A New Approach to the Minimum Wage in California

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State level minimum wages have been a hot economic topic recently, as voters in Arkansas and Missouri approved measures this month to raise the minimum wages in those states to $11/hour and $12/hour respectively. In fact, according to the Economic Policy Institute, 21 states and the District of Columbia have raised their state minimum wages since January 2014.[7] They have done this because the federal minimum wage, last raised in 2009, has not kept up with inflation and rising costs of living, leaving many families earning poverty wages around the country according to a Government Accountability Office (GAO) study released in October 2017.[9] The report found that 40% of the U.S. workforce earned less than $16/hour, and that most of the households of these workers were impoverished even with the use of federal social safety net programs.

One of the states that raised their minimum wage was California. In November 2016, voters overwhelmingly approved a plan to raise the minimum wage in California from $10/hour to $15/hour in increments from 2017 to 2022.[8] The incremental raises were motivated by a desire to give low-income workers a raise, while not overburdening businesses with rapid cost of labor increases. California's plan should increase the purchasing power of households with minimum wage earners, as over time, the purchasing power of the minimum wage in California has been eroded by inflation as figure 1 shows below. Its purchasing power peaked in 1968.

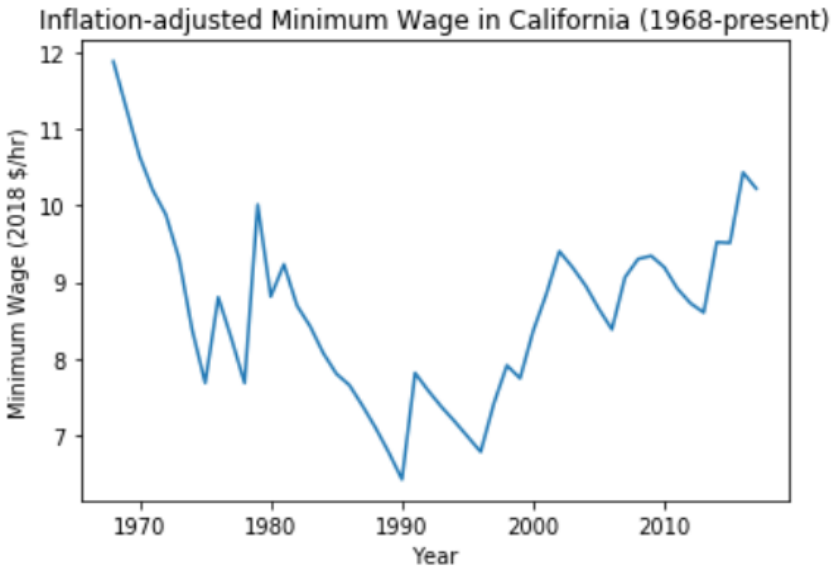


Figure 1

However, despite the increases in the minimum wage, California still has the highest poverty rate in the nation according to a Census Bureau report released in September.[10] At 19%, almost 1 in 5 Californians live in poverty, struggling to get by. This is largely due to the high costs of living in the state, as Californians pay some of the highest prices in the nation for housing, gasoline, food, and taxes.[11, 12, 13]

Furthermore, as Tables 1 and 2 show, the costs of living are not similar around the state. Using data scraped from the MIT Living Wage model,[4] which generates a living wage estimate for a family to meet the minimum costs of necessities such as food, childcare, housing, transportation, healthcare and other basic goods,[1] a pattern emerges of higher cost of living in urban counties with medium to large cities and lower costs of living in rural counties with smaller towns. This pattern is not isolated to the San Francisco Bay Area or the Los Angeles Metropolitan Area. For the average American household of 2 adults and 1 child, 1 adult would have to earn $26.49/hour working a full-time job for 40 hours a week to provide that household with a livable wage in Santa Barbara County, which is outside the Los Angeles metro area. That living wage rate is lower than in neighboring Ventura County and the same as in Los Angeles County, both of which are part of the Los Angeles metro area. In fact, in every county of the state, a worker would have to earn from $21 to $36 per hour to provide the average household with a livable wage according to the MIT Living Wage model.

Given that the minimum wage is only scheduled to rise to $15/hour by 2022, California's minimum wage plan does not provide households with a livable wage across the state, and in some counties, may not provide a livable wage to households with 2 adults working minimum wage jobs. A change of direction in minimum wage policy is needed to the generate socially optimal outcomes of lower adult and child poverty rates in California.

One possible way to do this would be to set minimum wage rates on the county level rather than on the state level. The idea behind this proposal is to account for cost of living differences across different areas of California, while setting wage rates to cover the market costs of living in various regions of the state. Intuitively, a worker's income will cover more expenses in Fresno, which has lower costs of living, than in San Francisco, with some of the highest costs of living in the nation.

To test this idea, I built a linear regression model, predicting the percent difference between a county's living wage and the state minimum wage using two variables. First, a variable for county-level poverty rates from 2016 and second, an indicator variable to denote whether a county was rural or urban using the federal government's definition of rural and urban counties.[5]

The results of the regression showed that a rural county with a high poverty rate should have a low percent difference, whereas a low-poverty, urban county should have a high percent difference. This regression result means that the booming urban areas of California are predicted to be expensive to live in, and that there is a higher difference between the state minimum wage and the estimated hourly wage a worker would have to make for a family to live a bare subsistence life above the poverty line in urban areas than in rural areas.

The regression results, as shown in figures 2 and 3, show that both variables, poverty rate and the urban/rural indicator variable, had statistically significant effects on the predicted percent difference between a county's living wage and the state minimum wage.

```
from sklearn.linear_model import LinearRegression
linreg = LinearRegression()
linreg = linreg.fit(cafeatures, y)
```

```
linreg.coef_
```

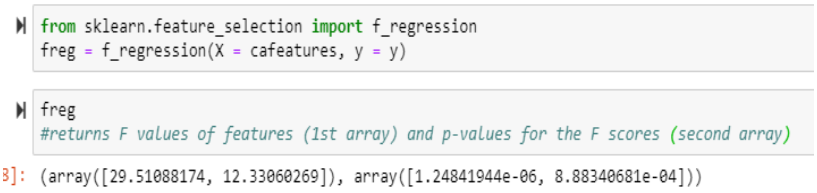
```
]: array([-3.72723883, 27.96158136])
```

```
linreg.intercept_
```

```
]: 164.78775148021242
```

Predicted Model: Percent_Difference(%) = −3.72723883 ∗ 2016_poverty_rate(%) + 27.96158136 ∗ Urban/Rural_Indicator_Variable + 164.78775148021242

Figure 2



```
from sklearn.feature_selection import f_regression
freg = f_regression(X = cafeatures, y = y)
```

```
freg
#returns F values of features (1st array) and p-values for the F scores (second array)
```

```
3]: (array([29.51088174, 12.33060269]), array([1.24841944e-06, 8.88340681e-04]))
```

Figure 3

On a policy level, the data in tables 1 and 2 show that the current minimum wage in California, as well as the scheduled increases, are insufficient for the minimum wage households in California to earn a livable wage, without the fear of living in poverty. Furthermore, the regression results confirm that the different counties of California would benefit from setting different minimum wage rates, as such a policy would have an appreciable effect in accounting for the different characteristics of the counties.

Setting minimum wage rates at the county level could conceivably reduce poverty rates across California by setting a livable wage for households to subsist on in their home counties, while not setting an unreasonably high rate for businesses that cannot afford to pay San Francisco wages to their employees in Bakersfield. County by county minimum wages would be

a more tailored approach to the problem of combatting poverty in California than a flat minimum wage across the state. Such a policy would go a long way to combatting the large problem of poverty in California.

Appendix

Citations

1. http://livingwage.mit.edu/resources/Living-Wage-User-Guide-and-Technical-Notes-2017.pdf

2. https://www.kaggle.com/lislejoem/us-minimum-wage-by-state-from-1968-to-2017

3. https://data.chhs.ca.gov/dataset/living-wage/resource/f5a57e7a-e0fe-4d80-b0f6-92d66ecb907f

4. http://livingwage.mit.edu/ (data scraped from this site for all CA counties for 2018.)

5. https://www.ers.usda.gov/webdocs/DataFiles/53180/25559_CA.pdf?v=0

6. https://scdd.ca.gov/wp-content/uploads/sites/33/2018/01/Exhbit-A-SCDD-2016-California-Poverty-Levels-by-County.pdf

7. https://www.epi.org/minimum-wage-tracker/

8. https://www.sacbee.com/news/politics-government/capitol-alert/article156853119.html

9. https://www.gao.gov/products/GAO-17-677

10. https://www.census.gov/content/dam/Census/library/publications/2018/demo/p60-265.pdf

11. https://www.usnews.com/news/best-states/articles/2018-06-20/the-10-states-with-the-highest-average-gas-prices

12. https://www.forbes.com/sites/samanthasharf/2017/11/28/full-list-americas-most-expensive-zip-codes-2017/#43a5230c5d19

13. https://www.epi.org/resources/budget/budget-map/

Tables

	county_name	livingwage	State Minimum Wage	Percent Difference (%)
9	Alameda	21.30	8	166.250
291	Alpine	17.92	8	124.000
379	Amador	19.00	8	137.500
493	Butte	17.43	8	117.875
716	Calaveras	17.43	8	117.875
924	Colusa	17.35	8	116.875
1009	Contra Costa	21.30	8	166.250
1535	Del Norte	17.26	8	115.750
1611	El Dorado	18.81	8	135.125
1750	Fresno	17.34	8	116.750
2199	Glenn	16.64	8	108.000
2250	Humboldt	17.81	8	122.625
2533	Imperial	17.38	8	117.250
2765	Inyo	16.98	8	112.250
3006	Kern	17.04	8	113.000
3679	Kings	16.98	8	112.250
3821	Lake	17.88	8	121.000
4036	Lassen	17.54	8	119.250
4087	Los Angeles	21.62	8	170.250
5676	Madera	17.49	8	118.625
5820	Marin	24.13	8	201.625
6184	Mariposa	17.92	8	124.000
6302	Mendocino	18.30	8	128.750
6447	Merced	17.04	8	113.000
6661	Modoc	17.10	8	113.750
6756	Mono	19.73	8	146.625
6819	Monterey	20.01	8	150.125
7177	Napa	21.10	8	163.750
7301	Nevada	19.39	8	142.375
7434	Orange	22.90	8	186.250
7921	Placer	18.81	8	135.125
8132	Plumas	17.69	8	121.125
8703	Riverside	19.32	8	141.500
9406	Sacramento	18.81	8	135.125
9734	San Benito	20.01	8	150.125
9801	San Bernardino	19.32	8	141.500
10342	San Diego	20.91	8	161.375
10959	San Francisco	24.13	8	201.625
10986	San Joaquin	18.13	8	126.625
11257	San Luis Obispo	19.70	8	146.250
11507	San Mateo	24.13	8	201.625
11886	Santa Barbara	20.43	8	155.375
12160	Santa Clara	21.75	8	171.875
12476	Santa Cruz	23.38	8	192.000
12765	Shasta	17.25	8	115.625
12997	Sierra	18.85	8	135.625
13055	Siskiyou	16.82	8	110.250
13317	Solano	20.07	8	150.875
13459	Sonoma	20.78	8	159.750
13805	Stanislaus	18.01	8	125.125
14133	Sutter	16.78	8	109.750
14215	Tehama	16.89	8	111.125
14363	Trinity	16.92	8	111.500
14448	Tulare	16.11	8	101.375
14629	Tuolumne	18.22	8	127.750
15104	Ventura	22.06	8	175.750
15363	Yolo	18.91	8	136.375
15472	Yuba	16.78	8	109.750

Table 1- 2010 data

	id	County Name	Wage per hour	State Minimum Wage	Percent Difference (%)
1	1	alameda	30.56	11.0	177.818182
2	2	alpine	21.83	11.0	98.454545
3	3	amador	22.92	11.0	108.363636
4	4	butte	22.34	11.0	103.090909
5	5	calaveras	21.97	11.0	99.727273
6	6	colusa	21.87	11.0	97.000000
7	7	contra costa	30.56	11.0	177.818182
8	8	del norte	22.12	11.0	101.090909
9	9	el dorado	23.08	11.0	109.818182
10	10	fresno	22.10	11.0	100.909091
11	11	glenn	21.38	11.0	94.181818
12	12	humboldt	23.01	11.0	109.181818
13	13	imperial	21.87	11.0	97.000000
14	14	inyo	22.04	11.0	100.363636
15	15	kern	21.82	11.0	98.363636
16	16	kings	21.55	11.0	95.909091
17	17	lake	22.29	11.0	102.636364
18	18	lassen	22.30	11.0	102.727273
19	19	los angeles	28.43	11.0	140.272727
20	20	madera	22.14	11.0	101.272727
21	21	marin	36.11	11.0	228.272727
22	22	mariposa	21.95	11.0	99.545455
23	23	mendocino	23.05	11.0	109.545455
24	24	merced	21.37	11.0	94.272727
25	25	modoc	20.75	11.0	88.636364
26	26	mono	24.09	11.0	119.000000
27	27	monterey	25.59	11.0	132.636364
28	28	napa	26.78	11.0	143.454545
29	29	nevada	24.88	11.0	126.181818
30	30	orange	28.19	11.0	156.272727
31	31	placer	23.08	11.0	109.818182
32	32	plumas	21.73	11.0	97.545455
33	33	riverside	24.14	11.0	119.454545
34	34	sacramento	23.08	11.0	109.818182
35	35	san benito	28.07	11.0	137.000000
36	36	san bernardino	24.14	11.0	119.454545
37	37	san diego	27.72	11.0	152.000000
38	38	san francisco	36.11	11.0	228.272727
39	39	san joaquin	22.63	11.0	105.727273
40	40	san luis obispo	24.88	11.0	126.181818
41	41	san mateo	36.11	11.0	228.272727
42	42	santa barbara	26.49	11.0	140.818182
43	43	santa clara	30.86	11.0	180.545455
44	44	santa cruz	28.29	11.0	157.181818
45	45	shasta	22.13	11.0	101.181818
46	46	sierra	23.84	11.0	116.727273
47	47	siskiyou	21.82	11.0	98.545455
48	48	solano	24.78	11.0	125.272727
49	49	sonoma	26.80	11.0	141.818182
50	50	stanislaus	22.44	11.0	104.000000
51	51	sutter	22.09	11.0	100.818182
52	52	tehama	21.68	11.0	97.090909
53	53	trinity	21.61	11.0	96.454545
54	54	tulare	22.01	11.0	100.090909
55	55	tuolumne	22.64	11.0	105.818182
56	56	ventura	27.85	11.0	153.181818
57	57	yolo	23.99	11.0	118.090909
58	58	yuba	22.09	11.0	100.818182

Table 2- 2018 data

Assumptions

1. Because the federal government assumes the typical family size is 2.54 people, living wage data displayed is for a 2 adult, 1 child family.

2. Because the California HHS dataset assumes this type of family has one worker, the living wage displayed is what one worker would need to make per hour in that county.

3. County living wage data was taken from the MIT Living Wage Calculator. Their definition of a living wage is: "a 'step up' from poverty as measured by the poverty thresholds". It accounts for the basic needs of a family. This means it is the minimum subsistence wage for persons living in the United States to live without public assistance and housing or food insecurity.