1. (a) Unless a project has an explicit goal of job creation, it should not be favoured just because it hires many employees. Generally labour is a cost, an input, to be valued at the appropriate shadow wage, usually between the higher tax-inclusive and the lower tax-excluded prices. In the case of involuntary unemployment it might be even lower. The social benefit per job created = the market wage − the shadow wage ≥ 0

(b) If there exists involuntary unemployment, then market wage > shadow wage, and since labour is a cost, an input, the $NPV_{s.w.} > NPV_{m.w.}$ Moreover, if the project is sufficiently large to raise the market wage, have to distinguish between incremental labour (valued at tax-excluded) and displaced labour (valued at tax-inclusive). Note: use willingness to pay for displaced, and opportunity cost for incremental.

(c) Large quantities of input is <u>not necessarily</u> a good thing, on average. In a simple CBA, want to maximise the difference NPB − NPC, which is not done if costs are higher than necessary: note: this is just EVA, Economic Value Added! NPV measures improved efficiency, size of the economic "pie".

(d) The interest rate is a price: the cost of capital. Just as with other prices, we may have to

adjust for market distortions where market i.r. ≠ shadow i.r. Again, if the capital is wholly incremental, then shadow i.r. < tax-inclusive market i.r., but if some capital is displaced, then use tax-inclusive. Why? Opportunity cost of capital = market interest rate with taxes; willingness to pay = market interest rate paid. No, neither private nor public projects should be subsidised, necessarily. If gain in C.S. > prospective loss of a private firm, then there is a case of subsidy, to improve the social welfare.

2. (a) A Pareto Improvement (PI) gives losers the veto. Under PPIC losers lose the veto, so long as winners could in principle pay the losers to be content and still be ahead themselves. So estimate the winners' gains and the losers' losses. If WG > LL, then PPIC is satisfied, and on efficiency grounds the project should go ahead, even if the losers lose.

(b) See (a). Compensation could still be valuable if the project has distributional goals as well or if political pressures, implementation etc. will be satisfied by it.

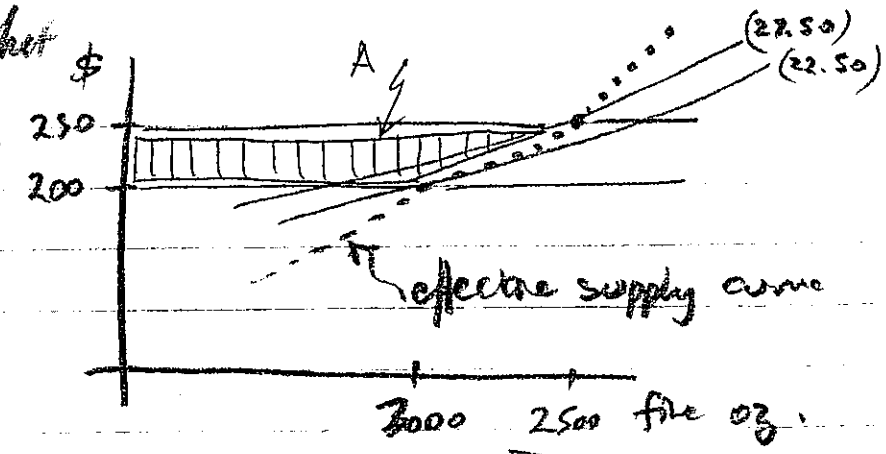
(c) The Internal Rate of Return (IRR) is the discount rate (not interest rate) that results in an NPV = 0. It need not be unique. The IRR is an attempt to determine how profitable an investment project will be: is the IRR > the hurdle rate? If yes, then good.

But the IRR is scale-independent: double the size of the project leaves the IRR unchanged. So it cannot be used to rank exclusive projects, and it cannot be used when there is capital rationing (a budget). In all cases we wish to choose a combination of projects that maximise NPV in aggregate. (Use NPV/K_0 or NBIR to rank projects, not IRR.)

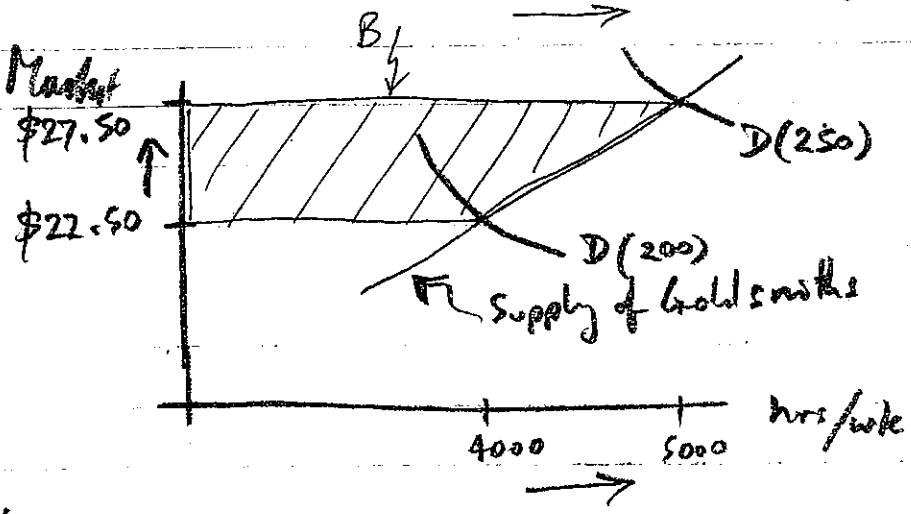
(d) No. Although the toll (by necessity the effective price of using the highway will increase the demand for substitutes (such as the railway) and reduce the demand for complements (such as petrol etc.), and so there will be changes in CS in these other markets — specifically there will be an increase in CS in the rail travel market. These changes should not be included in the CBA, in general.

Occurring through the smooth operation of the market mechanism, they are Pecuniary External Benefits (PEEs). Only if these related markets are not competitive should changes in them be included in the CBA. Otherwise, there are winners and losers, but these cancel. In this case, with horizontal supply (constant Marginal Cost) there is no change in the rail travel fare, and that market is competitive. Ignore the increase in CS there.

4 (a) Gold Market



Observed points lie on the "effective demand" curve, since a determinant of supply, the cost



of Goldsmiths is affected by the world price of gold. From the second graph, the cost of Goldsmiths rises from $22.50 to $27.50, and so the supply curves in the first graph are actually more elastic (shallower) than the effective demand curve.

(b) The mine owners gain A = 50 × 2250 in Gold M.
= $112,500

but Lose B: 5 × 4500 = $22,500 in GS M

I Net = $90,000 gain = A − B

II The Goldsmiths gain B = $22,500

III Total net gain = A − B + B = A = $112,500

IV This is what Australia gains.
Assuming that (1) no externalities, (2) the supply of Australian gold is negatively influenced by the wages paid to Goldsmiths.