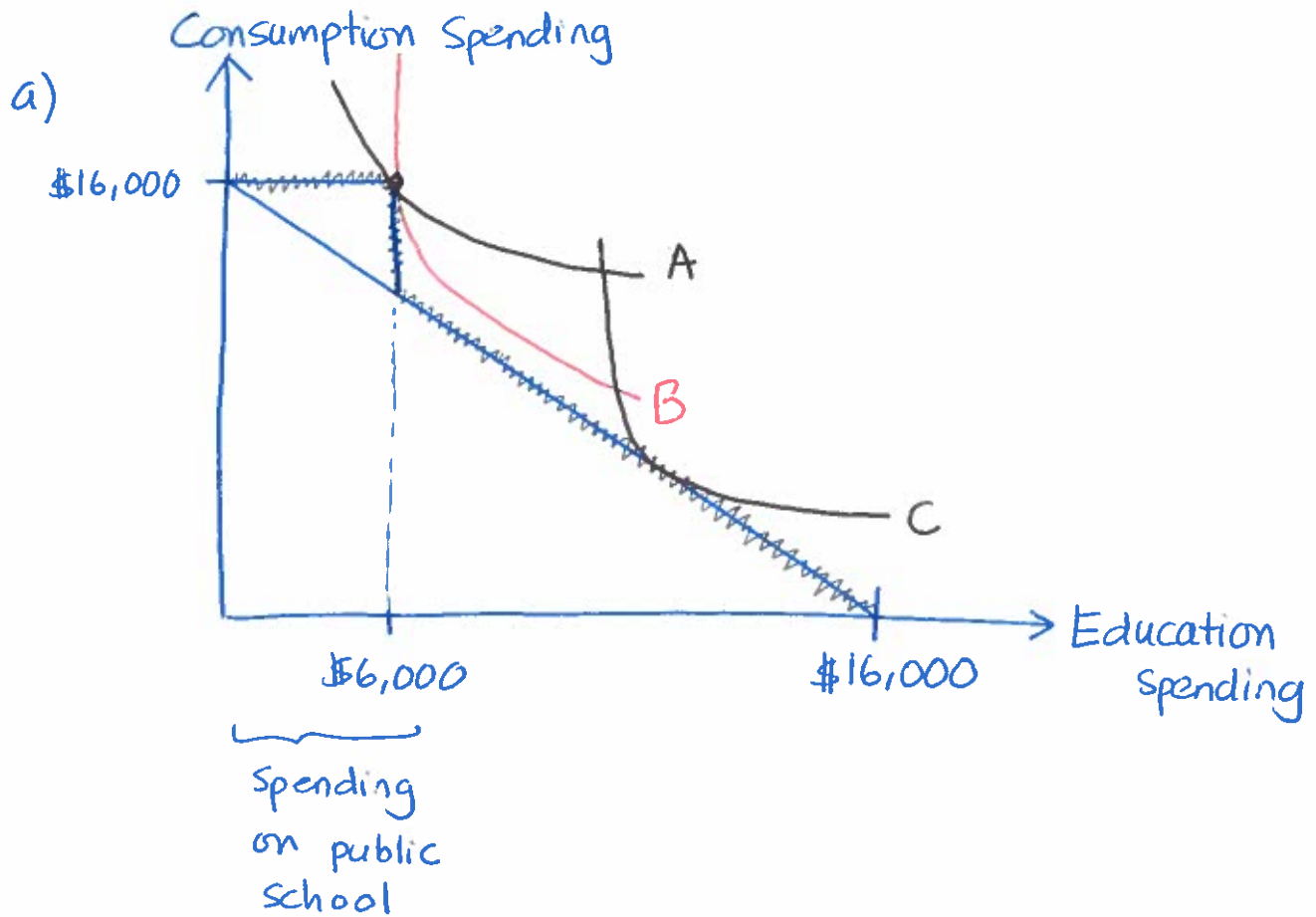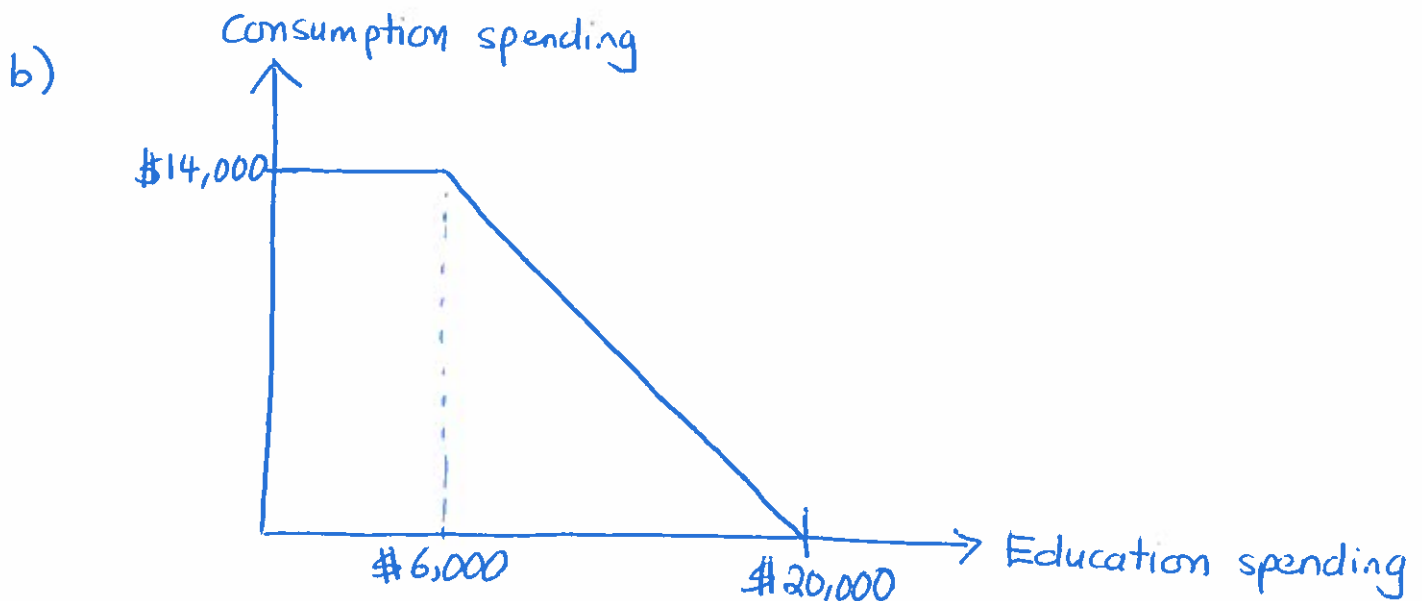## Q1)

a)

B's IC is steeper than A: reflecting their greater preference for education (even though make same choice)

b)

c) C made better off — easy. pure income effect.
Before, paying $4,000 in taxes with no voucher.
Now pay $2,000 more and get $6,000 voucher.
B/c spending more than $6,000 of education before,
voucher = cash, so they are effectively $4,000 richer.

A worse off — continue to get same education as
before but now have $2,000 less of consumption
goods b/c taxes have gone up.

d) Depends on preferences regarding tradeoffs between
consumption spending and education spending.
Two competing forces

↳ ① They would be poorer if they did not
change their choice — as a result of paying
higher taxes.

② B/c get $6,000 in voucher funds that they
can spend on either private/ public ed,
they can move to private school w/out
giving up subsidy

Q2)

Summary of the problem: Two types of people — smokers and non-smokers. Utility is given by $U = \log(C)$, where C is consumption.

Income — $15,000 (consume fully if no health problems)

If need medical attention, spend $10,000 on health expenditures (leaving only $5,000 to consume; assuming no insurance)

Smokers ⟶ 12% chance of getting sick
Non-smokers ⟶ 2% of getting sick

Two types of policies ⟶ low deductible (L)   covers all costs > $3,000
                      ⟶ high deductible (H)   covers all costs > $8,000

a) L plan

Smokers: $0.12(10,000 - 3,000) = \$840$

Non-Smokers: $0.02(10,000 - 3,000) = \$140$

H plan

Smokers: $0.12(10,000 - 8,000) = \$240$

Non-Smokers: $0.02(10,000 - 8,000) = \$40$

b) <u>Method 1</u>) Since both policies are actuarially fairly priced for each group, both groups will prefer the policy that is closer to full insurance — the L policy.

<u>Method 2)</u>

<u>Compute expected utilities</u>:

<u>Smoker</u>

Plan L : $0.12 \log(15{,}000 - 10{,}000 + 7000 - 840)$

$\qquad + 0.88 \log(15{,}000 - 840)$

$\qquad = 0.12 \log(11{,}160) + 0.88 \log(14{,}160)$

$\qquad = 4.137$

Plan H : $0.12 \log(15{,}000 - 10{,}000 + 2000 - 240)$

$\qquad + 0.88 \log(15{,}000 - 240)$

$\qquad = 0.12 \log(6{,}760) + 0.88 \log(14{,}760)$

$\qquad = 4.128$

No Insurance : $0.12 \log(15{,}000 - 10{,}000) + 0.88 \log(15{,}000)$

$\qquad = 0.12 \log(5{,}000) + 0.88 \log(15{,}000)$

$\qquad = 4.119$

So smokers prefer $L > H >$ no insurance

Non-smoker

Plan L: $0.02 \log(15{,}000 - 10{,}000 + 7{,}000 - 140)$

$\quad\quad + 0.98 \log(15{,}000 - 140)$

$\quad\quad = 4.17$

Plan H: $0.02 \log(15{,}000 - 10{,}000 + 2{,}000 - 40)$

$\quad\quad + 0.98 \log(15{,}000 - 40)$

$\quad\quad = 4.1683$

No insurance: $0.02 \log(15{,}000 - 10{,}000) + 0.98 \log(15{,}000)$

$\quad\quad = 4.1665$

So non-smokers also prefer $L > H >$ no insurance.

c) Assymetric information → companies can't offer one price to smokers and another to non-smokers b/c can't see who is smoker or not.

If price is lower to non-smokers, smokers will pretend to be non-smokers.

So if both smokers + non-smokers buy L policies, premium must be <u>at least</u> $\frac{840 + 140}{2} = 490$ or else firm will lose money when it sells to both groups.

<u>But</u> at this high of premium, note that non-smokers will <u>not</u> buy insurance:

Utility from no insurance $= 0.02 \log (15,000 - 10.000)$
$\qquad\qquad\qquad\qquad + 0.98 \log (15,000) = 9.594$

Utility from L-policy with premium \$490
$\qquad = 0.02 \log (15,000 - 10,000 + 7000 - 490)$
$\qquad\quad + 0.98 \log (15,000 - 490)$
$\qquad = 9.578$

The only group that wants L policies at this high price is smokers. But if only smokers are buying insurance, premium ≥ 840 for firms to not lose money.

(d) Suppose that Insurance company offers two policies:

$$\begin{cases} \$840 & L \text{ policy} \\ \$40 & H \text{ policy} \end{cases}$$

From (c), we know non-smokers prefer no policy to high-priced L policy. Since a $40 H policy is actuanally fairly priced for them, they will prefer this policy to no policy:

Non-smokers: $40 H policy > no policy > $840 L policy

Firm will break even at $40 H policy for non-smokers.

Smokers get expected utility of

$$\begin{cases} L \text{ policy} : & 0.88 \log(15,000-840) + 0.12 \log(15,000-840 \\ & = 9.530 \qquad\qquad -10,000+7000) \\ H \text{ policy} : & 0.88 \log(15,000-40) + 0.12 \log(15,000-40 \\ & = 9.521 \qquad\qquad -10,000+2,000) \end{cases}$$

$\Rightarrow$ Smokers choose high-priced L policy.

Firms break even selling to them.

Answer, Q3: Students would have less incentive to choose a major or program that leads to a high-paying job on graduation. Some students currently feel financial pressure to pick majors that will enable them to live comfortably while paying off large student loans. If the loan repayment plan were income-contingent, students would be able to choose majors based on their own preferences and strengths rather than their ability to repay the loans.

While this scheme would ease students' financial worries, it would not necessarily be efficient. It has been claimed that one of the rationales for subsidized student loans is to offset failures in the credit market. But a working credit market would not freely accommodate a student's wish to pursue a career in art rather than in business. A fully functioning credit market would lend more money to a student pursuing a lucrative major and would lend less to a student seeking a rewarding but low-paying career because the financial returns to these choices differ.

Students who choose lower-paying careers must be making a trade-off between money and other sources of utility. An income-contingent repayment plan would encourage students to choose lower-paying jobs because they would not have to bear the full cost of that choice.