Explanatory Document on ΔCA for today's lecture

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We have

$$CA(q) = X - qM$$

from the previous settings, where $CA(q)$ is the Current Account in real term.

Now we rewrite the above equation into a dynamic system:

$$\begin{cases} CA_2 &= X_2 - q_2 M_2 \\ CA_1 &= X_1 - q_1 M_1 \end{cases}$$

Then use the upper part to subtract the lower part and rewrite using Δ step-by-step:

$$\begin{aligned} CA_2 - CA_1 &= X_2 - X_1 - q_2 M_2 + q_1 M_1 \\ \Delta CA &= \Delta X - q_2 M_2 + q_1 M_1 \\ \Delta CA &= \Delta X - q_2 M_2 + q_1 M_2 - q_1 M_2 + q_1 M_1 \\ \Delta CA &= \Delta X - (q_2 M_2 - q_1 M_2) - (q_1 M_2 - q_1 M_1) \\ \Delta CA &= \Delta X - (q_2 - q_1) M_2 - q_1 (M_2 - M_1) \\ \Delta CA &= \Delta X - (\Delta q) M_2 - q_1 (\Delta M) \end{aligned}$$

And then we need to **APPROXIMATE** ☹☹☹ that

$$(\Delta q) M_2 \approx (\Delta q) M_1$$

and we obtain the **APPROXIMATED** result:

$$\Delta CA = \Delta X - (\Delta q) M_1 - q_1 (\Delta M)$$

or equivalently if we write $q_1 = q$ and $M_1 = M$ then the result is:

$$\Delta CA = \Delta X - (\Delta q) M - q (\Delta M)$$