



Making a Living in California

INFO 247
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Project Goals

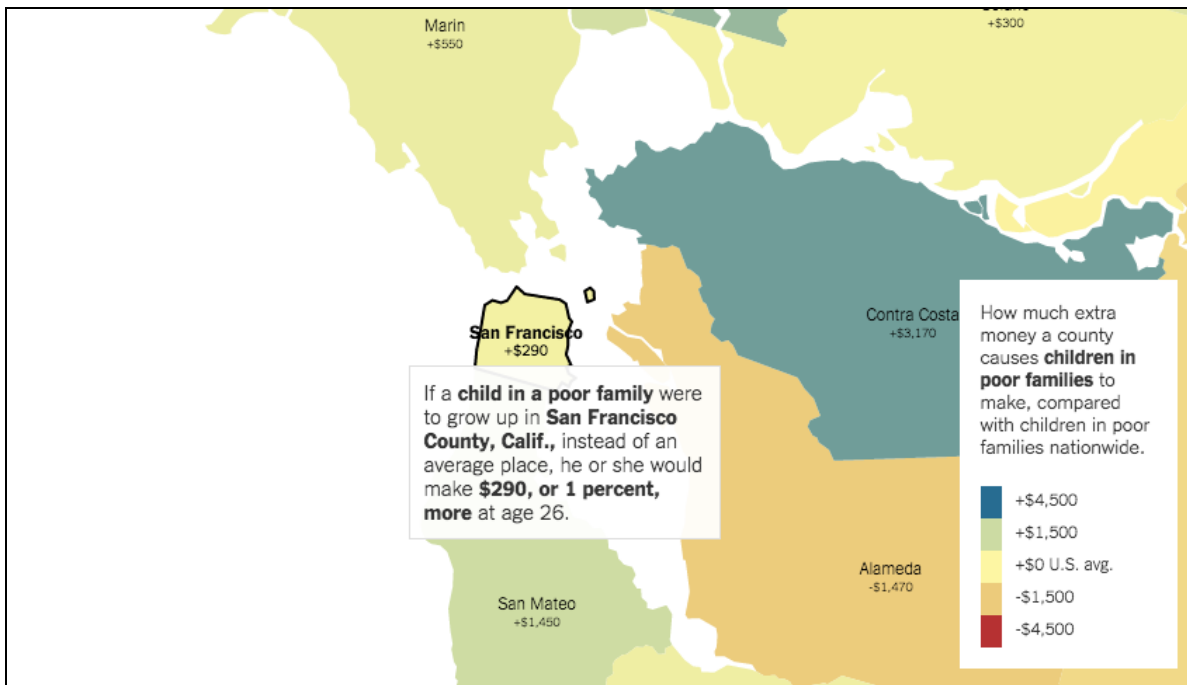
The goals of this project were to introduce users to the different expenses that make up monthly cost of living in Alameda County and across California for different family sizes; to allow them to explore how the gap between income and cost of living changes for different family sizes and minimum wage amounts at the county level in California; and to show the landscape of current and proposed minimum wage laws in Alameda County. Overall, we wanted to allow users to get a better understanding of minimum wage as it relates to the cost of living in Alameda County and in California as a whole, to contextualize the improvements that have happened, and to understand that work still needs to be done.

Related Work

We derived visual inspiration for our project from a variety of sources. However, due to the extensive news coverage that the minimum wage has received in the past few years, much of the related work discussed below comes from press and other media outlets.

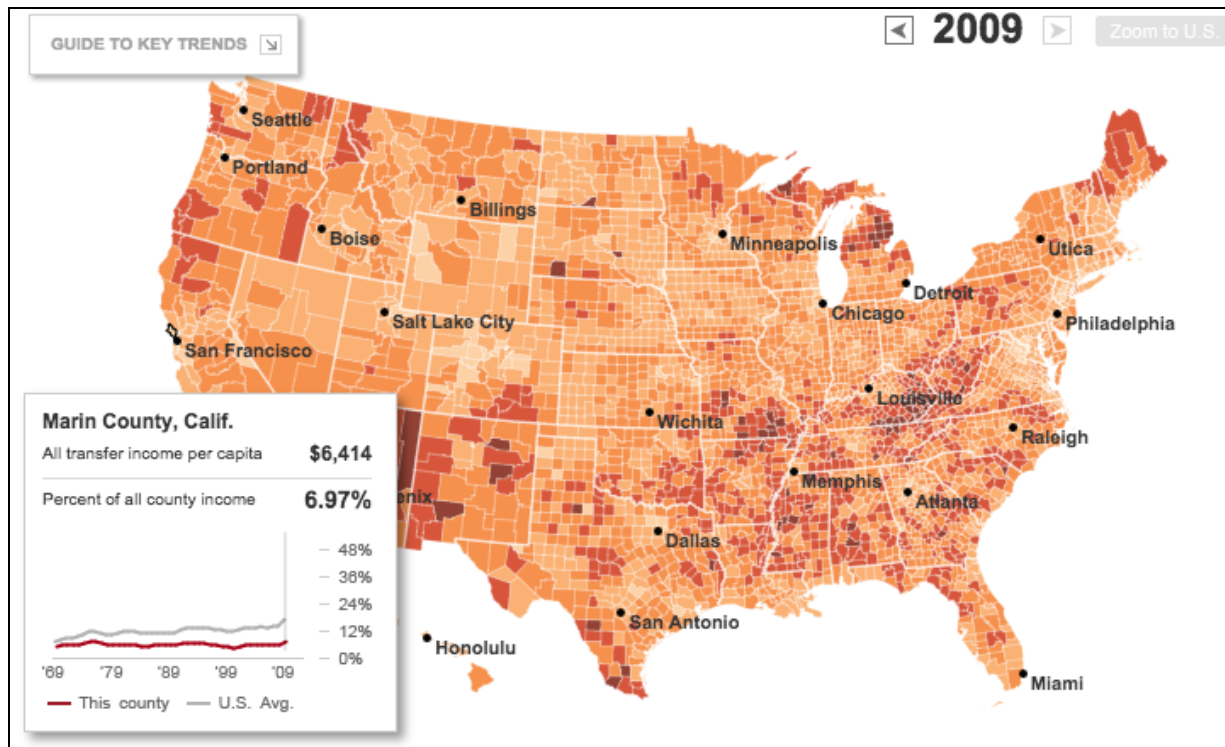
1. Leonhardt, David. "[The Best and Worst Places to Grow Up.](http://www.nytimes.com/interactive/2015/05/03/upshot/the-best-and-worst-places-to-grow-up-how-your-area-compares.html)" *The New York Times*. 4 May 2015.

<<http://www.nytimes.com/interactive/2015/05/03/upshot/the-best-and-worst-places-to-grow-up-how-your-area-compares.html>>



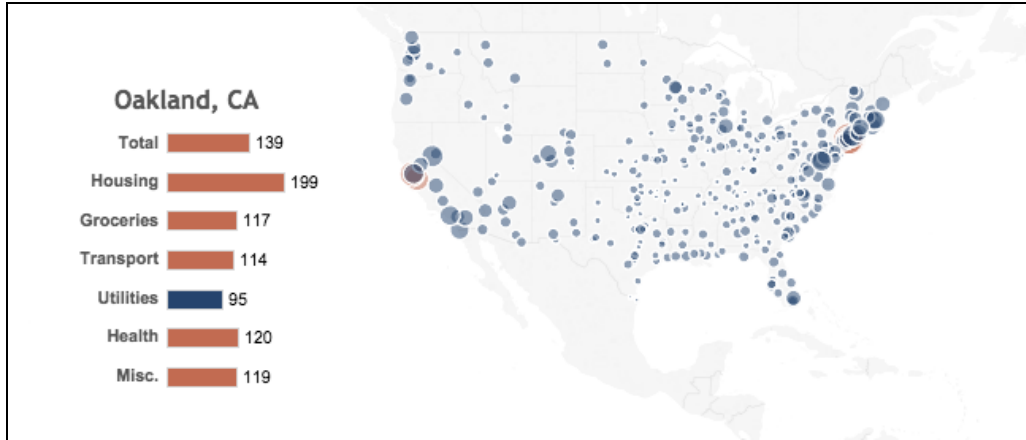
We drew a significant amount of inspiration from this article for our Tableau visualization on the Wage Gap. Specifically, this visualization served as a great example of how to use a choropleth effectively in a narrative context. The dynamic tooltip in our visualization, which was able to create a sentence using the interactive selectors on the graph, was inspired by the hover in this NYT graph. In addition, the varying of the color scale with only a few increments was more effective in showing drastic regional differences than a more gradual color scale.

- White, Jeremy, Robert Gebeloff, Ford Fessenden, Archie Tse, and Alan McLean. “[The Geography of Government Benefits](#). *The New York Times*. 11 February 2012. <<http://www.nytimes.com/interactive/2012/02/12/us/entitlement-map.html>>



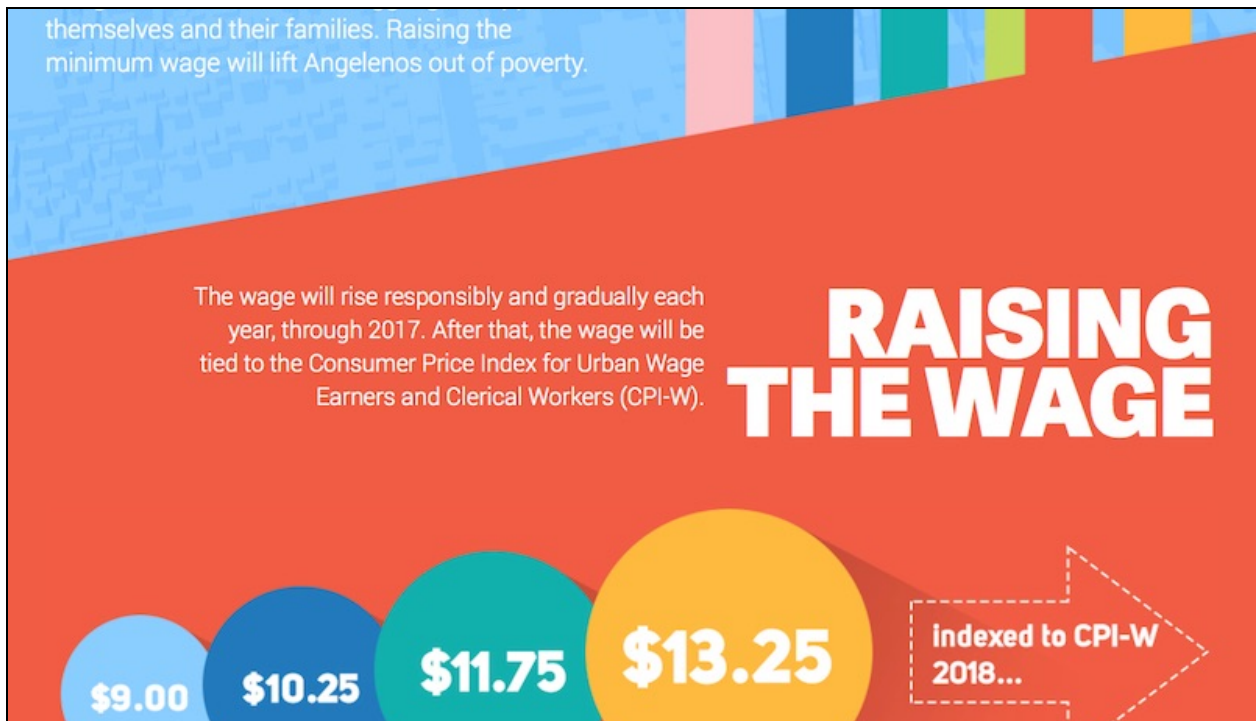
This graph utilizes an interesting juxtaposition of a choropleth with a line graph for each county that’s shown upon hover. We thought about using a similar technique for our choropleth on cost of living, to demonstrate how costs have also risen over time by county. In the end we decided against this for a couple of reasons. First, while we did introduce the historical cost of living in Alameda County, our ultimate focus was not as much on the historical trends of cost of living as it was on the present day comparison of minimum wage to current costs. Secondly, we wanted for users to be able to compare counties against each other and had we utilized this hovering technique such comparisons would not have been possible (or if possible, would have required a significant time investment with d3.js).

- Sleeper, Ryan. “[Cost of Living in the United States](#)” Evolytics. 8 October 2013. <<http://www.evolytics.com/blog/cost-living-united-states-visualization/>>



This visualization was useful in showing how regional trends in cost of living could be shown without using a choropleth. In particular, it showed how the interplay between size and color could be overlaid on a map to make a point about regional cost of living expenses. We used a similar approach in our Current Cost of Living visualization. We initially had the circles show the cost of living through both color and size as they do in this related work but we decided that the size did not make it easier for people to perceive since many of the circles are already close together or overlapping, the cost of living was already shown by the color, and it is difficult for people to perceive differences, especially subtle ones, through the area of a circle.

4. Los Angeles Mayor’s Office. “# Raise The Wage LA” 1 September 2014.
<http://www.lamayor.org/raisethewagela>

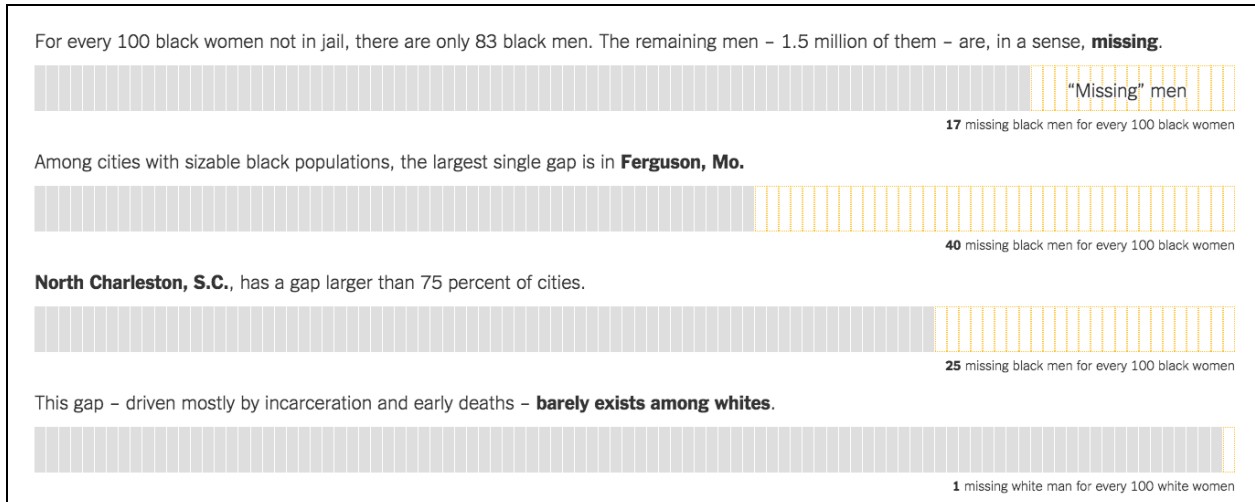


This website was created by Office of the Los Angeles Mayor Eric Garcetti in an effort to garner support for this minimum wage increase proposal (there are other competing

proposals in Los Angeles). The layout of the page really supports the presentation of a narrative. The scrolling element of this page, in particular, was a source of design inspiration.

5. Wolfers, Justin, David Leonhardt, and Kevin Quealy. [“1.5 Million Missing Black Men.”](#) *The New York Times*. 20 April 2015.

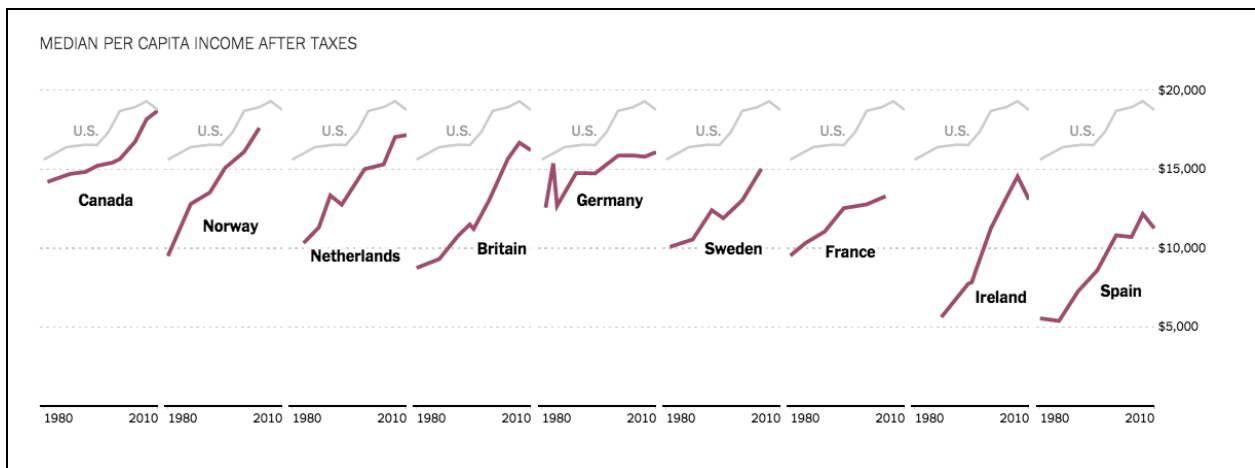
<<http://www.nytimes.com/interactive/2015/04/20/upshot/missing-black-men.html>>



This visualization helped us think about ways to show gaps. Letting our users see the gap between cost of living and minimum wage was important in our Wage Gap and Local Perspective visualizations. We liked the way this visualization adapted a horizontal stacked bar chart. This inspired the version of the bullet chart we used in our Local Perspective visualization to show the gap between current and future city minimum wage laws and cost of living.

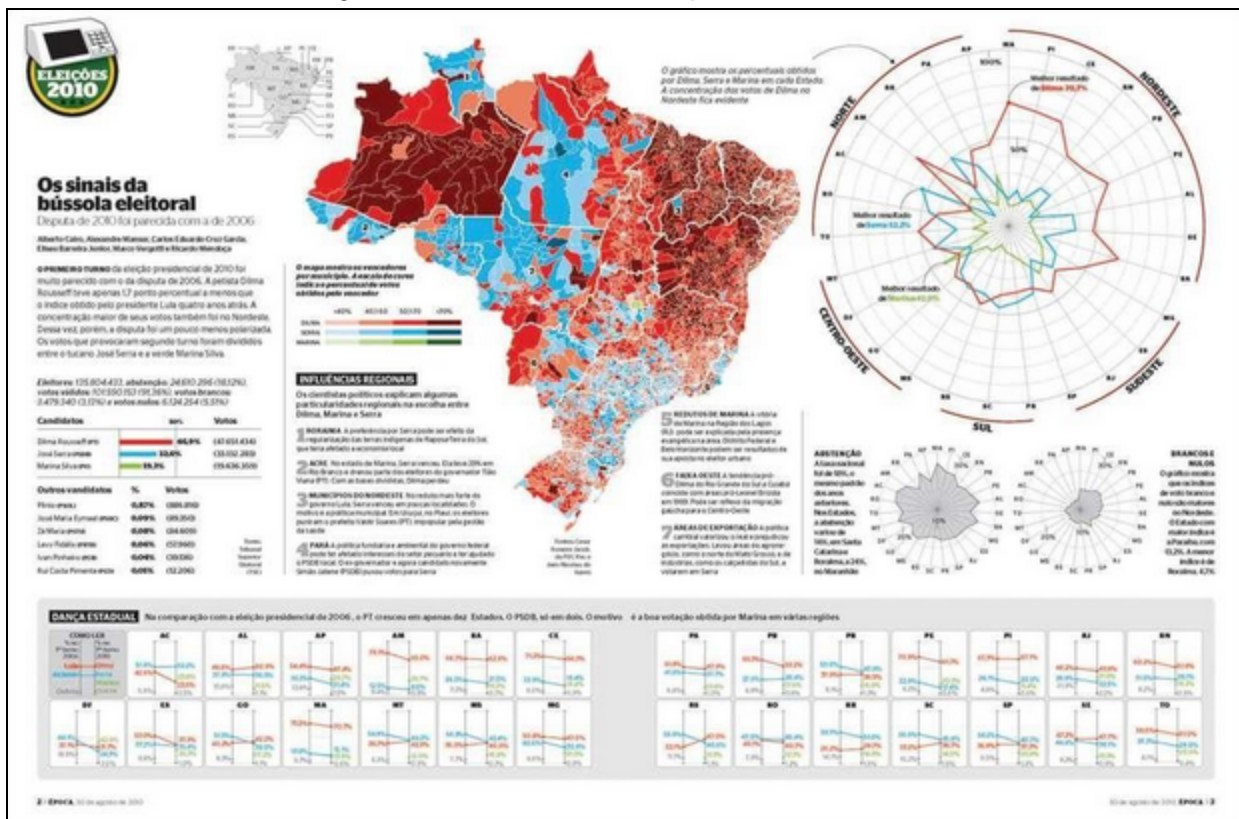
6. Leonhardt, David and Kevin Quealy. [“The American Middle Class is No Longer the World’s Richest.”](#) *The New York Times*. 22 April 2014.

<<http://www.nytimes.com/2014/04/23/upshot/the-american-middle-class-is-no-longer-the-worlds-richest.html>>



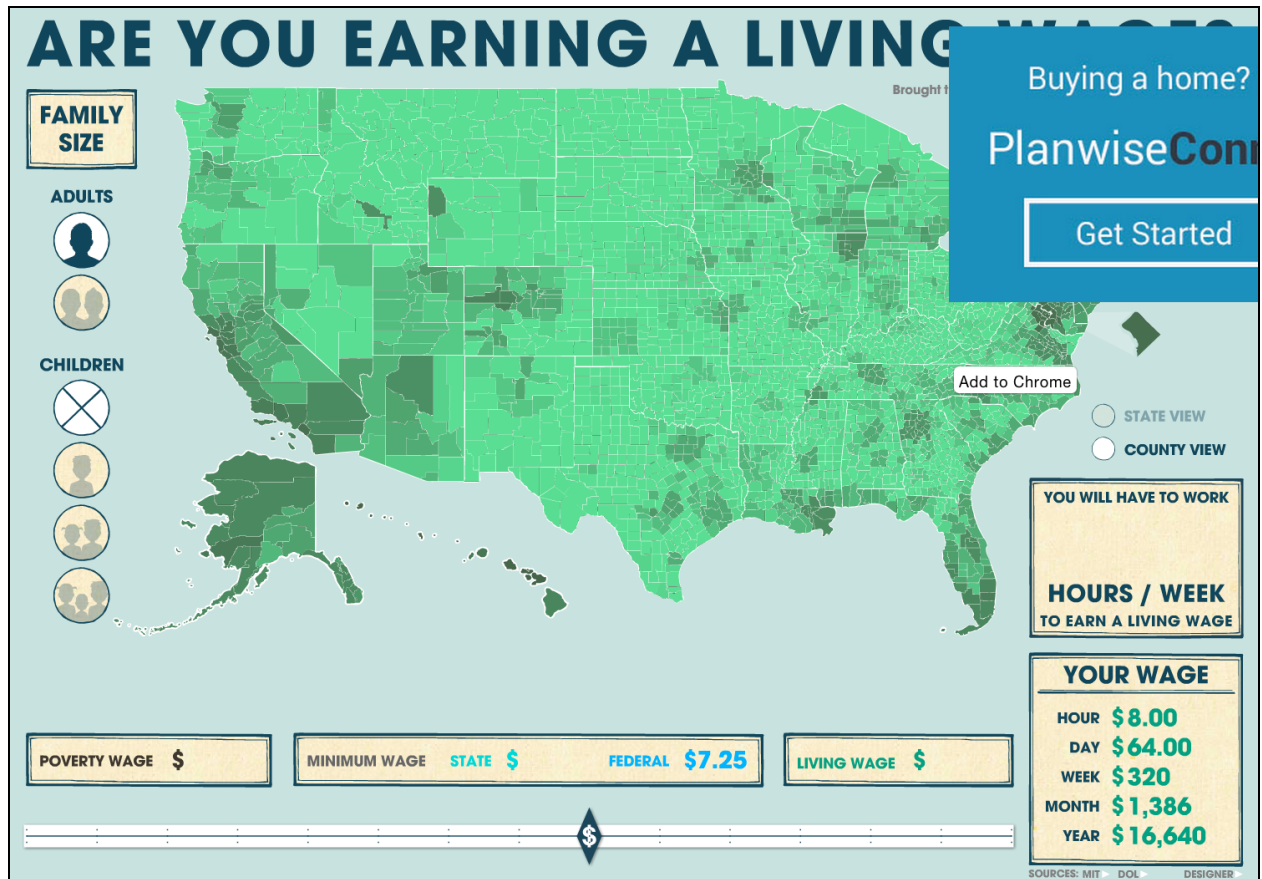
We also looked at this visualization to inform our thinking about the best ways to show gaps over time. We tried using two line graphs in the Local Perspective visualization to show the gap between self-sufficiency and minimum wage under current and future minimum wage rates. We found, however, that this approach was less effective than the adapted bullet graph because we only had a few data points since the minimum wage increases occur at set dates in the future. This made using a line graph a little confusing because that would imply that there was a gradual increase in the minimum wage amounts over time when in reality there are discrete jumps.

7. “The Signs of the Electoral Compass” *Epoca* magazine (pg. 84 in Cairo, Alberto. *The Functional Art: An Introduction to Information Graphics and Visualizations*. New Riders: Berkeley, CA: New Riders. 2013.)



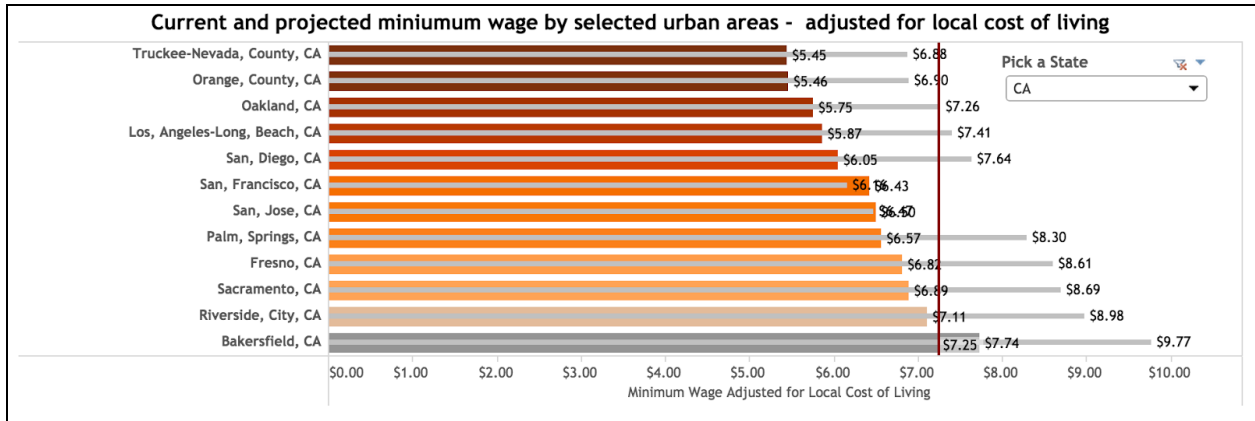
In Chapter 4 of *The Functional Art* Alberto Cairo talks about a visualization that used a radar (he refers to it as a compass) graph to show electoral results in different states in Brazil. This gave us the initial idea for the radar graph as an alternative way to show geographic information. We initially made the radar graph with an axis for each city, grouped by region, based on this *Epoca* visualization. Our use of the radar graph shifted during our project (see discussion in Process section of the report) but the idea was inspired by this visualization.

8. Turner, Vincent and Eric Phillips. “Are You Earning A Living Wage?” *Planwise Blog*. 25 April 2014. <<http://planwise.com/blog/earning-living-wage-interactive-graphic/>>



This interactive graphic comes from Planwise, a website that aims to help people make better financial decisions. Functionally, this graphic is similar to our second and third visualizations in that it provides information about cost of living (the graphic uses the term “living wage”) and also allows the user the ability to test out different wage scenarios through the use of a slider. However, although this graphic contains much interactivity, there is not much guidance and maneuvering through this visualization quickly becomes confusing. It is also unclear if changing from a state level view to a county level view does much analytically (aside from changing the choropleth).

9. G., Peter. “[Taking A Look at What the Minimum Wage Means](http://planwise.com/blog/earning-living-wage-interactive-graphic/)” *Paint By Numbers*. 27 February 2014. <<http://planwise.com/blog/earning-living-wage-interactive-graphic/>>

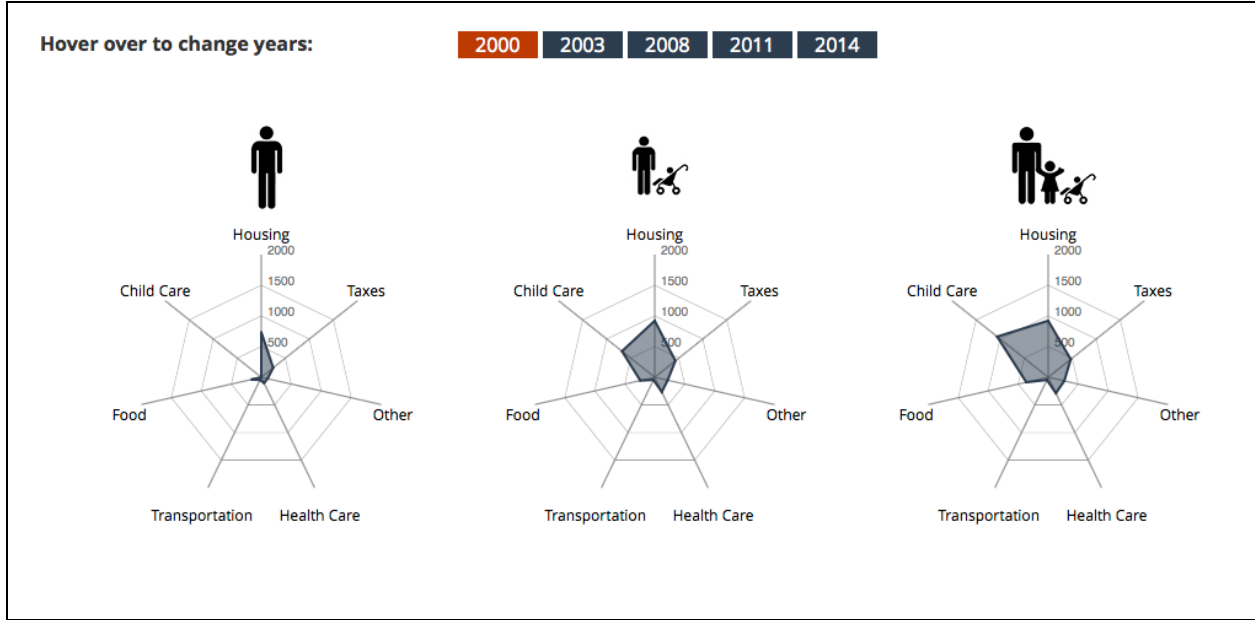


This visualization comes from the author’s personal blog that is dedicated to presenting different Tableau visualizations. In the accompanying post to this visualization, the author writes that part of the motivation for creating this specific visualization came from that fact that he lives in Manhattan, arguably the most expensive place to live in the United States. As is evident below, part of this visualization contained city-specific information. The author used Tableau’s bullet graph feature to present information about both present and future minimum wage levels for various cities. The gap shown here arises from a federal level change to the minimum wage and the wages have been adjusted to their “true” purchasing power value.

Visualizations

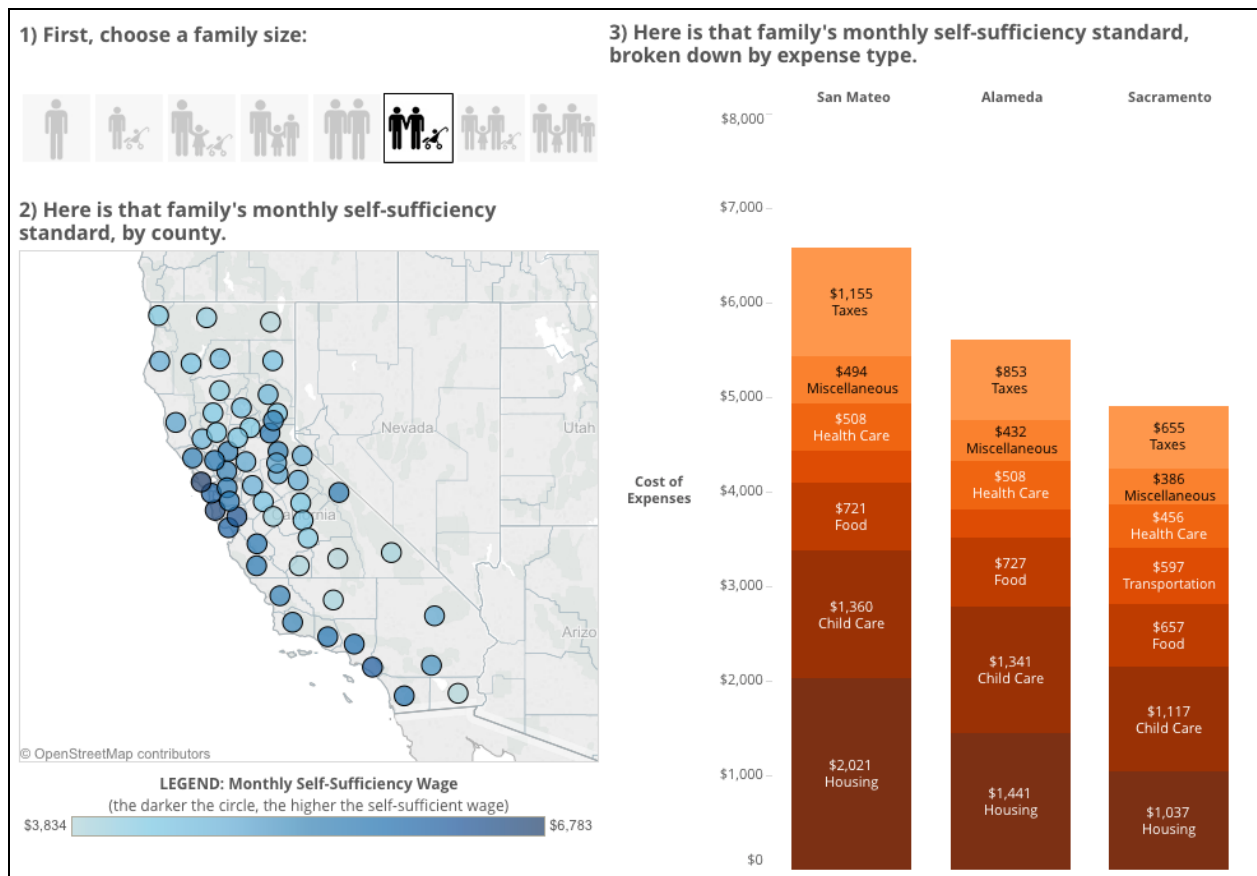
Our project consists of four visualizations. On our site these visualizations are presented sequentially and each is accompanied by explanatory text that provides users with contextual information as well as information about how to interact with the visualization. Each visualization is described in more detail below.

Visualization 1: The Cost of Living is Rising



This visualization (created in d3) uses radar graphs to show the increase in cost of living broken down by expense type between 2000 and 2014 for three different family sizes based on the Family Economic Self-Sufficiency Standard. We wanted to convey how these costs have increased rapidly since 2000 and also show the significant costs that children add to monthly expenses. This visualization is designed to draw visitors in to the site and let them quickly see that there is a large difference in costs for a single adult and an adult with children and that these costs have been rising. After learning a bit about the costs of living in Alameda County, users can compare these costs to other counties in California in the second visualization.

Visualization 2: Current Costs in California

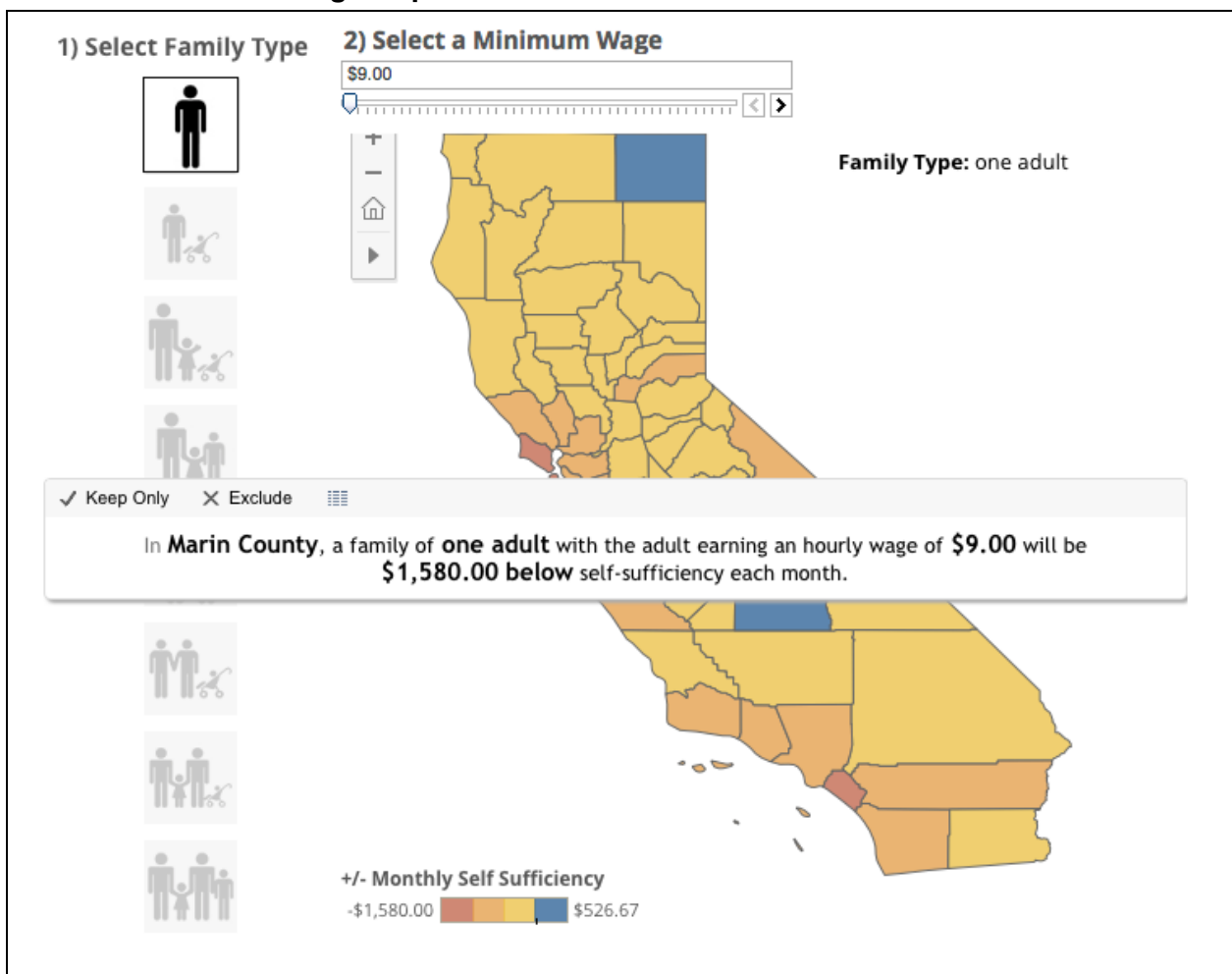


The second visualization (created in Tableau) depicts the current cost of living for each California county. This metric is based on the 2014 California Self-Sufficiency Standard (created by researchers at the University of Washington and the Insight Center for Community and Economic Development) and includes the following expenses: Housing, Child Care, Food, Transportation, Health Care, Taxes, and a Miscellaneous category.

This visualization serves to give a broader picture of the problem on a statewide level, while at the same time allowing the reader to compare these costs with that of Alameda County. The family type selector allows the user to look at how the costs for different family sizes are

impacted disproportionately, a point we initially made in the first visualization. For each family type, the map on the left side of the visualization presents the self sufficiency amount by county. We placed circles within each county instead of using choropleth. We wanted users to be able to select individual counties to compare and the circles made this feature more apparent. On the right hand side of this visualization we included a stacked bar graph which gives a breakdown of the self sufficiency expenses by category (based on the previous selections of family size and county). We chose to automatically sort the bars from most to least expensive county so the user could easily see these rankings. We made the height of the y-axis fixed and not dynamic so that it would be easier to visually compare many different groups of selections.

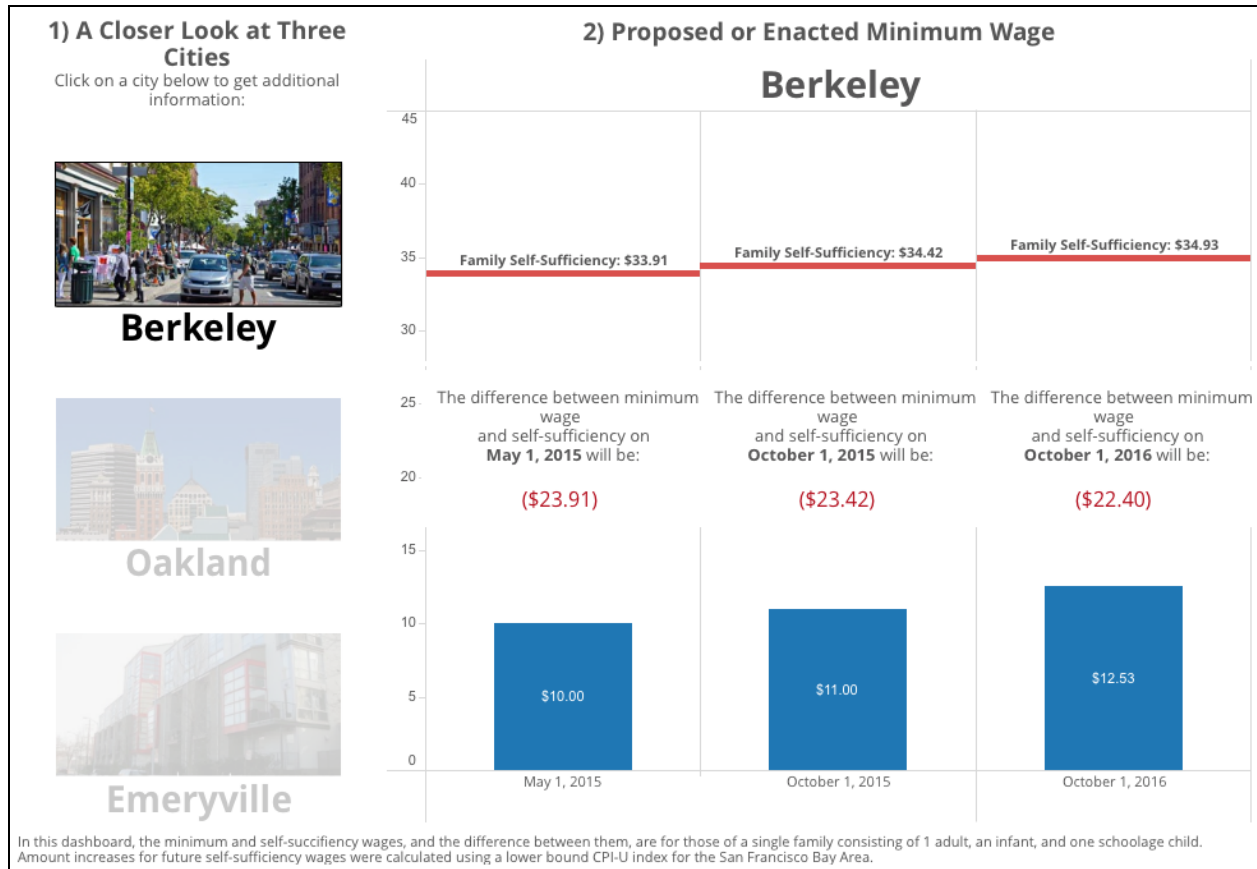
Visualization 3: The Wage Gap



Our third visualization added an additional layer of minimum wage on top of the existing narrative already introduced in the previous two visualizations. The point was to show that when considering these costs and minimum wage together, many families cannot make ends meet. We decided that the most effective way to make this point would be to depict the gap between minimum wage and self-sufficiency. Again, we included icons to select family type as the initial filter for the visualization. For this visualization, we also included a slider so that the

user could select a minimum wage to compare against self-sufficiency. For the slider, we started at the current California minimum wage of \$9/hour as the lowest value and went up to \$20/hour as anything higher would be unrealistic and give the user unnecessary information. We included only 25 cent increments in the slider because some of the minimum wage increases occur in 25 cent increments and it would be easier to interpret. We also wanted to give the user the opportunity to explore and see for themselves what minimum wage is required for different families in California to be self-sufficient. For the actual choropleth, we drew inspiration from the *New York Times* visualization on The Best and Worst Places to Grow Up. We decided to include only 4 scales in our color gradient as it was more effective in showing the stark differences by region and family type. We also included a tooltip that provided information based on the varying selectors in the format of a sentence. Because of the many interactive features on the graph, a tooltip like this allowed us to easily summarize exactly what information the user was seeing without becoming confused.

Visualization 4: A Local Perspective



For the final visualization (which focuses on the future of minimum wage), we wanted to come back to Alameda County in order to round-out our narrative and show the user something more personal and relatable (our target users live in Alameda County). It also allowed us to make the point that even within a county, there could be differences in the minimum wage standards and legislation. We chose to focus on Berkeley, Oakland, and Emeryville - all cities where future minimum wage increases have either been proposed or enacted. The left side of

the visualization consists of a city selection sheet while the right side shows a bar graph of future minimum wage increases (by date). We included a red trend line to show the projected self sufficiency standard for those time periods in order to show the continuing inadequacy of minimum wage. The data for this visualization presents information for a family of one adult, one infant, and one school age child, as this was the type of family that was most negatively impacted. We thought about including other family types, but decided that would cause clutter and take away from the main point of the visualization.

Data Sources

The main data for our visualizations came from the Insight Center for Community and Economic Development, a nonprofit focused on research that builds economic health in vulnerable communities.

The Insight Center provided two different datasets with cost of living data: one at the city-level for 2014 only and one at the county-level for 2000, 2003, 2008, 2011, and 2014. Although we ended up using the Insight Center's county-level data across our project, we briefly considered using the city-level data for the radar graphs. Here we discussed the possibility of adjusting the city-level data for inflation and using that for the radar graphs but we quickly realized that doing so obscured the significant increases in costs in the Bay Area (which have outpaced inflation). In the end we decided that it was more important for the radar graphs to accurately capture these rising costs although it meant we could only look at Alameda at the county-level.

Data for the fourth visualization (A Local Perspective) was obtained on a case-by-case basis for each of the profiled cities. In this case specific data about proposed or enacted minimum wage increases all came from Berkeley and Emeryville's city websites and the Oakland data came from Ballotpedia.

Tools

D3.js

We utilized the d3.js JavaScript library for our first visualization which depicted radar graphs of family sizes and living expenses. The radar chart code was adapted from <http://bl.ocks.org/nbremer/6506614> which was based on <https://github.com/alangrafu/radar-chart-d3>.

Tableau 9.0

We used Tableau for the remaining visualizations (Current Costs in California, The Wage Gap, and A Local Perspective).

OpenRefine

We used OpenRefine to clean and organize the initial data we obtained from the Insight Center. This included transposing much of the data that was housed in columns into rows in order to allow for compatibility and input into Tableau.

Process

When we started this project our goal was to create an interactive visualization that looked at the maximum income people can make in each state and still qualify for welfare benefits. We wanted to compare this to the living wage amount in each of those states to see how large the gap is where people are not making enough money to get by but are also not qualifying for welfare. However, as we started to conduct research about the various public assistance programs available, it became clear that there was simply too much variability from state to state with regards to the various welfare programs and eligibility standards required. Around this time the UC Berkeley Labor Center released a report about the use of public assistance by families on the minimum wage. The news coverage of this and of proposed minimum wage increases and the Fight for 15 protests across the country informed our refined focus on the current and future minimum wage increases and whether they are actually enough for families to live on. We decided to narrow our focus to California because some of the nation's highest minimum wages have been enacted or proposed (Oakland currently has the nation's highest enacted minimum wage at \$12.25/hour) in this state and cost of living, especially in the Bay Area are some of the highest in the country as well.

The first visualizations we made were the Current Cost of Living and the Wage Gap dashboards. We knew we wanted to let users see the breakdown of costs different family sizes faced and we also wanted to make the gap between minimum wage and those costs apparent to people. While we developed the overarching idea for these two visualizations early on we refined them to be more usable through user testing, feedback from our professor, and brainstorming. Broadly, many of our changes for the Tableau visualizations focused on how to minimize text while still allowing us to present the necessary data to make our point. One way we did this was through the use of the hover tooltip. Another practical way this was achieved was by explicitly stating to users the interactions that were possible with the Tableau visualizations. Our focus on minimizing text also led to the addition of icons for family sizes, changes in color schemes, the addition of a slider and a free entry text field for the Wage Gap visualization.

Our radar graph went through several iterations. We initially conceived of it as a way to provide an overview of the gap between minimum wage and living wage with a slider where users could control the minimum wage amount. We thought a radar graph would be an interesting way to show the point where the minimum wage monthly income would exceed the monthly self-sufficiency standard in different cities. Once we decided to introduce our visualizations by providing some historical context on the minimum wage and cost of living we decided to shift the user-controlled input (via the slider) to the year. When we plotted this, however, it was not very interesting because the minimum wage plot was always smaller than

the cost of living plot. So instead of taking advantage of the ease of perceiving the lines crossing we would be expecting users to perceive the gap between the two plots, a task that would be much better served by other visualizations like a bar graph or by calculating the gap and plotting that over time on a line graph or scatter plot and was also less interesting because the values in the dataset we had did not come close at any point. We went back to the drawing board to brainstorm possible uses of the radar graph and decide whether it made sense to keep it. We were wary of letting the visualization dictate our approach so we considered eliminating the radar graph all together. During our brainstorming session we came up with the idea to use the radar graphs to show the significant differences in the composition of costs for different families. At this point, we had realized that we wanted to emphasize that there are many families, especially single parent families, relying on minimum wage jobs in Alameda County. While the current and proposed increases may be sufficient for single adults or couples without children, the minimum wage is far from being sufficient to support a family as a single adult. We changed the radar graph axes to cover the different types of expenses and plotted the monthly self-sufficiency standard for different family sizes over time. We initially made radar graphs for expenses for both one- and two-adult families but found through user testing that people did not get much extra information from the addition of the two-adult radar graphs and were confused about why they were included. We tried out the idea of putting one and two adult families on the same graph but the expenses for these families are so similar that it was difficult to see both plots. This led us to decide to include just the one-adult family expenses to provide the historical overview, and because 60% of single parent households in Alameda are below the self-sufficiency standard.

The last visualization we added was the Local Perspective visualization. Because we are in Alameda County and because there are several minimum wage laws that are in effect or will be in the next few years we thought it would be helpful to give users details on the city-level about minimum wage increases. This visualization initially used grouped bar charts to show minimum wage and self-sufficiency wage over the next few years. After getting feedback that the bar graphs were not very useful or eye-catching, we reviewed some of our related work to think through the best ways to show the gap. We decided on the bullet graph and modified it from the Tableau defaults to clearly show the self-sufficiency wage amount and the minimum wage. We initially had the text with the amount of the gap as a separate part of the dashboard but after we got feedback on this visualization at the showcase we combined those two components.

Results

We conducted usability testing with friends and classmates. This feedback, along with the feedback we received from the showcase and from our professor, helped us identify several main areas for improvement. We used this feedback to inform another round of changes to the site design and the visualizations. Common feedback included:

- **Icons are helpful and engaging**

This feedback was particularly helpful for the Tableau visualizations. Initially, for these visualizations we simply utilized dropdowns for family selection. However, the Tableau dashboard allows for linking actions across sheets so we made use of this feature and created the selectable shapes which became the family icons. We also introduced the icons at the beginning to familiarize people with the family sizes we were talking about throughout and get them used to quickly seeing and understanding the icons which should facilitate their use of the subsequent visualizations.

- **There was too much text throughout the site**

While we wanted to be accurate when explaining certain terms and providing context for our visualizations, this also led to dense sentences. During the showcase we noticed that people did not read most of the text and as such missed some of the key points about the visualizations and how to use them (particularly for the radar graph). As a result, we ended up stripping away unnecessary detail that was not germane to our visualizations and bolding key information about the visualization for readers who tend to skim.

- **Having two rows of radar graphs was confusing**

In feedback from our professor and in the showcase users were not sure why there were two rows of radar graphs with different colors. People did not notice the header text on each graph indicating the family size. We decided to cut this down to one row of one-adult family expenses and include the icons which we had introduced at the beginning to help people quickly see the family size they are looking at.

- **Hard to tell what's a selector**

During the showcase we noticed that people did not readily click on the blue circles for counties in the Current Cost of Living visualization. To address this we added more specific bolded instructions to the preceding text.

- **Visualization directions should be more explicit**

During the showcase we also noticed in the Current Cost of Living and in other visualizations that users did not seem aware of the functionality of the visualizations. Particularly with the mouseover to change years in the radar graph, the ability to multi-select counties on current costs, and the fact that there is a tooltip in the wage gap visualization. We added more specific, and bolded, instructions about this in our text.

- **Font for the main text was hard to read**

During the showcase we realized that the Open Sans font we were using was difficult for people to read in body text. We also got feedback from multiple people that the shadow style of font made it harder the main text (although it was fine for the headers).

Therefore, we decided to change the main body text to serif font and remove the drop shadow.

- **A universal family-size selector would be helpful**

Some mentioned that having a single family size selection that changes all of the visualizations on the site would be more intuitive. Although we added the family size icons at the top of the page, adding the functionality to use them as selector for all of our visualizations would be difficult to implement. This is a change we can explore for the future.

With more time we would like to do another round of user testing of the site with the updates noted above to see how it improves the usability of the visualizations and the overall experience of the site.

Links

Project Website: <http://people.ischool.berkeley.edu/~emily.paul/INFO247/Project>

Radar Graphs:

- **Visualization 1:** <https://github.com/emilylengle/min-wage-ca>

Tableau Dashboards:

- **Visualization 2 :** http://public.tableau.com/shared/RK7NR6KQR?:display_count=yes
- **Visualization 3:**
http://public.tableau.com/views/CaliforniaSelfSufficiency/Dashboard2?:embed=y&:loadOrderID=1&:showTabs=y&:display_count=yes
- **Visualization 4:**
http://public.tableau.com/views/cities_7/Dashboard3?:embed=y&:loadOrderID=2&:showTabs=y&:display_count=yes

Distribution of Work

Project Component	Team Members Involved (Proportion)
Initial planning	Emily (33%), Shom (33%), Pavel (33%)
Data gathering	Emily (33%), Shom (33%), Pavel (33%)
Data clean-up	Pavel (80%), Shom (10%), Emily (10%)
Tableau visualizations (3 dashboards)	Pavel (45%), Shom (45%), Emily (10%)
Radar graphs	Emily (90%), Pavel (5%), Shom (5%)
Presentation	Emily (50%), Shom (25%), Pavel (25%)
Narrative	Emily (33%), Shom (33%), Pavel (33%)
Website design	Shom (50%), Pavel (25%), Emily (25%)
Brainstorming and refining	Emily (33%), Shom (33%), Pavel (33%)
Final report	Emily (33%), Shom (33%), Pavel (33%)

Appendix









In addition to our visualizations, our project’s webpage also included specific Introduction and Conclusion sections. Screenshots of these sections are shown below.

Introduction section: For this section we wanted not only to introduce the topic of cost of living but also highlight our project’s focus on how families are particularly impacted.

“By living wages, I mean more than a bare subsistence level—I mean the wages of a decent living.” —Franklin Delano Roosevelt

In Alameda County in 2012, 60% of single parent households; 29.4% of married couples with children; and 22.7% of households without children were not making enough money to meet their basic costs. The cost of living measure used throughout this site is the [Family Economic Self-Sufficiency Standard](#). It includes the basic costs families face on a daily basis—housing, food, child care, out-of-pocket medical expenses, transportation, and other necessary spending (it does not include spending for recreation, entertainment, savings, or debt repayment). Unlike the federal poverty level or the consumer price index, the self-sufficiency standard provides a comprehensive picture of what it takes for families to make ends meet and accounts for variation in costs of living at the county level.

Here are the different family sizes we look at:

			
One adult	One adult and an infant	One adult, an infant, and a schoolage child	One adult, a schoolage child, and a teenager
			
Two adults	Two adults and an infant	Two adults, an infant, and a schoolage child	Two adults, a schoolage child, and a teenager

Conclusion section: We decided to end our project’s narrative by emphasizing the importance of local initiatives while at the same time reiterating the fact that even recent minimum wage increases will not be sufficient to close the wage gap. We end by pointing users to additional online resources.

Conclusion

Local changes in minimum wage can have a national impact.

The proposed minimum wage increases in Alameda County are still not enough to meet the self-sufficiency standards for many families, but they are an important first step in changing the status quo. The recent media attention on these legislative proposals in Alameda highlight the ability for local governments to change the national conversation on minimum wage. It’s important that this conversation includes a fuller understanding of minimum wage that acknowledges the difficulties so many different families face in meeting their everyday needs. We all have the ability to contribute to this conversation, both on a local and national level. Learn more about minimum wage advocacy at the local and national level: [East Bay Alliance for a Sustainable Economy](#); [Lift Up Oakland](#); [UC Berkeley Labor Center](#); [Raise the Minimum Wage](#).