

## Explanation:

- a) In my long regression with PCHICK, I chose to use the variables Y, POP, CPI, MEATEX, and PBEEF. I chose these variables because they each were statistically significant with their association to PCHICK.

In my instrument variable regression, I chose to use all the variables from my long regression, in addition to using PF as an instrument for PCHICK. I chose to use PF as an instrument because it is a supply shock. Based on my correlation matrix, it also has relatively low correlation with Q, around 0.85.

- b) The regression coefficient in the short regression of Q on PCHICK is positive because of severe omitted variable bias. PCHICK is also an endogenous variable in the function. It actually goes against the Law of Demand. When prices rise, demand will fall. In the short regression in column 1, there is a positive relationship between PCHICK and Q which indicates there is a problem.
- c) By adding the variables in column 2, we are controlling for the part of PCHICK that are correlated with those new variables. Because we are controlling for these other indicators, it corrects the PCHICK coefficient and it becomes negative, indicating it is inversely correlated with Q. Each new variable helps to control for some of the variation of the relationship between PCHICK and Q.
- d) The single instrument I used is a regression of PCHICK on PF. The R command used for this whole regression is 'ivreg'. This command is formatted such that the final equation is put on the right side of the equal sign, then a bar '|' is used at the end of that equation, and the instrument variable is added plus the other exogenous variables used in the final equation.

This command does the first stage and second stage of a two-stage-least-squares for you. The endogenous variable in the final equation is regressed by the new variable added after the bar '|'.

- e) As long as the additional variables are exogenously correlated, then the validity of the instruments should not change. If there is endogeneity bias, then it would occur in the error term as a demand shock.
- f) Column1:  $|\cdot 252 / \cdot 010| = 25.2 > 1.96$ , Yes, it is significant!  
Column2:  $|\cdot 196 / \cdot 042| = 4.67 > 1.96$ , Yes, it is significant!  
Column3:  $|\cdot 272 / \cdot 069| = 3.94 > 1.96$ , Yes, it is significant!
- g) The coefficient on the instrument PF is significant with a p-value  $3.43e-05$ . This satisfies the relevance condition.
- h) If both PCHICK and PBEEF are endogenous, then our first-stage variables will be PF, PCOR, Y, POP, CPI, and MEATEX. Our second stage variables will be the exogenous variables.