# EXAMPLE 1: REGRESS LN(MEDIAN HOUSEHOLD INCOME) ON LN(MEDIAN HOUSE VALUE) AND % INDIVIDUALS LIVING IN POVERTY

DEPENDENT VARIABLE: **LN(MEDIAN HOUSEHOLD INCOME)**

R-SQUARE 0.39

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Variable Coefficient P-value

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CONSTANT .. ..

**LN**MEDHVALUE 2.03 0.0067

PCTBELPOV -0.043 0.0034

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# Logged Dependent Variable

* Natural Log(median household income) *Logged*

**Two Independent Variables (predictors):**

* Natural Log(median house value) (LNMEDHVALUE) *Logged*
* % Individuals living in poverty (PCTBELPOV) *Not Logged*

**Interpreting the coefficient of the first predictor:**

* **DV**: LN(Y) = LN(MEDIAN HOUSEHOLD INCOME)
* **PREDICTOR**: LN(X) = LN(MEDIAN HOUSE VALUE)
* *Interpretation:* As *x* changes by 1%, the expected value of *y* changes by .
  + As median house value changes by 1%, the expected value of median household income changes by , holding % in poverty constant.
* When is small (< 20 in absolute value), we can use the following approximation:

.

* + Here, . So, as median house value changes by 1%, the expected value of median household income changes by approximately , holding % in poverty constant.

**Interpreting the coefficient of the second predictor:**

* **DV**: LN(Y) = LN(MEDIAN HOUSEHOLD INCOME)
* **PREDICTOR**: X = % LIVING IN POVERTY
* *Interpretation:* As predictor *x* goes up by 1 unit, the expected change in *y* is .
  + As % living in poverty goes up by 1 unit (i.e., 1%), the expected change in median household income is . That is, as % living in poverty goes up by 1 unit (1%), median household income goes down by 4.209%, holding median house value constant.
* When is small (≤ 0.3 in absolute value), it happens to be the case that 100%, so we can say that as *x* goes up by 1 unit, the expected change in *y* is approximately 100%
  + Here, , so we can say that as % living in poverty goes up by 1 unit (i.e., 1%), the expected change in median household income is approximately 100, holding median house value constant.

# EXAMPLE 2: REGRESS MEDIAN HOUSEHOLD INCOME ON LN(MEDIAN HOUSE VALUE), % INDIVIDUALS LIVING IN POVERTY, AND NUMBER OF AGGRAVATED ASSAULTS

DEPENDENT VARIABLE: **MEDIAN HOUSEHOLD INCOME**

R-SQUARE 0.39

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Variable Coefficient P-value

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CONSTANT .. ..

**LN**MEDHVALUE 189.03 0.0021

PCTBELPOV -3.2344 0.0034

AGGRASSAULT 0.8094 0.4092

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# Unlogged Dependent Variable

* Median household income (in $1000) *Not* *Logged*

**Three Independent Variables (predictors):**

* Natural Log(median house value) (LNMEDHVALUE) *Logged*
* % Individuals living in poverty (PCTBELPOV) *Not Logged*
* # Aggravated assaults (AGGASSAULT) *Not Logged*

**Interpreting the coefficient of the first predictor:**

* **DV**: Y = MEDIAN HOUSEHOLD INCOME
* **PREDICTOR**: LN(X) = LN(MEDIAN HOUSE VALUE)
* *Interpretation:* A 1% increase in *x* is associated with a change in *y* by units.
  + A 1% increase in median house value is associated with a change (increase) in median household income by units ($1,880), holding % in poverty and number of aggravated assaults constant.
* For any value of , the following approximation works well: .
  + A 1% increase in median house value is associated with a change in median household income by units ($1,890), holding % in poverty and # aggravated assaults constant.

**Interpreting the coefficient of the second predictor:**

* **DV**: Y = MEDIAN HOUSEHOLD INCOME
* **PREDICTOR**: X = % LIVING IN POVERTY
* *Interpretation:* A 1 unit increase in *x* is associated with an expected change in *y* by units.
  + As % individuals living in poverty goes up by 1 unit (1%), the expected change in median household income is -3.2344 units ($3,234.4), holding median house value and number of aggravated assaults constant.

**Interpreting the coefficient of the third predictor (# Aggravated assaults):**

* Since it’s not significant (p > 0.05), we generally don’t bother with interpretation (regardless of whether predictor and/or dependent variable are logged).