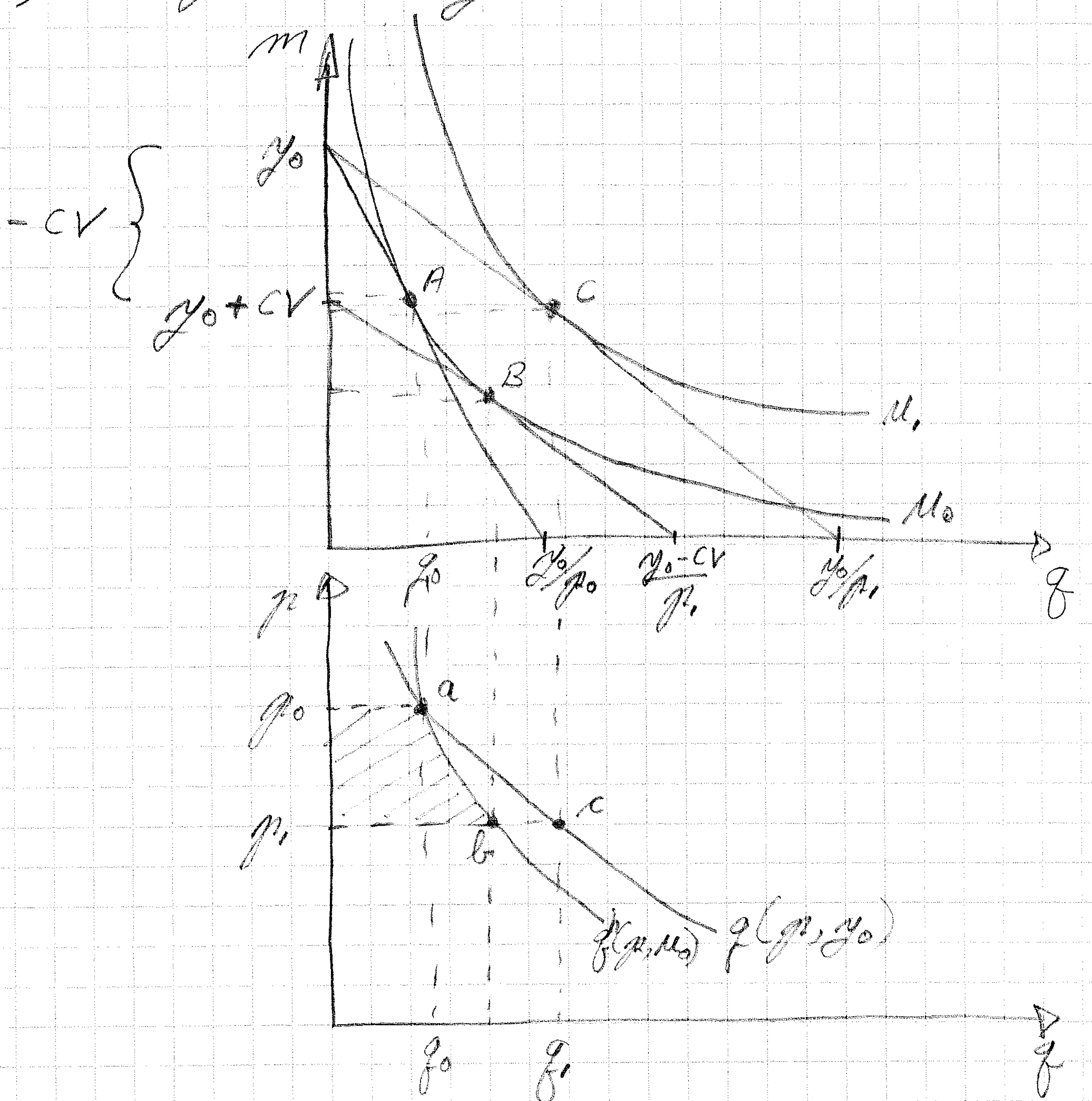
ECO 6122
FINAL EXAM DEC. 2008.

1) a) Compensating Variation:



As the price drops from p_0 to p_1 the movement along indifference curve u_0 from A to B keeps utility unchanged with a drop in income equal to CV. CV therefore corresponds to the maximum that the consumer is willing to pay for the new facilities.

b) It turns out that

$$CV = \int_{p_0}^{p_1} q^h(p, u_0)\, dp \equiv \text{area } p_0 a b p_1$$

The change in consumer surplus is given by

$$\Delta CS = \int_{p_0}^{p_1} q(p, y_0)\, dp \equiv \text{area } p_0 a c p_1$$

It is therefore clear from the graphic that

$$\Delta CS > -CV.$$

c) The problem with the concept of compensating variation is that it relies on the Hicksian demand function which is not directly observable.

It has been shown, however, that in most applications, the use of the consumer surplus provides a reasonable estimate of the value of CV. So one may use the Marshallian demand instead.

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#2) a) $E(\pi) = 0 \Rightarrow \alpha(q-1)x + (1-\alpha)qx = 0$

$$\Rightarrow \alpha q - \alpha + q - \alpha q = 0$$

$$\Rightarrow q = \alpha$$

The unit cost of x is equal to α.
The problem of the individual is thus:

$$\max_{x} E(u) = \alpha u(w_0 - (L - x) - \alpha x) + (1-\alpha) u(w_0 - \alpha x)$$

$$\frac{\partial E(u)}{\partial x} = \alpha u'(w_0 - (L-x) - \alpha x)(1-\alpha) - (1-\alpha) u'(w_0 - \alpha x)\alpha = 0$$

$$\Rightarrow u'(w_0 - (L-x) - \alpha x) = u'(w_0 - \alpha x)$$

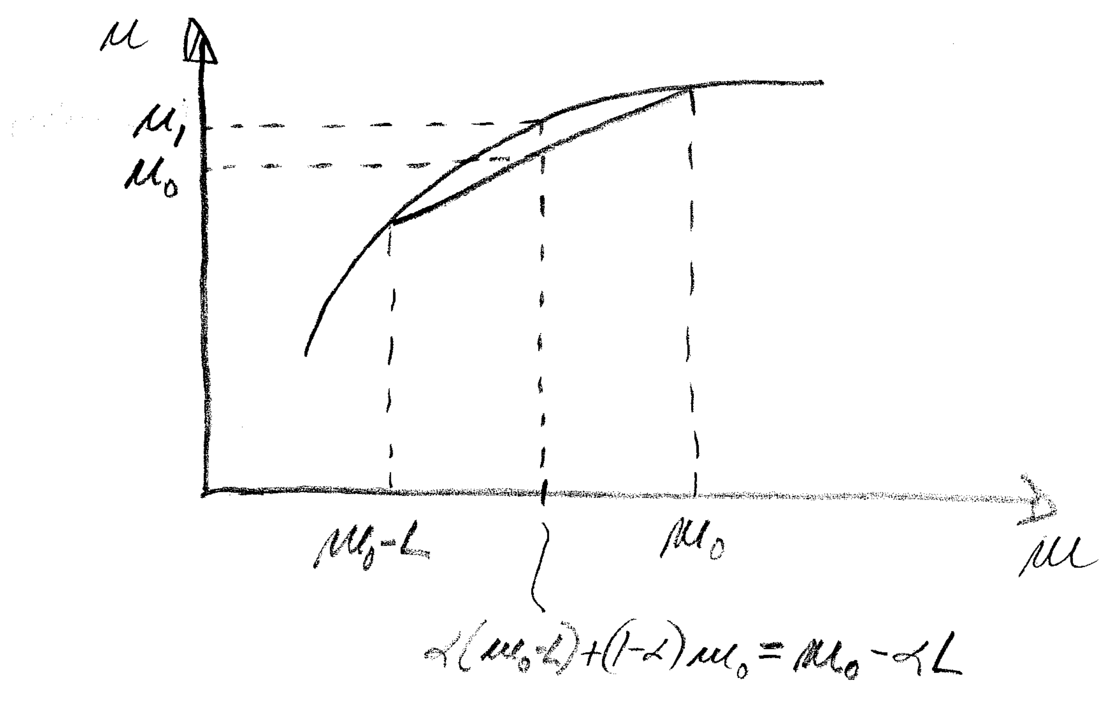
Since $u''(\cdot) < 0$ by risk aversion, we must have:

$$w_0 - (L-x) - \alpha x = w_0 - \alpha x$$

$$\Rightarrow L = x$$

The individual is thus fully insured.

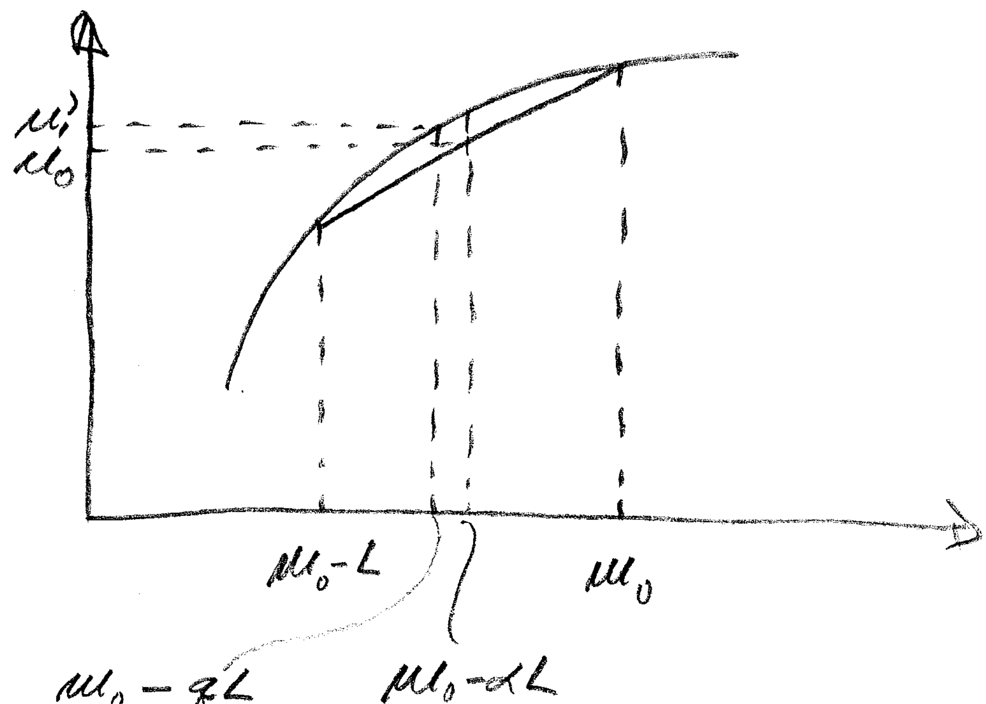
b)



With full insurance, the expected utility is $u_1 = u(m_0 - \alpha L)$.

Without insurance, the expected utility is $u_0 = \alpha u(m_0 - L) + (1-\alpha) u(m_0)$.
We can see on the graphic that with $u''(m) < 0$, we have $u_1 > u_0$.

c)



If $q > \alpha$, we can still have
$u_1' = u(m_0 - qL) > u_0$.

d) The problem is:

$$\max_{x} E(u) = \alpha u(m_0 - (L - x) - qx) + (1-\alpha) u(m_0 - qx)$$

$$\frac{\partial E(u)}{\partial x} = \alpha u'(m_0 - L + x - qx)(1-q) - (1-\alpha) u'(m_0 - qx) q = 0$$

$$\Rightarrow \frac{u'(m_0 - (L - x^*) - qx^*)}{u'(m_0 - qx^*)} = \frac{(1-\alpha) q}{\alpha (1-q)}$$

$$q > \alpha \Rightarrow \frac{1-\alpha}{1-q}\frac{q}{\alpha} > 1.$$

Hence, $u'(m_0-(L-x^*)-qx^*) > u'(m_0-qx^*)$.

Since $u''(\cdot)<0$ by risk-aversion, this implies:

$$m_0-(L-x^*)-qx^* < m_0-qx^*$$

$$\Rightarrow x^* < L \qquad \underline{QED}$$

e) $x^*=0$ if $\left.\frac{\partial E(u)}{\partial x}\right|_{x=0} \leq 0$.

$$\Rightarrow \frac{u'(m_0-L)}{u'(m_0)} \leq \frac{(1-\alpha)q}{\alpha(1-q)}.$$

The more risk-averse the individual, the larger is $u''(m_0)$. This implies that $\frac{u'(m_0-L)}{u'(m_0)}$ increases with degree of risk-aversion. Hence, the above inequality is less likely to hold for a more risk-averse individual.