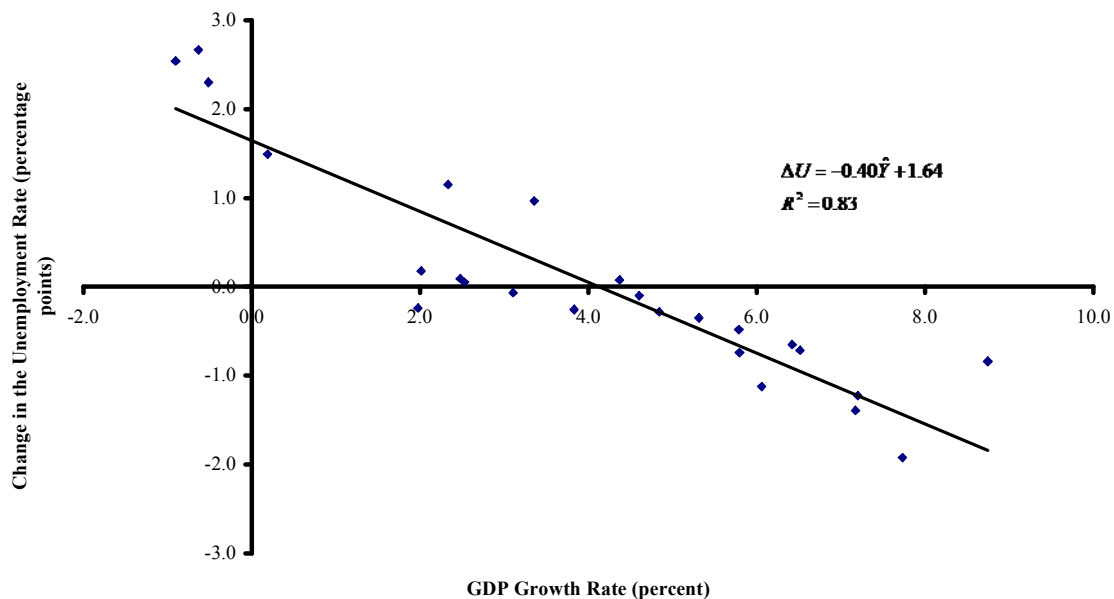


## Chapter 15 Selected Answers

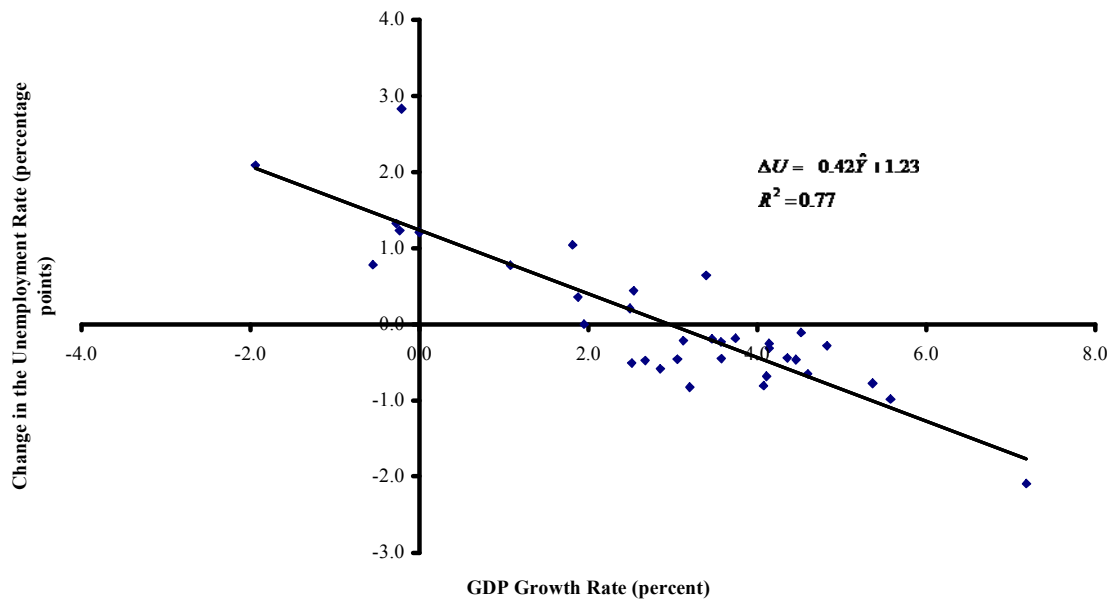
**Problem 15.2:** There are many examples. Here are a few: (i) the government changed the standard for television broadcasts from analogue to digital HD; this lowered the economic stock of television transmission technology and of old television receivers, both of which had to be modified in order to continue to be useful at all, even though their physical functioning remained unchanged. (ii) a similar thing happened with the government mandate to adopt compact fluorescent light bulbs, replacing incandescent; the machines that make incandescent light bulbs are still functional, but will be of little economic value in production process if the mandate goes into effect as planned (as of 2011). (iii) the development of steam ships rendered sailing ships for the transport of cargo obsolete as productive capital.

**Problem 15.3:** (*Conjectures and interpretation will vary by student.*) For 1949-1973,  $\hat{Y}^* = 4.1$  percent; for 1974-2008  $\hat{Y}^* = 2.9$  percent.

**Figure 15.3.1**  
**Okun's Law: 1949-1973**



**Figure 15.3.2**  
**Okun's Law: 1974-2008**



**Problem 15.7:**

Table 15.7.1 presents the estimates of Okun's Law for the G-7 countries. The United States has the highest modified balanced growth rate of the seven, as well as the fastest speed of adjustment. The high  $\hat{Y}^*$  in part reflects the fact that labor-force growth is higher in the U.S. during this period than in most other countries. The faster speed of adjustment in part reflects more flexible labor markets. Notice, however, that Canada, Japan, and the United Kingdom are quite similar to the United States. In contrast, the German modified balanced growth rate is very low and the French and Italian rates are negative. *Students may suggest other explanations, but here are at least three explanations (possibly complementary):* First, in the case of France and Germany, Okun's law simply fits very poorly (note the low  $R^2$ ) – which suggests that other factors, not accounted for by the regression, are at work. Second, one such factor may be the highly regulated and/or unionized nature of the labor markets in these countries, which may prevent firms from responding to changes in demand in the same way that they would in less regulated markets. Third, the modified balanced growth rate can, in reality, be negative if, for example, the labor force is declining and/or participation rates are falling, so long as these are not offset by productivity growth. The populations of these countries is growing relatively slowly – in fact, in Germany and Italy it is falling. So it is not implausible that labor forces may also be

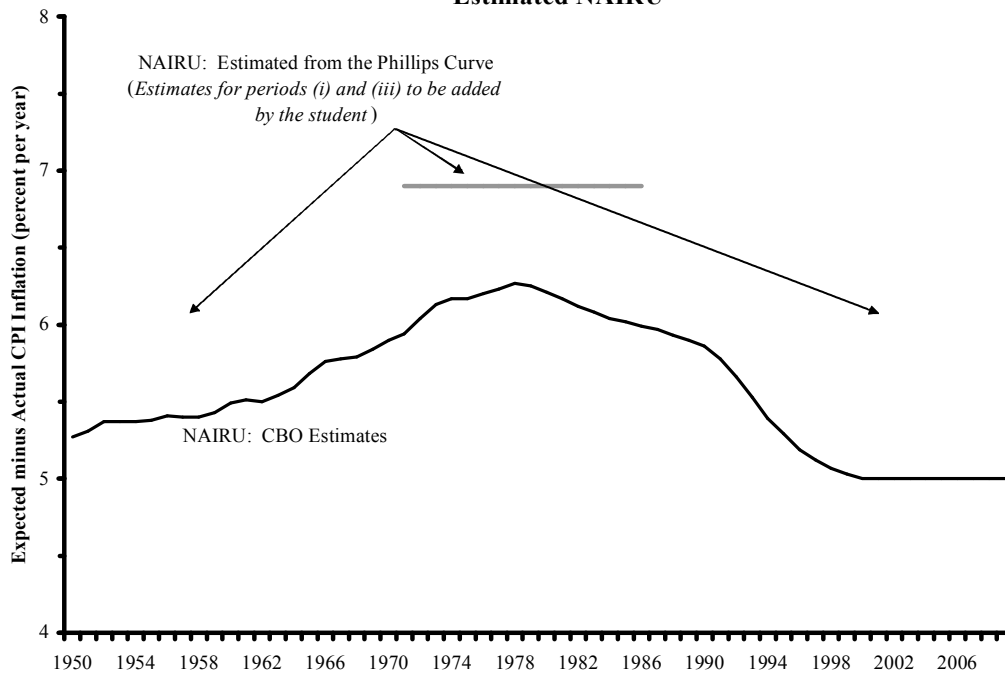
falling. *Students should suggest further tests of their conjectured explanations.*

**Table 15.7.1**  
**Okun's Law for the G-7 Countries**

	Modified Balance Growth Rate ( $\hat{Y}^*$ )	Speed-of-Adjustment ( $\gamma$ )	$R^2$
Canada	2.2	0.34	0.74
France	-1.1	0.09	0.04
Germany	0.63	0.31	0.12
Italy	-0.20	0.19	0.41
Japan	1.65	0.16	0.69
United Kingdom	1.89	0.23	0.62
United States	2.96	0.49	0.82

**Problem 15.10:** The Phillips curve graphs for the three periods are not shown, but NAIRU can be calculated from the equation of their regression lines.  
*(Periods (i) and (iii) and comparison to CBO estimates left to the student)*  
 (ii)  $\Delta \hat{p} = -1.38(U - 6.9)$ .

**Figure 15.10.1**  
**Estimated NAIRU**



**Problem 15.13:**

(i) 1971-1986:  $\Delta \hat{p} = -1.08(U - 4.6)$  .

(ii) 1987-2009:  $\Delta \hat{p} = -0.56(U - 4.5)$  .

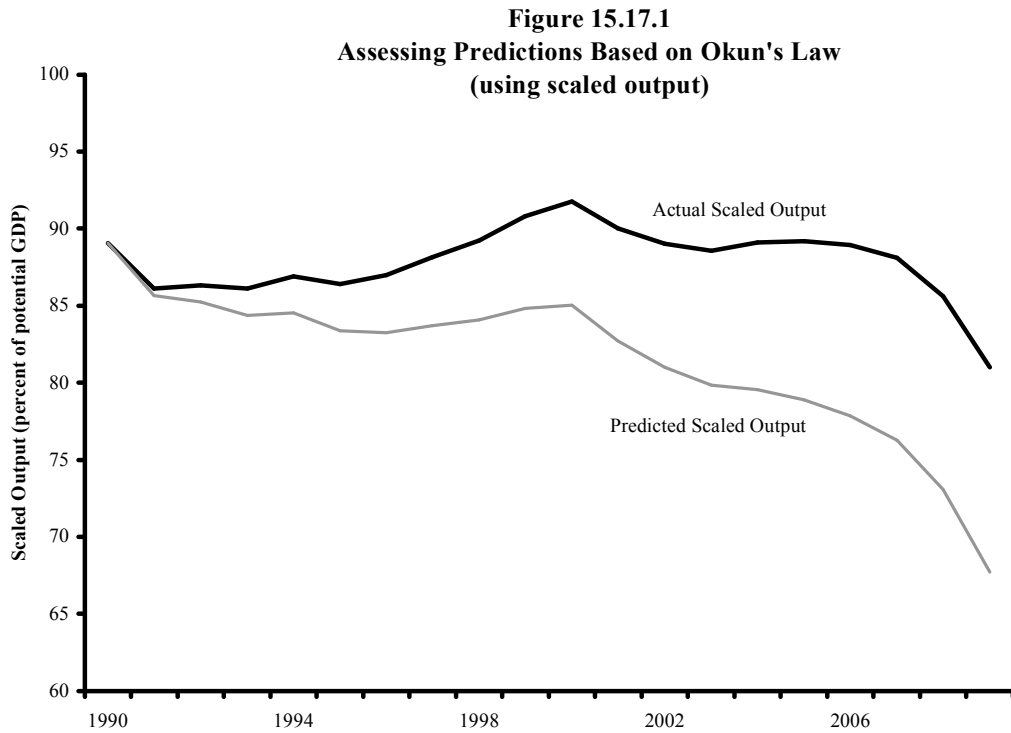
Table 15.13.1 compares the NAIRU estimates using unemployment rates for prime-age male workers to those using all workers (see Problem 15.10). The fit of the estimated Phillips curve ( $R^2$ ) is similar in each— slightly higher for all workers in the earlier period and slightly higher for prime-age males in the later period. In both cases, NAIRU falls between the earlier and later period, but the fall is very small (0.1 percentage points) for prime-age workers and much bigger (1.4 percentage points) for all workers, indicating that the estimate of NAIRU is much more stable for prime-age male workers (something that might have been guessed from the information analyzed in Problem 15.12).

**Table 15.13.1**  
**NAIRU Estimates Using Different Unemployment Measures**

	Unemployment Concept			
	Prime-age Males		All Workers	
	1971-1987	1987-2009	1971-1987	1987-2009
<b>NAIRU</b>	4.6	4.5	6.9	5.5
<b><math>R^2</math></b>	0.44	0.44	0.50	0.40

**Problem 15.17:**

Figure 15.17.1 shows that predictions for scaled output based on Okun's law diverge systematically from the actual values with the gap widening over time. However, the general shape of the predicted plot is similar to that of the actual data. This shows that Okun's law predicts similar changes (in direction and magnitude) to what actually occurs, but that its errors tend dominantly toward slight overprediction, so that they cumulate over time.



**Problem 15.18:**

Figure 15.18.1 shows that predictions for inflation based on the Phillips curve are not very precise. However, they do follow a similar pattern, capturing the major movements, though often missing the magnitudes. There are both periods of overprediction and underprediction, which do not cancel each other out in the short run, but keep the series fairly well aligned in the long run.

