USER GUIDE

Vastly Challenging Economics

A VISUAL EXPLORATION OF THE FINANCIAL HEALTH OF THE CITY OF ENGAGEMENT, OHIO

1. User Guide

On this landing page, there is a short introduction to the different sections of the application and an overview of what each section seeks to achieve to better understand the financial health of the city of Engagement, Ohio. Each section may be accessed via the tabs at the top of the page.

Fig 1: Navigation

2. Business

2.1 Change in revenue

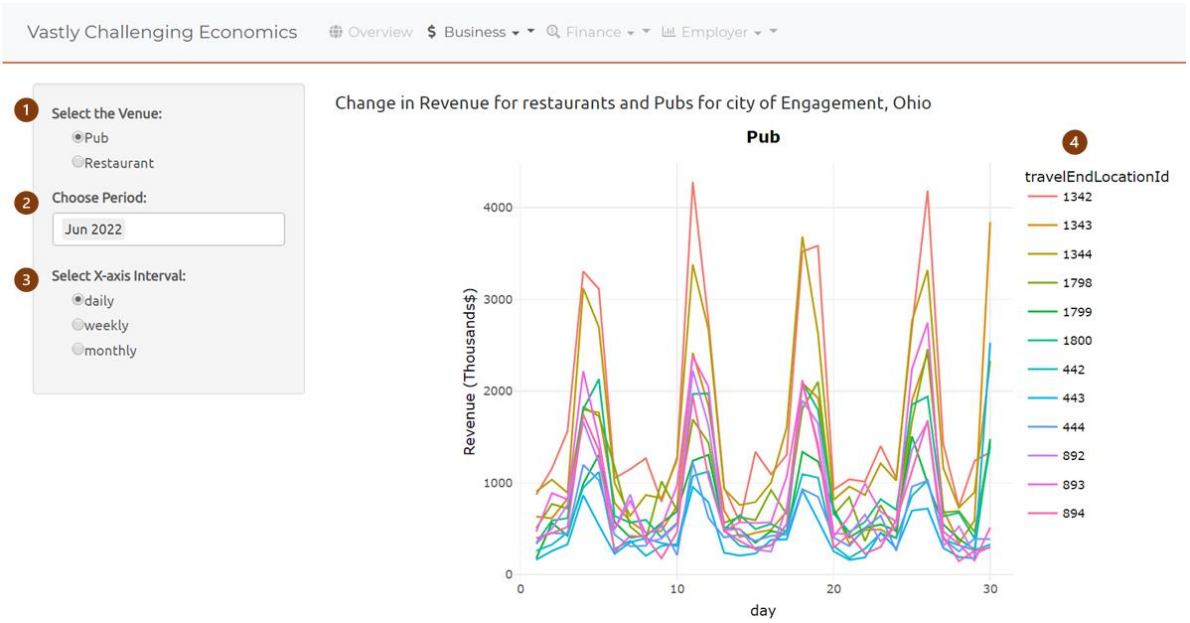

Fig 2: Change in Revenue plot

1. Select the desired venue: Pubs or restaurants to get a line plot of the desired venue

2. choose the time period for which you wish to see the variation in the Revenue for the desired venue – period is given in month year

3. select the time interval or time period that you want to see on the x axis. We have provided the options of daily – range of 30 days, weekly – over the seven days of the week and monthly – over the entire range of time calculated as month Year

4. the legend shows the venue ID for the selected pubs or restaurants

2.2 Grouped change in Revenue

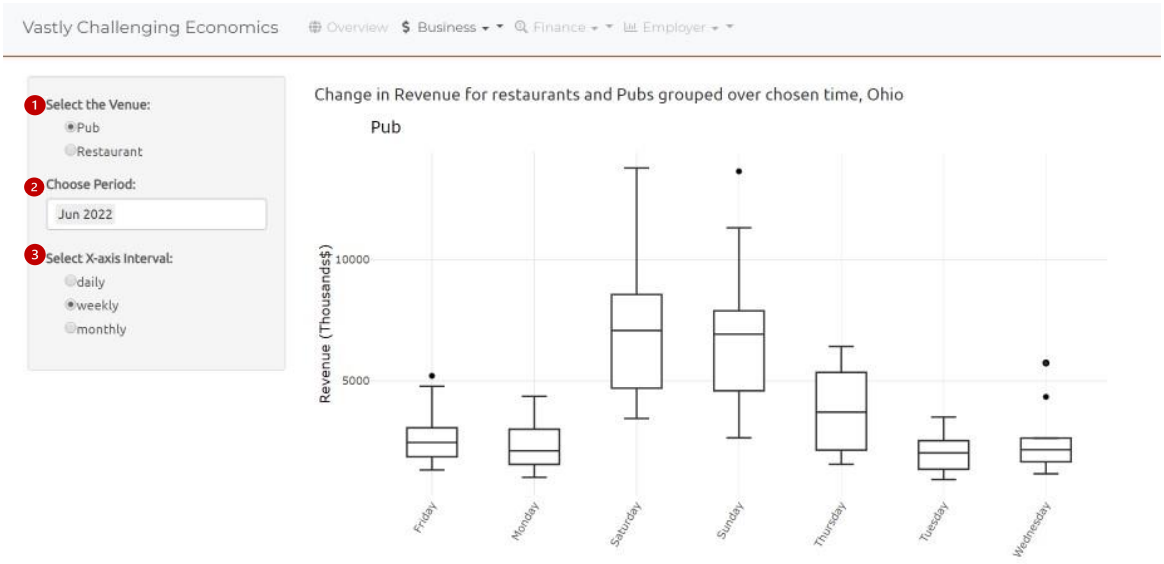

Fig 3: Grouped change in Revenue plot

1. Select the desired venue: Pubs or restaurants to get a box plot of the desired venue aggregated over the chosen time group

2. choose the time period for which you wish to see the variation in the Revenue for the desired venue – period is given in month year

3. select the time interval or time period that you want to see on the x axis. We have provided the options of daily – range of 30 days, weekly – over the seven days of the week and monthly – over the entire range of time calculated as month Year

2.3 Map of Venue visited by Participant

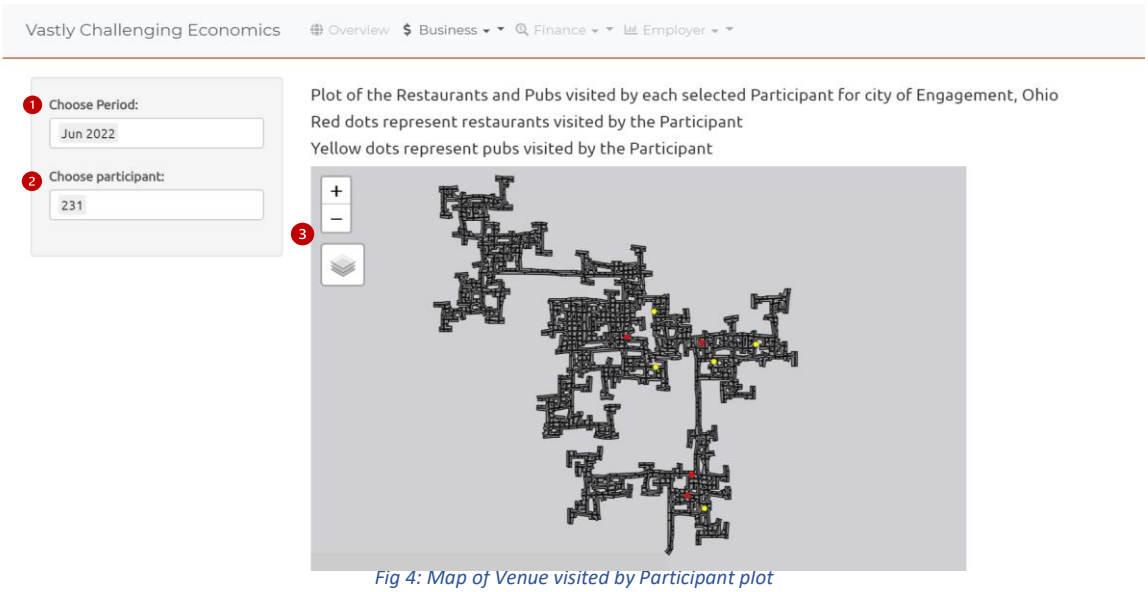

Fig 4: Map of Venue visited by Participant plot

1. choose the time period for which you wish to see the variation in the Revenue for the desired venue – period is given in month year

2. Choose the participantID : select the participant ID to see on the map the restaurants or pubs visited by the participant

Multiple choices can be made

3. the Zoom option can be used to zoom in or out of the map

2.4 Sparks line for Revenue

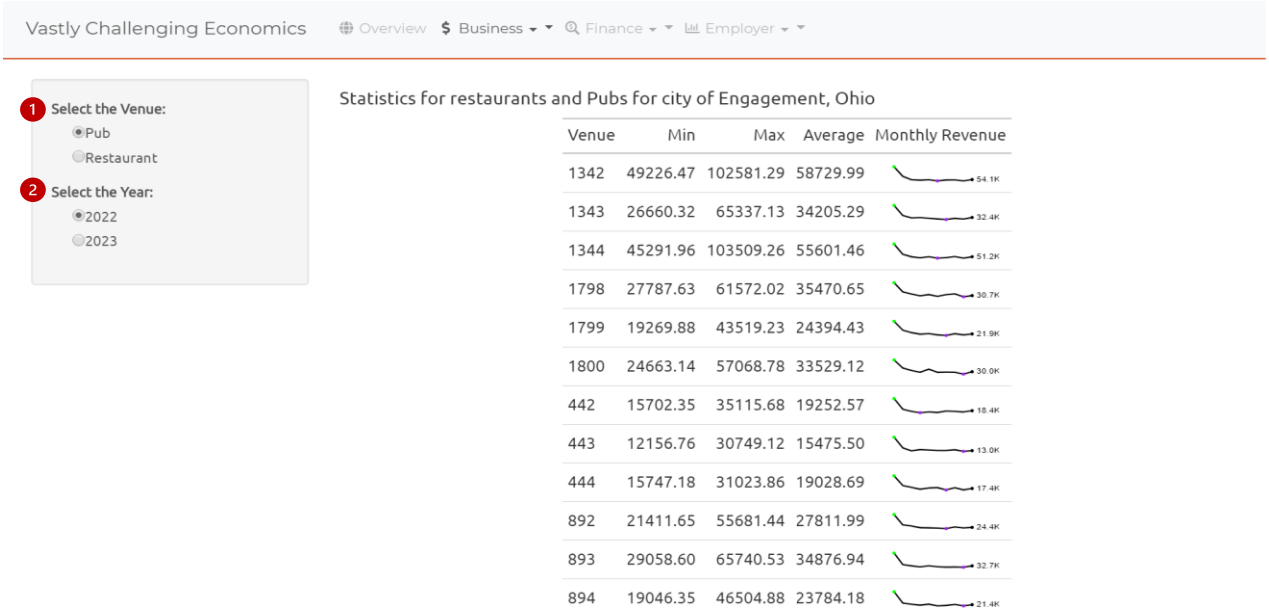

Fig 5: Sparksline for Revenue plot

1. Select the desired venue: Pubs or restaurants to get a line plot of the desired venue

2. select the year for which the data need to be analyzed

The above plot shows the Venue i.e the pubId or the restaurantId based on the choice 1 and also shows the minimum, maximum and average revenue over the months along with a small sparks line plot which shows the variation of data.

2.5 ANOVA

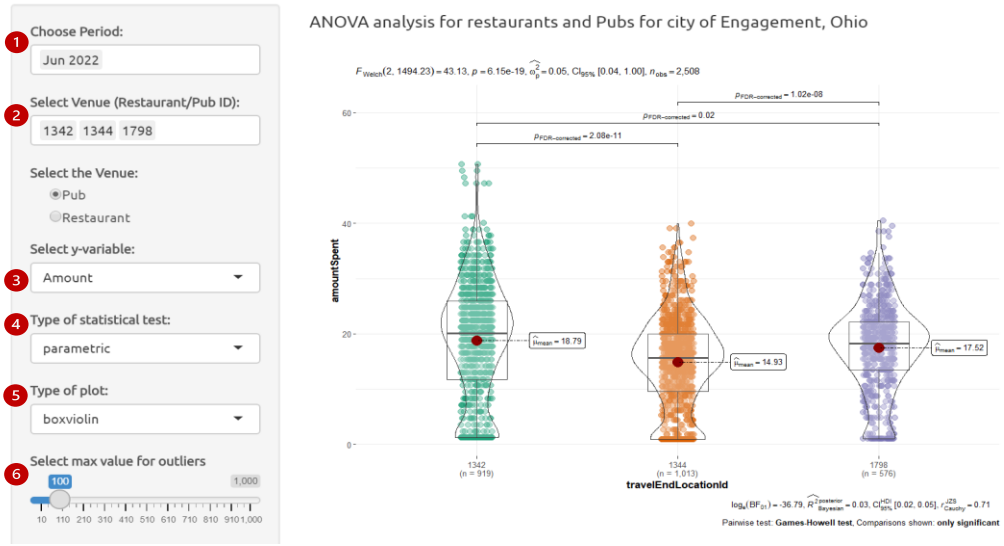

Fig 6: ANOVA

1. choose the time period for which you wish to see the variation in the Revenue for the desired venue – period is given in month year

2. Choose the venue : select the desired restaurant / Pub Id's for comparison

3. select the Y variable : amount, time spent, travel time

4. select the type of test : parametric, non parametric, bayes, robust

5. Select the type of plot: boxviolin, violin, box

6. select the value which you wish to keep as threshold to clean outliers

7. give your own tile for the plot

2.6 Correlation

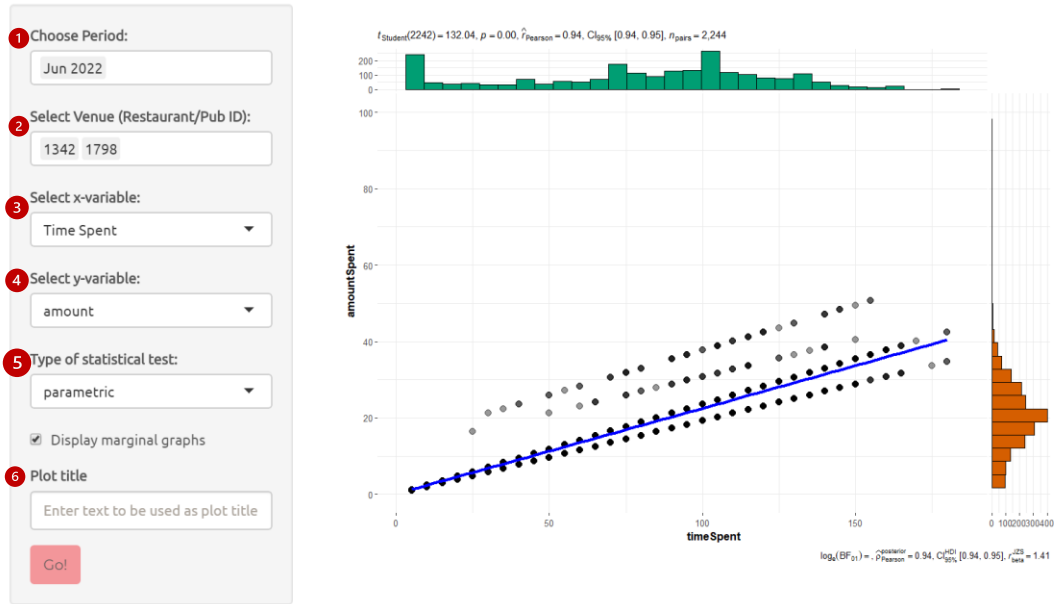

Fig 7 : Correlation

1. 1. choose the time period for which you wish to see the variation in the Revenue for the desired venue – period is given in month year

2. Choose the venue : select the desired restaurant / Pub Id's for comparison

3. select the X variable : amount, time spent, travel time

4. select the Y variable : amount, time spent, travel time

5. select the type of test : parametric, non parametric, bayes, robust

6. give your own tile for the plot

3. Finance

The Finance page allows the user to delve deep into analysis of Income and Expenses of the participants of the survey which in turn will help them to understand the patterns of the entire City. Under this page we have 4 sections which are as follows:

3.1 Income and Expense

In this section, we can visualise the income and expense averaged over all participants aggregated by month. We can see what portion of the income is spent for Shelter, Recreation, Food and Education. We can further drill down using the dropdown in the side panel. When we select an education Level(1), the visual will show the Income and expense pattern for that Education Level. Same if select an Age Group(2). We can further combine these 2 selections and see the income and expense for participants belonging to a particular education level and an age group.

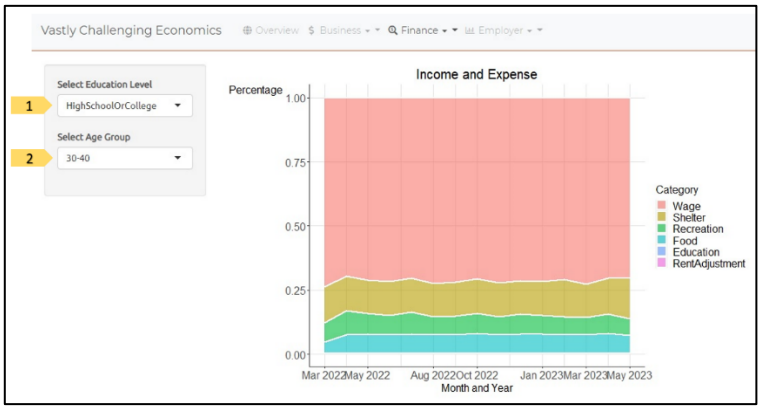

Fig 8:Income Vs Expense plot by Education Level and Age Group

3.2 Finance Variation

This plot helps us to compare the variations in income and expenses of people with different education level (1) and from different age groups (2). Clicking on a plot displays an enlarged view of the plot with a selected Education Level and Age Group, below.

Fig 9: Income and Expense of different Groups

3.3 Expense Calendar

Fig 10: Calendar Heatmap

The heatmap helps us to understand the spending patterns of the residents over weekdays, weekends and even time of the year. The days of the week(1) are along the x axis and each month(2) is displayed separately. The legend(3) helps us to understand the range of the expense. We can also filter by Education Level (5) and Age Group (4) to understand the spending patterns of these groups.

4. Employer

This tab allows you to deep dive into the employer's health and employment patterns.

4.1 Employer Health

This section allows you to explore the spread of hourly wages of different education levels. A static, faceted overview of all education levels is at the centre of the page to facilitate comparison visually.

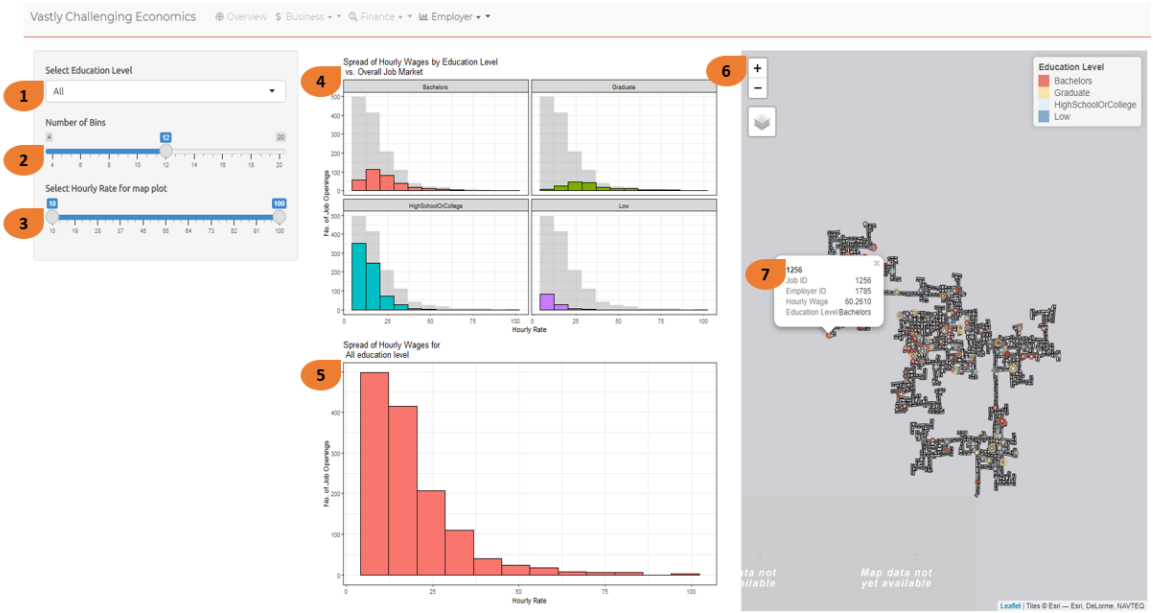

Fig 12: Employer Health

Step 1: Select the education level of interest by choosing from the dropdown list. The default value is "All". This value will be reflected in the histogram at the bottom centre of the page which shows the spread of wages based on education level selected. This value will also be reflected in the map to the right which will show the jobs offered based on the education level selected.

Step 2: Select the number of desired bins by dragging the button on the slider. The default value is 12. This value will be reflected in the two histogram plots in the centre of the page. The value selected decides the number of bins the histograms have.

Step 3: Select the hourly wages of interest by dragging the buttons on either end of the slider. The default value is between 10-100, which is the minimum and maximum hourly wages currently offered. The value selected will be reflected in the map to the right which will show the jobs offered that are in range of the hourly wages selected.

Step 4: This is the static faceted overview of hourly wages across different education levels. It will only change the number of bins it has across the 4 histograms based on the number of bins selected in step 2.

Step 5: This is a dynamic histogram which will show the spread of wages, based on the education level selected in step 1, and the number of bins the histogram will have is based on the value of the number of bins selected in step 2.

Step 6: This is an interactive map showing the jobs available in the city to the education level selected in step 1, which is further filtered by hourly wage selected in step 3 (i.e. map will only show jobs that offer hourly wages within the range selected). User is able to zoom-in and out of the map by clicking on the "+" and "-" buttons respectively.

Step 7: User can click on the job (i.e. the bubble) that they are interested in. A tool-tip will appear once the bubble is clicked to show the Job ID, Employer ID, Hourly Wage and Education Level.

4.2 Employment Patterns

This section allows you to analyse if there are any patterns between hourly wage and categorical variables like age group and education level by doing a one-way ANOVA test. It only allows user to analyse if there's any correlation between average age hired, and variables like hourly wage and number of jobs hired for.

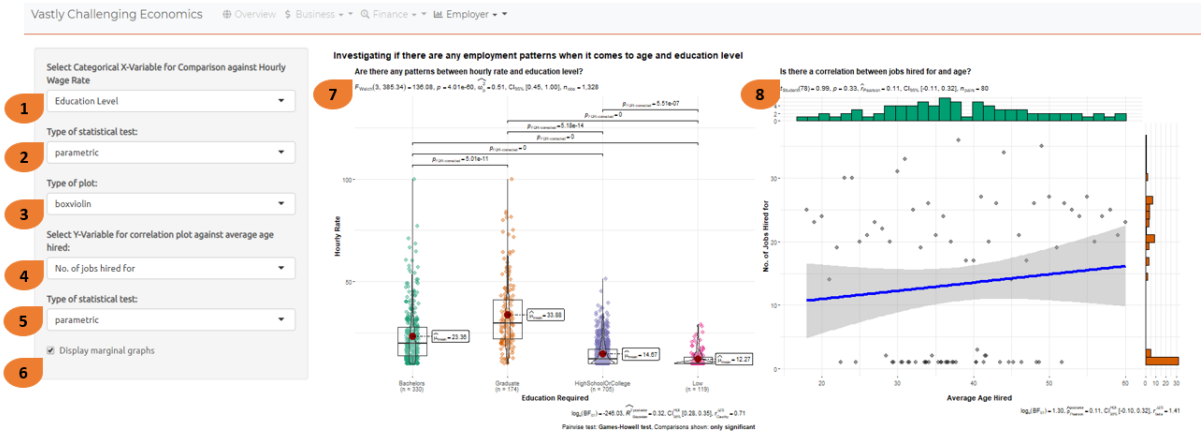

Fig 13: Employment Patterns

Step 1: Select categorical variable from drop-down list for comparison against hourly wage rate in a one-way ANOVA test. Default value selected is "Education Level"

Step 2: Select type of statistical test to conduct from drop-down list for one-way ANOVA test. Default value selected is "parametric".

Step 3: Select type of plot to show from drop-down list for one-way ANOVA test. Default value selected is "boxviolin"

Step 4: Select Y-Variable from drop-down list for correlation analysis against average age hired. Default value selected is "No. of jobs hired for".

Step 5: Select type of statistical test to conduct for correlation analysis from drop-down list. Default value is “parametric”.

Step 6: Select check-box option of whether to show marginal graphs for correlation analysis. Default option is to “Display marginal graphs”.

Step 7: This is the one-way ANOVA test based on the parameters selected in step 1-3.

Step 8: This is the correlation analysis based on the parameters selected in step 4-6

4.3 Turnover

This section allows you to identify areas of high turnover and areas with difficulty filling job opportunities. It also has a static horizontal bar plot to show the number of jobs with high turnover by education level, and the number of job opportunities that are difficult to fill (i.e. 0 job applicants) by education level.

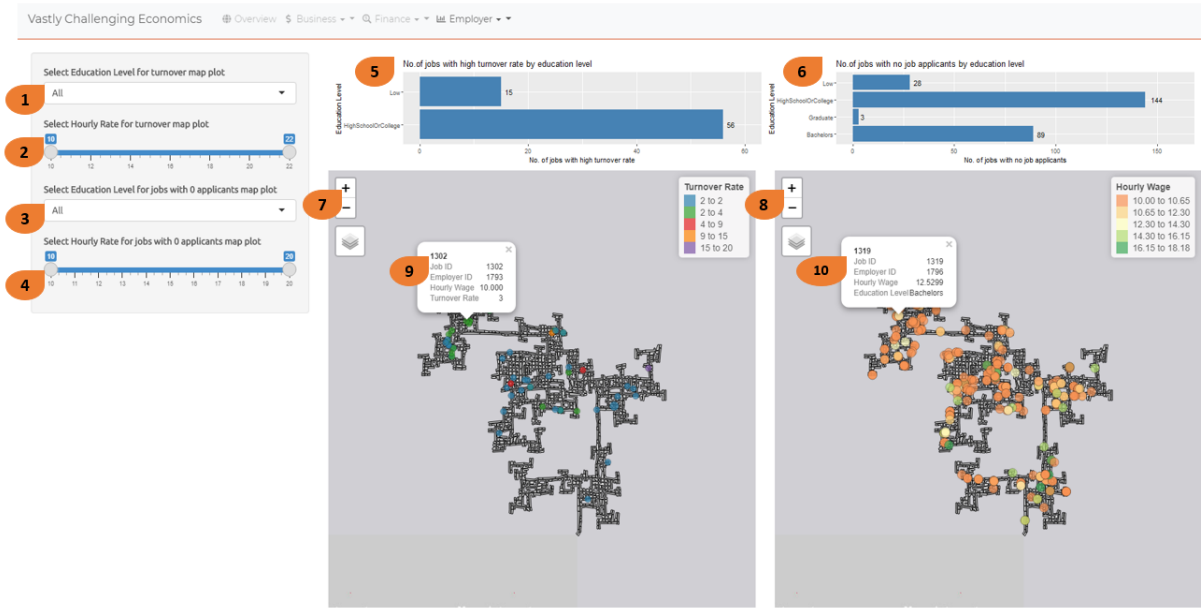

Fig 14 : Turnover

Step 1: Select the education level of interest by choosing from the dropdown list. The default value is “All”. This value will be reflected in the map to the bottom left of the page which will show the jobs with high turnover based on the education level selected.

Step 2: Select the hourly wages of interest by dragging the buttons on either end of the slider. The default value is between 10-22, which is the minimum and maximum hourly wages currently offered for identified jobs with high turnover. The value selected will be reflected in the map to the bottom left of the page, which will show jobs with high turnover that are in range of the hourly wages selected.

Step 3: Select the education level of interest by choosing from the dropdown list. The default value is “All”. This value will be reflected in the map to the bottom right of the page which will show the jobs with 0 job applicants based on the education level selected.

Step 4: Select the hourly wages of interest by dragging the buttons on either end of the slider. The default value is between 10-20, which is the minimum and maximum hourly wages currently offered for identified jobs with 0 job applicants. The value selected will be reflected in the map to the bottom right of the page, which will show jobs with 0 job applicants that are in range of the hourly wages selected.

Step 5: This is the static horizontal bar plot which shows the number of jobs with high turnover by education level.

Step 6: This is the static horizontal bar plot which shows the number of jobs with 0 job applicants by education level.

Step 7: This is an interactive map showing the jobs with high turnover in the city to the education level selected in step 1, which is further filtered by hourly wage selected in step 2 (i.e. map will only show jobs that offer hourly wages within the range selected). User is able to zoom-in and out of the map by clicking on the "+" and "-" buttons respectively.

Step 8: This is an interactive map showing the jobs with 0 job applicants in the city to the education level selected in step 3, which is further filtered by hourly wage selected in step 4 (i.e. map will only show jobs that offer hourly wages within the range selected). User is able to zoom-in and out of the map by clicking on the "+" and "-" buttons respectively.

Step 9: User can click on the job (i.e. the bubble) with high turnover that they are interested in. A tool-tip will appear once the bubble is clicked to show the Job ID, Employer ID, Hourly Wage and Turnover Rate.

Step 10: User can click on the job (i.e. the bubble) with 0 job applicants that they are interested in. A tool-tip will appear once the bubble is clicked to show the Job ID, Employer ID, Hourly Wage and Education Level.