Examining family finances by marital status in Utah

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This purpose of this statistical analysis:

The purpose of this statistical analysis is to examine the financial situations of non-marital cohabiting households with children under 18 and married couple households with children under 18. The analysis will focus on comparing these households based on the following variables: income-to-poverty ratio, household income in the last 12 months, and public assistance income in the last 12 months.

Variables and explanations:

Comparing married and unmarried households with children seeks to investigate the degree of importance marriage has in family financial wellbeing.

Poverty-to-income ratio:

Comparing household types using the income-to-poverty ratio helps compare economic conditions between married vs. unmarried households. This analysis can highlight which groups are more financially vulnerable, and show the impact of marital status on child poverty.

Household income in the last 12 months:

Comparing household types based on household income in the last 12 months reveals financial differences between married vs. unmarried households. This helps assess economic stability, the impact of marital status on child-rearing costs.

Public Assistance income in the last 12 months:

Comparing household types based on public assistance income in the last 12 months shows which groups are more reliant on government support, such as married vs. unmarried households on this occasion. This is a key indicator for determining trends between self-sufficiency and marital decisions.

Independent variable(s): Household type (Married households with children, and cohabiting unmarried households with children)
Dependent variables: Poverty-to-income ratio, household income in the last 12 months, and public assistance income in the last 12 months.

Data:

This data is collected from the U.S. Census Bureau, ACS 1-Year Estimates Public Use Microdata Sample (2022). This is only data for the State of Utah. This statistical analysis was run with the household weight variable accounted for, to ensure reliability and accuracy.

Hypotheses:

Hypothesis (H^1): Married households with children have significantly higher income levels than cohabiting households with children.
Null Hypothesis (H^{1A}): There is no significant difference in income levels between married households with children and cohabiting households with children.
Hypothesis (H^2): Married households with children have significantly higher income-to-poverty ratios than cohabiting households with children.
Null Hypothesis (H^{2A}): There is no significant difference in income-to-poverty ratios between married households with children and cohabiting households with children.
Hypothesis (H^3): Married households with children have significantly lower public assistance income than cohabiting households with children.
Null Hypothesis (H^{3A}): There is no significant difference in public assistance income between married households with children and cohabiting households with children.

Descriptive Statistics:

Married Households with Children:

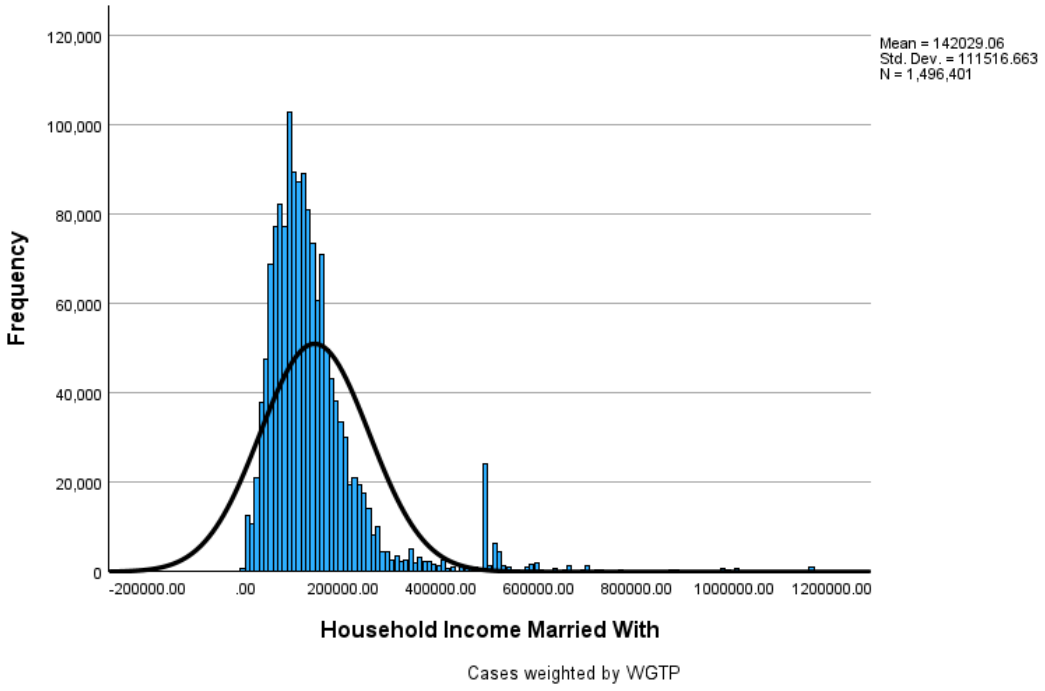
Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean		Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error
PublicAssistance_Income_Last12Months	1496401	-1	22800	13042405	8.72	.254	311.037	50.221	.002
Household Income Married With	1496401	-4000.00	1160000.00	2.13E+11	142029.0647	91.16240	111516.66271	3.085	.002
Income_Poverty_Ratio	1496401	-1	501	506855632	338.72	.113	138.458	-.371	.002
Valid N (listwise)	1496401								

Income-Poverty-Ratio:
We find that the mean income poverty ratio for married households with children is 338.72, meaning married households with children average 3.38 times higher than the federal poverty line. The standard deviation for this is 138.458, meaning most households will fall outside of the federal poverty line. In fact, we can estimate that roughly 90-95% of married households with children are above the federal poverty line. The skewness of -0.371 indicates that there is a

small proportion of households with lower ratios, indicating this proportion of people is pulling the distribution to lower levels, however, the skewness is not extreme, with only a slight bias.

Household Income in the last 12 months:
The mean household income is $142,029.06. This is a good number, and indicates that on average these households are doing well. However, the standard deviation of $111,516.66 shows a high degree of variability in household incomes among these households. We can recognize this in relation to the skewness and see that there is a small number of household earners that have significantly higher incomes, pulling these numbers to higher levels. We are still able to estimate that about 68% of households in this income bracket fall between $30,512.40 and $253,545.72, which is relatively reasonable. Although this does seem concerning, the median household income is $118,500 which provides a bit more statistical clarity on the situation.



Public Assistance Income in the last 12 months:
The mean of the public assistance income in the last 12 months is $8.72, suggesting most households received little to no public assistance in the last year. The standard deviation is extremely large compared to the mean, demonstrating a wide variation in public assistance income received by households. A skewness of 50.221 is an extreme positive screw, and means

most households received very little or no public assistance, and a small number of households received very large amounts, pulling the distribution to the right. This is over 10X the skewness we see in a statistically “eyebrow-raising” income analysis. The median public assistance income in the last 12 months is $0. We can gather more statistical clarity by dividing this by percentiles. At 50%, and it shows the different values and how many people belonged to those different value groups. It was determined that 3,283 married households with children received some sort of public assistance income. Although, it is important to note that 615,575 values, or 41.1% were at -1, the purpose of this is unclear, and likely is used to fill a missing value, thus the data seems to be incomplete.

Cohabiting Households with Children:

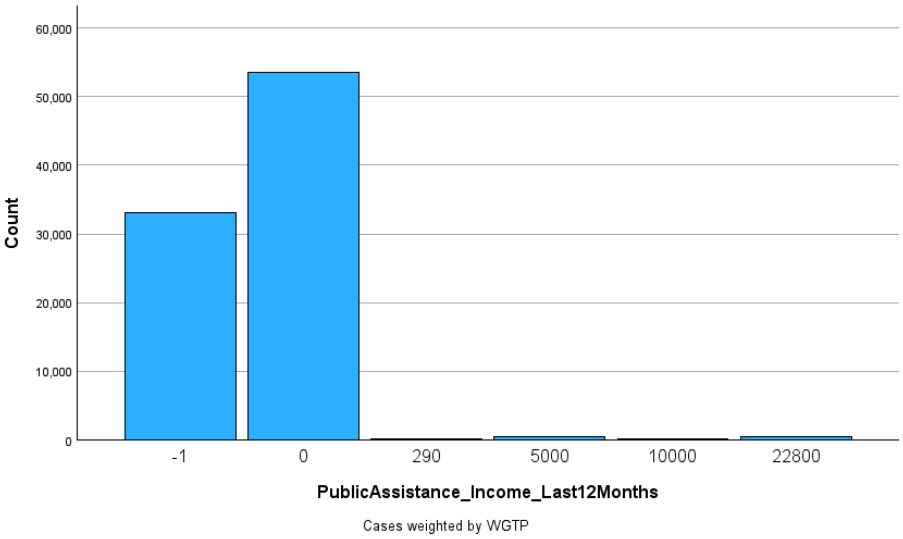
Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean		Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error
PublicAssistance_Income_Last12Months	87548	-1	22800	12778656	145.96	5.637	1667.945	12.748	.008
Household Income	87548	6000.00	972000.00	10009611676	114332.8423	318.64964	94283.68430	4.190	.008
Income_Poverty_Ratio	87548	-1	501	19578329	223.63	.523	154.767	.346	.008
Valid N (listwise)	87548								

Income-to-poverty ratio:
Based on the mean, the average cohabiting family with children is 223.63% of the federal poverty line, and earn about 2.23 times more than this threshold. The standard deviation is 154.767 indicating these ratios vary quite a bit in these households. Based on this information, we are able to estimate that 85%-90% of cohabiting households with children fall above the federal poverty line, a pretty good number! A skewness of 0.346 indicates that there is a slightly positively skewed distribution, with a few households pulling the numbers to the higher end, but it is a fairly symmetrical skew, with only a slight bias.

Household income in the last 12 months:
The mean household income is $114,332.84, indicating reasonably strong earning levels for cohabiting households. With a standard deviation of $94,283.68 high variability is common among these households. The skewness is 4.190, demonstrating extreme positive skewness, with a small number of households having very high earnings, bringing these numbers up. The skewness and large standard deviation are concerns for this, so it is important to determine the median to get a more accurate understanding of the income situation. Using the same method as before, a median of $92,000 demonstrates a better understanding of where the average earner in this bracket might be. We can estimate that 68% of the population has an income between $20,049.16 and $208,616.52.

Public assistance income in the last 12 months:
On average, we see that cohabiting families with children receive $145.96 per month. This is only an average, as other statistics here bring important observations, as the standard deviation is extremely large compared to the mean, and demonstrates incredibly high levels of variability in public assistance income in the last 12 months. A skewness of 12.748 shows extreme positive skewness, and suggests that there is a small number of households in this data collection that receive a very large amount of public assistance in this population. The median public assistance income in the last 12 months for cohabiting households with children is $0, demonstrating a high degree of skew in this distribution. 942 households received the whole of this population's public assistance income in the last 12 months. 37.8% of respondents had a value of -1, potentially indicating missing data.



Comparison:

Comparing these two populations across these variables, we will begin to look into the insights that will allow us to test the three original hypotheses: this comparison will be broken down by each of the three dependent variables, and comparing the two independent variables.

Income-to-poverty ratio:

The mean for income to poverty ratio in married households with children is 338.72, compared to 223.63 for cohabiting households with children. This means that married households will have about a 50% higher income-to-poverty ratio than cohabiting households with children,

suggesting that there is a lesser degree of poverty in the married households with children population. It is also notable that there is a smaller standard error of the mean for married households with children than cohabiting households with children.
The standard deviation for married households with children is 138.458, while it is 154.767 for cohabiting households with children. This suggests that although similar, there is a higher level of volatility and variation in cohabiting households with children. From this, we are also able to estimate that 90%-95% of married households with children fall within the federal poverty line, and 85%-90% of cohabiting households with children fall within the federal poverty line, suggesting a probable edge to married households with children regarding their ability to stay out of poverty.
The skewness of married households with children is -0.0371, while it is 0.346 for cohabiting households with children. This indicates that there are slight skew biases towards the lower end for married households with children, and slight skew biases towards the higher end for cohabiting households with children.
Overall, we can determine that as it comes to income-to-poverty ratio, married households with children are in better positions.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p			Lower	Upper
Income_Poverty_Ratio	Equal variances assumed	1617.826	<.001	237.417	1583947	<.001	<.001	115.087	.485	114.137	116.037
	Equal variances not assumed			215.047	95925.430	<.001	<.001	115.087	.535	114.038	116.136

After running a t-test with the two populations in regard to income-to-poverty ratio, it was determined that the difference between income-to-poverty ratios between married households with children and cohabiting households with children is highly statistically significant. Cohen's d with Hedges' correction test results (point estimate .826) indicate a significant and highly meaningful difference between married households and cohabiting households, with an effect difference around 115% of the federal poverty level.

Household income in the last 12 months:

Comparing the mean across groups, we see married households with a mean of $142,029.06 and cohabiting households with a mean of $114,332.84, married households having a substantially larger average income. Cohabiting has a significantly larger standard error of the mean, suggesting at higher levels of volatility. Although the standard deviation is larger for married, these two statistics might suggest that there are more people at both ends of the high and low extremes for cohabiting households. This could be supported by there being a higher level of skewness for cohabiting households with children towards the upper end, and thus it brings up that average while contributing to the high standard error. This in consideration, by comparing the medians, as well, being $118,500 for married households, and $92,000 for cohabiting households, demonstrating that because the difference between the average and the

median is considerably larger for married households than cohabiting households, there may be a larger influence from a small number of high earners.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Household Income	Equal variances assumed	1499.949	<.001	71.996	1583947	<.001	<.001	27696.22237	384.69203	26942.23952	28450.20523
	Equal variances not assumed			83.565	102424.316	<.001	<.001	27696.22237	331.43352	27046.61715	28345.82760

After running a t-test on the two populations as they relate to household income in the last 12 months, marriage vs cohabitation was determined to be a statistically significant indicator of household income, where the 95% confidence interval difference was determined to total in the ballpark of of $27,600 difference, determined by household marital status. Cohen's d and Hedges correction helps determine that this is a small effect (point estimate .250), this could be true in proportion to the amount of income, and the degree of skew. It could also be explained by other factors and concerns which will be addressed later.

Public Assistance income in the last 12 months:

The mean public assistance income in the last 12 months for married households is $8.72, while it is $145.96 for cohabiting households. This would suggest that cohabiting households on average receive more public assistance than married households. We will find no insight in looking at the median for this variable, as it is $0 for both populations. However, looking at other statistics will provide more insight to the situation. We see drastic skewness for both of these, and while cohabiting households sit at an impressive 12.748 positive skew, indicating an extremely small number of people receive an incredibly large amount of public assistance, married households hold a skewness statistic of a whopping 50.221! Demonstrating that an even smaller proportion of people in the married households bring in a majority of the public assistance income. Higher standard deviation and standard error of the mean for cohabiting households suggest that there is more variation within that population, and likely indicate that a small number of married households are more likely to receive full public assistance income, while more cohabiting households are likely to have some public assistance income.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
PublicAssistance_Income_Last12Months	Equal variances assumed	25346.736	<.001	-79.716	1583947	<.001	<.001	-137.246	1.722	-140.620	-133.871
	Equal variances not assumed			-24.322	87903.571	<.001	<.001	-137.246	5.643	-148.306	-126.186

The results of the t-test show that there is, yet again, a statistically significant difference in the average public assistance income in the last 12 months, where married households are likely to, on average, take about $137.25 less per year than their unmarried counterparts. Cohen's d and Hedge's correction (point estimate of -.277) indicate that this does have a relatively small impact, but is still a statistically significant indicator. This information is beneficial, and perhaps

outlines the potentially drastic differences indicated in the paragraph above, where a small number of married households are more likely to receive full public assistance income, while a slightly larger number of cohabiting households are likely to have some public assistance income.

Conclusion:

By evaluating our t-tests in relation to the three original hypotheses, we can draw a conclusion from this data and determine whether or not our hypotheses were correct.

Hypothesis 1 (H^1)

Null Hypothesis (H^{1A}): There is no significant difference in income levels between married households with children and cohabiting households with children.

P<.05, null hypothesis is rejected.

Hypothesis (H^1): Married households with children have significantly higher income levels than cohabiting households with children. Hypothesis is correct!

Hypothesis 2 (H^2)

Null Hypothesis (H^{2A}): There is no significant difference in income-to-poverty ratios between married households with children and cohabiting households with children. P<.05, null hypothesis is rejected.

Hypothesis (H^2): Married households with children have significantly higher income-to-poverty ratios than cohabiting households with children. Hypothesis is correct!

Hypothesis 3 (H^3)

Null Hypothesis (H^{3A}): There is no significant difference in public assistance income between married households with children and cohabiting households with children. P<.05, null hypothesis is rejected.

Hypothesis (H^3): Married households with children have significantly lower public assistance income than cohabiting households with children. Hypothesis is correct!

All in all, we can determine that given this data, all three hypotheses were extremely statistically significant and were correct.

Addressing Validity Concerns:

Married Households with Children: One of the concerns with the married households with children having larger incomes than the federal poverty line is that we did not account for relative poverty given the number of children. This is compared to a standardized poverty line, the relation to this poverty line has differing financial implications to families with one child vs. a family with five children, for example.

There is concern of the value “-1” being used to fill in a missing value in the public assistance income in the last 12 months variable. This indicates possible incomplete data and potentially impacts the validity of this analysis.

There are additional considerations that are not necessarily data exclusive that are also important to consider in these results:

In this data, divorces and split custody are not accounted for. This could have implications on households where 50% of the time custody is with one parent, for example, and is not reflected independently in the data. This also leads to the question of alimony and child support, and if this sort of financial support was accounted for in instances of cohabitation; for instance, a divorced woman receiving child support, while living with a boyfriend. These sorts of situations could have implications on data reporting.

Lifestyle is not accounted for in this data, it may be an empirical observation to note that temperance regarding alcohol, for example, would likely look different among unmarried non-religious households, vs. married and religious households, and possibly have an impact on their ability to progress in a job or career. This is a bit of a stretch to make, but a possible concern that this data would not address.

The number of children is not accounted for here, this could potentially give us better insight into the concept of married households with children having the ability to maximize public assistance income, for example. It also may impact, as previously mentioned, a relative poverty line in relation to the functionality of paying for a given number of children, and hence not give us a proper indicator of true relative poverty.

The number of working parents is not accounted for. It is possible that cohabiting households have a larger number of working parents than married households, or vice versa. This could also be considered in relation to divorce information, for example, a mother of children who has custody 50% of the time may live with a working boyfriend, while the father does not live with a working girlfriend. This could, again, be the other way around. But trends that might exist in this area are not accounted for in this data.

It is unknown if public assistance income is accounted for in household income. It is possible that it either is or is not, but at this time the information is not known, and this could have reporting standardization issues.

There is a tactic among some single people to remain single intentionally in order to receive more public assistance income, while cohabiting outside of marriage. Sometimes, this is

referred to as a “Welfare Mama”. Although it is likely not an overwhelming number of people, this does have reporting and data analysis implications that may be of concern.

Non-monetary assistance is not accounted for here. Although this does not have major implications on impacting the purpose of this analysis, looking at the finances, but it is important to consider that assistance not in the financial realm can alleviate financial burdens, allow time for more earning, and other things of that nature that may make a households situation easier than the finances would suggest.

The concerns that may exist are not limited to this, however these are major considerations that were made throughout the process of this statistical analysis.

References:

Data acquired from:
U.S. Census Bureau ACS 1-Year Estimates Public Use Microdata Sample (2022). Accessed (9/27/2024)
https://data.census.gov/mdat/#/search?ds=ACSPUMS1Y2022&vv=POVPIP,HINCP,PAP&rv=HHT2(01,02,03,04)&nv=ucgid&wt=PWGTP&g=0400000US49