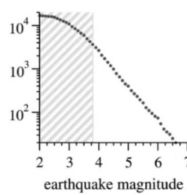
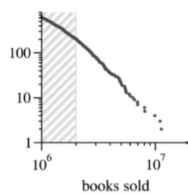
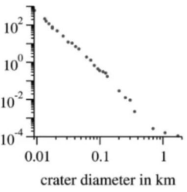
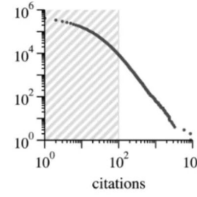
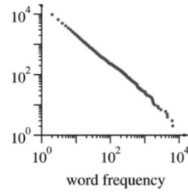
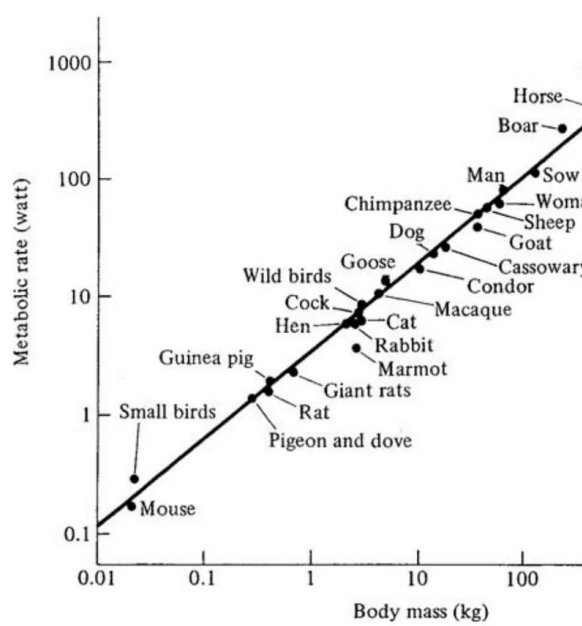


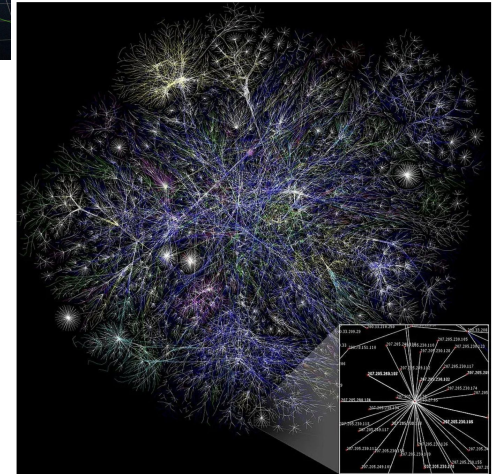
The Thanos Question

Meritocracy Continued...

What do these have in common?



Examples of the power law distribution. Adapted from: M. Newman, Power laws, Pareto distributions and Zipf's law, Contemporary Physics, 2007.



The Internet, consisting of connected autonomous systems and routers, is an example of a complex system that exhibits a power law in the number of connections. The most connected vertices are called hubs. Source: https://en.wikipedia.org/wiki/Scale-free_network.

Power Law

“Power laws are not just a mathematical curiosity, but a key to understanding the emergent behavior of complex systems, from the Internet to the human brain.” — Steven Strogatz.

Hierarchies and Power Law

 royalsocietypublishing.org
<https://royalsocietypublishing.org/doi/rsif.2017.0231>

Hierarchical temporal structure in music, speech and animal

by CT Kello · 2017 · Cited by 64 — Several studies have reported evidence that the conn
neural systems is hierarchically **power law** structured [56–58], and temporal ...

 National Institutes of Health (.gov)
<https://www.ncbi.nlm.nih.gov/articles/PMC75>

Hierarchical Scaling in Systems of Natural Cities - PMC

by Y Chen · 2018 · Cited by 16 — A hierarchy can be mathematically described with a power law
or a **pair of exponential laws**. In recent years, many scientists have been ...

 Pennsylvania State University
<https://citeseerx.ist.psu.edu/viewdoc/download>

Network Topologies, Power Laws, and Hierarchy

by H Tangmunarunkit · Cited by 135 — We find that while the degree-based generators do not
explicitly inject **hierarchy** into the network, the **power-law** nature of the degree distribution...

 ScienceDirect
<https://www.sciencedirect.com/article/abs/pii>

Power, status, and hierarchy: current trends and future ...

by GA van Kleef · 2020 · Cited by 27 — In diverse social species, including humans, **power** and
status dynamics become manifest in the form of within-group ranking asymmetries. In this

 Science
<https://www.science.org/doi/sciadv.abn6093>


Frequency-dependent transition in power-law rheological ...

by JT Hang · 2022 · Cited by 11 — Here, we show that a self-similar **hierarchical** model can
capture cell's **power-law** rheological characteristics in different frequency scales. In ...

 York University
https://bnarchives.yorku.ca/20180700_fix_hiera...


Hierarchy and the power-law income distribution tail

by B Fix · 2018 · Cited by 22 — On the theoretical side, these results suggest that **hierarchy** is a
plausible mechanism for generating the power-law scaling of top incomes. This ...

 Springer
<https://link.springer.com/article>

Hierarchy and the power-law income distribution tail

by B Fix · 2018 · Cited by 22 — On the theoretical side, these results suggest that **hierarchy**
plausible mechanism for generating the power-law scaling of top incomes.

 University of California, Berkeley
<https://www1.icsi.berkeley.edu/pfiles/hiernets>


Hierarchical networks, power laws, and ... - ICSI (Berkeley)

by EJ Friedman · 2013 · Cited by 48 — of **hierarchical** architecture in a network. Our main **result**
reveals the interesting role of **hierarchy** in generat- ing robust **power-law** behavior in networks, ...

 PNAS
<https://www.pnas.org/doi/pnas.1913014117>

Common power laws for cities and spatial fractal structures

by T Mori · 2020 · Cited by 27 — We find that city-size distributions in different parts of these
spatial **hierarchies** exhibit **power laws** that are, again, far more similar than would be ...

 American Institute of Physics
<https://pubs.aip.org/aip/cha/article/Hierarchical-ne...>

Hierarchical networks, power laws, and neuronal avalanches

by EJ Friedman · 2013 · Cited by 48 — Our analysis shows how the hierarchical organization of a
network can itself lead to **power-law distributions of avalanche sizes** and ...

Do we care?



Inequality sucks but what if...

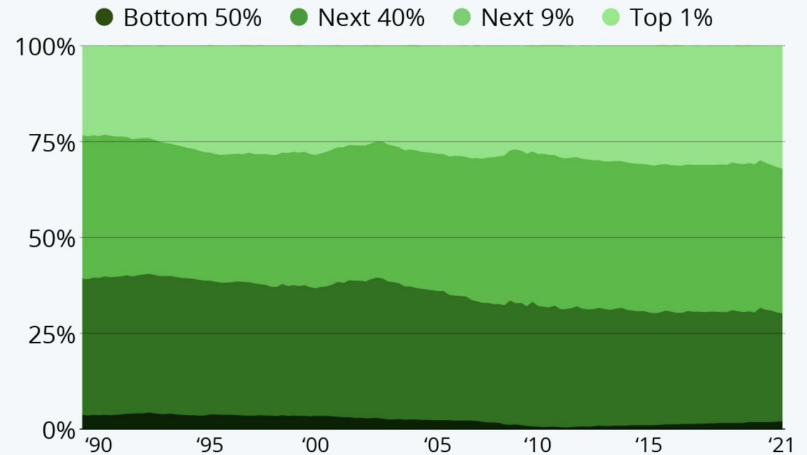


Let's make a model

- That is unequal (assumes wealth is power law)
- That assumes mechanism for passing on wealth

Top 10 Percent Own 70 Percent of U.S. Wealth

Distribution of total U.S. net worth 1989-2021 (in percent)



Percent of aggregate, not seasonally adjusted.

Source: Federal Reserve Bank of St. Louis

Include

- **Ambition (mobility)**
 - Mark Cuban
 - Oprah Winfrey
- **Society Builds**
 - 10 generations ago if you were rich you had a horse
 - 1 generation ago if you were rich you had a cell phone

This doesn't incorporate changing inequality



Questions

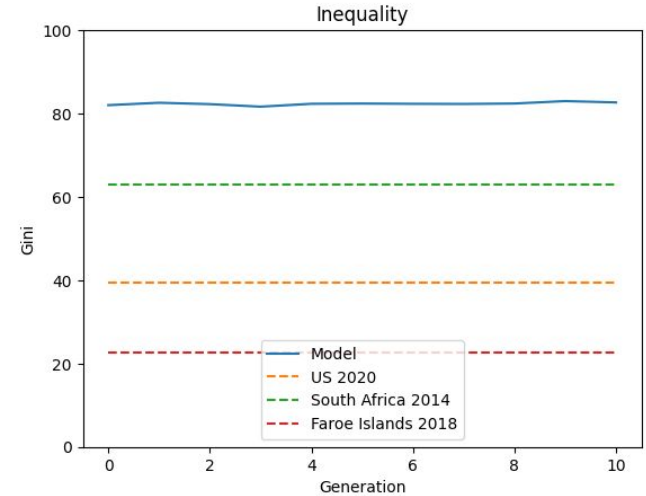
Do we get entrenched inequality?

What would it take for people to improve their lives?

How would ambition as a mechanism affect things?

Model

- Population = 100
- 10 generations (US is 7-12 old)
- 2 children (replacement level)
- Match - assortative, agent wealth + normal noise
 - Std - 0.15
- Wealth power law distributed by rank
- Resources start at $1e10$ (10 Billion) - gini coeff of
 - (1e7 more like US)
- Maximize potential improves society



Agents

- Potential [0.1, 1.0] (Unrefined + Developed)
- Ambition [0.0, 1.0]
- Opportunity [0.0, 1.0]

Potential Gap = Potential - Unrefined

Competency = Unrefined + (Ambition * Gap) + (Opportunity * Gap)

Productivity = Competency * Resource Potential

Rank: relative competency

Calibration

- Assortative mating, intelligence ~ 0.4
- Child intelligence heritability 20-80%



National Institutes of Health (.gov)

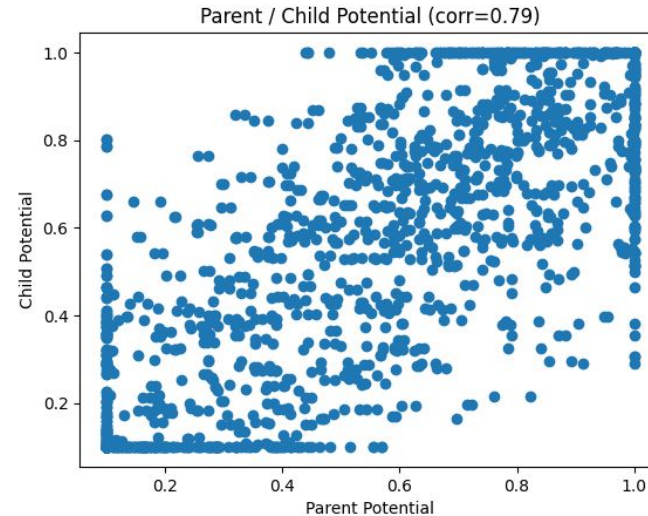
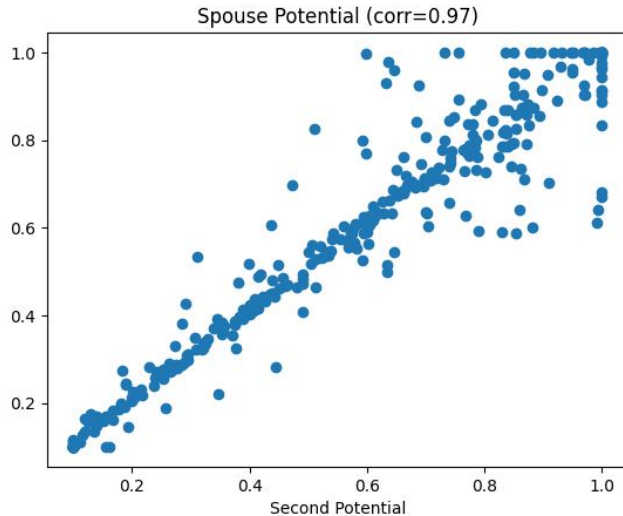
<https://www.ncbi.nlm.nih.gov/articles/PMC4270739> ;

Genetics and intelligence differences: five special findings

by R Plomin · 2015 · Cited by 752 — **Intelligence** is one of the most **heritable** behavioural traits.

Here, we highlight five genetic findings that are special to **intelligence** ...

[Abstract](#) · [Three 'laws' of the genetics of...](#) · [What is intelligence and why is...](#)

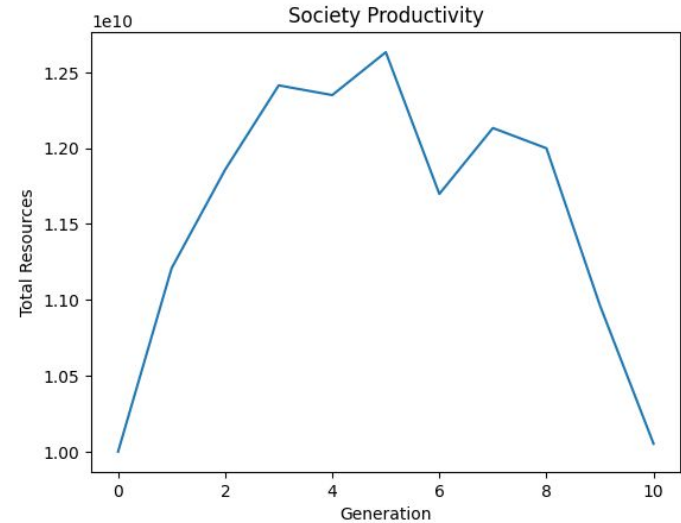


Results (Scenario 1)

Assumptions

- Assume ambition has 0 effect
- Assume opportunity has full effect
- Unrefined = 0.3

To get productive economy need productivity factor of 1.99



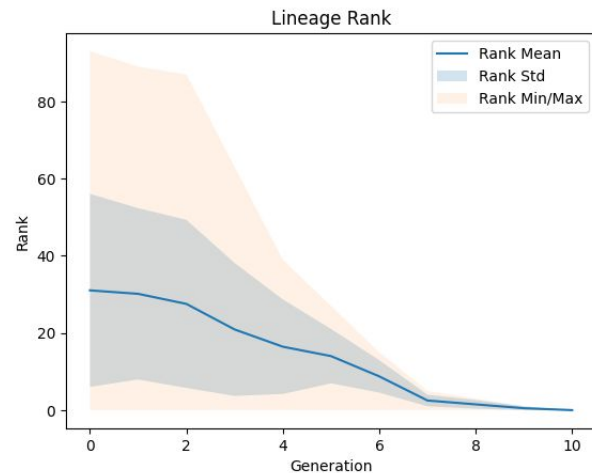
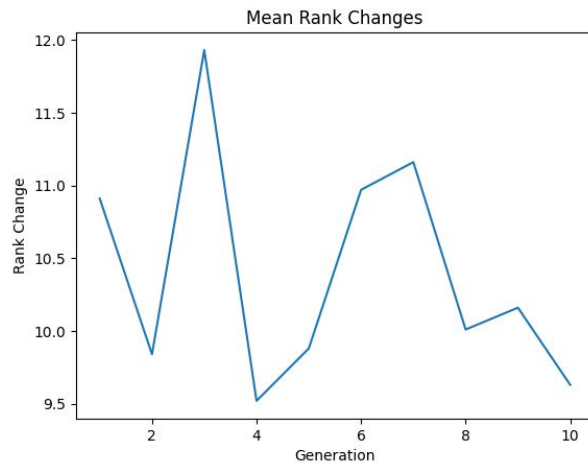
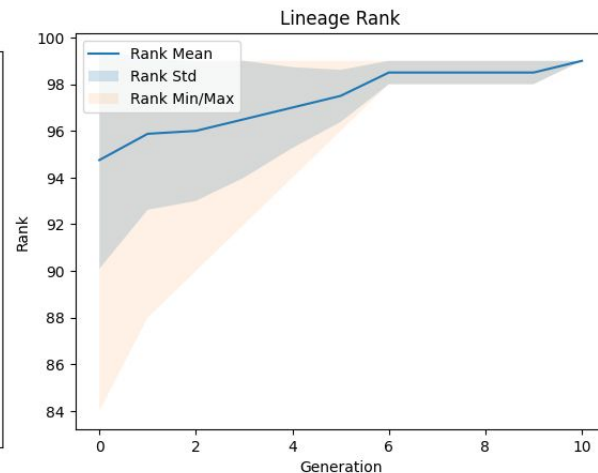
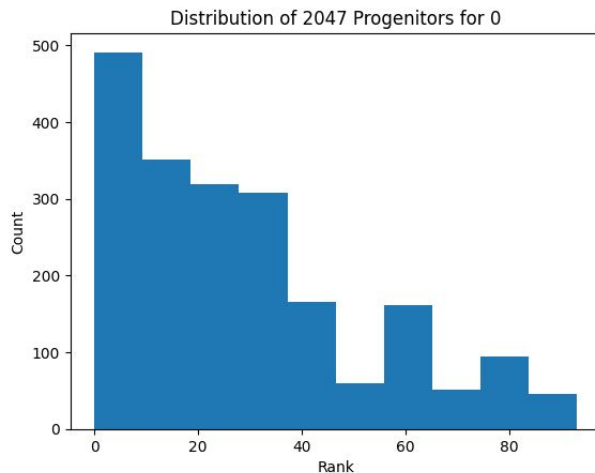
Scenario 1

For rank 0, in 3 generations:

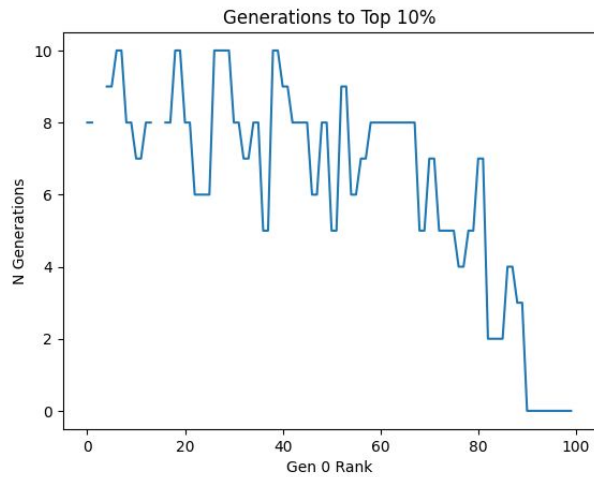
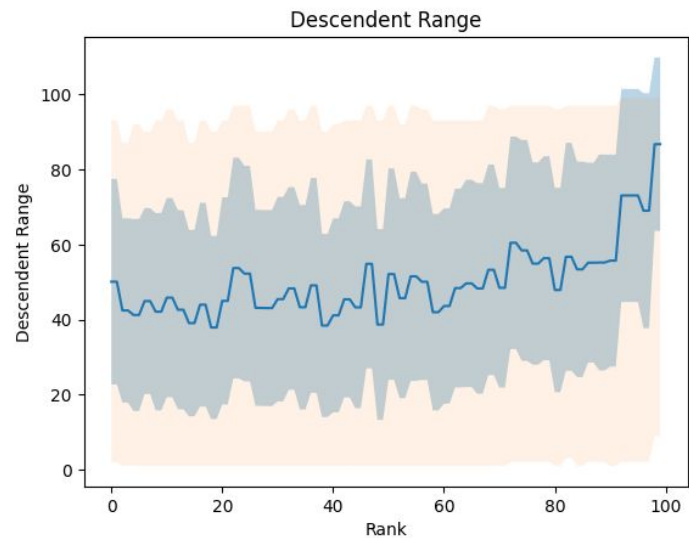
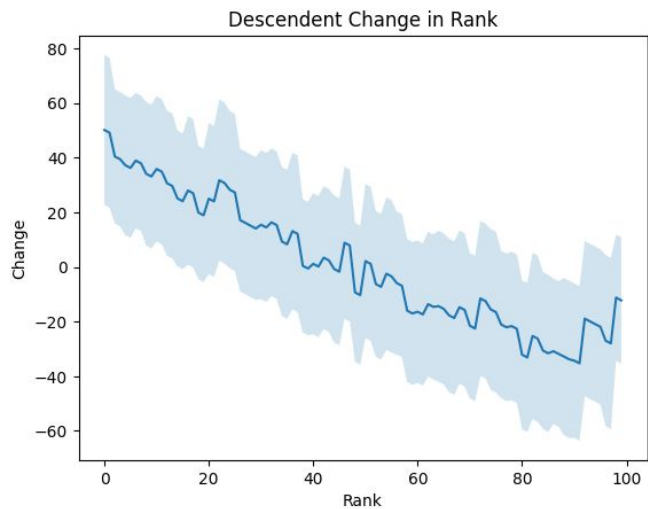
- Best: 57
- Worst: 0

For rank 100:

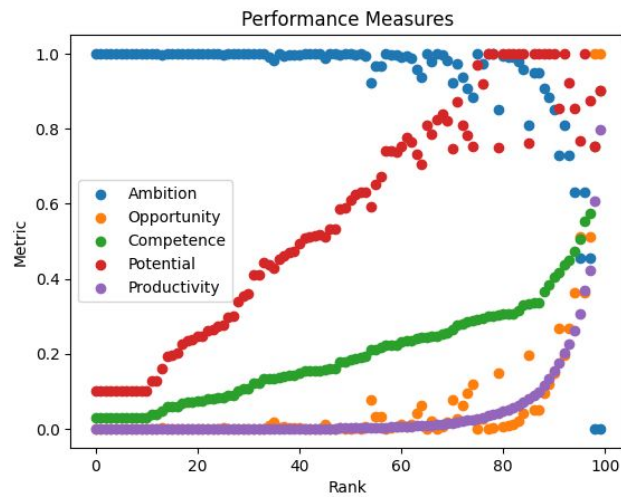
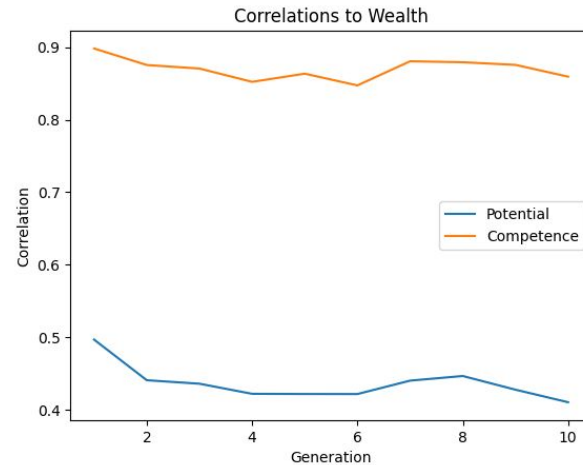
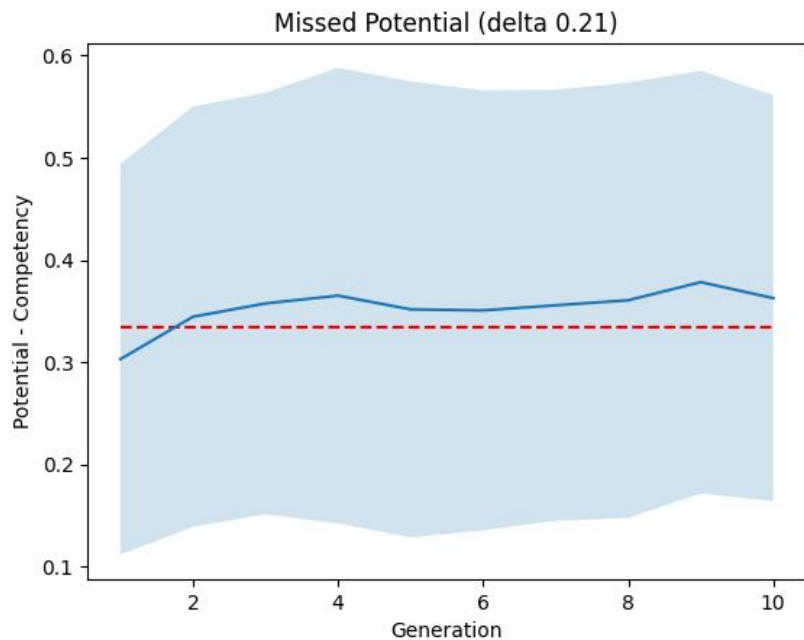
- Best: 100
- Worst: 99



Scenario 1: Mobility



Scenario 1: Missed Potential



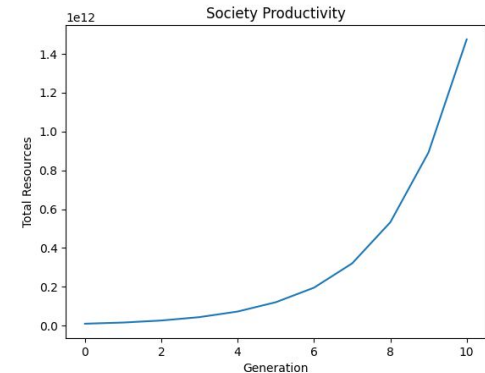
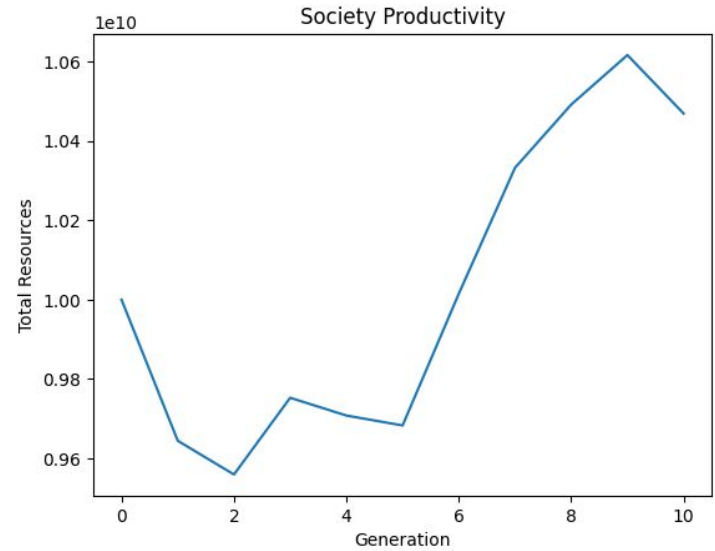
Scenario 2

Assumptions

- Assume ambition has max 0.7 effect
- Assume opportunity has full effect
- Unrefined = 0.3

To get productive economy need productivity factor of 1.2

Keeping it at 1.99 gives us this hockey stick graph



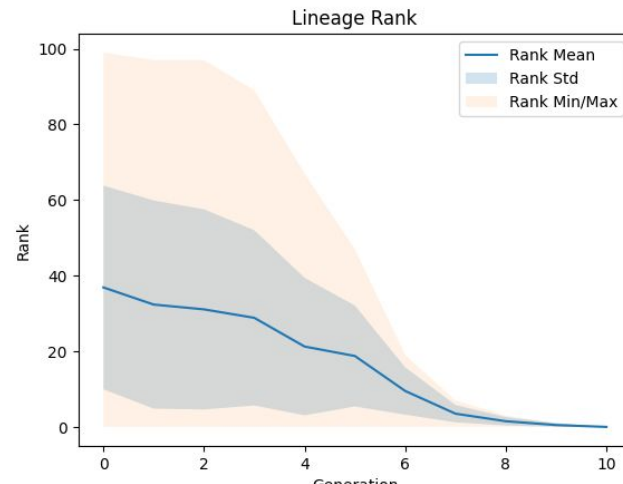
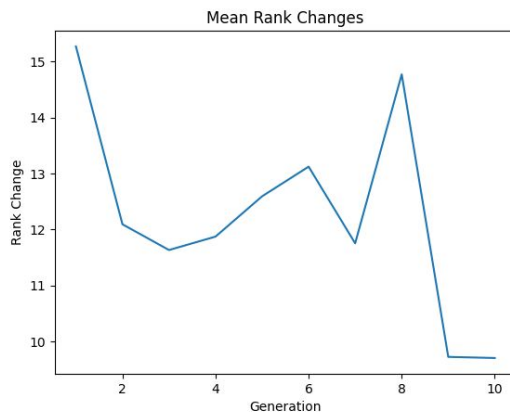
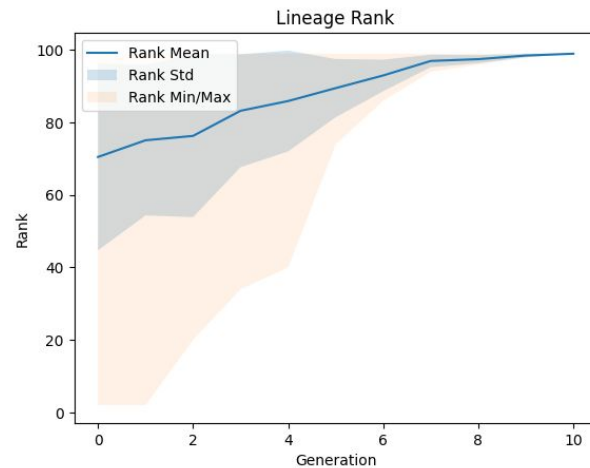
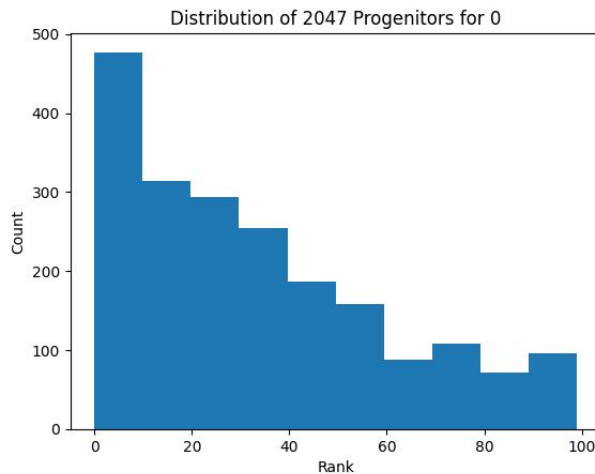
Scenario 2

For rank 0, in 3 generations:

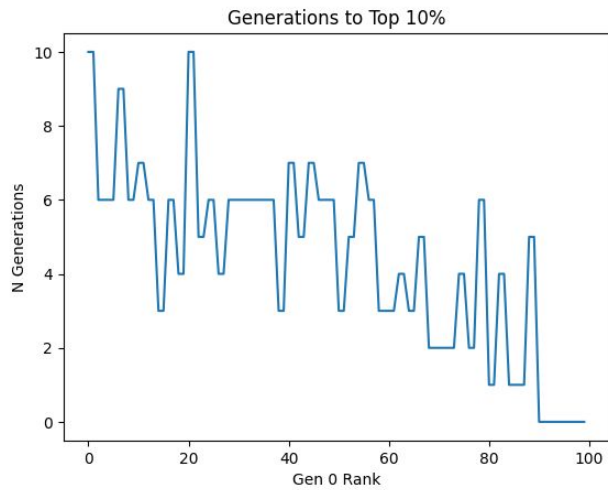
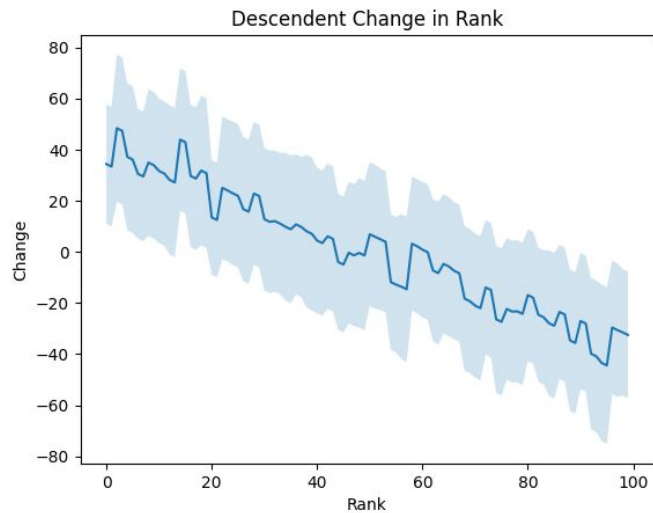
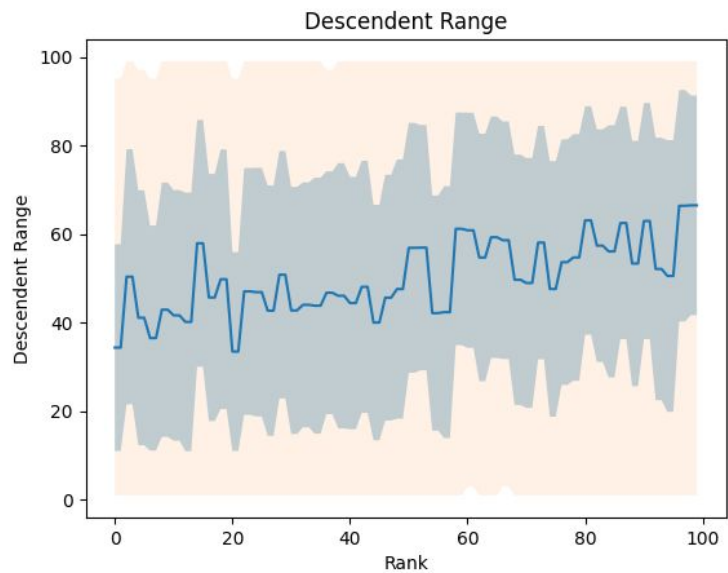
- Best: 71
- Worst: 10

For rank 100:

- Best: 100
- Worst: 57

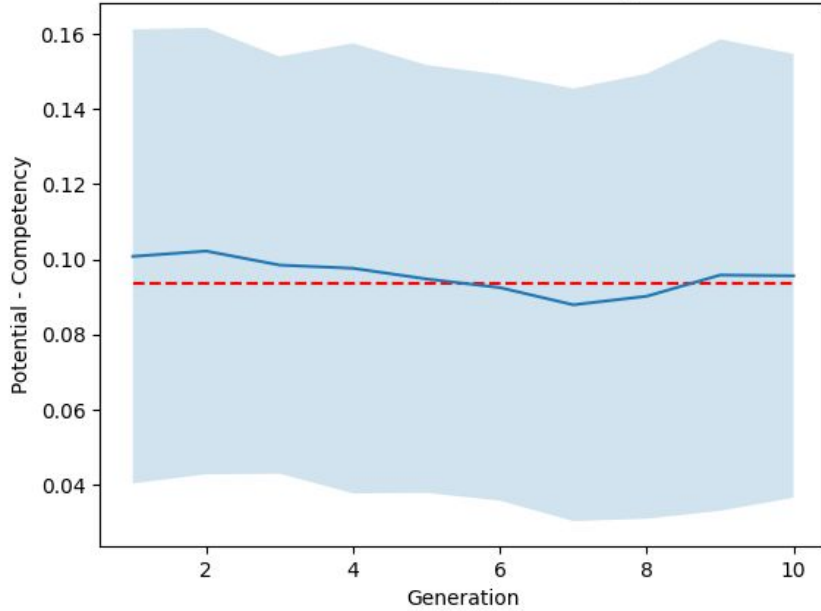


Scenario 2: Mobility

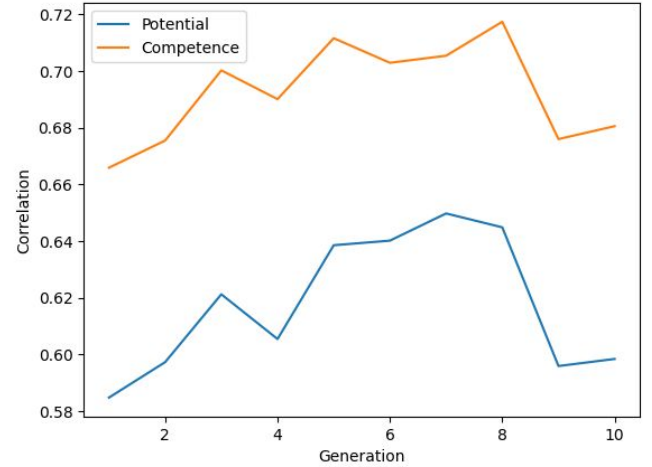


Scenario 2: Missed Potential

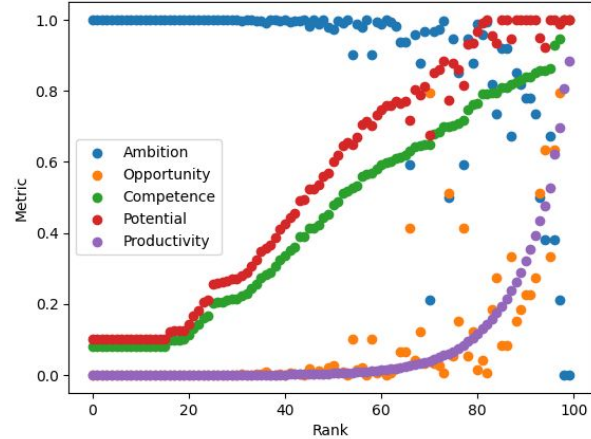
Missed Potential (delta 0.02)



Correlations to Wealth



Performance Measures



Conclusion / Future

- Mobility effect
- What would the effect of minimum assistance be?
 - 0.1 floor for opportunity for example
- etc