OKUN'S LAW: $\%\Delta Y = \%\Delta Y^* + (c \times (U_{t0} - U_{t1}))$

Okun's law, when originally presented, had a value of '2', for 'c', the Okun coefficient. In words, that means the equation expected real growth would be equal to the economy's expected long-term growth rate, %ΔY*, plus two times the change in the unemployment rate. Does this make sense? Consider the table, below, on the left. It assumes that labor productivity, LP, expands at its long run pace, irrespective of changes in the unemployment rate. It also assumes the labor force participation rate, LFPR, is stable, so that employment grows at the pace implied by the expected long run growth rate for population. Suppose the unemployment rate falls by two percentage points. At what pace will employment grow? We know the following from our simple model of the economy:

$U_L = LF - E_L$ and so: $E_L = LF - U_L$

We see, below, that LF rises by 1%, and E rises by 3.2%. This reflects both the 1 percent climb in the size of the labor force and the 2-percentage point decline in the unemployment rate. We then calculate real GDP growth. We now solve for 'c'. it roughly equals '1'.The table on the right assumes a pro-cyclical pop for LP and the LFPR

Okun's Law: Assume LTSG =3%, LP = 2%, LF = 1%%

No swings for Productivity or LFPR:

Okun's Law:			
No LP, LFPR			
Cycles			
LTSG			**3.0%**
real gdp	**1,110,000**	**1167540**	**5.2%**
labor productivity	**100**	**102**	**2%**
employment	**11,100**	**11453.4**	**3.2%**
unemployment	**900**	**666.6**	
unemployment rate	**7.5%**	**5.5%**	**2 p.p.**
labor force	**12000**	**12120**	**1.0%**
L.F.P.R.	**80.0%**	**80.0%**	**0.0%**
population	**15,000**	**15150**	**1.0%**

Major Swings for Productivity or LFPR:

Okun's Law:			
Large LP, LFPR			
Cycles			
LTSG			**3%**
real gdp	**1,110,000**	**1190093**	**7.2%**
labor productivity	**100**	**103**	**3%**
employment	**11,100**	**11567.93**	**4.2%**
unemployment	**900**	**673.266**	
unemployment rate	**7.5%**	**5.5%**	**2 p.p.**
labor force	**12000**	**12241.2**	**2.0%**
L.F.P.R.	**80.0%**	**80.8%**	**1.0%**
population	**15,000**	**15150**	**1.0%**

Solve for Okun's coefficient, c:

Okun's Law: $Y = Y^* - c(U_t - U_{t-1})$

$5.2\% = 3\% - c(5.5\% - 7.5\%)$

/ $2.2\% = -c(5.5\% - 7.5\%)$

/ $c = 1.1\%$

Solve for Okun's coefficient, c:

Okun's Law: $Y = Y^* - c(U_t - U_{t-1})$

$7.2\% = 3\% - c(5.5\% - 7.5\%)$

$4.2\% = -c(5.5\% - 7.5\%)$

$c = 2.2\%$

THE POINT? The Okun coefficient, using historical data 1950-1990, has a value close to "2", because productivity and Labor force participation were highly pro-cyclical. During the economic recovery, 2010-2017, neither LP nor the LFPR showed any cyclical rebound, and the c, the coefficient was closer to 1.

Okun's Law, Policy Options, and the Performance for U3 vs Y.

You have spent a bit of time looking at jobless claims to pencil in a rate for U3, 2020:Q2.

Lets now work backward and estimate effect on the jobless rate, from a social distancing mandated 7.5% decline for the economy, Q2 vs Q1.

Assume LTSG=2% ***per year***
Assume the Okun coefficient is 1.
Calculate the rise for U3 using the assumption that Y = 100, 2020:Q1

	2020:Q1	2020:Q2	% change
	100	92.5	-7.50%
okun's law,C=1	3.50%		

Now think about a different picture. We impose extreme social distancing. We get the same 7.5% decline for output over the quarter. But companies are told, like I he UK, Germany and france, that the government will pay their laborors, as long as the companies don't fire them.

So U3 is unchanged. How can that be? Use a different formula to show how that works

Homework #1 ANSWER KEY

Problem # 1: **Okun's Law:** $\%\Delta Y = \%\Delta Y^* + c(U_{t0} - U_{t1})$

Y_{t0} = \$14.93 trillion c = 2 U_{t0} = 9.5% U_{t1} = 4.1% $\%\Delta Y^*$ = 2.1% per year

$\%\Delta Y^* = (1.021)^7 - 1 = 15.7\%$ per seven years

$\%\Delta Y = 15.7\% + 2\times(9.5\% - 4.1\%) = 15.7\% + 10.8\% = 26.5\%$

Y_{t1} = \$14.93 trillion × 1.265 = \$18.88 trillion

Note: $(18.88/14.93)^{1/7} = 1.034$

Thus Okun's Law, using '2' for the Okun coefficient, tells us that real GDP growth over the 7 year period should have averaged 3.4%

Problem # 2: **Okun's Law:** $\%\Delta Y = \%\Delta Y^* + (c \times (U_{t0} - U_{t1}))$

Y_{t0} = \$14.93 trillion c = 1 U_{t0} = 9.5% U_{t1} = 4.1% $\%\Delta Y^*$ = 2.1% per year

$\%\Delta Y^* = (1.021)^7 - 1 = 15.7\%$ per seven years

$\%\Delta Y = 15.7\% + 1\times(9.5\% - 4.1\%) = 15.7\% + 5.4\% = 21.1\%$

$Y_{t1} = \$14.93 \text{ trillion} \times 1.211 = \$18.07 \text{ trillion}$

Note: $(18.07/14.93)^{1/7} = 1.028$

Thus Okun's Law, using '1' for the Okun coefficient, tells us that real GDP growth over the 7 year period should have averaged 2.8%

Problem # 3:

$Y_{2017:Q4} = \$17.27$ trillion

$(17.27/14.93) = 1.157$

$(17.27/14.93)^{1/7} = 1.021$

In reality, over the 7-year period, real GDP grew at a 2.1% pace.

We don't, therefore, need to do any calculations. We know that Okun's law tells us that real GDP grows at its long term sustainable pace, plus whatever additional growth is gained from a falling unemployment rate. Over the last 7 years, real GDP grew 2.1% per year. That is our guess for Y*. Thus, Okun's law tells us that, *for any positive value for the Okun coefficient, the jobless rate had to be unchanged.*

Problem # 4:

From Q3, we know the answer to Q4. We must assign the value ZERO, to the Okun coefficient, to reconcile the past 7-years growth rate for Y, and change for U.

Clearly, over the past 7 years, Okun is broken.

What went wrong for Okun's Law?

We expected 0.6%/year for growth in the labor force. We got that. We also expected 1.5% growth for labor productivity, and we got nothing like that. Falling joblessness, and the implicit rise for employment, contributed to growth, amid sluggish LP:

	labor force	labor productivity	unemployment rate	total
2010:Q4	153803	103.9	9.50%	
2017:Q4	160500	108.8	4.10%	
annualized growth	0.6%	0.7%	0.8%	2.0%