When working isn't *working*:

The case for a parent staying home with the kids

There are plenty of 2-parent families for whom it would make financial sense for the lower-earning parent to stay home with the children because childcare costs outweigh the second income. In cases where that is true, I sought to create a campaign that could empower a parent to embrace full-time parenting as a valuable and rewarding contribution to the family.

Re-evaluation of the family's financial situation is vital in families where having children has changed the dynamics of what makes sense. A family that decided to pursue two incomes when they had zero children should consciously consider whether their financial situation is significantly different now that they have children and whether forgoing a second income might also reduce expenses such that they would come out ahead.

Target Audience

My target audience is families that have two working parents and young children. In particular, I'm directing my message toward cases where the lower-earning parent's income is insufficient to justify incurring childcare expenses.

Media

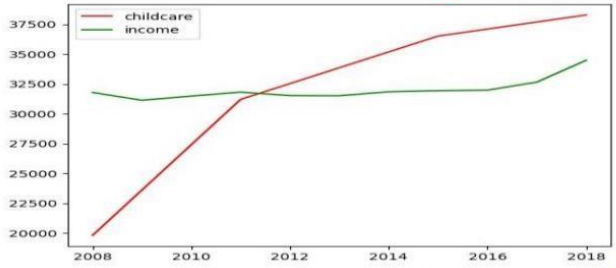
Billboard

I have made a billboard that points out that if your childcare cost exceeds the lower of the two incomes in a two-income family, you're not working to get ahead, you're literally "working to get behind." I envision it being posted on popular commuting thoroughfares in neighborhoods where statistics indicate that typical childcare costs may exceed a median income.

Tri-fold Handout

I have made a tri-fold handout that presents the reality that childcare can cost more than a working parent's salary. It values the positive influence that a stay-at-home parent has on the family finances. I envision it being distributed by/in food pantries, free medical clinics, and other places frequented by people who might be struggling to make ends meet.

When working isn't working…

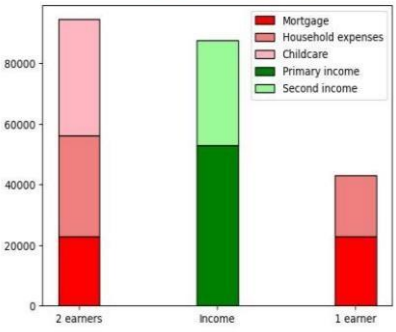


actual costs and median 2nd income for 2toddlers in daycare in Fairfield County, CT

IT'S SMART to stay home with the kids!

Flap

It's responsible for a parent to stay home with the kids instead of working to get behind.



Back

Call for more information

Would keeping one parent at home help your family finances?

How much is the difference, really?

How do I tell my spouse that I want to stay home?

How do I show my spouse that I respect and appreciate the decision to stay home?

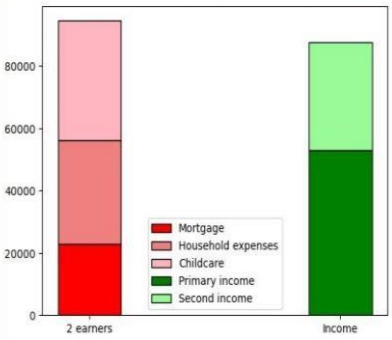
How do we make sure that neither spouse feels jealous?

Counseling and statistics available at

555-555-5555

Front

If the second income in your household doesn't cover childcare expenses...



Infographic

I have put together an infographic suitable for inclusion as a print ad or on a website aimed at people who might be in a situation where their income does not outpace the cost of childcare so they can use it to help justify changing to stay-at-home parenting. I envision making it available at (among other places) job fairs, where someone might be considering taking a job as a second income in their family without understanding the cost of childcare and the damage it might do to their financial situation.

Summary of Analysis

I initially narrowed the data set significantly, excluding (among other things) the race-related columns, the employment rates, the flags for the imputation methods for fields, and the 75th percentile information. I wanted to focus specifically on the mean incomes for men/women/households and the median childcare rates in their counties. I also only kept the most recent (2018) data because I wanted to look at how much a person/family needs to earn at a job for paid childcare to make financial sense.

I narrowed the data set even further to find only counties where the cost of 2 toddlers at a commercial daycare exceeds at least one of the mean incomes (either M or F). I was looking for examples of situations where it would make financial sense for a 2-child family to forgo the lower of its two incomes to avoid paying the cost of childcare.

Findings

There is a strong correlation between the median cost of childcare in a county and the median household income in that county. Childcare costs are high enough that it may take only 2 children in childcare before the costs outweigh the added income from a second parent working. In the median cases, it can make more financial sense for a parent to stay home with the family's child(ren) than to incur childcare costs.

I selected Fairfield County, CT, because the median household income is relatively high (almost $93k), and it is a large county (34k households and 94k people). I wanted a county with enough instances that it was unlikely one or two families would influence the means. I also wanted to find an affluent county because I think the general issue of being unable to out-earn childcare is often seen as a low-income problem. I attempted to make choices that might help remove stigma or counter incorrect stereotypes about stay-at-home parents.

Assumptions

I do not think I am consciously making any assumptions based on my message and my target audience. My conclusion would not necessarily work for every family, but I think that will be covered in the words I choose.

My calculations assume that the cost of 2 toddlers in childcare is twice that of 1 toddler in childcare. I am not accounting for the possibility that a facility might offer a discount for a second child from the same family. I find the assumption reasonable, I listed the source for my data, and I do not have the data to calculate a potential discount. Still, there is the possibility that my numbers would be slightly incorrect in the case where a discount is available.

Design Decisions

As noted above, I chose Fairfield County, CT, because it has a significant population and a high median income. For the project's purposes, I was pleased to quickly find a county where the cost of two toddlers in childcare was higher than one of the median incomes.

Billboard

I chose to use a picture of a parent bonding with children to demonstrate one of the non-financial benefits of staying home with the kids. I used red to emphasize the downside (rising childcare expenses and how it is "not working"). I used green to make staying home feel like a valid option, a "green light." I chose not to start the y-axis of my graph at zero to avoid a massive amount of empty space; since my focus is not so much the amount of growth as it is the comparison of childcare costs vs income, I do not think it is deceptive. (Aside: I was unpleasantly surprised to see the median income holding level over the last ten years while childcare costs nearly doubled.)

Tri-fold Handout

I chose green for income and red for expenses again, partly to continue the theme, partly because they feel intuitive, and partly to emphasize that I think incurring high childcare expenses for less income is detrimental to the person and the family. I chose pictures of frustrated people looking at bills and happy people with children to add an emotional component to the message. I maintained the line chart on the inside to communicate the message quickly but added bar charts on the flaps because people holding a handbill have more time to peruse it. The bar charts convey a significant amount of information about the proportions of a family income in an easily digestible format. Specifically, the stacked bar charts starkly compare childcare costs to the second income.

Infographic

I chose green for income and red for expenses for all the same reasons, partly to continue the theme, partly because they feel intuitive, and partly to emphasize that I think incurring high childcare expenses for less income is detrimental to the person and the family. I used stacked bar charts again, this time with overlay text and highlights on the shortfall and overage. The visual of the colored bars conveys the message quickly, while the overlay text provides more information that might encourage a viewer to investigate further. The orange highlights draw the eye, and the orange text succinctly communicates the most important part of the message.

Ethical Considerations

What changes were made to the data?

I did not make any changes to the data. I did pare down the data to keep enough to tell my story, but not enough to clutter the analysis.

Are there any legal or regulatory guidelines for your data or project?

I do not know of any legal or regulatory guidelines regarding the message I am sending. I was careful not to give any specific financial or investment guidance.

What risks could be created based on the transformations or how the visualizations are presented?

It is likely that my media would be viewed by people to whom it does not pertain, for example, a two-income family in which both incomes outpace the median childcare cost for their children. I suppose there is a risk that someone might feel justified in wanting to become a stay-at-home parent in such a situation, although it may still be a wise decision.

Did you make any assumptions in cleaning/transforming or when presenting the data? Did you filter any data without labeling or clearly identifying that the data was not included?

I pared down the dataset quite a bit but did not filter or exclude any relevant data. I added citations for the data used on all the graphics. I believe I treated the data fairly and ethically.

How was your data sourced/verified for credibility?
Was your data acquired in an ethical way?

The data that I included from allmortgagedetail.com and from the US Bureau of Labor website were taken directly from their publicly available web pages.

How would you mitigate any of the ethical implications you have identified?

My effort at mitigation was to add citations for the data that I used in my visualizations. I do not think any of my data was treated unfairly, but it is essential for someone viewing this data to know where it came from and what it depicts.

Lessons Learned

What would you do differently next time?

I do not think I would necessarily do anything differently, but I wanted to call out the value of making a first draft of the graphics. I had ideas in my head, and I was excited to try some new techniques, but the first draft showed me that my original plan did not work as well as I had hoped. I learned there is a lot of value in roughing something out and then looking at what does and does not work.

What did you enjoy the most?

I liked the creativity of designing and developing each medium into something with actual data behind it. It was genuinely exciting for me when I lined up all the data in a stacked bar graph and it told exactly the story I wanted to tell!

References

US Bureau of Labor. (2024, September 25). US Bureau of Labor Statistics. Consumer Expenditures–2023. https://www.bls.gov/news.release/cesan.nr0.htm

AllMortgageDetail. (n.d.). AllMortgageDetail.com. Fairfield County CT Mortgage Loan Application Totals and Details for 2018. https://www.allmortgagedetail.com/mortgages/fairfieldconnecticut.asp?yr=2018

Kellogg640TermProjectMilestone5b

November 11, 2024

[1]:
```
## Chris Kellogg
## DSC640-T301
## Term Paper Milestone 5

## Appendix
```

[2]:
```
# import and alias pandas
import pandas as pd

# import and alias numpy
import numpy as np

# import and alias the plotting package
import matplotlib.pyplot as plt

# import packages for suppressing warnings
import re
import warnings
```

[3]:
```
# suppress warnings
with warnings.catch_warnings():
    warnings.filterwarnings(
        'ignore',
        category = UserWarning,
        module = re.escape('openpyxl.styles.stylesheet')
    )

# read in the pristine data from the spreadsheet
df_pristine = pd.read_excel('nationaldatabaseofchildcareprices.xlsx')
```

[4]:
```
# create a copy, leaving the pristine data intact (just in case)
df = df_pristine.copy()

df
```

[4]:

	State_Name	State_Abbreviation	County_Name	County_FIPS_Code	\
0	Alabama	AL	Autauga County	1001	
1	Alabama	AL	Autauga County	1001	
2	Alabama	AL	Autauga County	1001	
3	Alabama	AL	Autauga County	1001	

```
4       Alabama              AL Autauga County          1001

…         …                …            …              …

34562   Wyoming              WY Weston County           56045

34563   Wyoming              WY Weston County           56045

34564   Wyoming              WY Weston County           56045

34565   Wyoming              WY Weston County           56045

34566   Wyoming              WY Weston County           56045

      StudyYear UNR_16 FUNR_16 MUNR_16 UNR_20to64 FUNR_20to64 … \
0          2008   5.42    4.41    6.32        4.6         3.5 …
1          2009   5.93    5.72    6.11        4.8         4.6 …
2          2010   6.21    5.57    6.78        5.1         4.6 …
3          2011   7.55    8.13    7.03        6.2         6.3 …
4          2012   8.60    8.88    8.29        6.7         6.4 …
…          …     …      …      …         …          … …

34562      2014   3.60    5.36    2.28        2.4         4.8 …
34563      2015   5.16    7.86    3.16        4.2         7.6 …
34564      2016   3.61    4.67    2.79        3.4         4.5 …
34565      2017   2.24    2.64    1.95        2.3         2.8 …
34566      2018   3.54    2.86    4.04        3.7         2.8 …
      MFCCToddler MFCCToddler_flag MFCCPreschool MFCCPreschool_flag
      \
0           83.45             3.0         81.40              1.0

1           87.39             3.0         85.68              1.0

2           91.33             3.0         89.96              1.0

3           95.28             3.0         94.25              1.0

4           99.22             3.0         98.53              1.0

…           …               …           …                 …

34562      110.71             1.0        111.47              1.0

34563      110.89             1.0        110.89              1.0

34564      111.07             1.0        110.31              1.0

34565      111.26             1.0        109.74              1.0

34566      111.44             1.0        109.16              1.0

 _75FCCInfant _75FCCInfant_flag _75FCCToddler _75FCCToddler_flag \
```

0	97.40	1.0	97.40	3.0
1	102.00	1.0	102.00	3.0
2	106.60	1.0	106.60	3.0
3	111.20	1.0	111.20	3.0
4	115.80	1.0	115.80	3.0
…	…	…	…	…
34562	129.22	3.0	129.22	1.0
34563	129.43	1.0	129.43	1.0
34564	133.17	3.0	129.64	1.0
34565	136.91	3.0	129.85	1.0
34566	140.64	3.0	130.06	1.0

	_75FCCPreschool	_75FCCPreschool_flag
0	95.00	1.0
1	100.00	1.0
2	105.00	1.0
3	110.00	1.0
4	115.00	1.0
…	…	…
34562	130.11	1.0
34563	129.43	1.0
34564	128.75	1.0
34565	128.08	1.0
34566	127.40	1.0

[34567 rows x 227 columns]

[5]:
```
##
## focus on the data we want to keep
##

# cut the data set down to only the most recent year
df = pd.DataFrame(df.query('StudyYear == 2018'))

# get the annual cost of each type of childcare
df['MCInfant_52'] = df.MCInfant * 52
df['MCToddler_52'] = df.MCToddler * 52
df['MCPreschool_52'] = df.MCPreschool * 52
df['MFCCInfant_52'] = df.MFCCInfant * 52
df['MFCCToddler_52'] = df.MFCCToddler * 52
df['MFCCPreschool_52'] = df.MFCCPreschool * 52

# keep only the columns we want
df = pd.DataFrame(df[[
    'State_Name',
    'State_Abbreviation',
    'County_Name',
    'County_FIPS_Code',
    'StudyYear',
    'MHI',
    'FME',
    'MME',
    'MCInfant_52',
    'MCToddler_52',
    'MCPreschool_52',
    'MFCCInfant_52',
    'MFCCToddler_52',
    'MFCCPreschool_52',
    'TotalPop',
    'Households',
    'MCInfant',
    'MCToddler',
    'MCPreschool',
    'MFCCInfant',
    'MFCCToddler',
    'MFCCPreschool'
]])

df
```

[5]:

	State_Name	State_Abbreviation	County_Name	County_FIPS_Code	\

```
10      Alabama              AL   Autauga County           1001
21      Alabama              AL   Baldwin County           1003
32      Alabama              AL   Barbour County           1005
43      Alabama              AL      Bibb County           1007
54      Alabama              AL    Blount County           1009
…         …                  …              …              …
34522   Wyoming              WY Sweetwater County          56037
34533   Wyoming              WY     Teton County           56039
34544   Wyoming              WY     Uinta County           56041
34555   Wyoming              WY   Washakie County          56043
34566   Wyoming              WY    Weston County           56045

      StudyYear    MHI     FME    MME MCInfant_52 MCToddler_52 … \
10         2018 58786.0 26243.0 43273.0     6261.32     6261.32
                                                              …
21         2018 55962.0 25308.0 39793.0     6261.32     6261.32
                                                              …
32         2018 34186.0 20396.0 30610.0     4482.40     4482.40
                                                              …
43         2018 45340.0 22416.0 34771.0     5451.16     5451.16
                                                              …
54         2018 48695.0 27579.0 40197.0     9260.16     9260.16
                                                              …
…          …      …      …      …          …           … …
34522      2018 73008.0 22290.0 53987.0     7235.80     6524.44
                                                              …
34533      2018 83831.0 34836.0 42172.0    20751.12    19022.64
                                                             …
34544      2018 58235.0 19981.0 50102.0     5625.36     5071.04
                                                              …
34555      2018 53426.0 22195.0 32632.0     5760.04     5196.88
                                                              …
34566      2018 52867.0 24406.0 41619.0     6561.36     5924.36
                                                              …
      MFCCToddler_52 MFCCPreschool_52 TotalPop Households MCInfant \
10          5569.20         5509.92    55200      21115   120.41
21          5643.56         5643.56   208107      78622   120.41
32          4247.36         4009.72    25782       9186    86.20
```

43	4529.72	4529.72	22527	6840	104.83	
54	5825.04	5825.04	57645	20600	178.08	
…	…	…	…	…	…	
34522	6358.04	6225.44	44117	15871	139.15	
34533	19568.64	17229.68	23059	9158	399.06	
34544	4965.48	4861.48	20609	7735	108.18	
34555	5085.60	4980.56	8129	3422	110.77	
34566	5794.88	5676.32	7100	3062	126.18	

	MCToddler	MCPreschool	MFCCInfant	MFCCToddler	MFCCPreschool
10	120.41	101.50	107.10	107.10	105.96
21	120.41	111.23	107.96	108.53	108.53
32	86.20	81.75	81.68	81.68	77.11
43	104.83	101.50	87.11	87.11	87.11
54	178.08	158.84	108.86	112.02	112.02
…	…	…	…	…	…	
34522	125.47	113.29	132.42	122.27	119.72
34533	365.82	358.00	430.94	376.32	331.34
34544	97.52	88.00	103.45	95.49	93.49
34555	99.94	90.33	105.85	97.80	95.78
34566	113.93	103.10	120.50	111.44	109.16

[3142 rows x 22 columns]

[6]:
```
##
## drop columns that aren't needed and look for correlations
##

df_corr = df.drop(columns = [
    'State_Name',
    'State_Abbreviation',
    'County_Name',
    'County_FIPS_Code',
    'StudyYear',
    'MCInfant',
    'MCToddler',
    'MCPreschool',
    'MFCCInfant',
    'MFCCToddler',
    'MFCCPreschool'
])

df_corr.corr()
```

[6]:

	MHI	FME	MME	MCInfant_52	MCToddler_52	\
MHI	1.000000	0.747717	0.813285	0.680092	0.669691	
FME	0.747717	1.000000	0.683570	0.591312	0.573394	
MME	0.813285	0.683570	1.000000	0.474237	0.476316	
MCInfant_52	0.680092	0.591312	0.474237	1.000000	0.958257	
MCToddler_52	0.669691	0.573394	0.476316	0.958257	1.000000	
MCPreschool_52	0.671002	0.577993	0.471239	0.953884	0.970887	
MFCCInfant_52	0.655517	0.541999	0.453444	0.911561	0.881594	
MFCCToddler_52	0.651663	0.537236	0.455717	0.911367	0.897597	
MFCCPreschool_52	0.648655	0.533776	0.452189	0.909545	0.887383	
TotalPop	0.258904	0.288638	0.163336	0.404103	0.367793	
Households	0.265374	0.306860	0.173543	0.419571	0.387273	

	MCPreschool_52	MFCCInfant_52	MFCCToddler_52	\
MHI	0.671002	0.655517	0.651663	
FME	0.577993	0.541999	0.537236	
MME	0.471239	0.453444	0.455717	
MCInfant_52	0.953884	0.911561	0.911367	
MCToddler_52	0.970887	0.881594	0.897597	
MCPreschool_52	1.000000	0.881643	0.893245	
MFCCInfant_52	0.881643	1.000000	0.975008	
MFCCToddler_52	0.893245	0.975008	1.000000	
MFCCPreschool_52	0.893301	0.963800	0.985433	
TotalPop	0.365770	0.357877	0.360175	

```
Households           0.383225     0.370015      0.373172

                 MFCCPreschool_52 TotalPop Households
MHI                      0.648655 0.258904   0.265374
FME                      0.533776 0.288638   0.306860
MME                      0.452189 0.163336   0.173543
MCInfant_52              0.909545 0.404103   0.419571
MCToddler_52             0.887383 0.367793   0.387273
MCPreschool_52           0.893301 0.365770   0.383225
MFCCInfant_52            0.963800 0.357877   0.370015
MFCCToddler_52           0.985433 0.360175   0.373172
MFCCPreschool_52         1.000000 0.348447   0.360139
TotalPop                 0.348447 1.000000   0.996094
Households               0.360139 0.996094   1.000000
```

[7]:
```
# find the counties where the cost of 2 toddlers at daycare
# is greater than one of the mean incomes
df.query("2 * MCToddler_52 > FME").head(12)
```

[7]:

	State_Name	State_Abbreviation	County_Name	County_FIPS_Code	StudyYear	MHI	FME	MME	MCInfant_52	MCToddler_52	…	MFCCToddler_52	MFCCPreschool_52	TotalPop
802	Alaska	AK	Denali Borough	2068	2018	84196.0	18194.0	35234.0	17483.96					
1021	Alaska	AK	Valdez-Cordova Census Area	2261	2018	82306.0	27363.0	53567.0	18036.20					
2506	California	CA	Santa Barbara County	6083	2018	71657.0	23560.0	32349.0	17840.68					
2671	California	CA	Yolo County	6113	2018	65923.0	24213.0	37223.0	17454.32					
3397	Connecticut	CT	Fairfield County	9001	2018	92969.0	34473.0	53085.0	19136.00					
3463	Connecticut	CT	Tolland County	9013	2018	84916.0	30594.0	49931.0	15964.00					
6026	Hawaii	HI	Honolulu County	15003	2018	82906.0	32366.0	42305.0	17999.80					
6268	Idaho	ID	Custer County	16037	2018	39957.0	16292.0	34188.0	9348.04					
6422	Idaho	ID	Madison County	16065	2018	36031.0	7336.0	15577.0	5649.80					
6455	Idaho	ID	Oneida County	16071	2018	51058.0	12356.0	41932.0	6917.04					
6752	Illinois	IL	DeKalb County	17037	2018	61086.0	20234.0	35029.0	14820.00					
13407	Massachusetts	MA	Berkshire County	25003	2018	56674.0	27766.0	37293.0	15184.00					

```
802       16829.80 …          NaN            NaN     2232
1021      14519.96 …          NaN            NaN     9301
2506      12784.72 …     10047.96       10047.96   443738
2671      12475.32 …     10147.80       10147.80   214977
3397      19136.00 …     12688.00       12688.00   944348
3463      15964.00 …     10088.00       10088.00   151269
6026      17999.80 …      9600.24        9600.24   987638
6268       8639.80 …      7055.88        6660.16     4141
6422       5392.92 …      4800.12        4651.40    38705
6455       6419.92 …      5400.20        5136.04     4326
6752      12480.00 …      8551.40        7779.20   104200
13407     14040.00 …      9620.00        9360.00   127328
   Households MCInfant MCToddler MCPreschool MFCCInfant MFCCToddler \
802           639   336.23    323.65     296.08       NaN         NaN
1021         3093   346.85    279.23     219.23       NaN         NaN
2506       144962   343.09    245.86     245.86    214.20      193.23
2671        73510   335.66    239.91     239.91    215.46      195.15
3397       340491   368.00    368.00     294.00    251.00      244.00
3463        55232   307.00    307.00     244.00    200.00      194.00
6026       311525   346.15    346.15     226.15    184.62      184.62
6268         1761   179.77    166.15     148.15    142.62      135.69
6422        10625   108.65    103.71      96.79     98.77       92.31
6455         1585   133.02    123.46     113.58    115.38      103.85
6752        37703   285.00    240.00     212.50    176.50      164.45
13407       55167   292.00    270.00     206.70    200.00      185.00
      MFCCPreschool
802             NaN
1021            NaN
2506         193.23
2671         195.15
3397         244.00
3463         194.00
6026         184.62
6268         128.08
6422          89.45
6455  98.77 6752
 149.60
13407        180.00
```

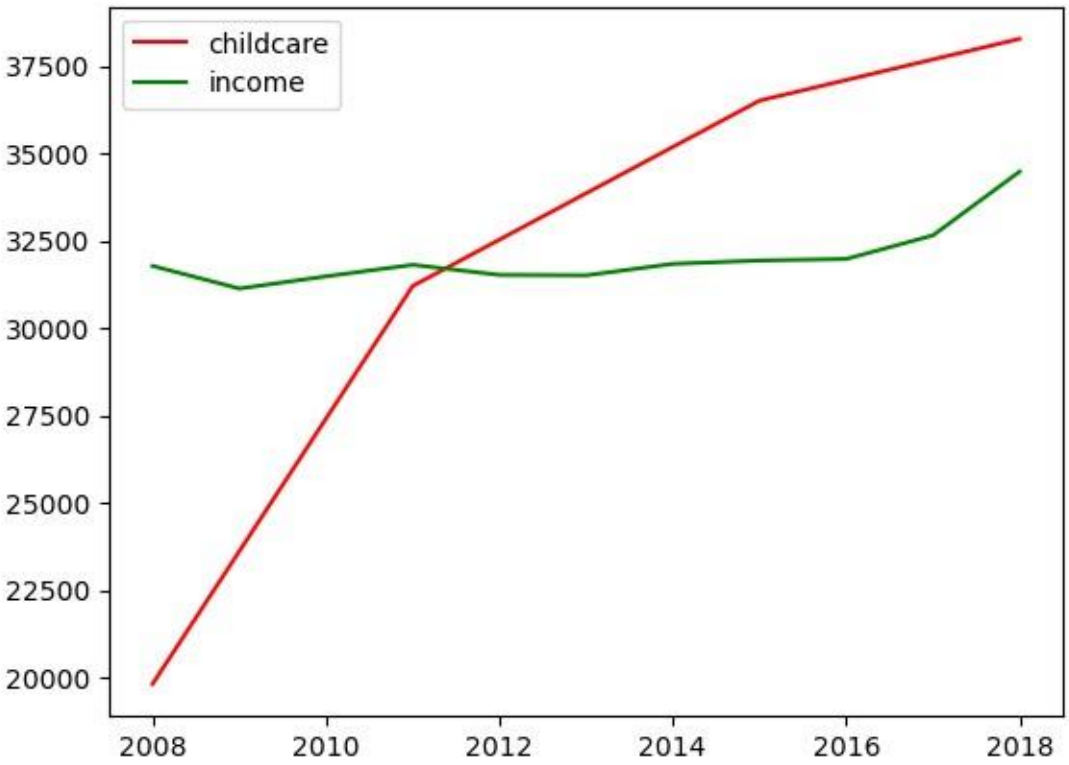
```
[12 rows x 22 columns]
```

[8]:
```python
# choose Fairfield County, CT
# the median household income is quite high (almost $93k)
# it's a very large county (34k households and 94k people)
df2 = df_pristine
df2 = pd.DataFrame(df2.query("County_FIPS_Code == 9001"))

# calculate the annual cost of a toddler in childcare
df2['MCToddler_52'] = df2.MCToddler * 52

# drop the clutter
df2 = pd.DataFrame(df2[[
    'State_Name',
    'State_Abbreviation',
    'County_Name',
    'County_FIPS_Code',
    'StudyYear',
    'MHI',
    'FME',
    'MME',
    'MCToddler_52',
    'TotalPop',
    'Households'
]])

df2
```

[8]:
```
       State_Name State_Abbreviation       County_Name  County_FIPS_Code  \
3387  Connecticut                 CT  Fairfield County              9001
3388  Connecticut                 CT  Fairfield County              9001
3389  Connecticut                 CT  Fairfield County              9001
3390  Connecticut                 CT  Fairfield County              9001
3391  Connecticut                 CT  Fairfield County              9001
3392  Connecticut                 CT  Fairfield County              9001
3393  Connecticut                 CT  Fairfield County              9001
3394  Connecticut                 CT  Fairfield County              9001
3395  Connecticut                 CT  Fairfield County              9001
3396  Connecticut                 CT  Fairfield County              9001
3397  Connecticut                 CT  Fairfield County              9001
      StudyYear     MHI      FME     MME MCToddler_52 TotalPop Households
3387       2008 83492.0 31774.0 51325.0      9906.00   892046     324630
3388       2009 81114.0 31127.0 50249.0     11804.00   892843     325920
3389       2010 81268.0 31475.0 51125.0     13702.00   905342     331782
3390       2011 82558.0 31806.0 51735.0     15600.00   911196     332139
3391       2012 82614.0 31517.0 51830.0     16263.00   918892     332968
3392       2013 82283.0 31505.0 51099.0     16926.00   926233     332655
```

```
3393      2014  83163.0  31833.0  51065.0     17589.00   934215     333502
3394      2015  84233.0  31929.0  50886.0     18252.00   939983     334320
3395      2016  86670.0  31973.0  51235.0     18546.84   941618     335209
3396      2017  89773.0  32647.0  51368.0     18841.16   947328     337678
3397      2018  92969.0  34473.0  53085.0      19136.00   944348     340491
```

[9]:
```
##
## for the billboard and the inside of the tri-fold
## plot the changes in the second income vs childcare costs over time
##

# plot the childcare line
plt.plot(
    df2.StudyYear,
    2 * df2.MCToddler_52,
    color = 'red',
    label = 'childcare'
)

# plot the income line of the lower mean income
plt.plot(
    df2.StudyYear,
    df2.FME,
    color = 'green',
    label = 'income'
)

# add the legend
plt.legend()

# display the graphic
plt.show()
```

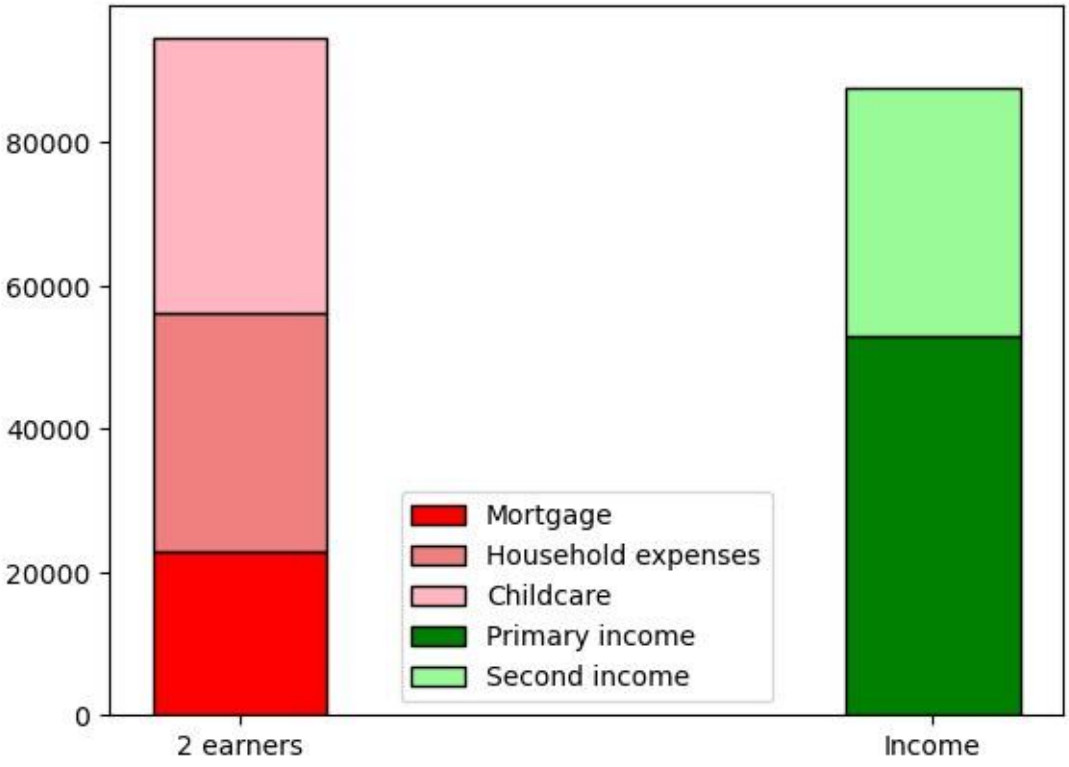


[10]:
```
##
## for the front of the tri-fold
## plot the comparison of income vs costs for two
earners ##

# get data for only the most recent year
df3 = pd.DataFrame(df2.query("StudyYear ==
2018"))

# set the average monthly mortgage payment in Fairfield County, CT
# -- assumes a 6% mortgage rate
# -- use the average mortgage application amount in the county =
$400k
# https://www.allmortgagedetail.com/mortgages/fairfield-
connecticut.asp?yr=2018 avg_monthly_pmt = 1918

# set the average consumer expenditure amount for food, insurance,
# healthcare, and entertainment, according to US Bureau of Labor
# https://www.bls.gov/news.release/cesan.nr0.htm
avg_expense_pct = 0.38
```

```
# calculate the value for income and expense bars
main_income = df3.MME
second_income = df3.FME
```

```
income_joint = df3.MME + df3.FME
income_single = df3.MME
annual_mortgage = 12 * avg_monthly_pmt
expenses_joint = round(avg_expense_pct * income_joint)
expenses_single = round(avg_expense_pct * income_single)
childcare = 2 * df3.MCToddler_52

# plot bars in stacks
bar_width = 0.25
plt.bar(
    '2 earners',
    annual_mortgage,
    color = 'red',
    width = bar_width,
    edgecolor = 'black',
    label = 'Mortgage'
)
plt.bar(
    '2 earners',
    expenses_joint,
    color = 'lightcoral',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage,
    label = 'Household expenses'
)
plt.bar(
    '2 earners',
    childcare,
    color = 'lightpink',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage + expenses_joint,
    label = 'Childcare'
)
plt.bar(
    'Income',
    df3.MME,
    color = 'green',
    width = bar_width,
    edgecolor = 'black',
    label = 'Primary income'
)
plt.bar(
    'Income',
    df3.FME,
    color = 'palegreen',
```

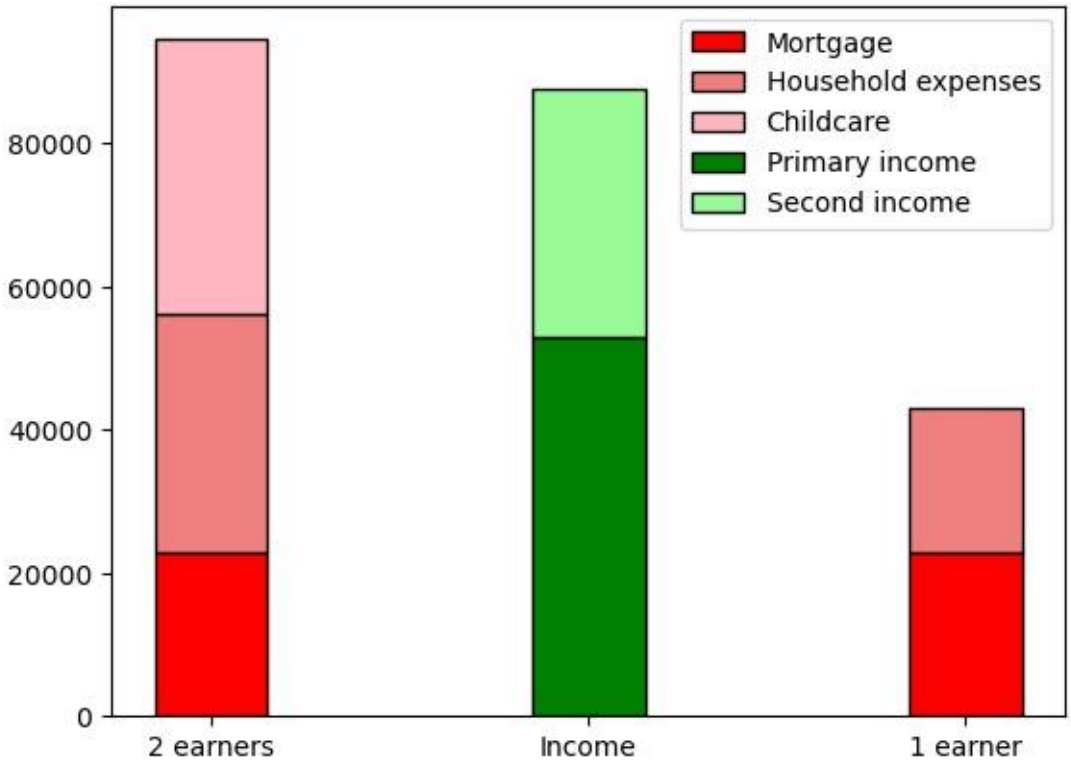
```
    width = bar_width,
    edgecolor = 'black',
    bottom = df3.MME,
    label = 'Second income'
)

# add the legend
plt.legend()

# display the graphic
plt.show()
```



[11]:
```
##
## for the front of the tri-fold
## plot the comparison of income vs costs for two earners and one earner
##

# plot bars in stacks
bar_width = 0.3
plt.bar(
    '2 earners',
    annual_mortgage,
```

```
    color = 'red',
    width = bar_width,
    edgecolor = 'black',
    label = 'Mortgage'
)
plt.bar(
    '2 earners',
    expenses_joint,
    color = 'lightcoral',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage,
    label = 'Household expenses'
)
plt.bar(
    '2 earners',
    childcare,
    color = 'lightpink',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage + expenses_joint,
    label = 'Childcare'
)
plt.bar(
    'Income',
    df3.MME,
    color = 'green',
    width = bar_width,
    edgecolor = 'black',
    label = 'Primary income'
)
plt.bar(
    'Income',
    df3.FME,
    color = 'palegreen',
    width = bar_width,
    edgecolor = 'black',
    bottom = df3.MME,
    label = 'Second income'
)
plt.bar(
    '1 earner',
    annual_mortgage,
    color = 'red',
    width = bar_width,
    edgecolor = 'black'
)
```

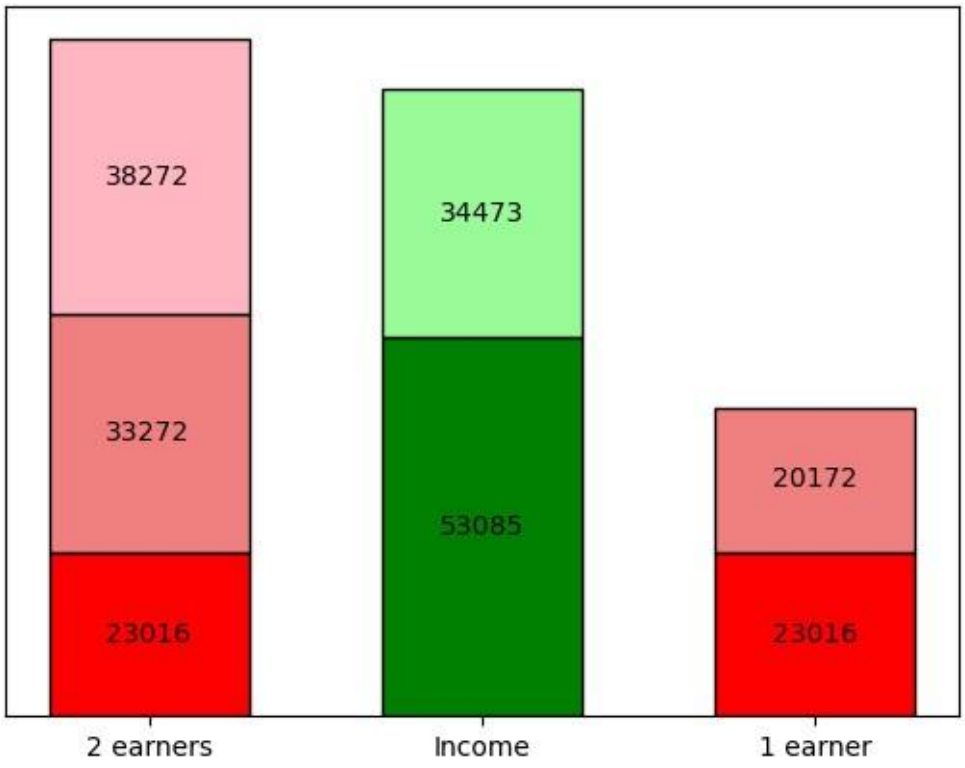
```
plt.bar(
    '1 earner',
    expenses_single,
    color = 'lightcoral',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage
)

# add the legend
plt.legend()

# display the graphic
plt.show()
```



[12]:
```
##
## for the infographic
## plot the comparison of income vs costs for two earners and one earner
##

# plot bars in stacks
bar_width = 0.6
```

```
# collect the subplots into a single graphic
fig, ax = plt.subplots()

# plot the annual mortgage for two earners and label it
p = ax.bar(
    '2 earners',
    annual_mortgage,
    color = 'red',
    width = bar_width,
    edgecolor = 'black',
    label = 'Mortgage'
)
ax.bar_label(p, label_type='center')

# plot the annual mortgage for two earners and label it
p = ax.bar(
    '2 earners',
    expenses_joint,
    color = 'lightcoral',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage,
    label = 'Household expenses'
)
ax.bar_label(p, label_type='center')

# plot the annual mortgage for two earners and label it
p = ax.bar(
    '2 earners',
    childcare,
    color = 'lightpink',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage + expenses_joint,
    label = 'Childcare'
)
ax.bar_label(p, label_type='center')

# plot the annual mortgage for two earners and label it
p = ax.bar(
    'Income',
    df3.MME,
    color = 'green',
    width = bar_width,
    edgecolor = 'black',
    label = 'Primary income'
```

```
)
ax.bar_label(p, label_type='center')

# plot the annual mortgage for two earners and label it
p = ax.bar(
    'Income',
    df3.FME,
    color = 'palegreen',
    width = bar_width,
    edgecolor = 'black',
    bottom = df3.MME,
    label = 'Second income'
)
ax.bar_label(p, label_type='center')

# plot the annual mortgage for two earners and label it
p = ax.bar(
    '1 earner',
    annual_mortgage,
    color = 'red',
    width = bar_width,
    edgecolor = 'black')
ax.bar_label(p, label_type='center')

# plot the annual mortgage for two earners and label it
p = ax.bar(
    '1 earner',
    expenses_single,
    color = 'lightcoral',
    width = bar_width,
    edgecolor = 'black',
    bottom = annual_mortgage
)
ax.bar_label(p, label_type='center')

# hide the y-axis
plt.yticks([])

# display the graphic
plt.show()
```


38272
33272
23016
34473
53085
20172
23016
2 earners
Income
1 earner