Equitable Futures

Image Source:
Michael Tompsett

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Urban Design & Planning
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Architecture
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Data Science
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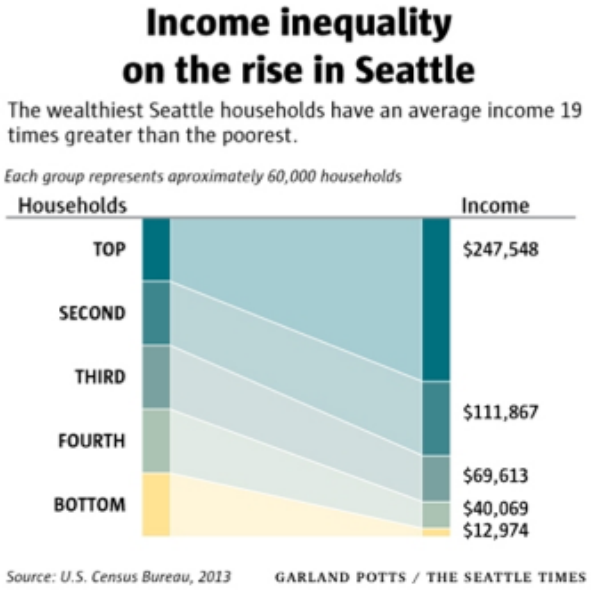
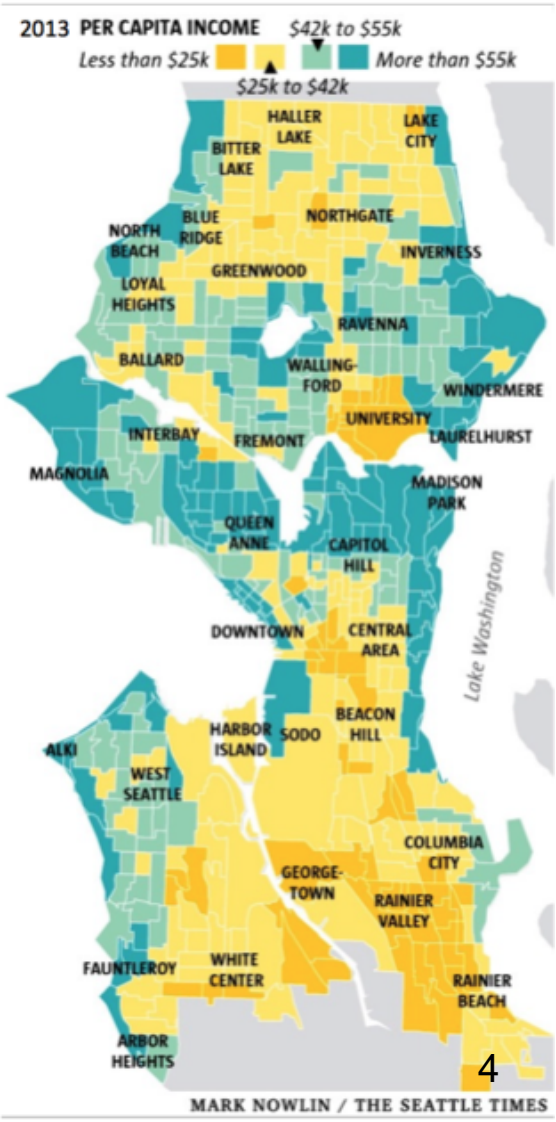
Data Science
Hillary Dawkins
Physics
Jacob Rich
Statistics
Yahui Ma
Human-Centered Design

Image Source:
The Seattle Times

Our project context:

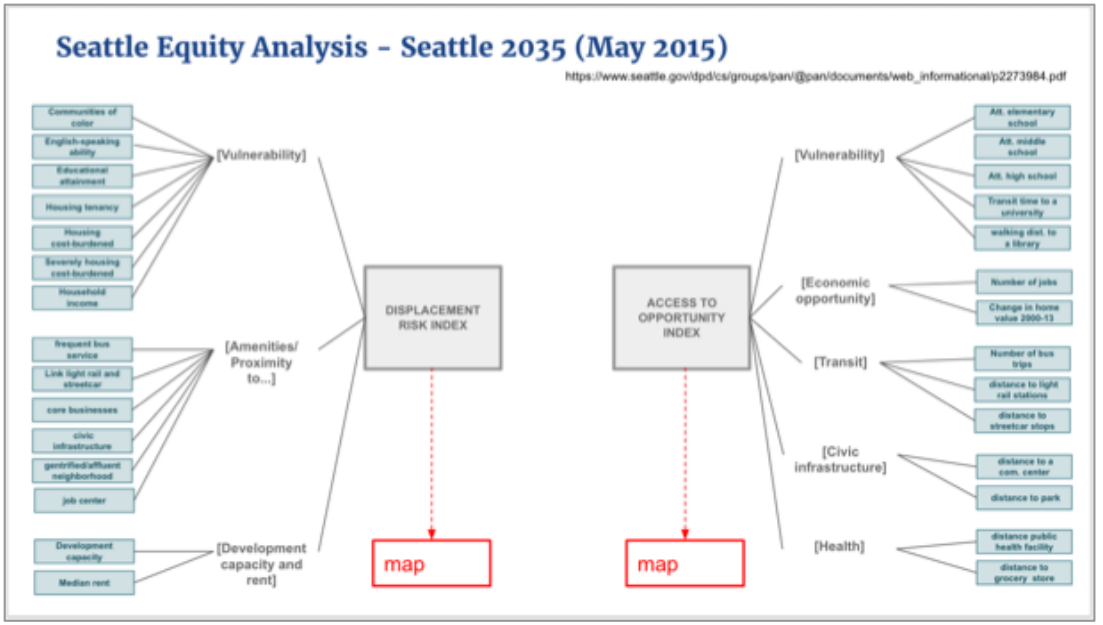
Urban Inequality in Seattle





Our project context:

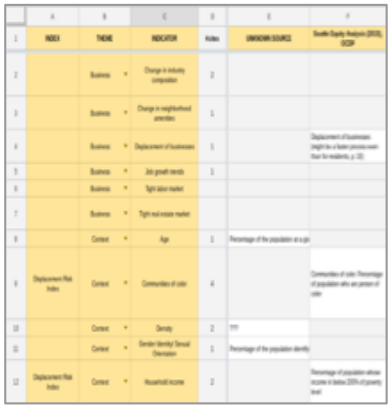
Working towards equity in Seattle



Our project:

An interactive educational website

Domain Research



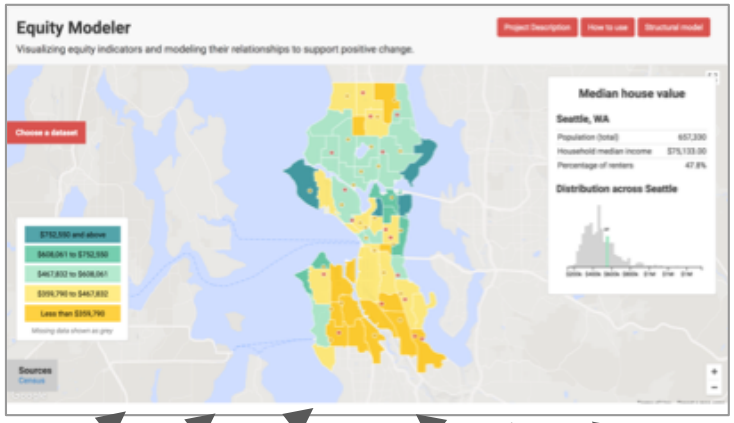
Literature review

Working definitions

Indicators

Processes

Interactive Visualization Tool

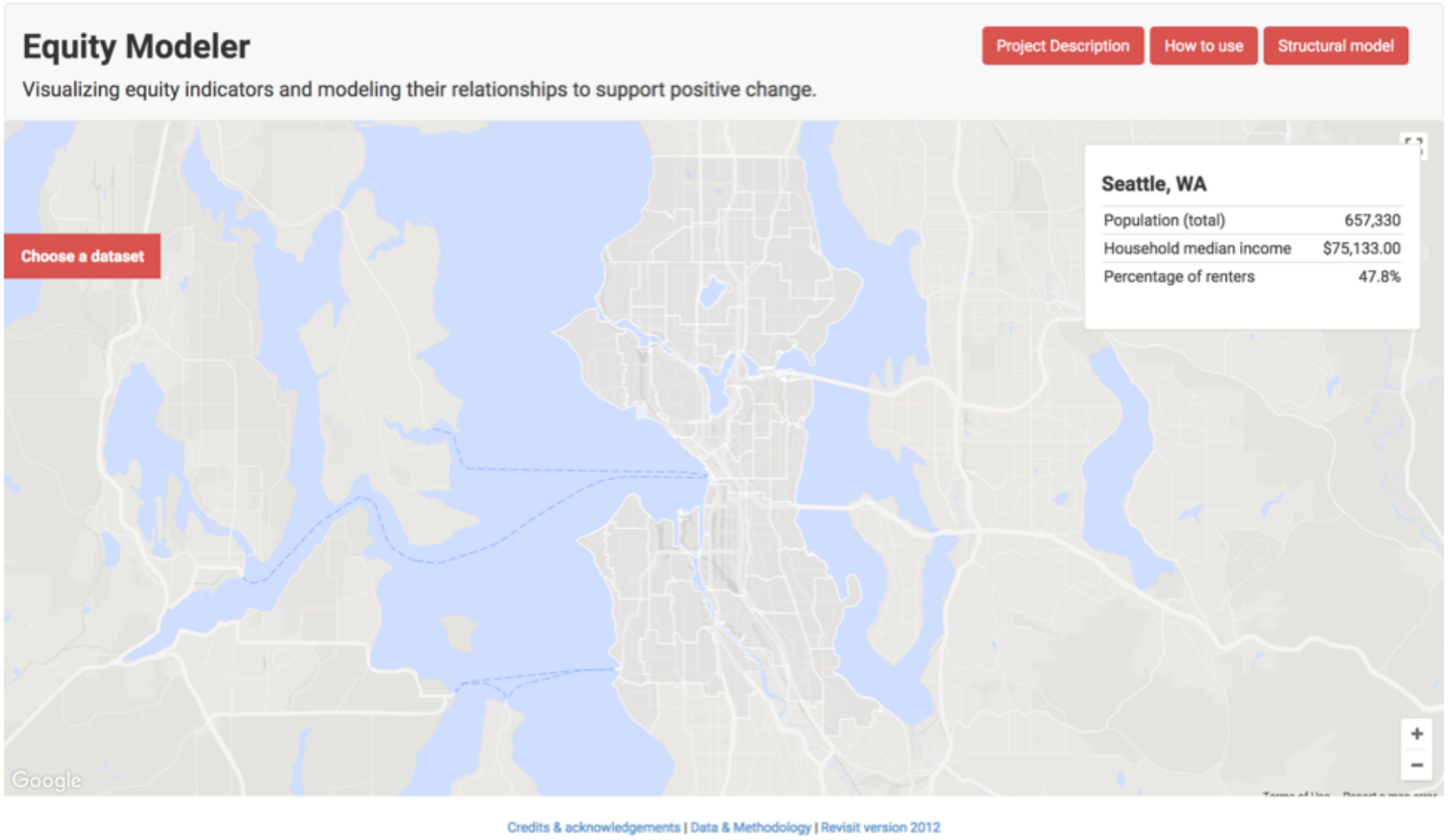


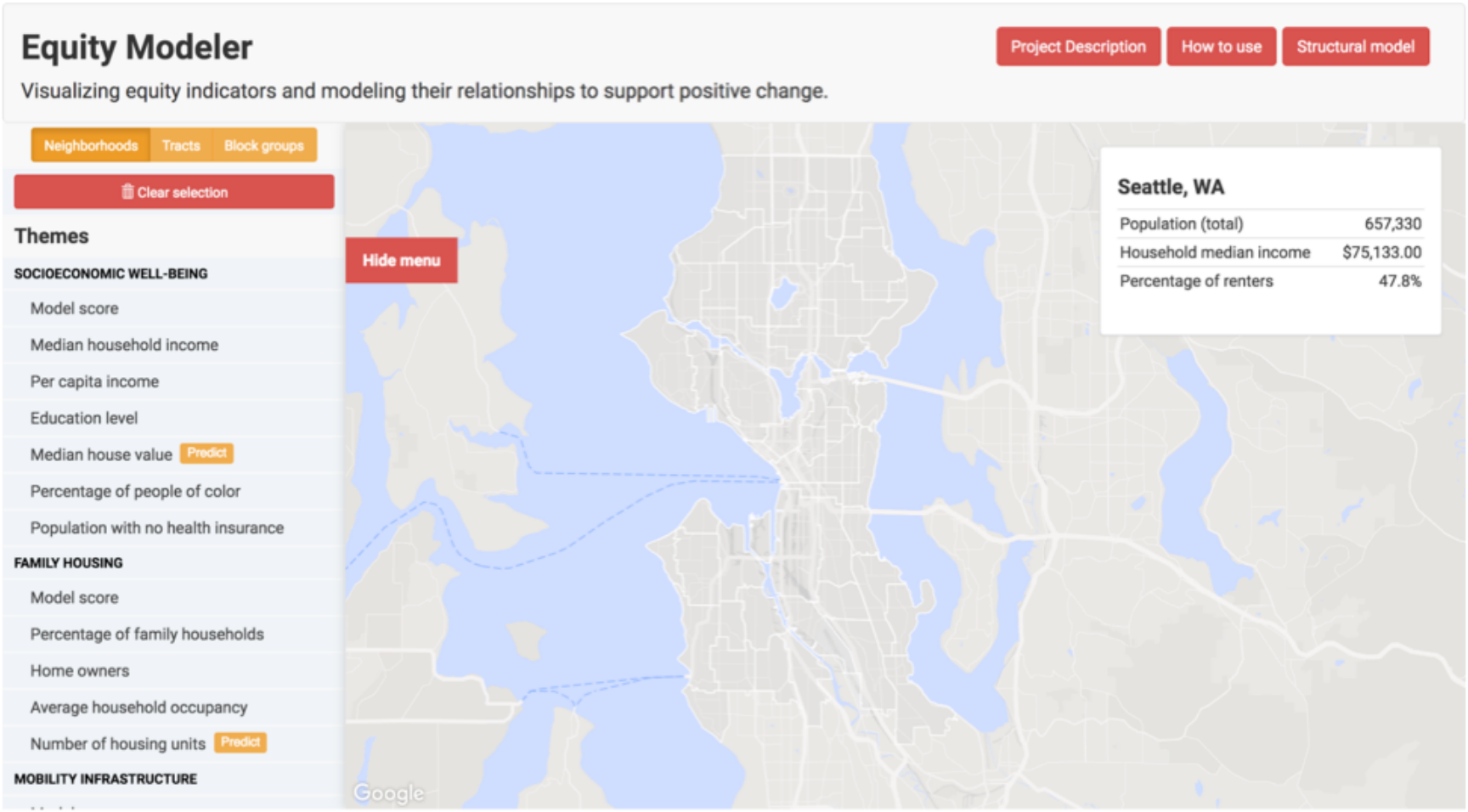
Structural Equation Model

Correlations

Model scores

Prediction


Equity Modeler
Visualizing equity indicators and modeling their relationships to support positive change.
Project Description
How to use
Structural model
Choose a dataset
Seattle, WA
Population (total) 657,330
Household median income $75,133.00
Percentage of renters 47.8%
Google
Credits & acknowledgements | Data & Methodology | Revisit version 2012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Project Description
How to use
Structural model
Neighborhoods
Tracts
Block groups
Clear selection
Themes
SOCIOECONOMIC WELL-BEING
Model score
Median household income
Per capita income
Education level
Median house value
Predict
Percentage of people of color
Population with no health insurance
FAMILY HOUSING
Model score
Percentage of family households
Home owners
Average household occupancy
Number of housing units
Predict
MOBILITY INFRASTRUCTURE
Hide menu
Seattle, WA
Population (total) 657,330
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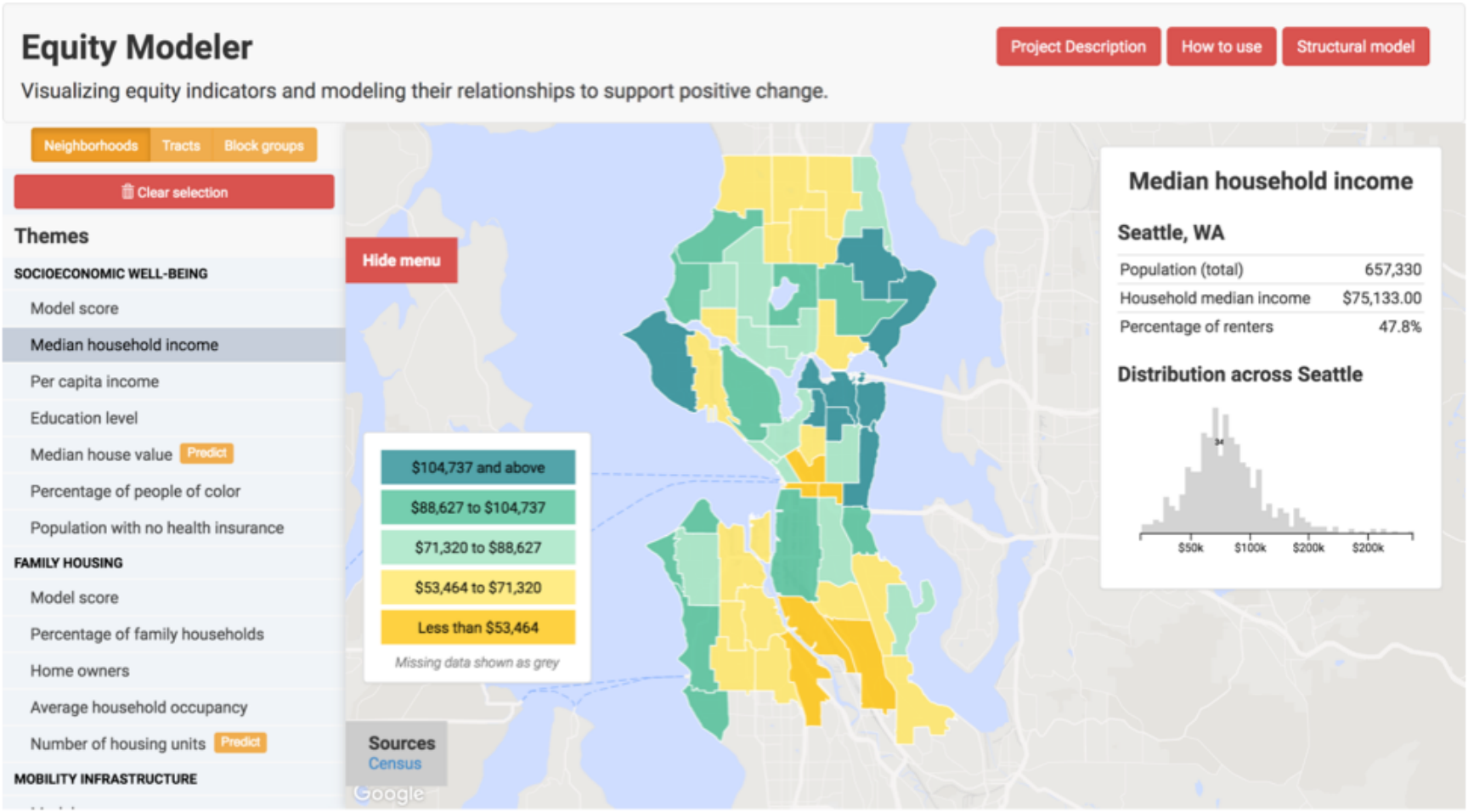
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FAMILY HOUSING
Model score
Percentage of family households
Home owners
Average household occupancy
Number of housing units
Predict
MOBILITY INFRASTRUCTURE
Hide menu
$104,737 and above
$88,627 to $104,737
$71,320 to $88,627
$53,464 to $71,320
Less than $53,464
Missing data shown as grey
Sources
Census
Google
Median household income
Seattle, WA
Population (total) 657,330
Household median income $75,133.00
Percentage of renters 47.8%
Distribution across Seattle
$50k
$100k
$200k
$200k
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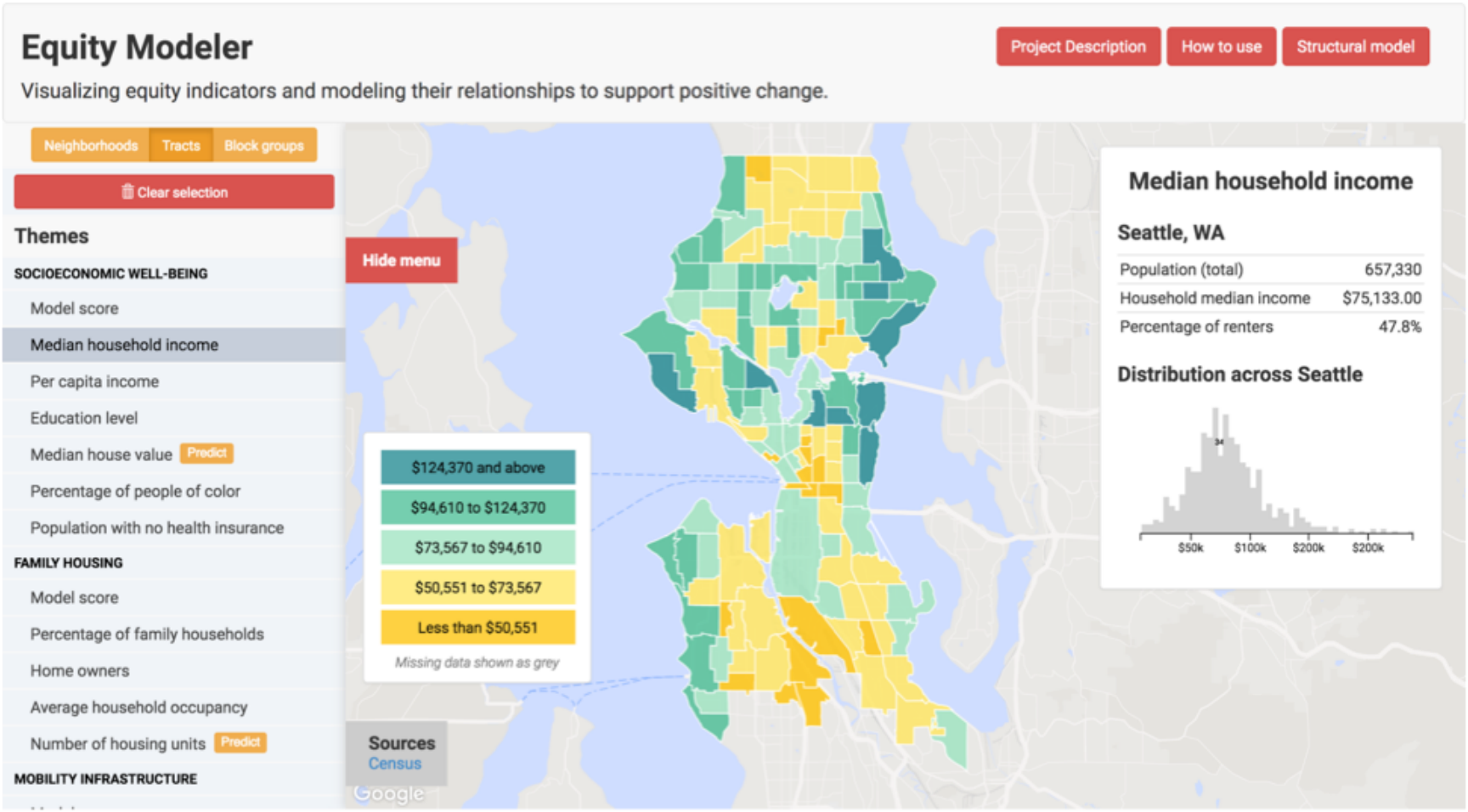
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Per capita income
Education level
Median house value
Predict
Percentage of people of color
Population with no health insurance
FAMILY HOUSING
Model score
Percentage of family households
Home owners
Average household occupancy
Number of housing units
Predict
MOBILITY INFRASTRUCTURE
Hide menu
$124,370 and above
$94,610 to $124,370
$73,567 to $94,610
$50,551 to $73,567
Less than $50,551
Missing data shown as grey
Sources
Census
Google
Median household income
Seattle, WA
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$50k
$100k
$200k
$200k
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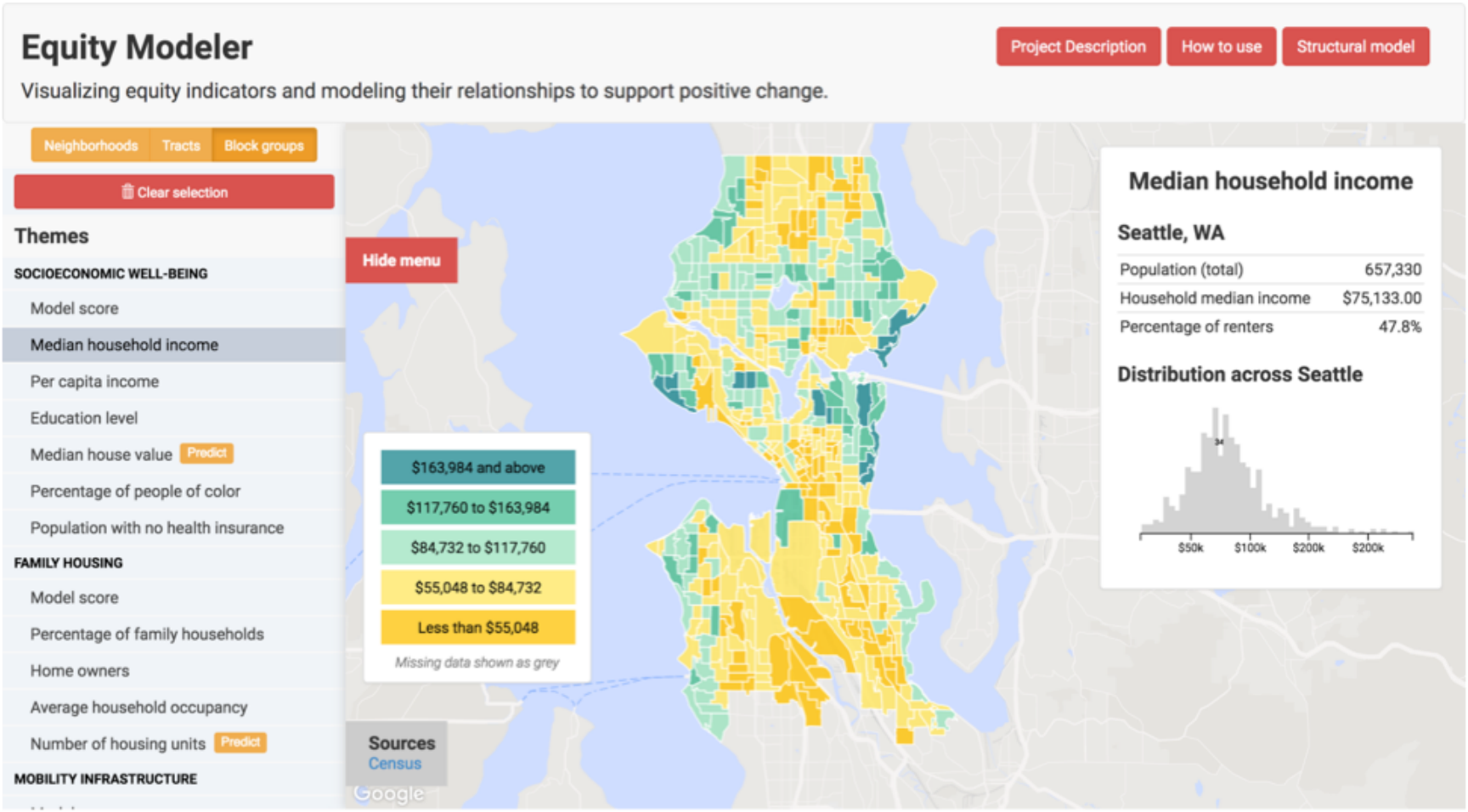
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Per capita income
Education level
Median house value
Predict
Percentage of people of color
Population with no health insurance
FAMILY HOUSING
Model score
Percentage of family households
Home owners
Average household occupancy
Number of housing units
Predict
MOBILITY INFRASTRUCTURE
Hide menu
$163,984 and above
$117,760 to $163,984
$84,732 to $117,760
$55,048 to $84,732
Less than $55,048
Missing data shown as grey
Sources
Census
Google
Median household income
Seattle, WA
Population (total) 657,330
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$50k
$100k
$200k
$200k
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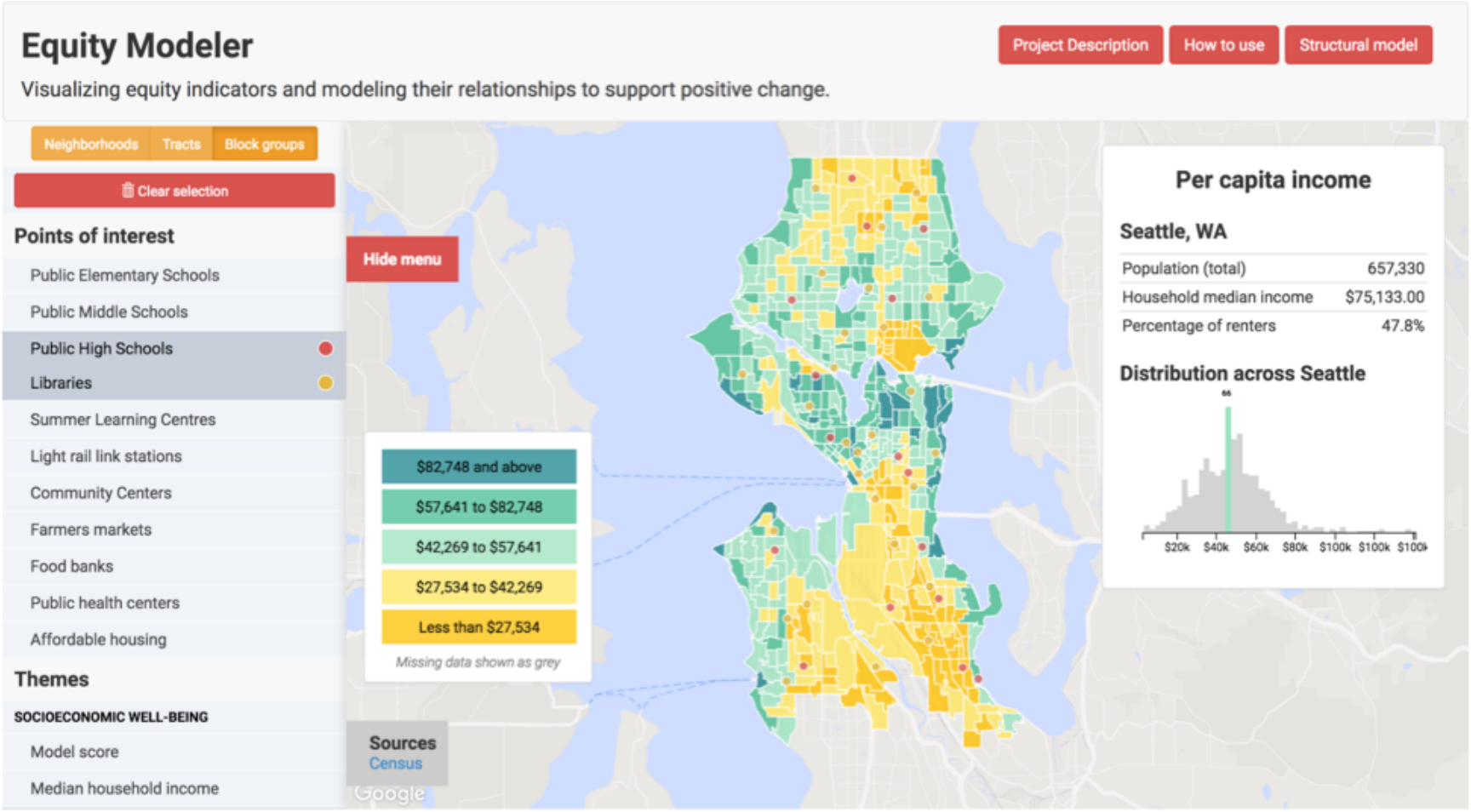
Equity Modeler
Visualizing equity indicators and modeling their relationships to support positive change.
Project Description
How to use
Structural model
Neighborhoods
Tracts
Block groups
Clear selection
Points of interest
Public Elementary Schools
Public Middle Schools
Public High Schools
Libraries
Summer Learning Centres
Light rail link stations
Community Centers
Farmers markets
Food banks
Public health centers
Affordable housing
Themes
SOCIOECONOMIC WELL-BEING
Model score
Median household income
Hide menu
$82,748 and above
$57,641 to $82,748
$42,269 to $57,641
$27,534 to $42,269
Less than $27,534
Missing data shown as grey
Sources
Census
Google
Per capita income
Seattle, WA
Population (total) 657,330
Household median income $75,133.00
Percentage of renters 47.8%
Distribution across Seattle
$20k $40k $60k $80k $100k $100k $100k
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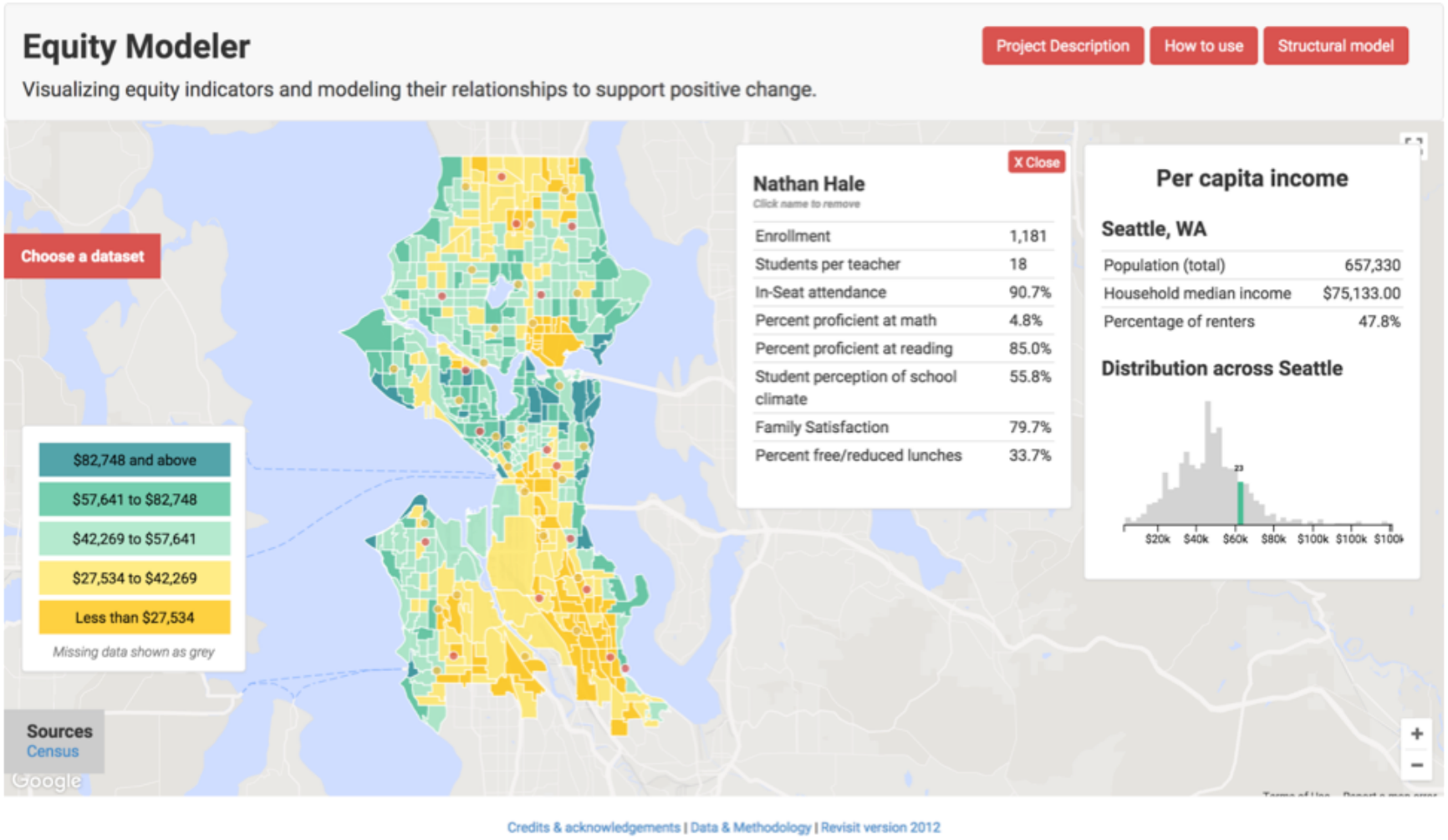
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Project Description
How to use
Structural model
Choose a dataset
$82,748 and above
$57,641 to $82,748
$42,269 to $57,641
$27,534 to $42,269
Less than $27,534
Missing data shown as grey
Sources
Census
Google
X Close
Nathan Hale
Click name to remove
Enrollment 1,181
Students per teacher 18
In-Seat attendance 90.7%
Percent proficient at math 4.8%
Percent proficient at reading 85.0%
Student perception of school climate 55.8%
Family Satisfaction 79.7%
Percent free/reduced lunches 33.7%
Per capita income
Seattle, WA
Population (total) 657,330
Household median income $75,133.00
Percentage of renters 47.8%
Distribution across Seattle
$20k $40k $60k $80k $100k $100k $100k
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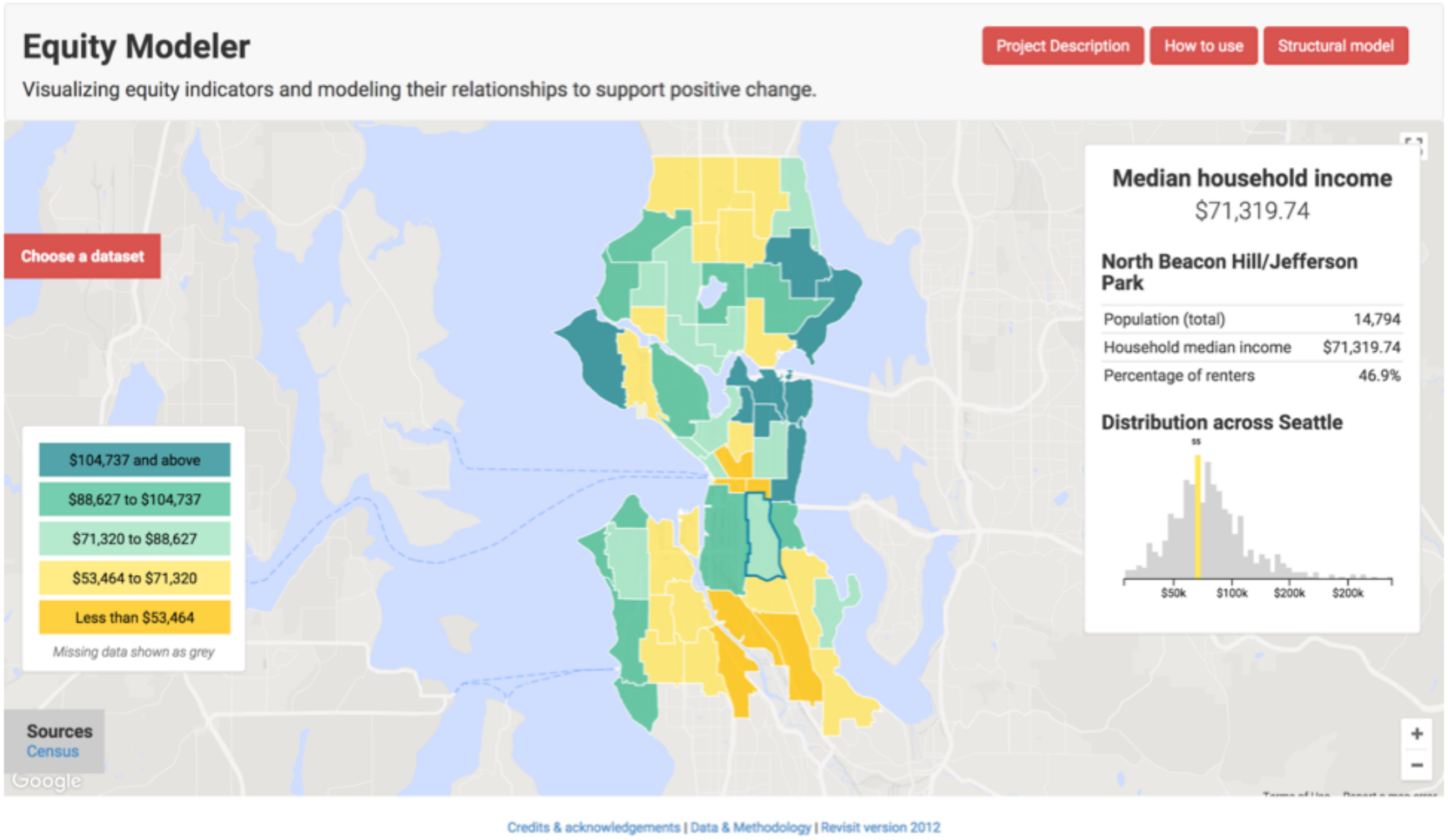
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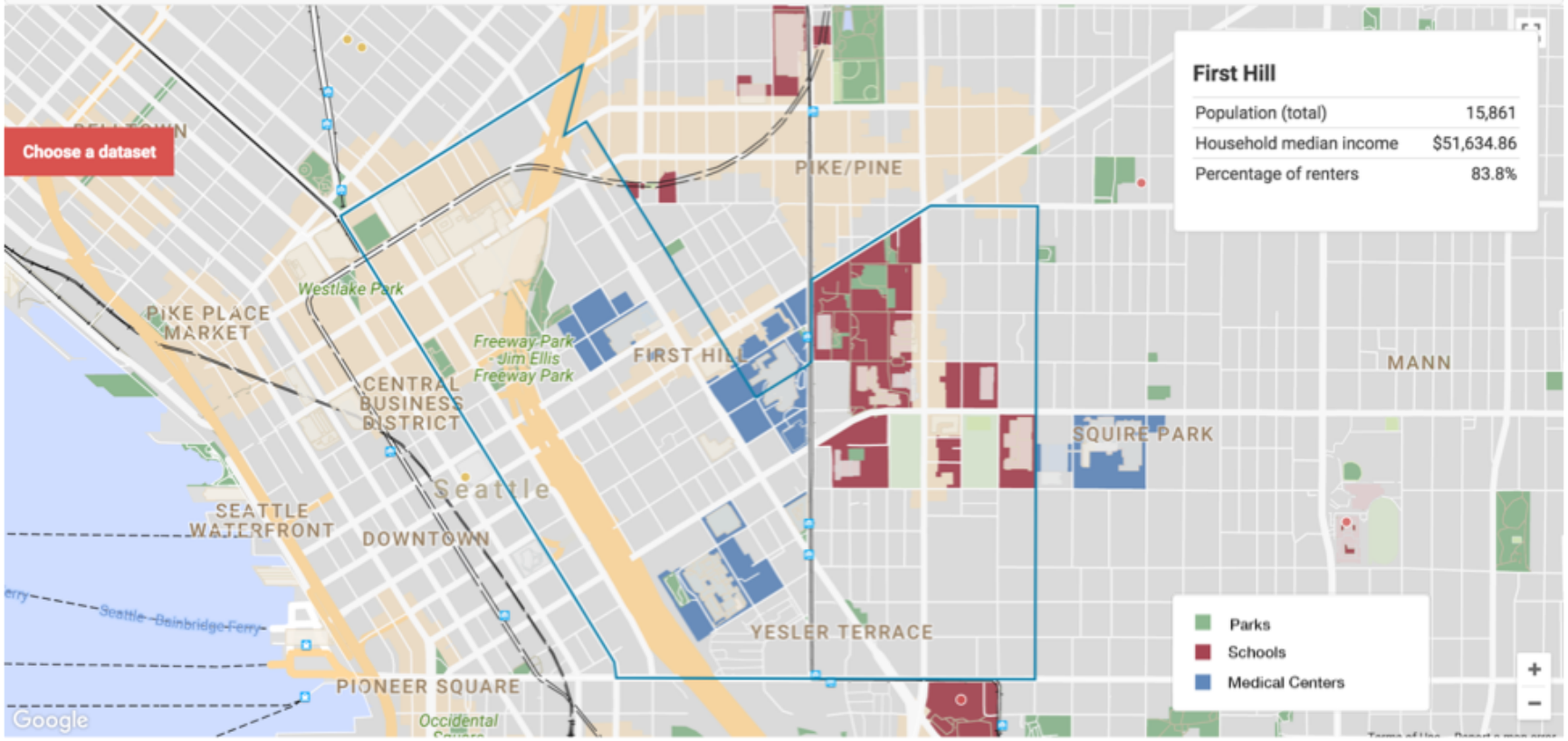
Project Description
How to use
Structural model
Choose a dataset
$104,737 and above
$88,627 to $104,737
$71,320 to $88,627
$53,464 to $71,320
Less than $53,464
Missing data shown as grey
Sources
Census
Google
Median household income
$71,319.74
North Beacon Hill/Jefferson Park
Population (total) 14,794
Household median income $71,319.74
Percentage of renters 46.9%
Distribution across Seattle
$50k
$100k
$200k
$200k
Credits & acknowledgements | Data & Methodology | Revisit version 2012

Equity Modeler

Project Description | How to use | Structural model

Visualizing equity indicators and modeling their relationships to support positive change.



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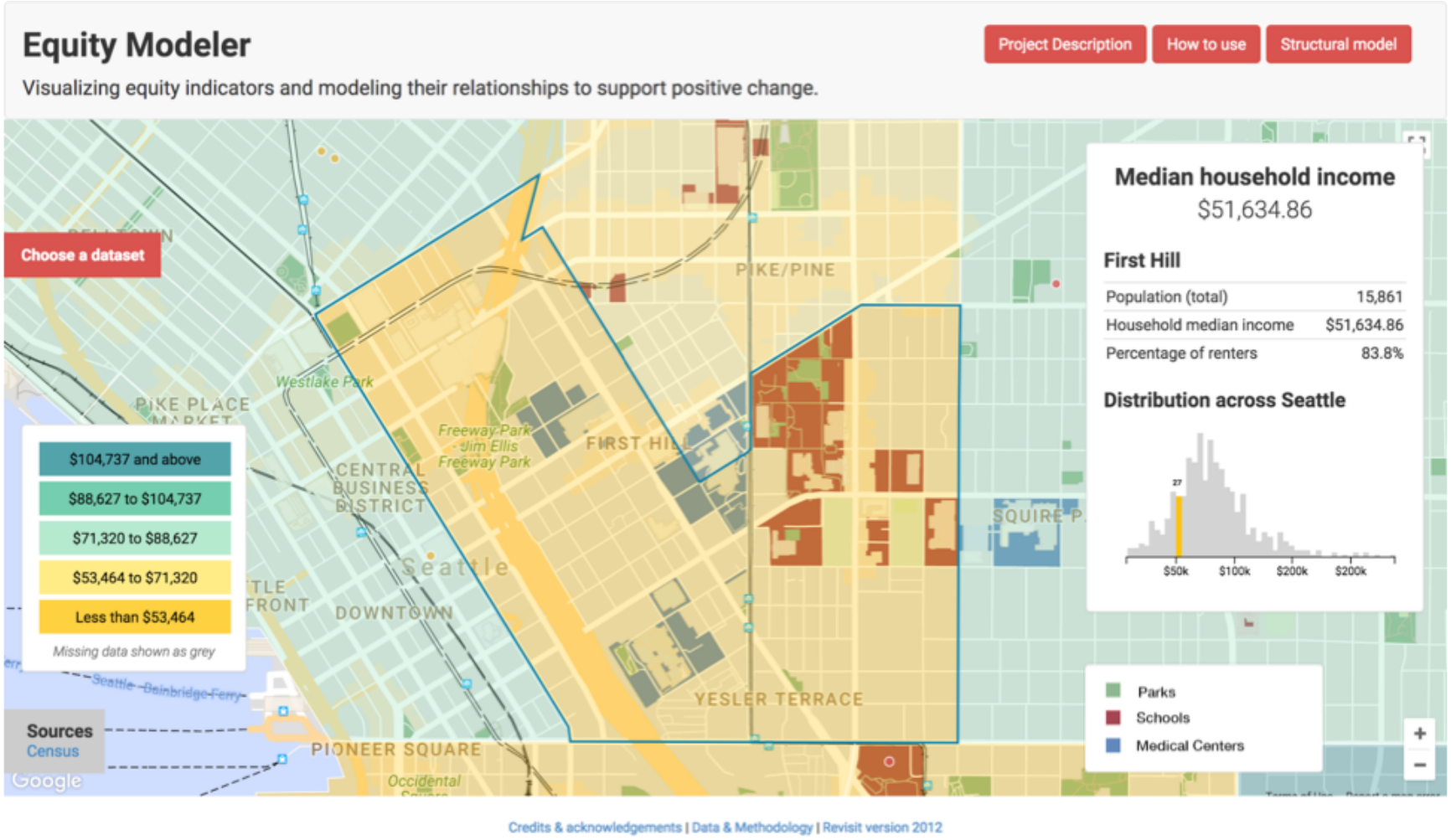
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Structural model
Choose a dataset
$104,737 and above
$88,627 to $104,737
$71,320 to $88,627
$53,464 to $71,320
Less than $53,464
Missing data shown as grey
Sources
Census
Median household income
$51,634.86
First Hill
Population (total) 15,861
Household median income $51,634.86
Percentage of renters 83.8%
Distribution across Seattle
$50k
$100k
$200k
$200k
Parks
Schools
Medical Centers
PIKE/PINE
Westlake Park
PIKE PLACE MARKET
Freeway Park - Jim Ellis Freeway Park
FIRST HILL
CENTRAL BUSINESS DISTRICT
Seattle
DOWNTOWN
YESLER TERRACE
PIONEER SQUARE
Google
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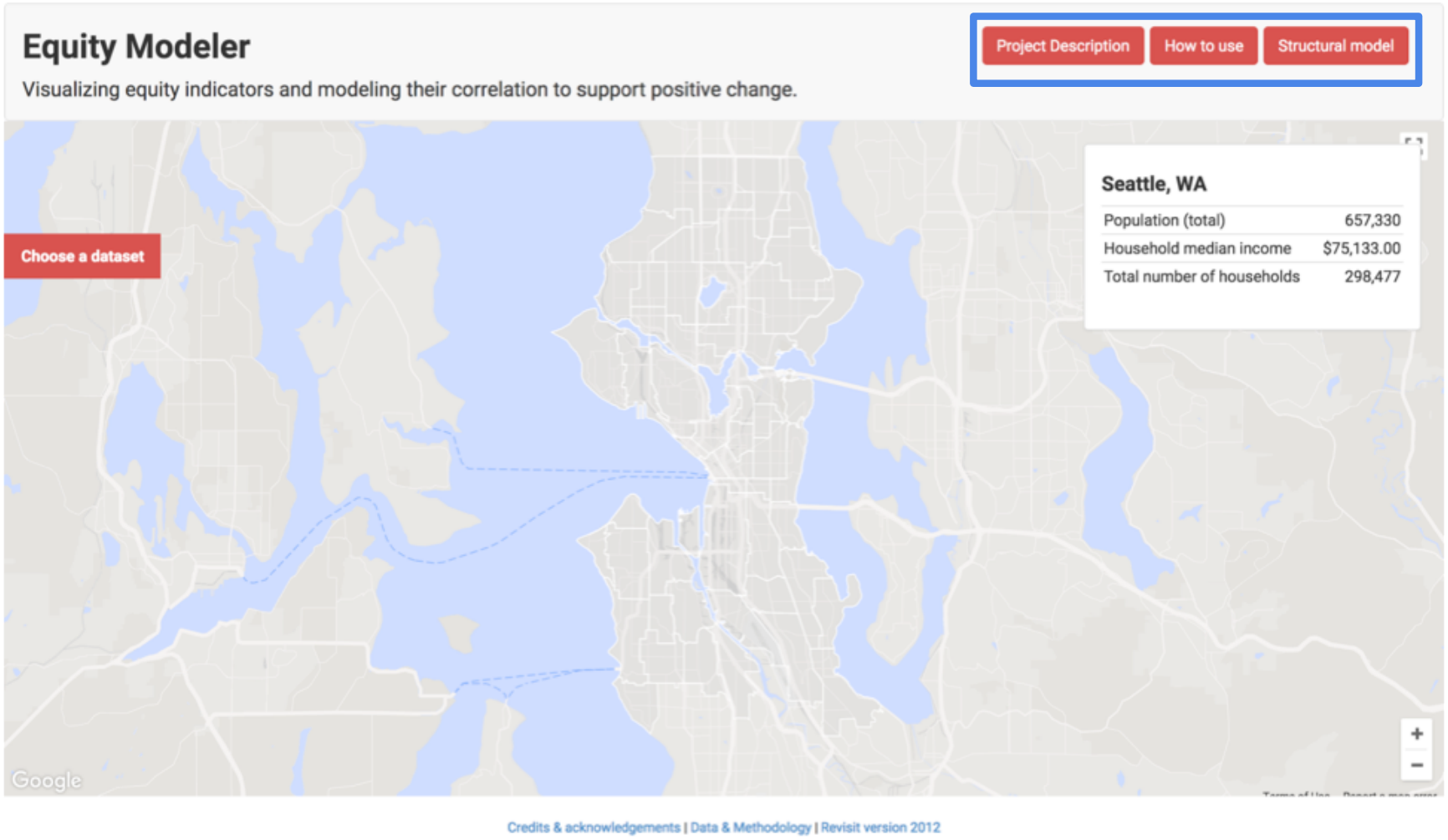
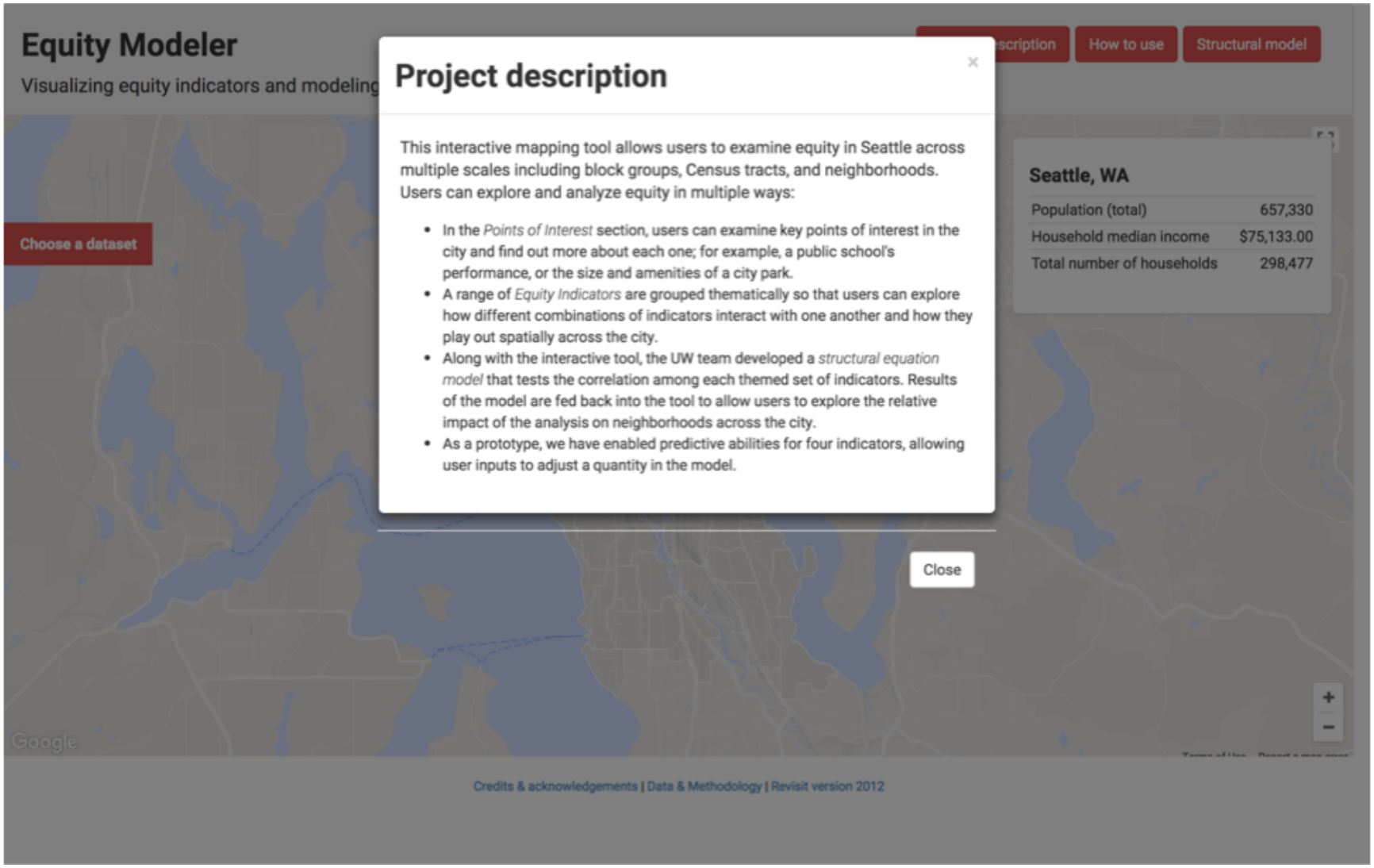

Equity Modeler
Visualizing equity indicators and modeling their correlation to support positive change.
Project Description
How to use
Structural model
Choose a dataset
Seattle, WA
Population (total) 657,330
Household median income $75,133.00
Total number of households 298,477
Google
Credits & acknowledgements | Data & Methodology | Revisit version 2012


Equity Modeler
Visualizing equity indicators and modeling
How to use
Structural model
Project description
This interactive mapping tool allows users to examine equity in Seattle across multiple scales including block groups, Census tracts, and neighborhoods. Users can explore and analyze equity in multiple ways:
In the Points of Interest section, users can examine key points of interest in the city and find out more about each one; for example, a public school's performance, or the size and amenities of a city park.
A range of Equity Indicators are grouped thematically so that users can explore how different combinations of indicators interact with one another and how they play out spatially across the city.
Along with the interactive tool, the UW team developed a structural equation model that tests the correlation among each themed set of indicators. Results of the model are fed back into the tool to allow users to explore the relative impact of the analysis on neighborhoods across the city.
As a prototype, we have enabled predictive abilities for four indicators, allowing user inputs to adjust a quantity in the model.
Close
Choose a dataset
Seattle, WA
Population (total) 657,330
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Total number of households 298,477
Google
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Data Processing

Census data

- General demographic information
- Aggregated at block group level

Points of interest

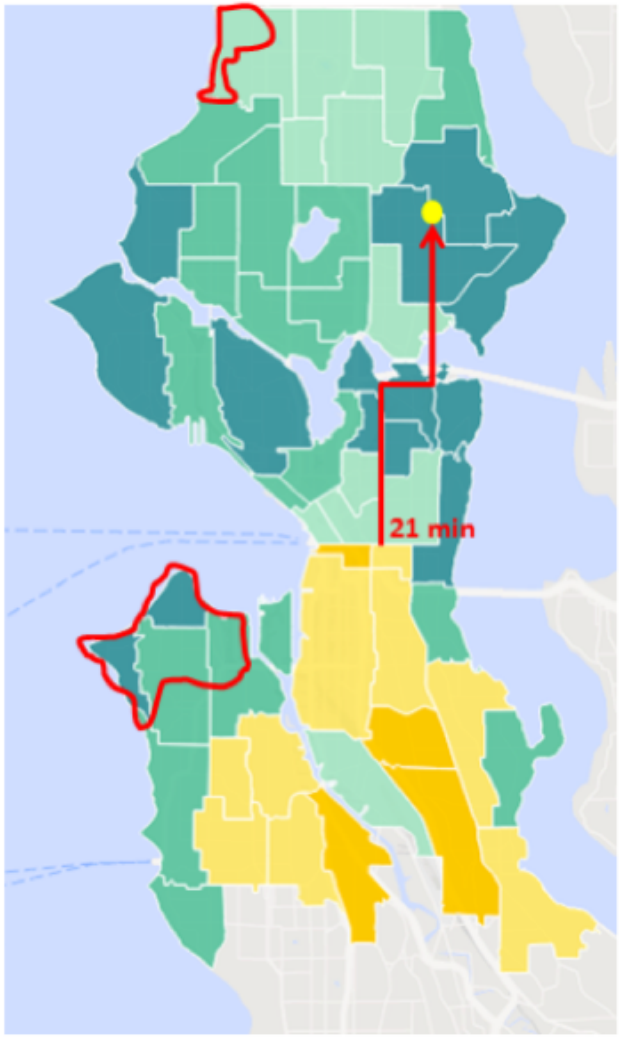
- Schools, libraries, parks, healthcare
- Sourced from Seattle Open Data portal

Accessibility

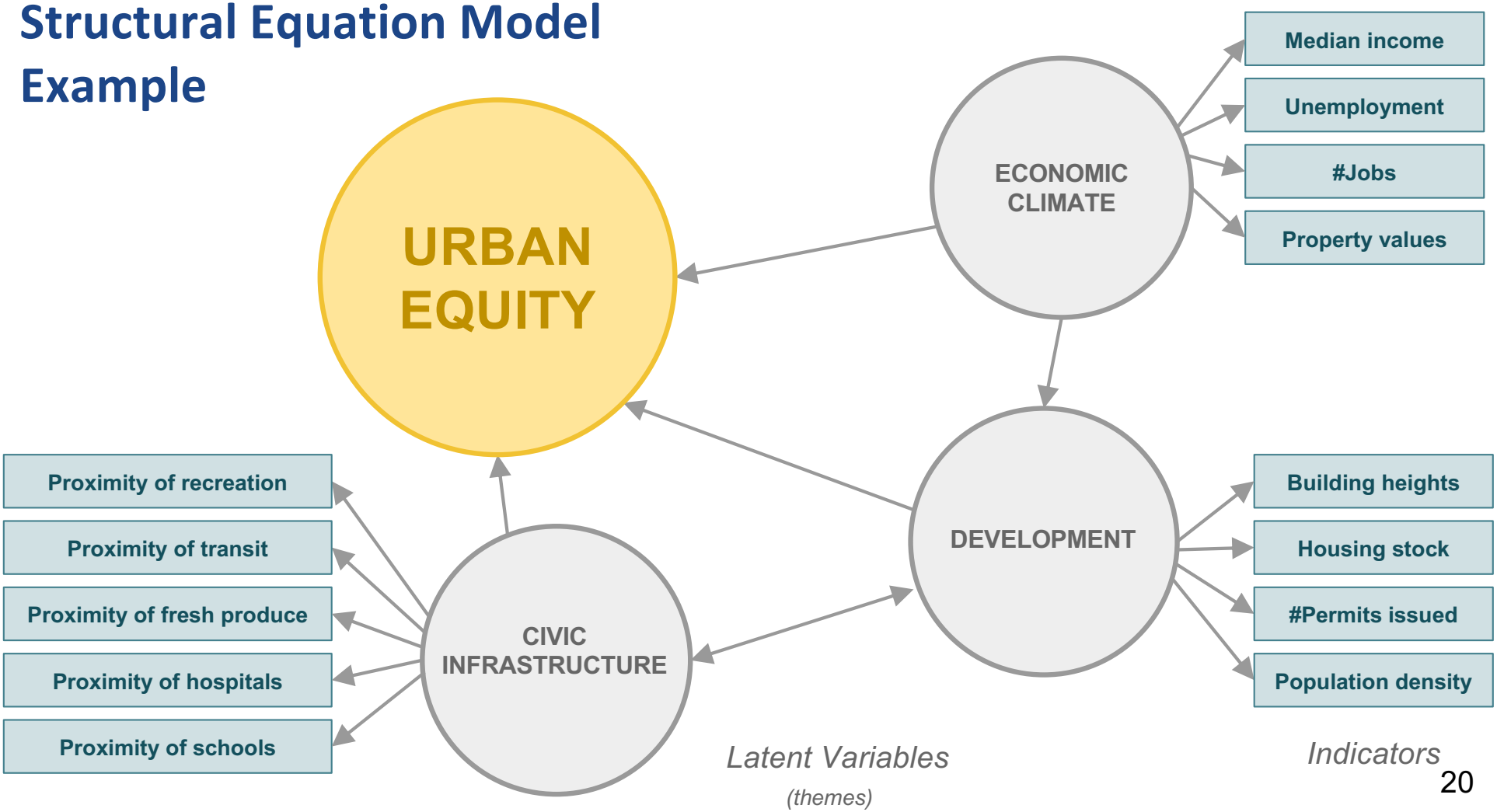
- Transit time to points of interest
- Sourced from Google Distance Matrix API

Other data

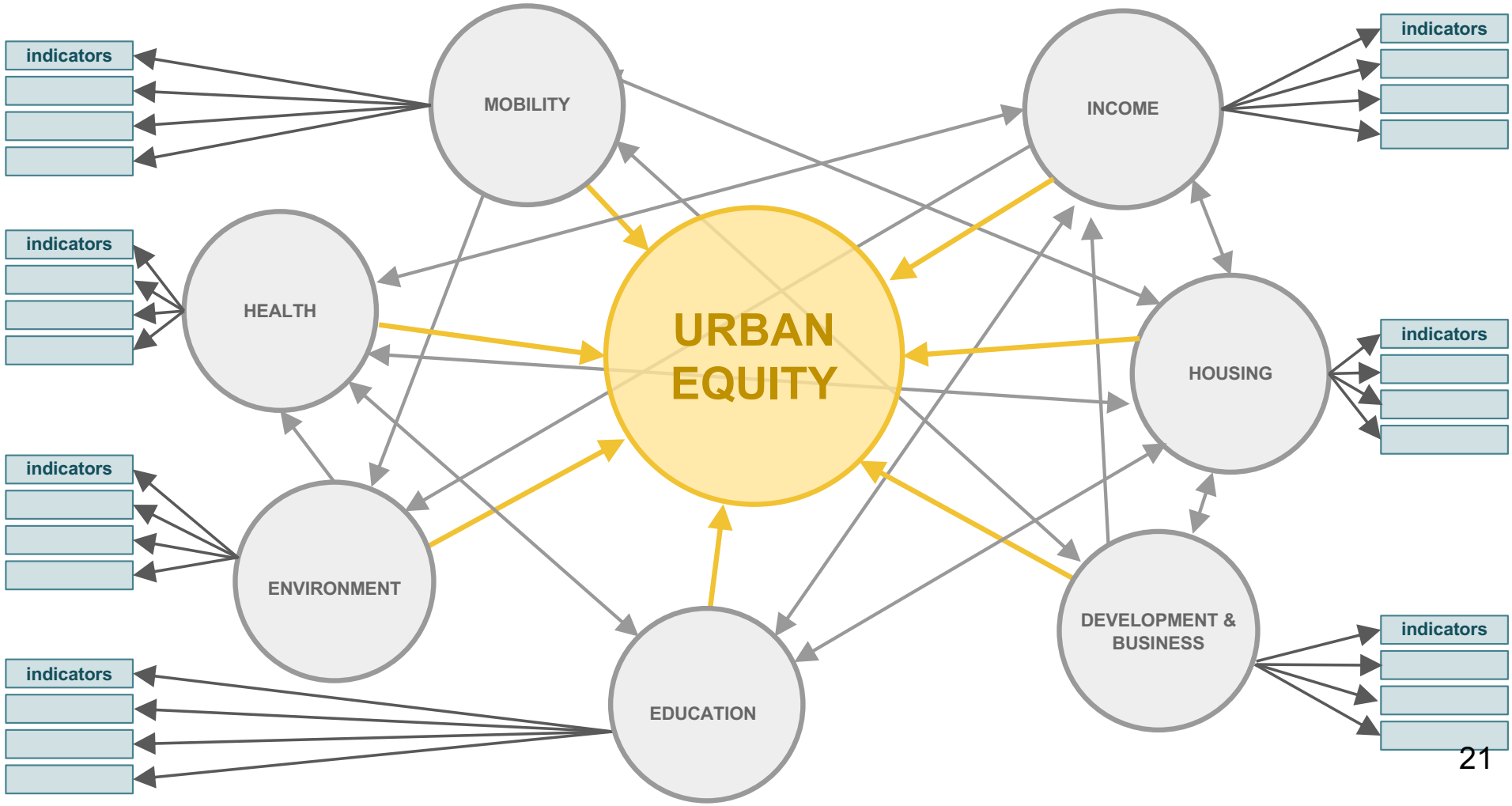
- Ex. walkscore, bike lanes, tree cover
- Can aggregate at any level
- Crosswalk script converts to block group



Structural Equation Model Example



SEM: Original Idea



Next Steps

Enhancing the Tool

- Build statistical analysis features to allow users to easily access more complicated diagnostic tests and graphics
- Create a system to visualize multiple indicators at once
- Incorporate more granular data into the model
- Develop further functionality at the neighborhood scale

Sharing the Tool

- Engage with stakeholders
- Targeted release of tool for testing
- Secure funding and hosting to support evolution of the tool

Thank you!

Washington Research FOUNDATION

Microsoft

GORDON AND BETTY MOORE FOUNDATION

Urban@UW

UNIVERSITY of WASHINGTON
eScience Institute

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