

The recent World Economic Outlook published by IMF has given rise to some Macro-Economic Puzzle. According to Okun's law there is negative relationship between unemployment and output and using that we can derive relation between change in unemployment and change in output. The gap version of Okun's law may be written (Abel & Bernanke 2005) as:

$$(\bar{Y} - Y)/\bar{Y} = c(u - \bar{u}), \text{ where: } \bar{Y} \text{ is potential output or GDP at full-employment, } Y \text{ is actual output, } \bar{u} \text{ is the natural rate of unemployment, } u \text{ is actual unemployment rate and } c \text{ is the factor relating changes in unemployment to changes in output}$$

The gap version of Okun's law, as shown above, is difficult to use in practice because \bar{Y} and \bar{u} can only be estimated, not measured. A more commonly used form of Okun's law, known as the difference or growth rate form of Okun's law, relates changes in output to changes in unemployment:

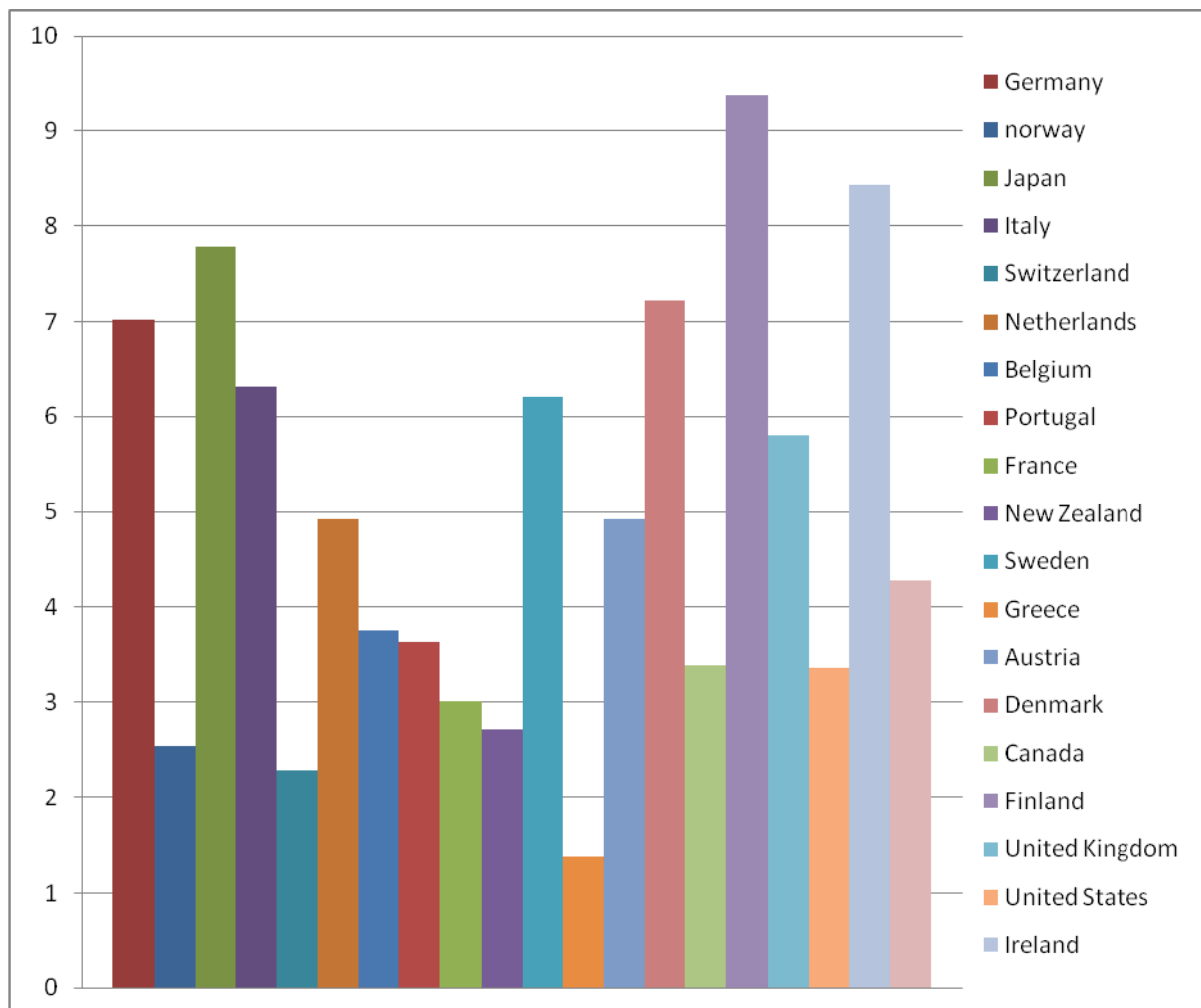
- $\Delta Y/Y = k - c\Delta u$, where:

But if you look at the table there are some surprising findings

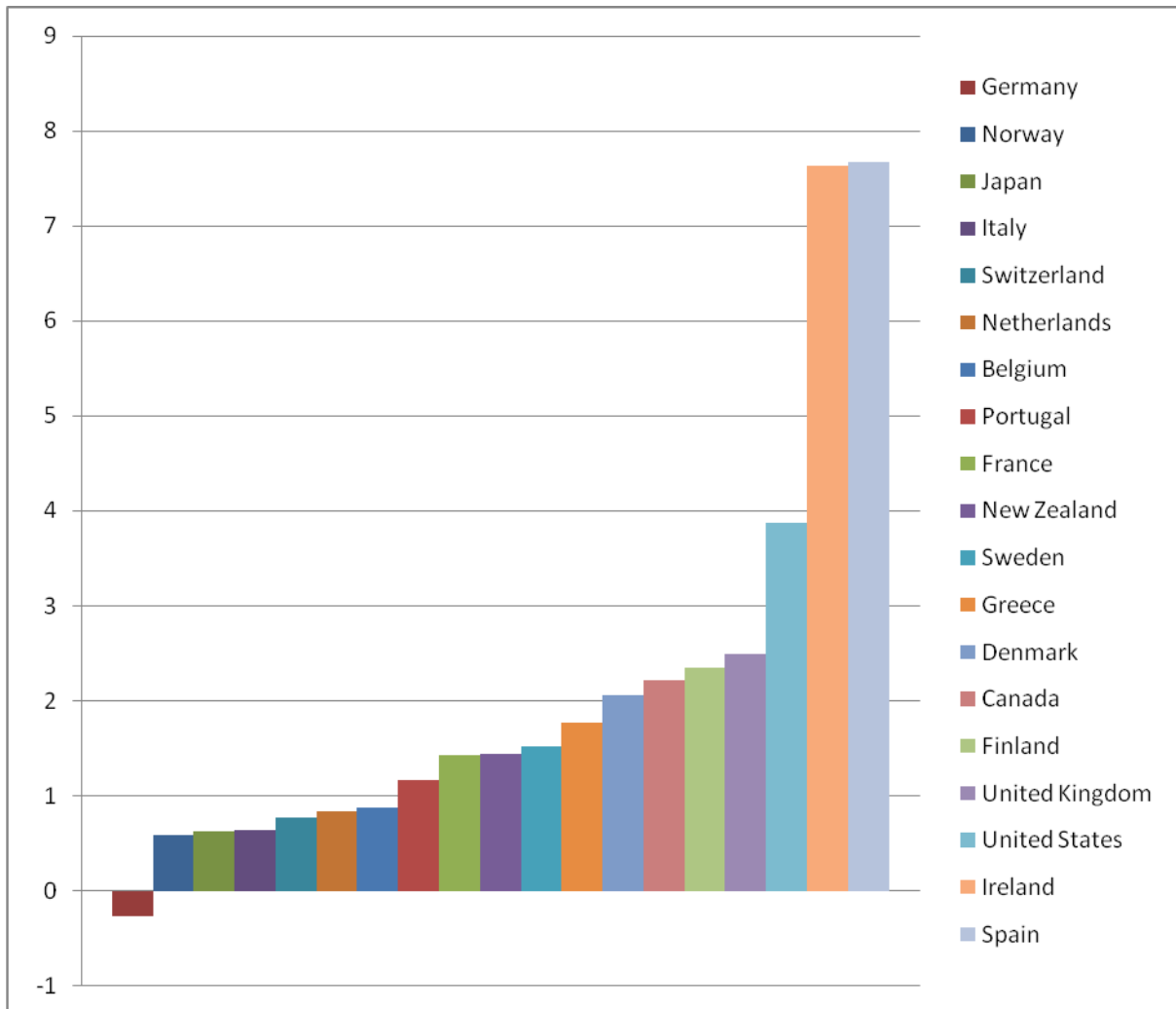
Country	%Change in Unemployment	%Change in Output
Germany	-0.2634463	7.02572
Norway	0.5840361	2.54688
Japan	0.6255987	7.78351
Italy	0.6355166	6.31256
Switzerland	0.7730956	2.28577
Netherlands	0.8334875	4.92458
Belgium	0.872386	3.75652
Portugal	1.164162	3.63789
France	1.42098	3.00589
New Zealand	1.444316	2.72293
Sweden	1.519388	6.20613
Greece	1.765525	1.37386
Austria	1.833355	4.91638
Denmark	2.05887	7.22179
Canada	2.21014	3.38078
Finland	2.343512	9.37519
United Kingdom	2.488077	5.80387
United States	3.871012	3.3556
Ireland	7.633996	8.44326
Spain	7.66725	4.28543

Germany has seen more than 7% decline in output but unemployment has fallen that is quite contrary to Okun's Law. Finland with highest fall in output has seen only around 2% rises in unemployment, whereas Spain with 4% fall in output has seen around 8% fall in output. It is thus clear that simple Okun's law is not working and there are some institutional and social factors that can explain this deviation from Okun's law.

Change in Output



Change in Unemployment



Derivation of the growth rate form of Okun's law

We start with the first form of Okun's law:

$$\begin{aligned}(\bar{Y} - Y)/\bar{Y} &= 1 - Y/\bar{Y} = c(u - \bar{u}) \\ -1 + Y/\bar{Y} &= c(\bar{u} - u).\end{aligned}$$

Taking annual differences on both sides, we obtain

$$\Delta(Y/\bar{Y}) = (Y + \Delta Y)/(\bar{Y} + \Delta\bar{Y}) - Y/\bar{Y} = c(\Delta\bar{u} - \Delta u).$$

Putting both numerators over a common denominator, we obtain

$$(\bar{Y}\Delta Y - Y\Delta\bar{Y})/(\bar{Y}(\bar{Y} + \Delta\bar{Y})) = c(\Delta\bar{u} - \Delta u).$$

Multiplying the left hand side by $(\bar{Y} + \Delta\bar{Y})/Y$, which is approximately equal to 1, we obtain

$$\begin{aligned}(\bar{Y}\Delta Y - Y\Delta\bar{Y})/(\bar{Y}Y) &= \Delta Y/Y - \Delta\bar{Y}/\bar{Y} \approx c(\Delta\bar{u} - \Delta u) \\ \Delta Y/Y &\approx \Delta\bar{Y}/\bar{Y} + c(\Delta\bar{u} - \Delta u).\end{aligned}$$

We assume that $\Delta\bar{u}$, the change in the natural rate of unemployment, is approximately equal to 0. We also assume that $\Delta\bar{Y}/\bar{Y}$, the growth rate of full-employment output, is approximately equal to its average value, k . So we finally obtain

$$\Delta Y/Y \approx k - c\Delta u.$$