# Modeling cities using ideas from Economic Complexity and Cultural Evolution

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**How come?**

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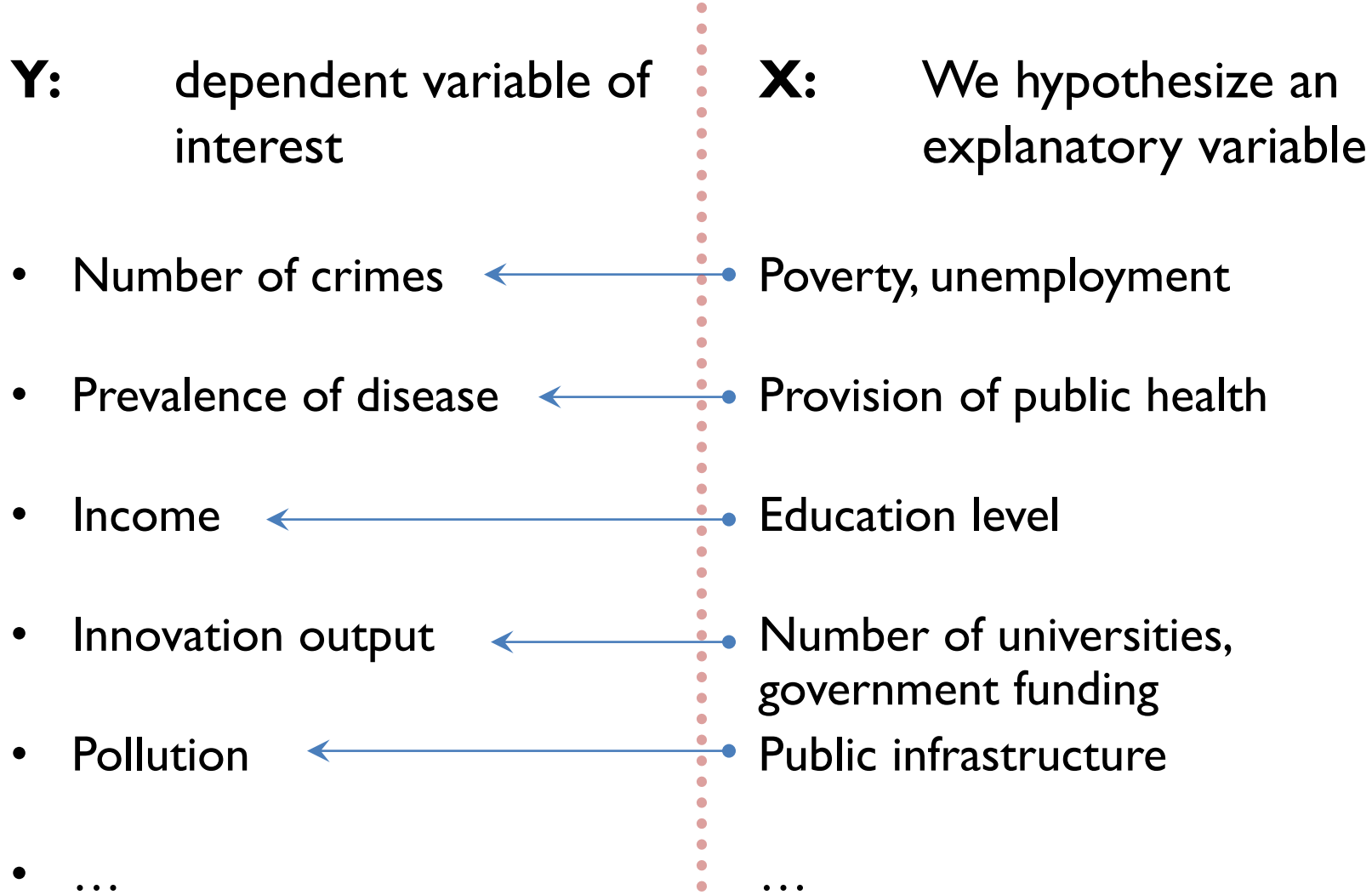

This is great, but it is important to remind ourselves that this is not the only approach.

# Thought experiment

Theory: $Y = f_1(X)$ → Empirics: $y_i = \beta_0 + \beta_1 x_{i,1} + \epsilon_i$

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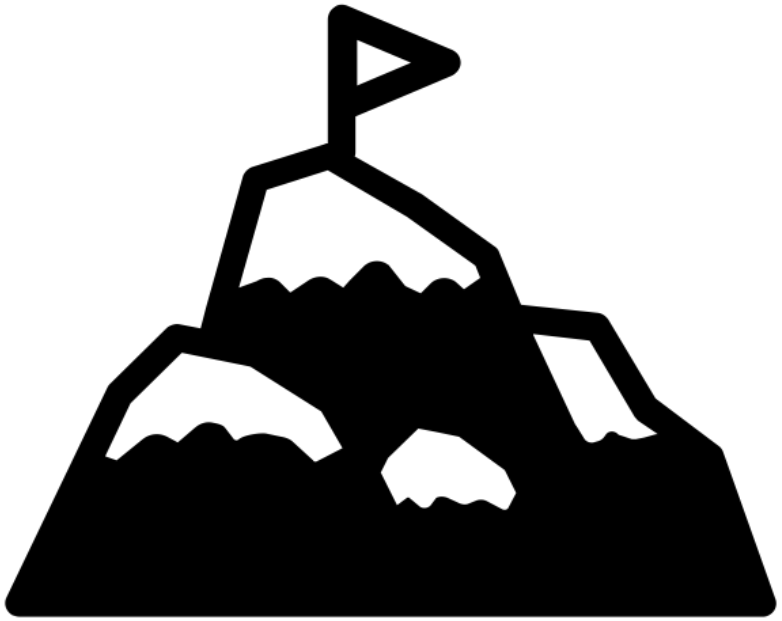
$$Y = f(X_1, X_2, X_3, X_4, \ldots \longrightarrow \infty)$$

*TRUTH*



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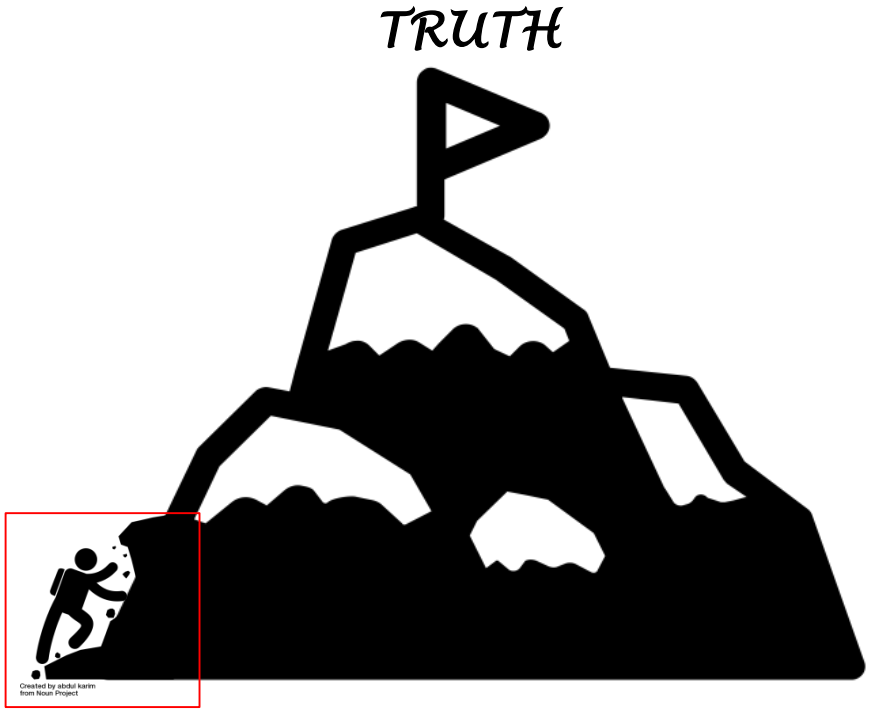


Explaining ***Y*** one variable at a time…

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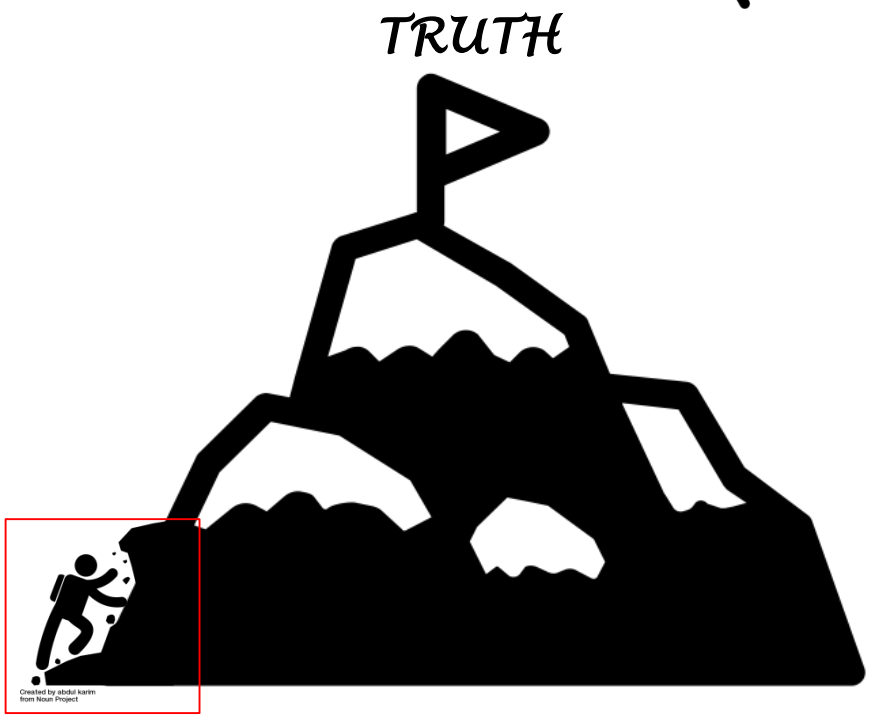
Explicitly assume ***Y*** is the consequence of ***many, many, many explanatory variables***.

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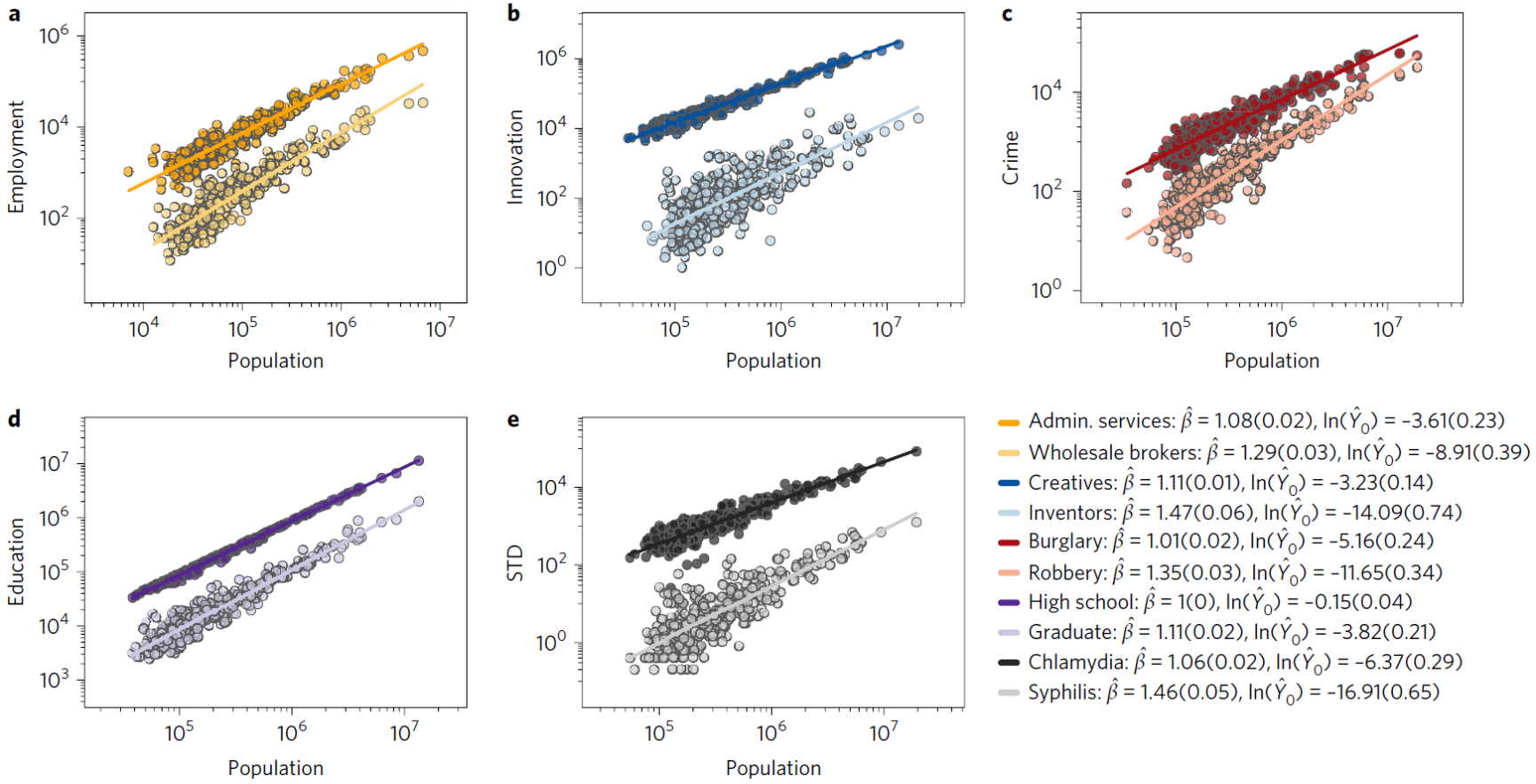
# The "view from above"

- The study of probability **distributions**,
  *not* of means.
- The study of the **processes** that give rise to the distributions,
  *not* of specific pathways/mechanisms.
- The study of **scale** and how phenomena in a system change with it,
  *not* just looking at a single city and a single scale.

# Four facts (among others) to try explaining



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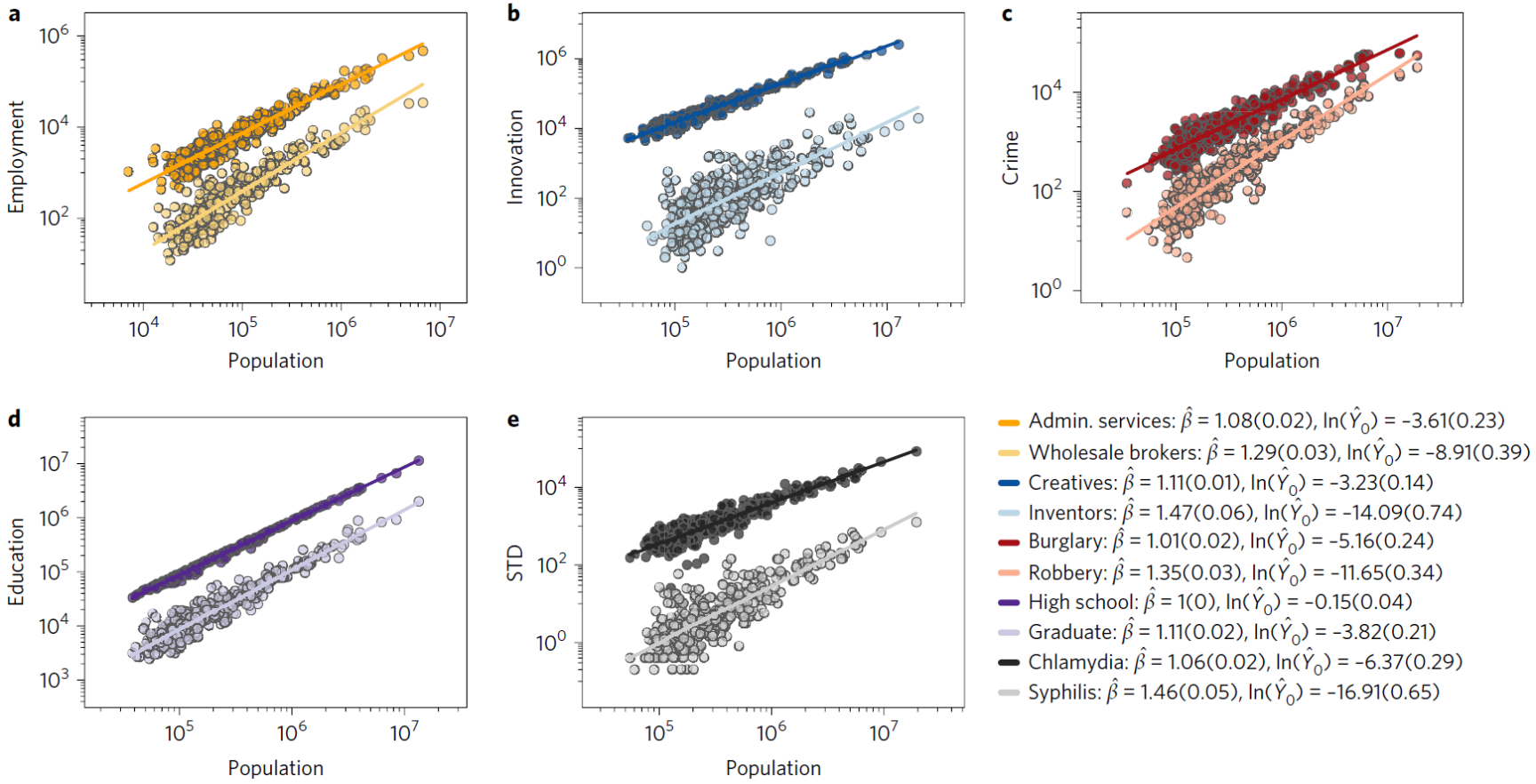

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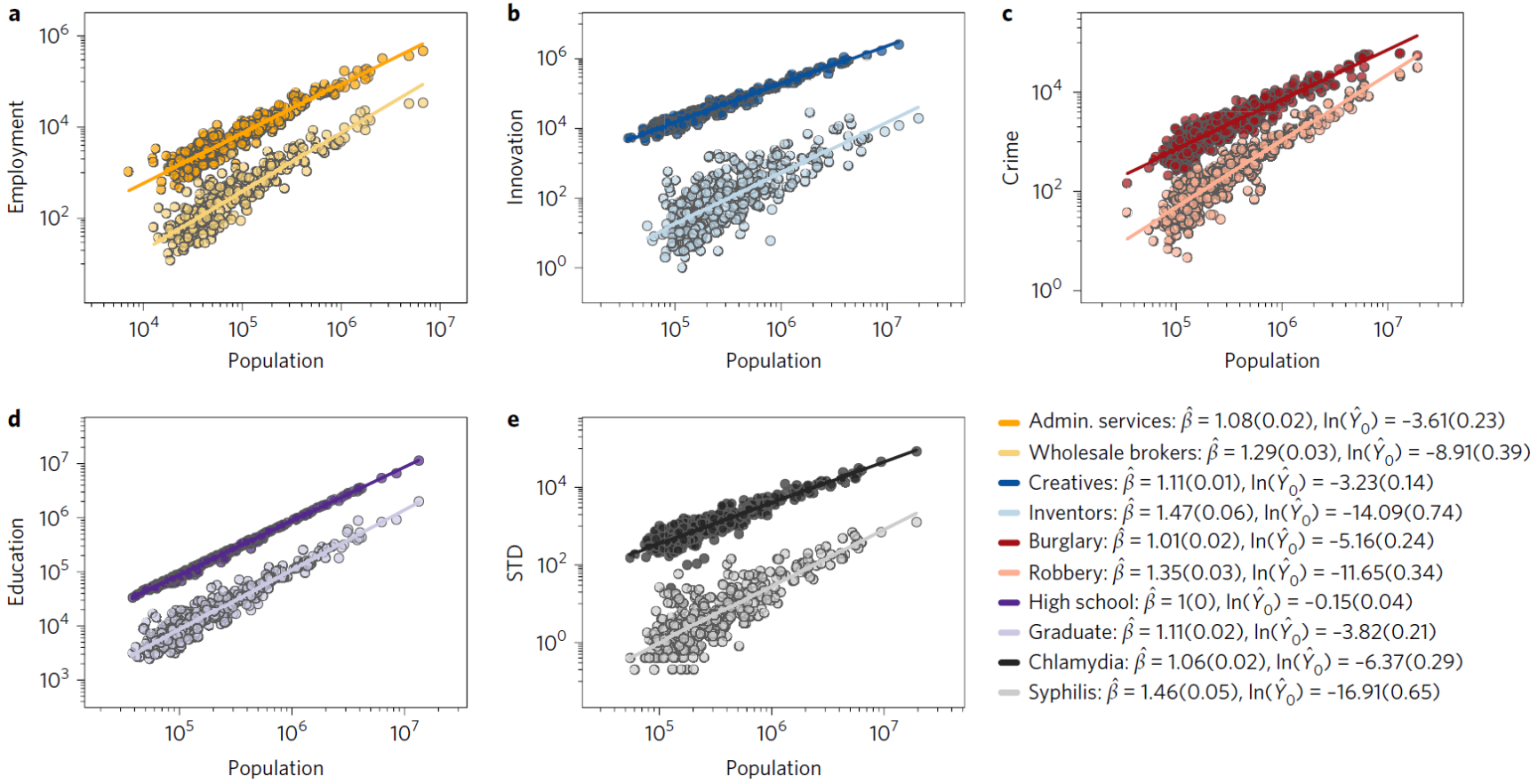

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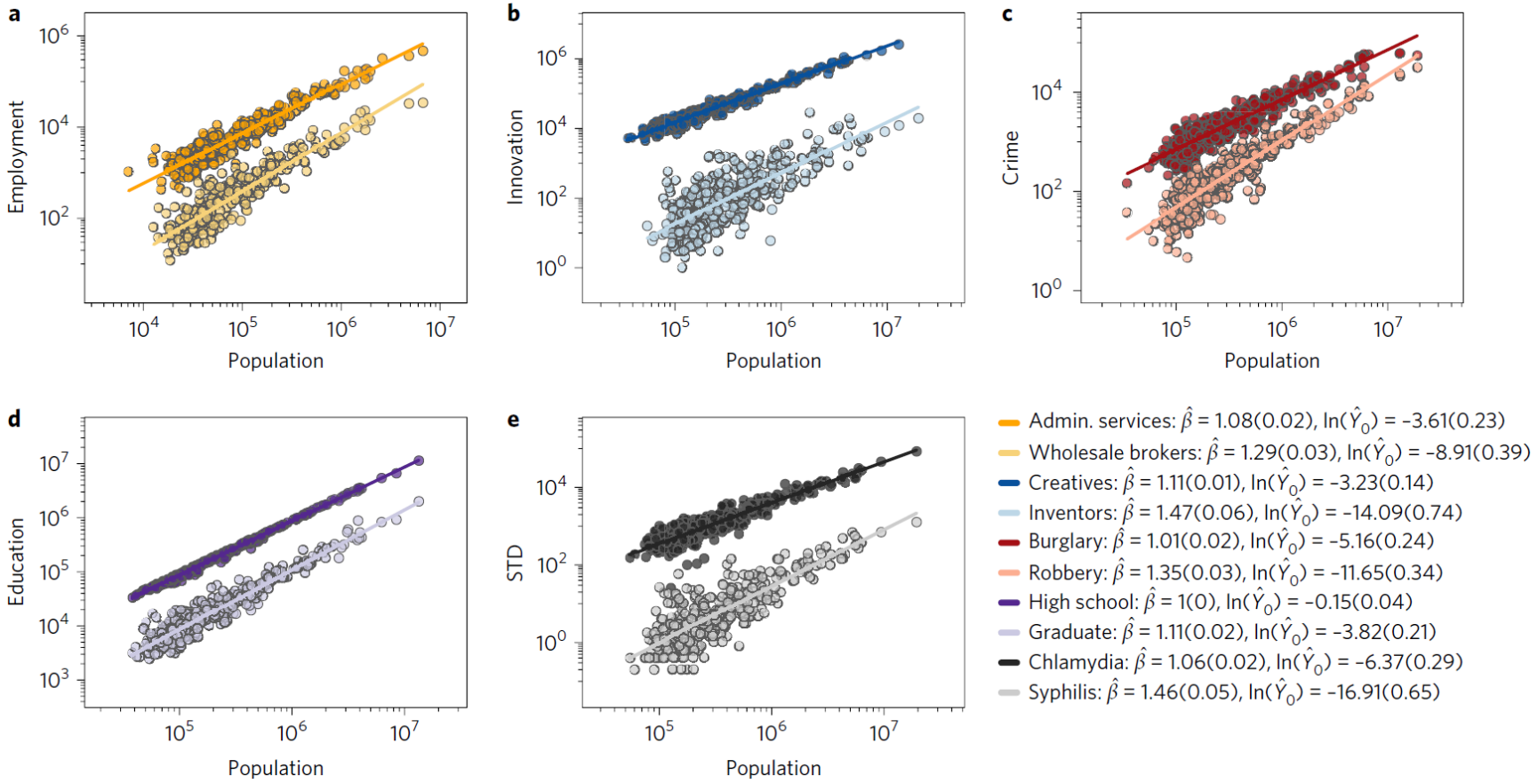

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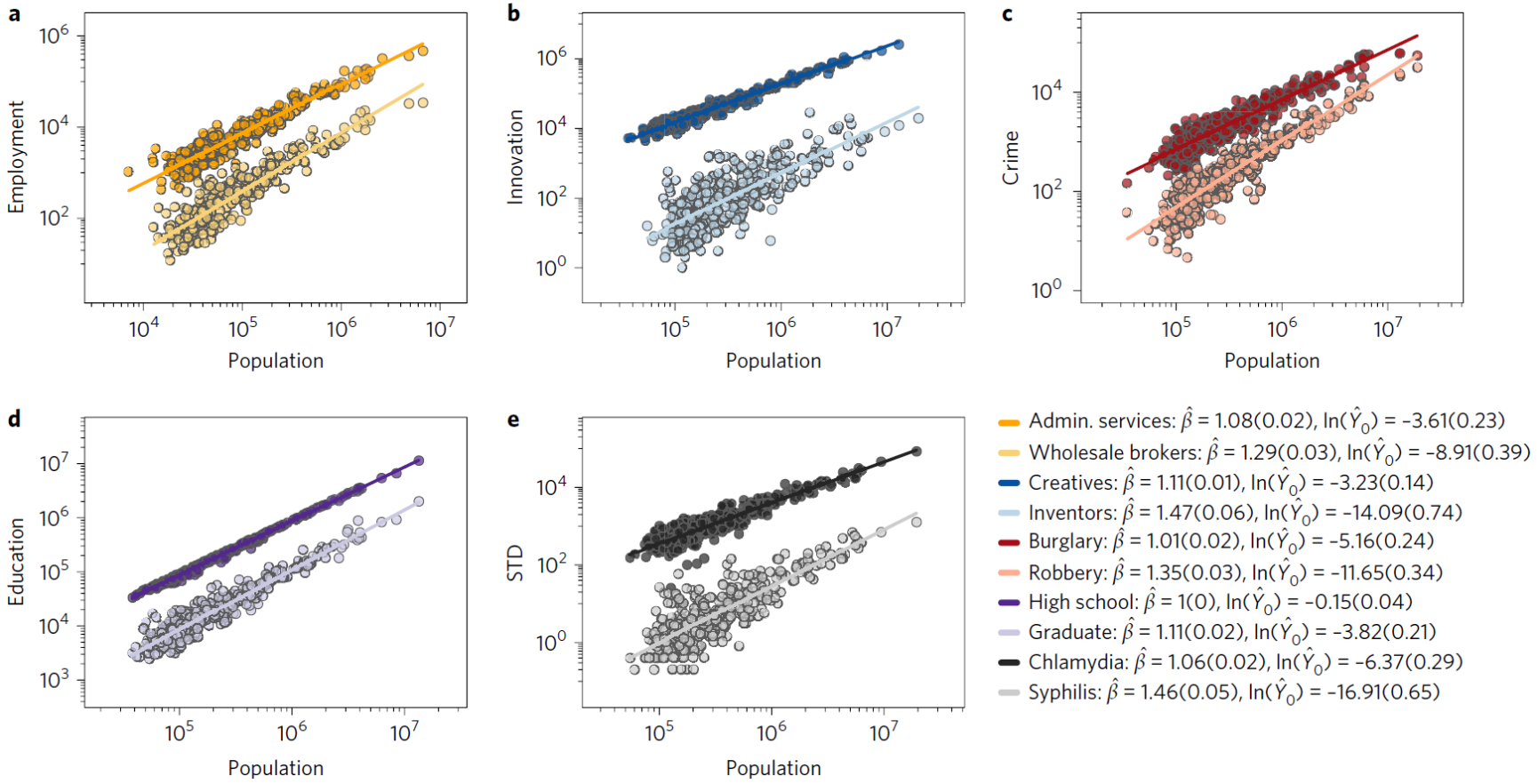

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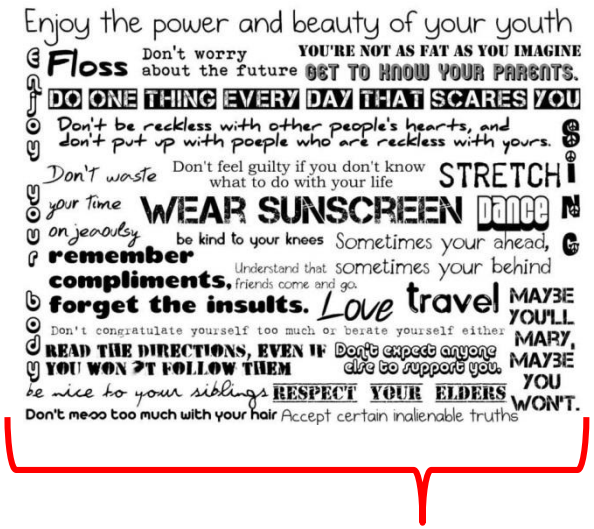


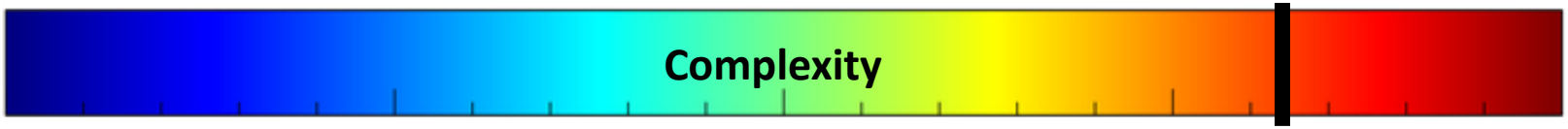

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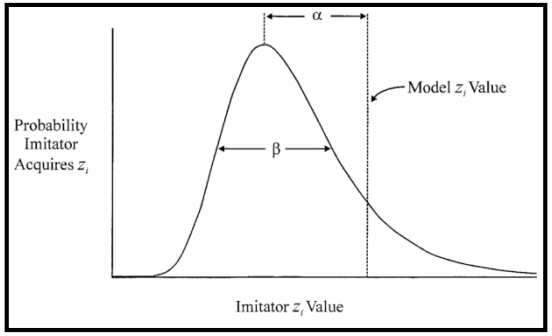
$$\Pr\{X_{i,c,f} = 1\} = e^{-M_f q_i (1 - r_c)}$$

## Models of economic complexity


&

## Models of cultural evolution



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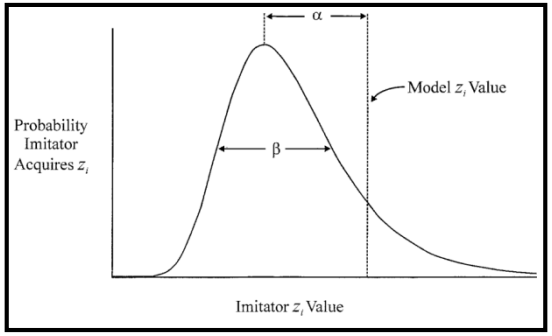


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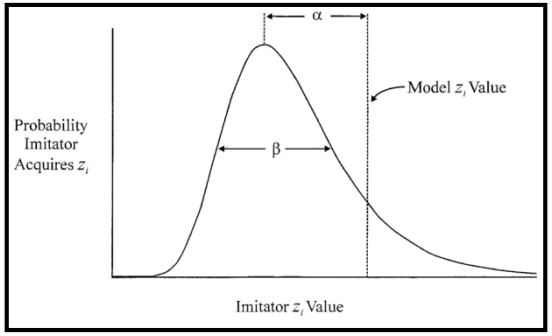


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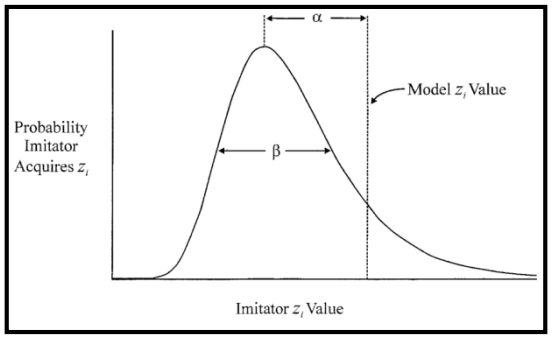


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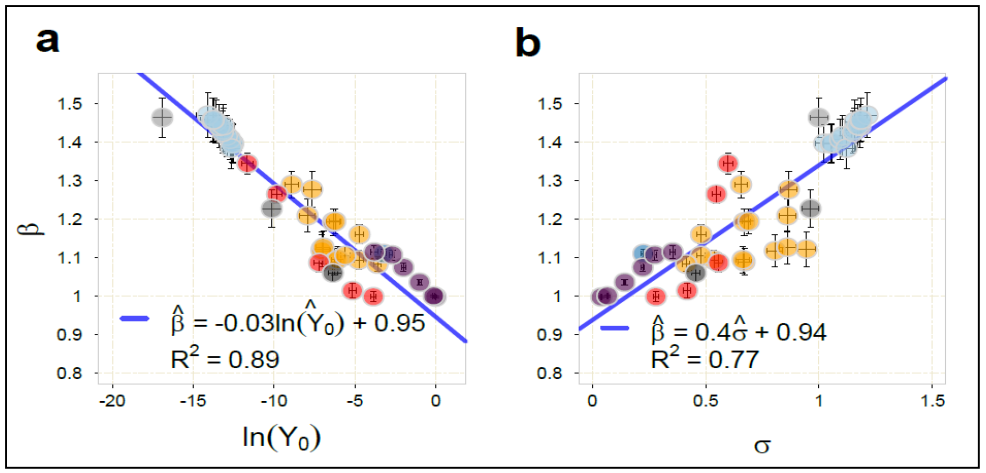

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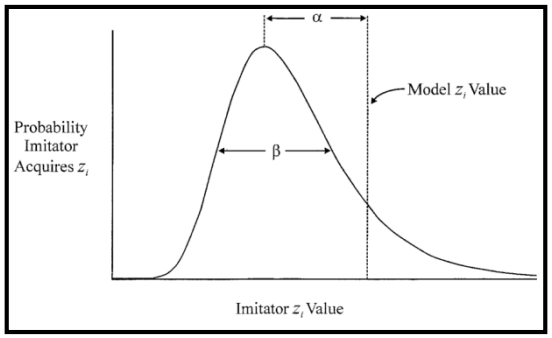


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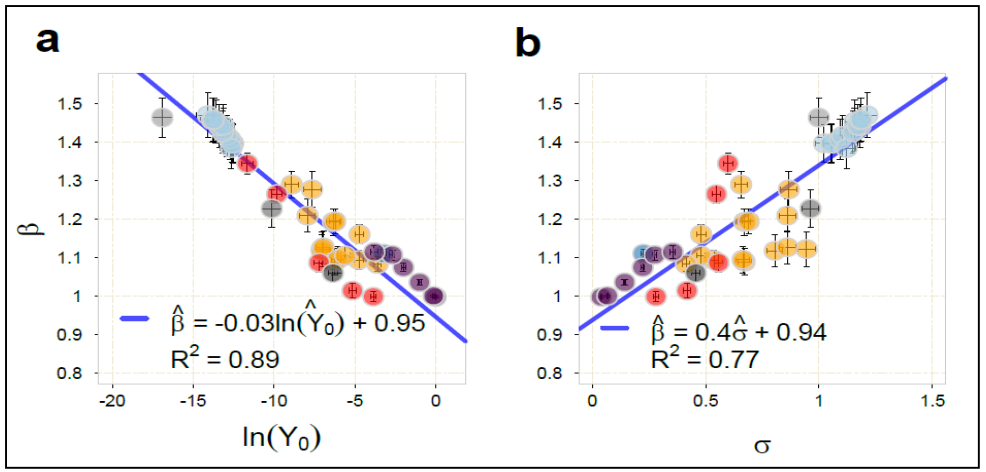
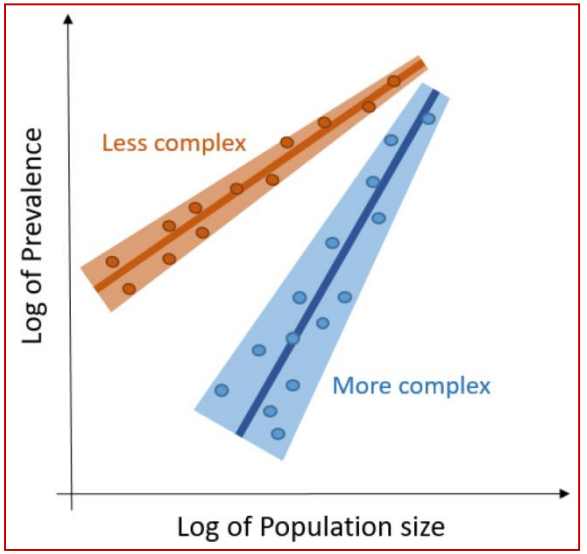
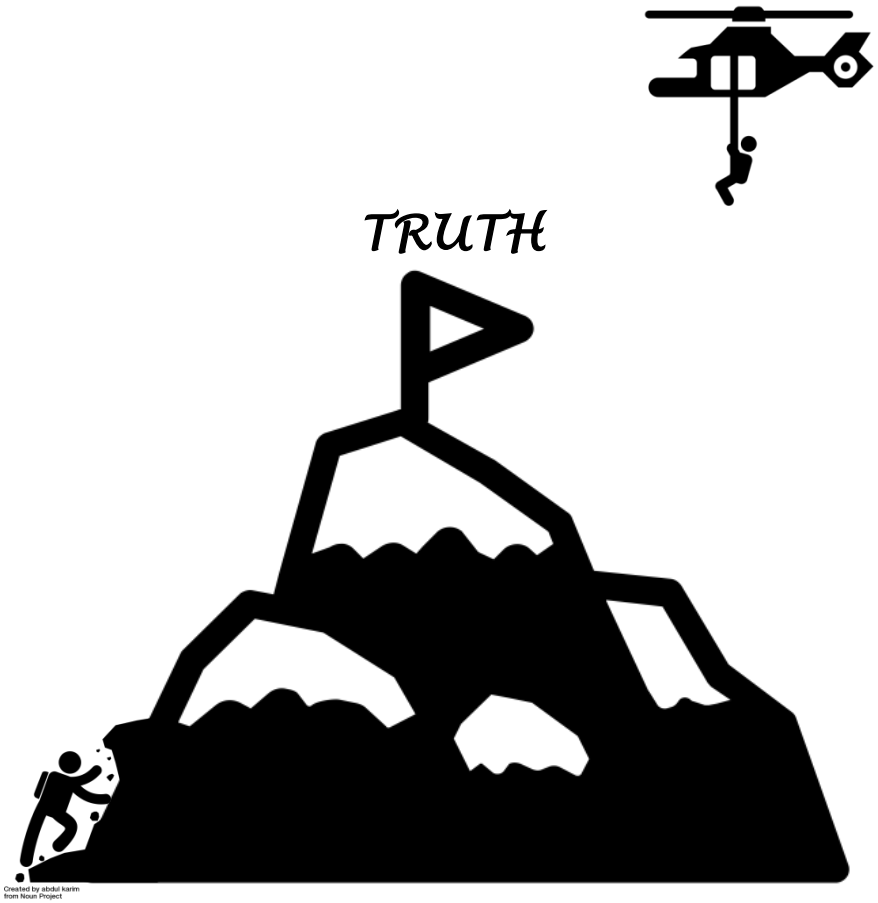


# Limitations/Future Directions

- Too simple. E.g., there are no dynamics. Hence, no sense of time-scales for how phenomena change in time.
- Cities are internally very heterogeneous, and segregated. How to include *spatial* heterogeneity?
- Too discrete (person *in* or *out*).

# Takeaways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# The importance of emergent phenomena

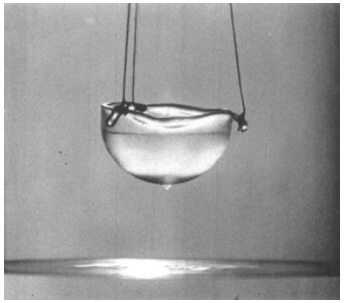
To understand a systemic phenomenon, consider

***how many*** parts and
how they ***interact***,

than

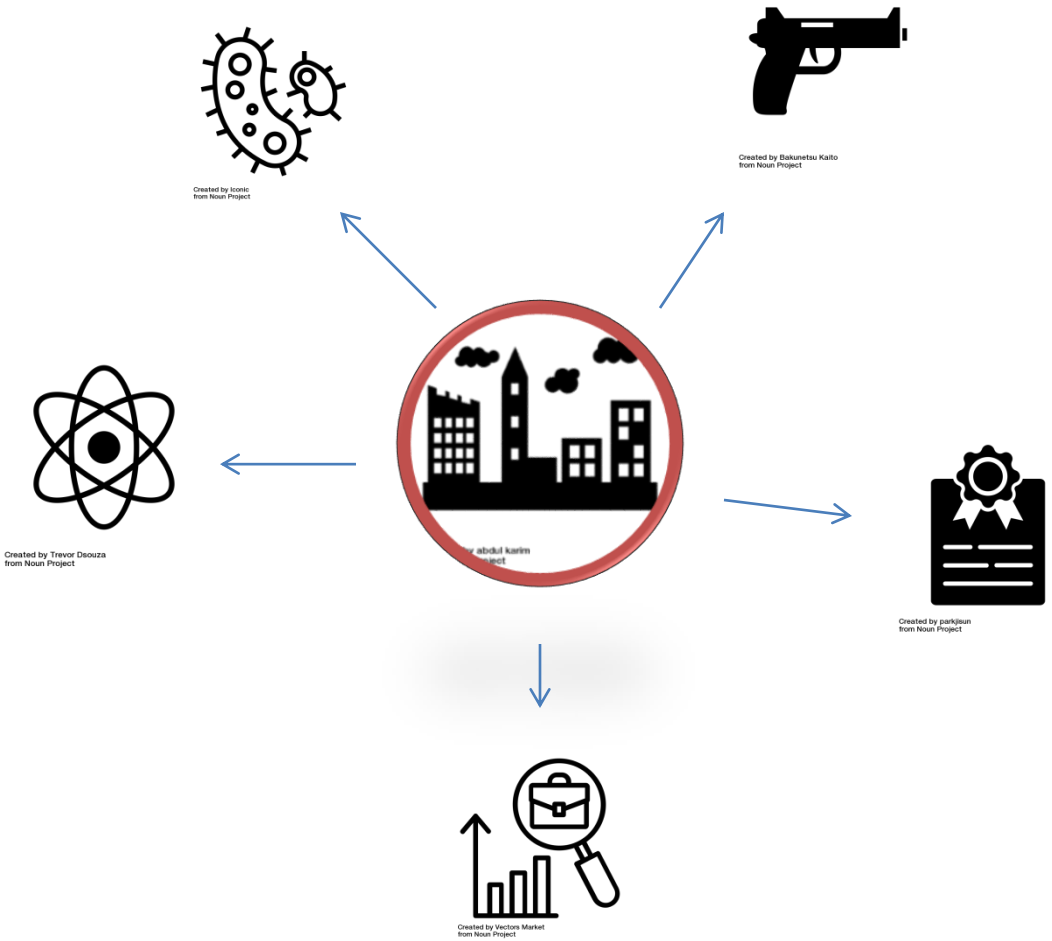
***what are*** the parts.

The fact that we understand the liquidity of water *means* that we understand liquidity in other materials.



# Urban “outcomes” as emergent phenomena

(→ my research ☺ )



# mentors and colleagues











# THANK YOU

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**References:**


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