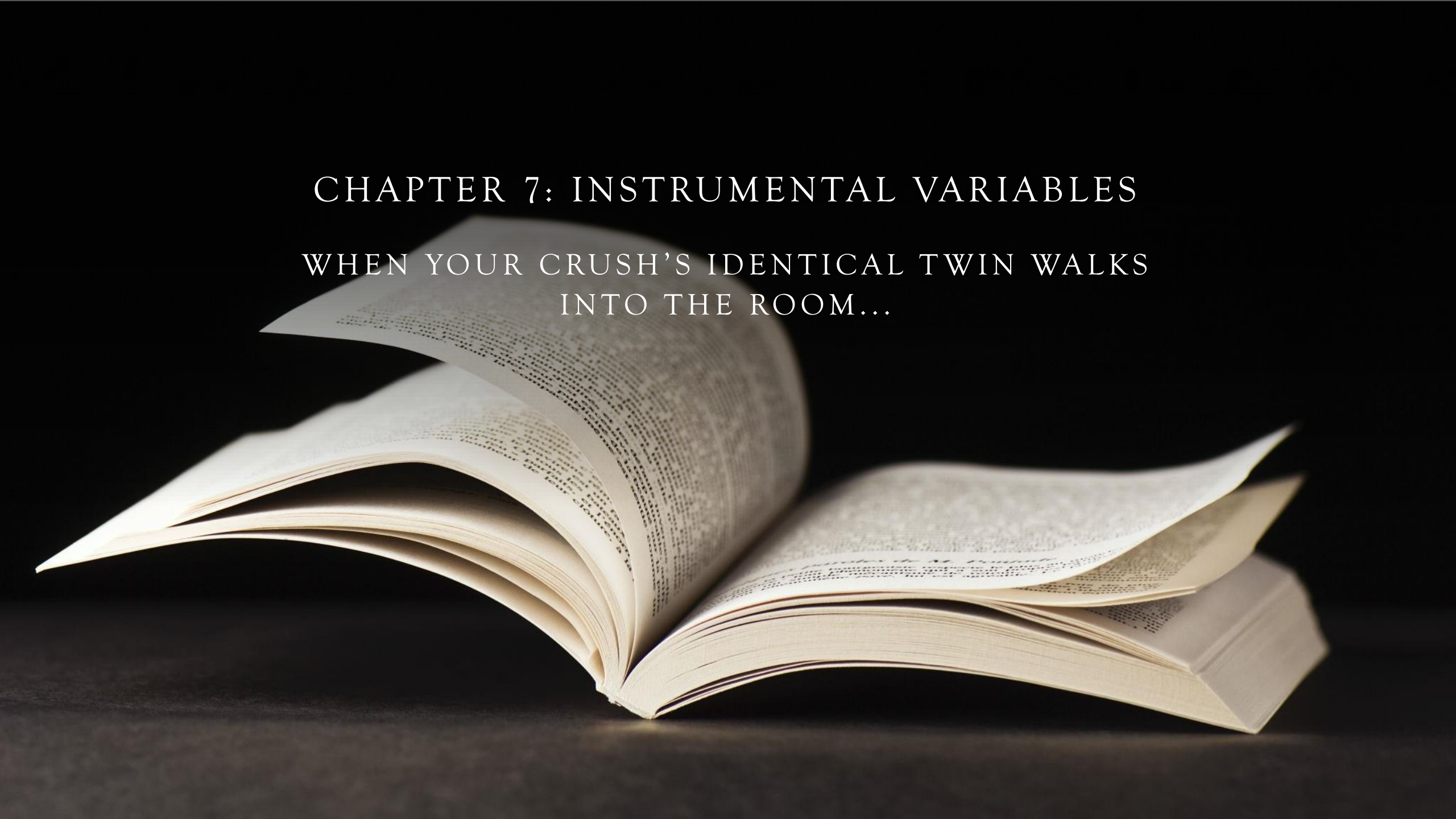
CHAPTER 6: CHOOSING THE BEST MODEL

WHEN ALL THE CHARACTERS COME TOGETHER AND YOU GET TO PICK YOUR FAVORITE



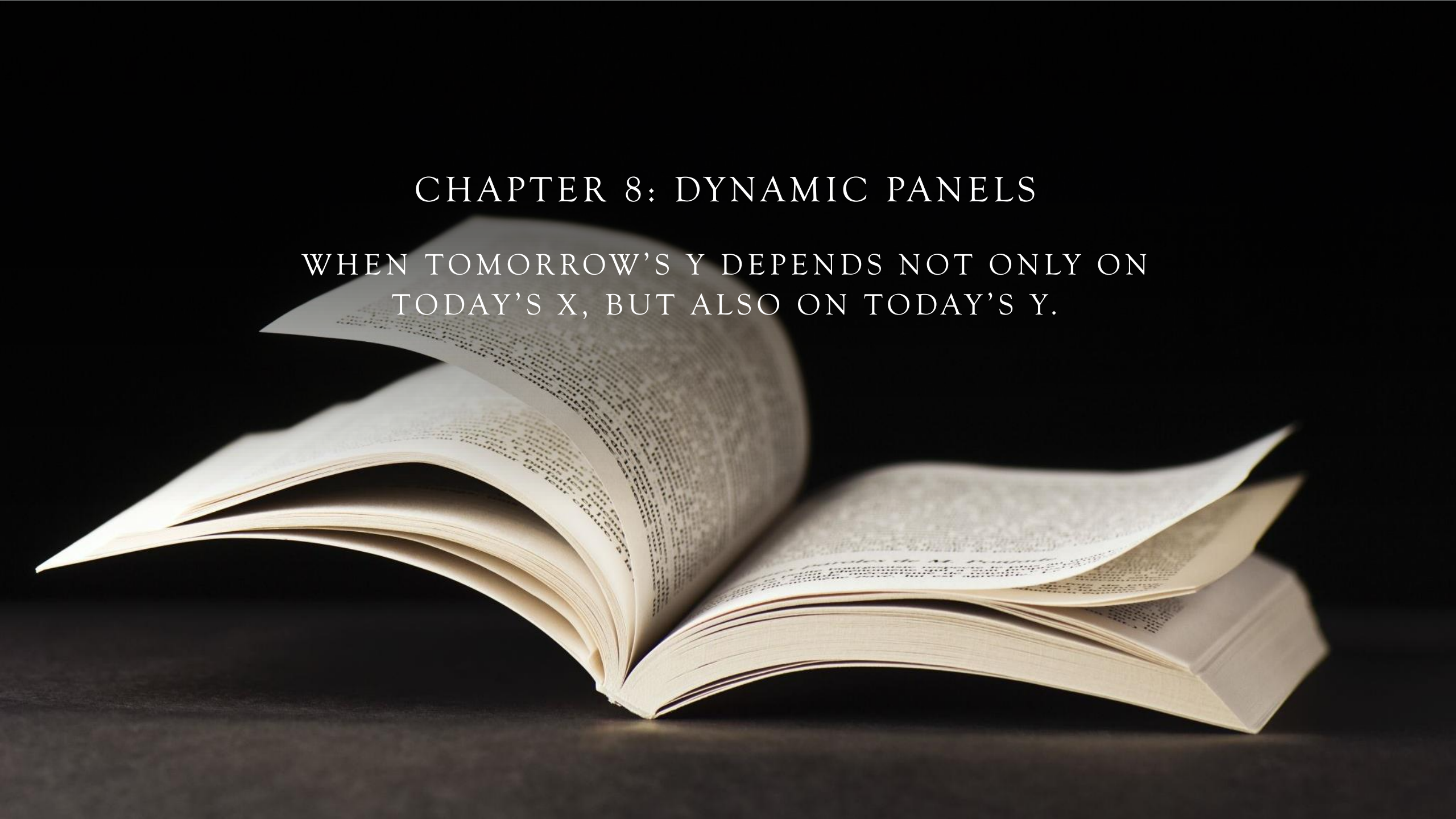
CHAPTER 7: INSTRUMENTAL VARIABLES

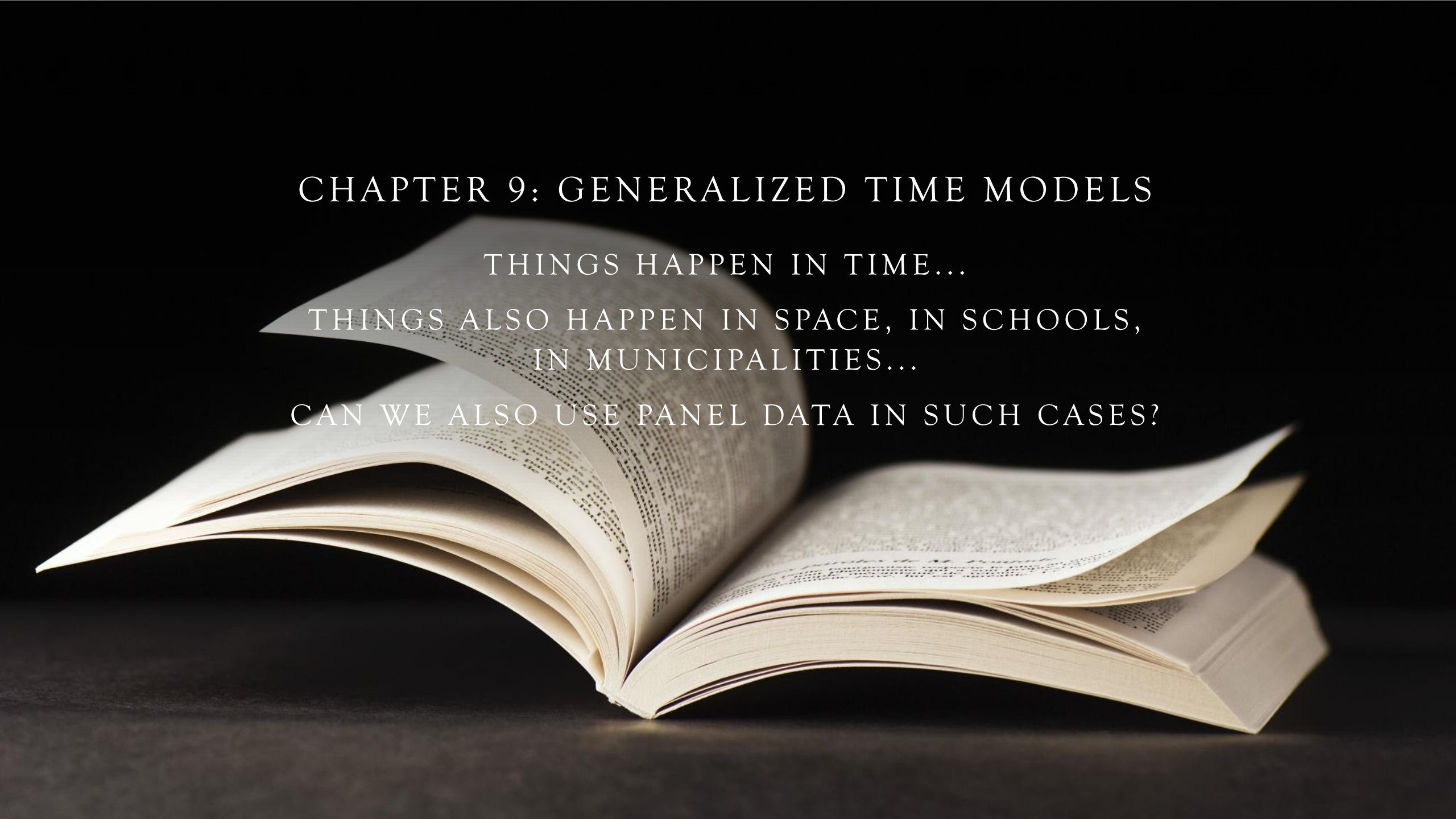
WHEN YOUR CRUSH'S IDENTICAL TWIN WALKS INTO THE ROOM...



CHAPTER 8: DYNAMIC PANELS

WHEN TOMORROW'S Y DEPENDS NOT ONLY ON TODAY'S X, BUT ALSO ON TODAY'S Y.





CHAPTER 9: GENERALIZED TIME MODELS

THINGS HAPPEN IN TIME...

THINGS ALSO HAPPEN IN SPACE, IN SCHOOLS, IN MUNICIPALITIES...

CAN WE ALSO USE PANEL DATA IN SUCH CASES?