1. a. Initial steady-state equilibrium levels are:

\[ k = 68.2338, \ h = 34.1169, \ y_{\text{pcapita}} = 10.2351 \]

b. When \( s_K \) increases from 0.20 to 0.25 and all else remain at their initial levels, the new steady-state equilibrium levels are:

\[ k = 100.83, \ h = 40.3322, \ y_{\text{pcapita}} = 12.0997 \]

Percentage change in \( y \) = 18.21%

The intuition is as follows. An increase in the physical capital accumulation rate \( s_K \) implies that at the initial level of \( k \), investment in \( k \) will be higher than the depreciation in \( k \). In other words, \( s_KA_k^\alpha h^\beta \) will be larger than \( \delta k \). Equation (5) indicates that this leads to physical capital accumulation and hence per capita output increases.

Then the question is how come the level of human capital per worker \( h \) is also increasing? Observe that when physical capital accumulation takes place (i.e. when \( k \) increases) \( s_HA_k^\alpha h^\beta \) also increases. This implies that at the initial level of \( h \), investment in \( h \) will be larger than the depreciation in \( h \). In other words, \( s_HA_k^\alpha h^\beta \) is larger than \( \delta h \). Equation (6) indicates that this leads to human capital accumulation and hence per capita output increases.

The arguments above imply that there will be a transitory period in which both human and physical capital accumulation will take place. This will give rise to a gradual increase in the level of per capita income. Over time, as the stocks of physical and human capital increase, diminishing returns will start kicking in. Eventually a steady-state equilibrium will be reached with \( \dot{h} = \dot{k} = 0 \). At this point, per capita income growth will come to a halt and \( y \) will reach its new steady-state level.

c. When \( s_H \) increases from 0.10 to 0.20 and all else remain at their initial levels the new steady-state equilibrium levels are:

\[ k = 114.755, \ h = 114.755, \ y_{\text{pcapita}} = 17.2133 \]

Percentage change in \( y \) = 68.17 %

The intuition is as follows. An increase in the human capital accumulation rate \( s_H \) implies that at the initial level of \( h \), investment in \( h \) will be higher than the depreciation in \( h \). In other words, \( s_HA_k^\alpha h^\beta \) will be larger than \( \delta h \). Equation (6) indicates that this leads to human capital accumulation and hence per capita output increases.

Then the question is how come the level of physical capital per worker \( k \) is also increasing? Observe that when human capital accumulation takes place (i.e. when \( h \) increases) \( s_KA_k^\alpha h^\beta \) also increases. This implies that at the initial level of \( k \), investment in \( k \) will be larger than the depreciation in \( k \). In other words, \( s_KA_k^\alpha h^\beta \) will be larger than \( \delta k \). Equation (5) indicates that this leads to human capital accumulation and hence per capita output increases.
The arguments above imply that there will be a transitory period in which both human and physical capital accumulation will take place. This will give rise to a gradual increase in the level of per capita income. Over time, as the stocks of physical and human capital increase, diminishing returns will start kicking in. Eventually a steady-state equilibrium will be reached with $\dot{h} = \dot{k} = 0$. At this point, per capita income growth will come to a halt and $y$ will reach its new steady-state level.

d. When $\alpha$ increases from 0.30 to 0.40 and all else remain at their initial levels, the new steady-state equilibrium levels are:

$$k = 278.825, \quad h = 139.413, \quad y_{\text{pcapita}} = 41.8238$$

Percentage change in $y = 308.63\%$

The intuition is as follows. An increase in $\alpha$ implies that productivity of capital increases. This implies that at the initial level of $k$, investment in $k$ will be higher than the depreciation in $k$. In other words, $s_k A_k^\alpha h^\beta$ will be larger than $\delta k$. Equation (5) indicates that this leads to physical capital accumulation and hence per capita output increases.

Similarly the increase in $\alpha$ implies that at the initial level of $h$, investment in $h$ will be larger than the depreciation in $h$. In other words, $s_h A_k^\alpha h^\beta$ is larger than $\delta h$. Equation (6) indicates that this leads to human capital accumulation. Thus $h$ increases and per capita output also increases.

The arguments above imply that there will be a transitory period in which both human and physical capital accumulation will take place. This will give rise to a gradual increase in the level of per capita income. Over time, as the stocks of physical and human capital increase, diminishing returns will start kicking in. Eventually a steady-state equilibrium will be reached with $\dot{h} = \dot{k} = 0$. At this point, per capita income growth will come to a halt and $y$ will reach its new steady-state level.

2. $\Delta$BANK = 0.83 – 0.56 = 0.27

a. To calculate the change in GYP, we use the coefficient estimate corresponding to BANK in the regression where the dependent variable is GYP. Hence, we need to use: 0.032.

The change in GYP is then given by:

$$\Delta \text{GYP} = \text{(the coefficient estimate for BANK)} \times \Delta \text{BANK}$$

$$= 0.032 \times 0.27 = 0.00864$$

b. With growth rate of 2% and $Y_{1960} = $100, the level of income in 1990 simply equals:

$$Y_{90} = (1 + 0.02)^{30} \times 100 = 181.1362$$

c. The new growth rate will be equal to 0.02 + $\Delta \text{GYP}$ = 0.02864

The predicted level of income with the higher growth rate is then equal to:

$$Y_{90} = (1 + 0.02864)^{30} \times 100 = 233.29$$

Hence, with the financial development the income per capita level will be 28.79% higher than would otherwise be.