

# 1 Balanced Growth in $\mathbf{c}$ and $\text{cov}(c, \mathbf{p})$

Section 4.2 demonstrates some propositions under the assumption that, when an economy satisfies the **GIC**, there will be constant growth factors  $\Omega_{\mathbf{c}}$  and  $\Omega_{\text{cov}}$  respectively for  $\mathbf{c}$  (the average value of the consumption ratio) and  $\text{cov}(c, \mathbf{p})$ . In the case of a Szeidl-invariant economy, the main text shows that these are  $\Omega_{\mathbf{c}} = 1$  and  $\Omega_{\text{cov}} = \Gamma$ . If the economy is Harmenberg- but not Szeidl-invariant, no proof is offered that these growth factors will be constant.

## 1.1 $\log c$ and $\log(-\text{cov}(c, \mathbf{p}))$ Grow Linearly

Figures 1 and 2 plot the results of simulations of an economy that satisfies Harmenberg- but not Szeidl-invariance with a population of 4 million agents over the last 1000 periods (of a 2000 period simulation). The first figure shows that  $\log \mathbf{c}$  increases apparently linearly. The second figure shows that  $\log(-\text{cov}(c, \mathbf{p}))$  also increases apparently linearly. (These results are produced by the notebook `ApndxBalancedGrowthcNrmAndCov.ipynb`).



**Figure 1**  $\log \mathbf{c}$  Appears to Grow Linearly



**Figure 2**  $\log -\text{cov}(c, \mathbf{p})$  Appears to Grow Linearly