Jorgenson, Ho and Stiroh: A Comment

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Banque de France and Bank of Canada Workshop,
"Perspective on Potential Output and Productivity Growth"
Enghien-les-Bains, April 24 and 25, 2006

Two topics

- *Growth accounting: 1995-2000 compared with 2000-2004*

- *JHS's model for projecting potential output*

1995-2000 compared with 2000-2004

Reasons for thinking the differences may not be so great

- Complementary investment and capital
- Temporarily lower depreciation of ICT capital

Equation (1)

$$\Delta \ln y = \bar{v}_{K_n} \Delta \ln k_n + \bar{v}_{K_{IT}} \Delta \ln k_{IT} + \bar{v}_L \Delta \ln L_Q + \bar{w}_n \Delta \ln A_n + \bar{w}_{IT} \Delta \ln A_{IT}$$

y: output per hour (Y/H); k: capital services per hour (K/H);

L_Q: labour quality; A: TFP; $\bar{v}$: input shares; $\bar{w}$: output shares

Equation (2)

$$\Delta \ln y = \frac{\bar{v}_K \Delta \ln K_Q - \bar{v}_K (1 - \bar{\mu}_R) \Delta \ln H + \bar{v}_L \Delta \ln L_Q + \bar{w}_{IT} \Delta \ln A_{IT} + \bar{w}_n \Delta \ln A_n}{1 - \bar{v}_K \bar{\mu}_R}$$

$\bar{\mu}_R$: proportion of overall capital share due to reproducible capital

$\bar{v}_K$: overall (reproducible + non-reproducible) capital share

K_Q : capital quality (growth of capital services minus growth of capital stock)

Equation (2’)

$$\Delta \ln y = \frac{\bar{v}_K \Delta \ln K_Q + \bar{w}_{IT} \Delta \ln A_{IT} + \bar{w}_n \Delta \ln A_n}{1 - \bar{v}_K}$$

Two-good model

$$Y_n = A_n k_{IT}^{\alpha} k_n^{\beta} H^n$$

$$Y_{IT} = A_{IT} k_{IT}^{\alpha} k_n^{\beta} H^{IT}$$

$$H = H^n + H^{IT}$$

Relative price of IT output

$$\Delta \ln p_{IT} = \Delta \ln A_n - \Delta \ln A_{IT}$$

p_{IT} : relative price of IT output

Steady state properties of model

$$\Delta \ln H^{n} = \Delta \ln H^{IT} = \Delta \ln H$$

$$\Delta \ln k_{n} = \Delta \ln y_{n}$$

$$\Delta \ln y_{IT} = \Delta \ln k_{IT} = \Delta \ln k_{n} - \Delta \ln p_{IT}$$

$\therefore$ the *value* of the capital-output ratio is constant in steady state:

$$\frac{K_{IT} + p_{IT} K_{IT}}{Y_{IT} + p_{IT} Y_{IT}} \text{ is constant}$$

Steady state growth rate

$$\Delta \ln y = \frac{\alpha(\Delta \ln A_{IT} - \Delta \ln A_n) + \bar{w}_n \Delta \ln A_n + \bar{w}_{IT} \Delta \ln A_{IT}}{1 - \alpha - \beta}$$

or, using JHS's notation,

$$\Delta \ln y = \frac{\bar{v}_{K_{IT}} (\Delta \ln A_{IT} - \Delta \ln A_n) + \bar{w}_n \Delta \ln A_n + \bar{w}_{IT} \Delta \ln A_{IT}}{1 - \bar{v}_K}$$

Difference between the models

JHS

$$\frac{\bar{v}_K \Delta \ln K_Q}{1 - \bar{v}_K \bar{\mu}_R}$$

Oulton

$$\frac{\bar{v}_{K_{IT}} (\Delta \ln A_{IT} - \Delta \ln A_n)}{1 - \bar{v}_K \bar{\mu}_R}$$

How much difference does it make?

Projections of labour productivity growth, % pa

	Pessimistic	Base-case	Optimistic
JHS	1.35	2.57	3.18
Oulton	1.79	2.54	3.03
JHS *minus* Oulton	-0.44	0.03	0.15

Source: JHS, Table 3. ICT income share = 0.08