Name:	_ Spring 2018
EC200 Econometrics and Applications	

Unit 1 Quiz

You have 75 minutes to complete this quiz. There are 36 total points. Please round to three decimal places when necessary. Note that some sub-questions build on previous sub-questions; if you get stuck on one part, at least make a guess so have you have values to apply to the following parts - you won't be penalized a second time if the numbers you carry over are incorrect.

- 1. (8 points) We've spent a decent amount of time talking about the zero conditional mean assumption behind our ordinary least squares estimates, that $E[u_i|X_i] = 0$. Consider one of two research questions:
 - A: What is the relationship between city-level crime rates and city-level median household income in 2015?
 - B: What is the relationship between quarterly CO_2 emissions and quarterly GDP in the United States, from 1980-2014.

	United States, from 1980-2014.	
(a)	For each research question, identify the dependent variable and independent variable $2p$	ble.
	A:	,
	B:	
(b)	in the error term but would not violate the zero conditional mean assumption. Ex	xplair
	your reasoning in one sentence. [3 p	$points_j$
(c)	Select question A or B (same or different from your choice in part b) and provi	de ar
	example of a variable that would be captured in the error term but would violate	

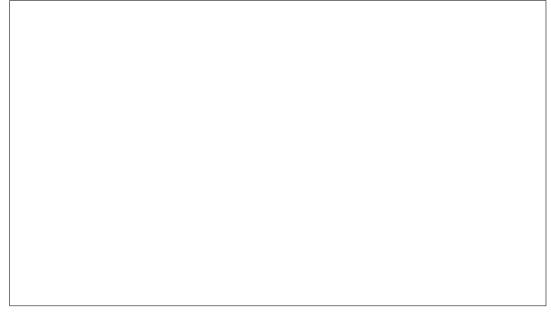
2. (14 points) Consider the relationship between annual per-capita cheese consumption (cheese, dependent variable) and unemployment rates (unemp, independent variable). You collect the following data:

Year	2005	2006	2007	2008
Per-capita cheese consumption (pounds):	31.7	32.6	33.1	32.7
Unemployment rate (percent):	4.9	4.4	5.0	7.3

(a) Write a population model for the relationship between per-capita cheese consumption and unemployment rates. [2 points]



(b) Estimate $\widehat{\beta}_0$ and $\widehat{\beta}_1$. [4 points]



(c) Interpret $\widehat{\beta}_0$ and $\widehat{\beta}_1$, making sure to include appropriate units. [2 points]

Calculate the residual for 2008. What does it mean?	[2 point
Calculate \mathbb{R}^2 . How much does unemployment explain per-ca	apita cheese consumptic

3. (14 points) Consider the following summary statistics and regression results from a nationally representative random sample of 1,172 mothers surveyed in the 2016 General Social Survey.

. sum _hrs1	_doesnthurt ch	ilds educ a	ıge		
Variable	Obs	Mean	Std. Dev.	Min	Max
_hrs1	1,172	19.40614	21.28042	0	89
_doesnthurt	1,172	.4974403	.5002069	0	1
childs	1,172	2.547782	1.376366	1	8
educ	1,172	13.43686	2.996486	0	20
age	1,172	52.71672	16.84845	19	89

where variables are defined as follows:

- hrs1 = hours worked last week
- _doesnthurt = 1 if agrees that it doesn't hurt children for their mothers to work outside of home, 0 otherwise
- childs = number of children
- educ = years of completed education
- age = age in years

	. regress _hrs	<pre>1 _doesnthurt</pre>	childs	$ \hbox{educ age if} $	_female == 1 &	child	ls > 0
	Source	SS	df	MS	Number of obs	=	1,172
-					F(4, 1167)	=	70.12
	Model	102760.201	4	25690.0502	Prob > F	=	0.0000
	Residual	427534.475	1,167	366.353449	R-squared	=	0.1938
-					Adj R-squared	=	0.1910
	Total	530294.676	1,171	452.856256	Root MSE	=	19.14
	_hrs1	Coef.	Std. Err	. t	P> t [95% C	onf.	Interval]
	_doesnthurt	.5572165	1.120283	0.50	0.619 -1.6407	 78	2.75521
	childs	8703755	.426837	-2.04	0.042 -1.7078	29	0329217
	educ	1.146882	.1924429	5.96	0.000 .76930	97	1.524455
	age	4831164	.0339084	-14.25	0.00054964	46	4165883
	_cons	31.4043	3.456793	9.08	0.000 24.622	80	38.18653

(a) What share of respondents believe that it doesn't hurt children for their mothers to work? [2 points]

answer in percents (0%-100%)

Fill out	the following table base	ed on the regression results above.	[2 p
	R^2	TSS	
	ESS	SSR	
		CED	
are likel		it be the case that $\widehat{\beta}_{childs}$ is BLUI, and for which would you need motion you list.	
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(e) Consider two friends, Drithi and Ayako. They are both 33-year-old mothers who believe that when mothers work outside of the home, it could hurt their children. However, Drithi is a high school graduate (12 years completed) with 3 children, and Ayako is a college graduate (16 years completed) with 2 children. What is the difference in predicted number of work hours between them? [2 points] (f) Marius says that since older people likely have had more children, $\widehat{\beta}_{childs}$, the impact of number of children on hours of work, is biased. Do you agree? Explain. [2 points]