

The labour production function

Assume a firm has a production function that takes input and capital to produce output

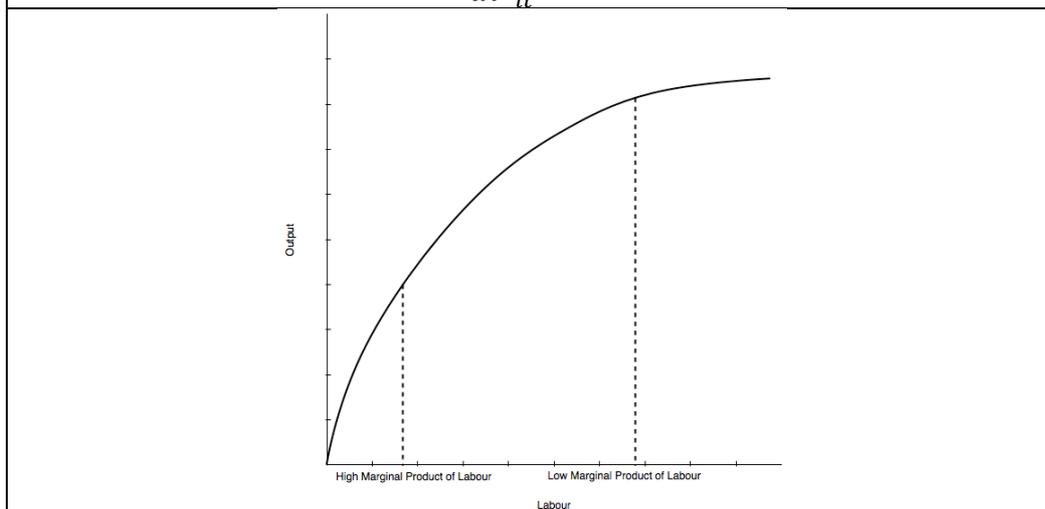
$$y_{it} = f(k_{it}, l_{it})$$

Output increases if capital or labour increases thus implying that

$$\frac{df(k_{it}, l_{it})}{dk_{it}} > 0 \text{ and } \frac{df(k_{it}, l_{it})}{dl_{it}} > 0$$

However, this occurs at a diminishing marginal rate implying that

$$\frac{d^2f(k_{it}, l_{it})}{dl_{it}^2} < 0$$



Output gaps and cyclical unemployment

- Potential output: The amount of output that an economy can produce when using resources such as labour and capital at normal rates
- Potential output is not the same as maximum output
- Output gap: The difference between potential output and actual output
- Expansionary output gap: A positive output gap that occurs when actual output is higher than potential output
- Contractionary output gap: A negative output gap that occurs when potential output exceeds actual output
- A contractionary output gap causes output and employment to fall below normal levels
- An expansionary output gap causes inflation to rise above normal levels

$$\text{output gap} = 100 \left(\frac{Y - Y^*}{Y^*} \right)$$

- The unemployment rate indicates how resources are being utilised whereby:
 - A high unemployment rate indicates that labour resources are not being used and that actual output has fallen below potential output
 - A low unemployment rate indicates that labour resource are being overused and that actual output is greater than potential output

- Natural rate of unemployment: The part of the total unemployment rate that is attributable to frictional and structural unemployment (u^*)
- This exists because regardless of the state of the economy, there will always exist some level of frictional or structural unemployment

$$\text{cyclical unemployment} = u - u^*$$

- In a contraction the actual unemployment rate exceeds the natural unemployment rate so cyclical unemployment ($u - u^*$) is positive
- In an expansion the actual unemployment rate falls below the natural rate of unemployment so cyclical unemployment ($u - u^*$) is negative

$$\text{Okun's law: } 100 \left(\frac{Y - Y^*}{Y^*} \right) = -\beta(u - u^*)$$

- Beta is approximately 1.8 for Australia
- Okun's law derives that each percentage point of cyclical unemployment is associated with approximately a two percentage point increase in the output gap

The policy reaction function (Taylor rule)

- Acts as a quantitative description of how the RBA behaves

$$r_t = \bar{r} + \alpha_y \underbrace{\left(\frac{Y - Y^*}{Y^*} \right)}_{\text{output gap}} + \alpha_\pi \times \pi$$

- $\bar{r}, \alpha_y, \alpha_\pi$ are assumed to be fixed constants
- \bar{r} represents the natural rate of interest that occurs when inflation is in its long run quillibrium
- α_y represents how interest rates respond to output fluctuations from a natural rate
- α_π represents how interest rates respond to inflation

