

Technology Shock

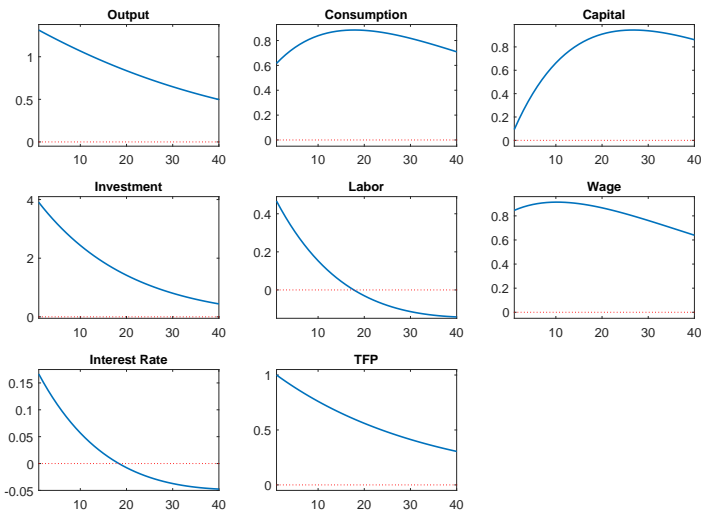


Figure 5: 1% shock to z_t . All values are percentage deviations from steady state. Only the real interest rate is shown in percentage points. k is shown at the end of the period.

Effects of a Technology Shock I

- As seen earlier, a positive technology shock has a positive **wealth effect**, hence consumption increases
- It also has a **substitution effect**, i.e. HHs provide more labor due to the increased marginal product of labor
- Note that HHs **smooth consumption** over time by building up a higher capital stock. They do so by investing, i.e. increasing the savings rate, but also by working more
- The desire to smooth consumption comes from the utility function, where the elasticity of substitution of consumption across time periods is smaller than infinity (namely one)
- k is also a production factor. Hence it should be high when it is productive, i.e. during times of high A . This is another reason why it is built up after a lasting technology shock
- Because of consumption smoothing (visible in the explanation on slide 138), it is built up slowly instead of channeling first all funds to investment, and then back to consumption

Effects of a Technology Shock II

- The net return to capital (interest rate) is $\alpha A(l/k)^{1-\alpha} - \delta$. It rises on impact because $A \uparrow$
- As capital gets accumulated, the net return falls afterwards. However, investment doesn't fall sharply after the initial periods, which would imply rising consumption and a falling interest rate
- Rising consumption would require a high interest rate in the Euler equation, not a low one. Hence, k grows and r falls slowly, until r falls even below the SS value
- Effect on the interest rate of a 1% shock to technology is rather limited (the interest rate plotted is per annum)
- HHs work more because of two reasons: $w \uparrow$ and $r \uparrow$. The first has an effect on impact, but subsequently the wage moves little. The subsequent decline of l stems from the fall in the interest rate, which induces the agents to stop saving (and working) so much.