EXAMINATION I

Economics

Corporate Finance

Financial Accounting and Financial Statement Analysis

Equity Valuation and Analysis

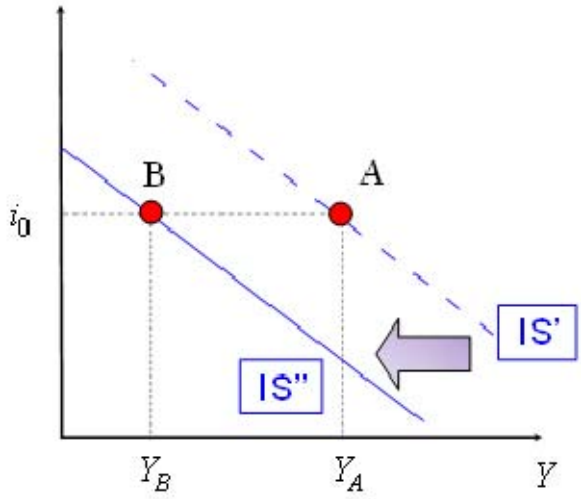
Solutions

Final examination

March 2014

S Q1 March14 : Economics

a)
a1)
The IS curve describes the equilibrium relation between GDP and interest rate on the goods and services market. The reduction in investment reduces the demand for goods and services. There is a direct effect (Investment is a component of aggregate demand) and an indirect effect, since a reduction in demand shrinks income, disposable income and hence consumption.



For any given interest rate, the demand is weaker, which implies a leftward shift of the IS curve. In the picture above, when the interest rate is at the (arbitrarily chosen) level i_0, the reduction in investment moves the IS curve (as from IS' to IS'') from A to B.

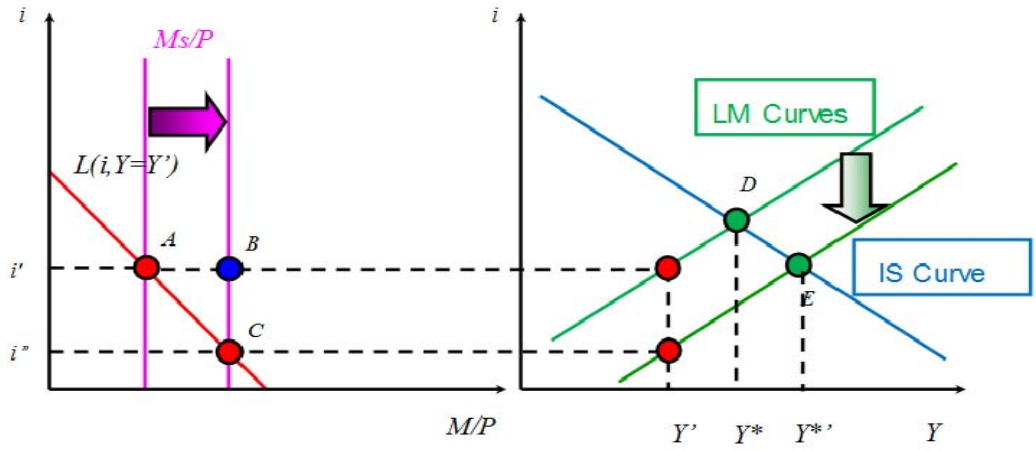
a2)
The money market equilibrium is affected by demand and supply of real money balances. The demand for money depends positively on income and negatively on the interest rate; the supply of money is supposed to be under the Central Bank's control. In the Figure below, the demand for money is depicted for a given level Y' of the real income.

The LM curve summarizes the equilibrium between money demand and money supply.

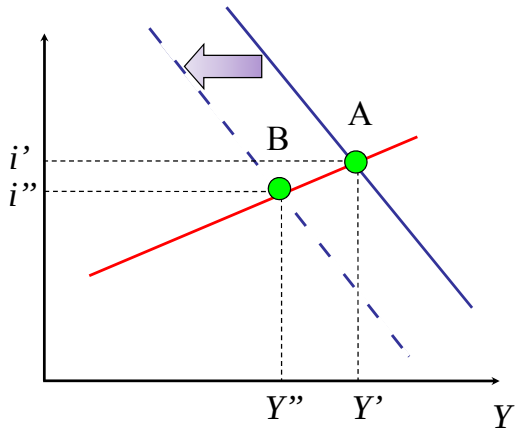
The Central Bank can affect output by changing the interest rate: a reduction in the interest rate exerts a positive influence on output by stimulating real investments.

The reduction of the interest rate is achieved by means of an increase in the supply of money Ms (Ms/P is moving rightward on the graph below). This induces a disequilibrium in the money market (there is an excess supply of money balances that corresponds to the horizontal distance between point B and point A, where point A represents the demand and point B represents the supply of money for the level i'), so that the interest rate must decrease (from i' to i''), to restore the equilibrium (at point C).

In the IS-LM diagram, the LM curve shifts downward. Thus, for any given level of autonomous demand, propensity to consume and invest, taxes, and so on (i.e. for a given IS curve) equilibrium output increases (from Y* to Y*', from D to E), via the stimulus on investment activity.



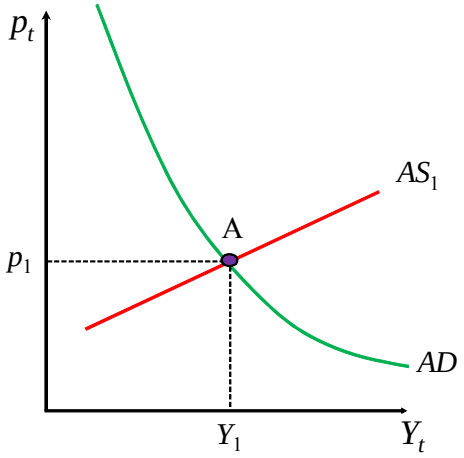
a3)
A leftward shift of the IS curve represents a reduction in demand (for any given interest rate). The reduction in demand for goods and services involves also a reduction in the demand for real money balances. For any given supply of money, the reduction in money demand calls for a reduction in the equilibrium interest rate (from A to B in the graph below). In other words: a reduction in the interest rate, implying an increase in money demand, is needed to balance the decrease in money demand caused by the income reduction.



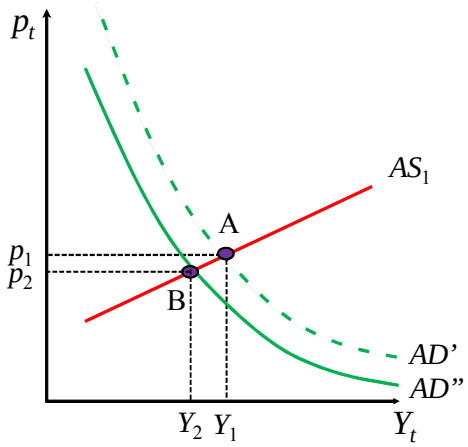
Accordingly, if the money supply does not change, the equilibrium interest rate decreases. The reduction in the interest rate experienced by Turkey has been low enough to justify the position suggesting that the decrease has been partly caused by the slowing down of economic activity (by the reduction in the rate of growth) and only partly caused by an increase in the supply of money (by an increase in the money growth rate).

a4)
The macroeconomic equilibrium can be summarised by means of the AS-AD model. Aggregate supply and aggregate demand relate the average price level (P) and output (Y). The AD curve depends on fiscal policy, monetary policy and on the level of the autonomous demand. Its slope is negative because a reduction in prices increases the real money balances, reduces the interest rate and hence increases demand in the IS-LM framework.

The AS curve relates output to costs and hence to prices. A reduction in output below its equilibrium level induces a downward pressure on wages and hence a reduction in the price level. We can also explain the reason why the slope of the AS curve is positive by $Y = F(L^D(W/P))$.



The most likely reason why the TCMB policy response has been weak is that – given the brisk economic growth that characterized the country from 2009 Q4 to 2011 Q2 – output was close (or above) its natural level (full employment). In the picture below, the reduction in demand caused by the contraction in investment induced a reduction in (the growth rate of) output and in (the growth rate of) prices.



b)
b1)
The real exchange rate (e.g. with respect to the Euro) is the ratio between the cost – measured in Turkish liras – of a good (of a basket of goods) on the international market and on the domestic market.

It is defined as $\varepsilon_t = \frac{S_t P_t^F}{P_t}$, in which P_t^F represent foreign prices (denominated in the foreign currency), P_t domestic prices, and S_t is defined as the spot Turkish lira to Euro exchange rate. Notice that an increase in the real exchange rate implies a higher cost for the 'foreign' basket of goods, and hence a depreciation for the domestic currency.

The "uncovered interest parity" equation states: $\mathrm{i}_{\mathrm{Tr}} = \mathrm{i}_{\mathrm{Euro}} + \frac{\mathrm{E}(\mathrm{S}_{\mathrm{t+1}}) - \mathrm{S}_{\mathrm{t}}}{\mathrm{S}_{\mathrm{t}}}$, which implies that the interest rates on domestic deposits i_{Tr} should be equal to the interest rate on foreign deposits $\mathrm{i}_{\mathrm{Euro}}$ plus the expected percentage depreciation of the domestic currency.

Solving the above equation for S_t, one gets: $S_t = \frac{E(S_{t+1})}{1 + i_{Tr} - i_{Euro}}$. Hence, a reduction in the domestic rate i_{Tr}, leads to an increase in the Turkish lira to Euro exchange rate (i.e. to depreciation for the Turkish currency). For given domestic and foreign prices, this also implies a real exchange rate depreciation.

b2)
The current account records payments for traded goods and services (which is the "trade balance"). The equation for the net exports is: $NX = X(Y_F,\varepsilon) - \varepsilon Q(Y,\varepsilon)$ in which X stand for export, Y and Y_F, denote respectively, the Turkish and European GDPs, and Q stands for imports. Imports are multiplied by the real exchange rate to take into account the fact that the goods and services making up imports are different from goods and services composing exports.

For a given level of Y and Y_F, and for a given interest rate, when the real exchange rate depreciates, the Turkish exports are encouraged and thus increase. Moreover, imports become more expensive and, therefore, their quantity decreases. Notice, however, that the real value of import increases.

The Marshall-Lerner condition claims that following depreciation, exports increase enough and imports decrease enough to compensate for the increase in the price of imports. Assuming that the Marshall-Lerner condition holds, the depreciation of the national currency leads to an increase in exports net of the real value of imports, which implies an improvement of the trade balance.

b3)
If the European Central Bank increases the policy rate, using the uncovered parity equation, we immediately realizes that the nominal exchange rate of the Turkish lira with respect to the Euro tends to depreciate.

If the Marshall-Lerner condition holds, the Turkish net export will increase, which is shifting upwards the IS curve. This increase in the IS curve adds to the one due to the (assumed) improvement in the Euroland economic conditions, which are likely to induce more Turkish exports. This will raise both output and the interest rate. The increase in the interest rate will partly counteract the depreciation in the Turkish currency, the lira.

S Q2 March14 : Financial Accounting and Financial Statement Analysis

a)
a1)
(1) = 1,363

Calculations
- Domestic liquor: FY2013 ratio of operating profit to sales
  11.9% = 1,151 / 9,676; 9,918 · (0.119 + 0.003) = 1,210
- International liquor: FY2013 ratio of operating profit to sales
  2.9% = 49 / 1,687; 1,822 · (0.029 + 0.003) = 58
- Beverages and food: 95 (from Exhibit 1)

So, FY2014 operating profit = 1,210 + 58 + 95 = 1,363

(2) = 1,441

Calculations
- Domestic liquor: FY2014 ratio of operating profit to sales = 12.2%, FY2015 = 12.5%:
  10,166 · 0.125 = 1,271
- International liquor: FY2014 ratio of operating profit to sales = 3.2%, FY2015 = 3.5%:
  1,968 · 0.035 = 69
- Beverages and food: 101 (from Exhibit 1)

So, FY2015 operating profit = 1,271 + 69 + 101 = 1,441

(3) = 784

FY2014 operating income (1,363 – 56) · (1 – 0.4) = 784

(4) = 9,088

End of FY2014 tangible fixed assets =
9,213 (end of FY2013 tangible fixed assets)
+ 500 (FY2014 CF investment in tangible fixed assets)
– 625 (FY2014 CF depreciation of tangible fixed assets).

(5) = 450

- FY2014 Operating CF = 784 (net income found in (3)) + 37 + 625 = 1,446
- FY2014 Investing CF = -500,
- FY2014 Financing CF = Financial liabilities + Dividends paid
  Financial liabilities = -300
  Dividends paid = -784 (net income found in (3)) · 0.25 (payout ratio 25%) = -196
  So, FY2014 Financing CF = -496

So, net CF (= increase in financial assets) =
1,446 (operating CF) – 500 (investing CF) – 496 (financing CF) = 450

(6) = -35

- End of FY2015 financial assets =
  3,450 (end of FY2013 financial assets) + 450 (FY2014 net CF) + 472 (FY2015 net CF) = 4,372
- FY2015 financial profit = 4,372 · 0.02 (given in question: 2%) = 87
- FY2015 financial liabilities = 3,661 (end of FY2013 financial liabilities) – 300 – 300 = 3,061
- FY2015 financial expenses = 3,061 · 0.04 (given in the question: 4%) = 122

So, FY2015 financial balance = 87 – 122 = – 35

(7) = 18,774

- FY2015 financial assets = 4,372 (calculated in (6))
- End of FY2015 tangible fixed assets = 9,088 (calculated in (4)) + 550 (investing CF) – 651 (FY2015 depreciation) = 8,987
- End of FY2015 balance of current assets (in Exhibit 1 balance sheet) = 5,415

So, End of FY2015 total assets = 4,372 + 8,987 + 5,415 = 18,774

a2)

	FY2015
Net income / pretax profit	0.600 (i)
Pretax profit / operating profit	0.976 (ii)
Operating profit / sales	0.083 (iii)
Sales / total assets	0.9216 (iv)
Total assets / net worth (shareholders equity)	2.08 (v)
ROE	9.3% (vi)

Calculation process:

FY2015 pretax income = 1,441 (operating profit (calculated in (2))) – 35 (financial balance (calculated in (6))) = 1,406; Net income = 1,406 · (1 – 0.4) = 844. So, 844 / 1,406 = 0.60

Pretax profit = 1,406; Operating profit (= EBIT) = 1,441. So, 1,406 / 1,441 = 0.976

Operating profit = 1,441; Sales = 17,303. So, 1,441 / 17,303 = 0.0832

Sales = 17,303; Total assets = 18,774 (calculated in (7)). So, 17,303 / 18,774 = 0.0921

Total assets = 18,774; Net worth = 18,774 (total assets) – 3,061 (financial liabilities (calculated in (6))) – 6,678 (current liabilities (stated in Exhibit 1)) = 9,035.
So, 18,774 / 9,305 = 2.08

And therefore, (i) · (ii) · (iii) · (iv) · (v) = 0.093 = 9.3%

Alternative answer:
We could also use 9.3%, calculated from the formula: net income = 1,406 (pretax income calculated in (1)) · 0.6 = 844; net worth 9,035 (calculated in (5)). So, 844 / 9,035 = 0.0934.

a3)

	FY2013
Net income / pretax profit	0.600
Pretax profit / operating profit	0.946
Operating profit / sales	0.079
Sales / total assets	0.917
Total assets / net worth	2.27
ROE	9.3%

ROE did not reach the target.

The ratio of operating profit-to-sales (EBIT) improved from 7.9% to 8.3%. Pretax income / EBIT also showed an improvement trend (94.3% → 97.6%) because of improvements in the financial balance and the 15.9% increase in net income.

However, financial leverage significantly worsened from 2.27 to 2.08, which offset the improvement in ROE. The payout ratio is still a low 25%, and the company has tended to accumulate surplus funds, and has also repaid 600 in financial liabilities during the period.

b)
b1)

	FY2015
Net income / pretax profit	923 / 1,488 = 0.620
Pretax profit / operating profit	1,488 / 1,548 = 0.961
Operating profit / sales	1,548 / 17,605 = 0.088
Sales / total assets	17,605 / 18,793 = 0.937
Total assets / net worth	18,793 / 8,337 = 2.254
ROE	923 / 8,8337 = 11.1%

b2)
FY2015 ratio of operating profit-to-sales:
Overall, profitability increased to 8.8%, which was above Company X's guidance of 8.3%. Domestic liquor and international liquor significantly improved, from 12.5% to 13.1% and from 3.5% to 4.9% respectively. There was no change for beverages and food.

Financial leverage (total assets / net worth) was 2.25, significantly higher than Company X's guidance of 2.08. This is because the payout ratio increased from 25% to 70% (restrained the accumulation of funds on hand); also contributing was the lack of decline in the balance of financial liabilities.

c)
c1)
FY2013 corrected ratio of operating profit-to-sales = 10.7% (i)
FY2013 total assets turnover rate = 0.67 (ii)

Formulae:
(i) 1,287 / (16,275 – 4,291) = 0.107.
(ii) (16,275 – 4,291) / 17,757 = 0.675.

c2)
Ratio of operating profit-to-sales = 17.0% (iii)
ROE = 17.7% (iv)

Formulae:
(iii) From Exhibit 2, FY2013 liquor unit ratio of operating profit-to-sales = total operating profit from the unit 1,200 (= 1,151 + 49) / liquor sales after deduction of liquor tax 7,072 (= 9,676 + 1,687 – 4,291) = 0.1697.
(iv) ROE = 0.6 · 0.92 · 0.17 (0.1697 found in calculation) · 0.77 · 2.45 = 0.177.

c3)
The company needs to expand international liquor sales and improve profitability. Company X is inferior to Company Y on "net income/pretax income." This is because Company X operates mostly in Japan and its tax rate is a high 40%, while Company Y's is only around 20% (estimated from net income/pretax income), creating a clear gap. Doing this will help it to overcome the gap.

It should consider selling the inefficient beverages and food unit.
It can also relocate its headquarter, because as long as the Company X is located in Japan, 40% tax will be levied.

S Q3 March14 : Corporate Finance / Equity valuation and analysis

a)
a1)
Calculation of cash flows to equity:

	1	2	3	4
Profit after Tax	162,000	200,700	214,440	224,460
+ Depreciation	+210,000	+220,500	+238,200	+262,300
- Increase in Current Assets	-30,300	-32,940	-36,360	-39,400
+ Increase in Current Liabilities	+27,570	+30,520	+35,470	+37,780
- Capital expenditures	-60,000	-70,500	-82,200	-85,400
Free Cash Flows	309,270	348,280	369,550	399,740

Calculate the cost of equity capital using the CAPM:
$r_{Equity} = 4\% + 1.25 \cdot (12\% - 4\%) = 14.00\%$

Calculate the market value of the firm given the cash flow forecast and the long-term growth rate of 4%:

$$Value_{Firm} = \frac{309,270}{1+0.14} + \frac{348,280}{(1+0.14)^2} + \frac{369,550}{(1+0.14)^3} + \frac{399,740}{(1+0.14)^4} + \frac{1}{(1+0.14)^4} \cdot \frac{399,740 \cdot 1.04}{0.14 - 0.04}$$
$$= 3,486,846.49$$

Divide the total value of equity by the number of shares outstanding to obtain the share price:

$$Value_{Share} = \frac{3,486,846.49}{80,000} = 43.59\,CU$$

a2)
Based on the forecasts by TMT Invest, i.e. the dividends on a per-share basis and the estimated cost of capital, the value of one Telecom North share is given by:

$$P_0 = \frac{270,000\,CU/80,000}{1.15} + \frac{300,000\,CU/80,000}{1.15^2} + \frac{345,000\,CU/80,000}{1.15^3} + \frac{1}{1.15^3} \cdot P_3$$

with $P_3 = \frac{(345,000\,CU/80,000) \cdot (1+g)}{0.15 - g}$.

Substituting the price target for P_0 into this equation leads to:

$$54\,CU = \frac{3.375\,CU}{1.15} + \frac{3.75\,CU}{1.15^2} + \frac{4.3125\,CU}{1.15^3} + \frac{1}{1.15^3} \cdot P_3$$

$$\frac{P_3}{1.15^3} = 45.39\,CU \Rightarrow P_3 = 45.39 \cdot 1.15^3 = 69.04\,CU$$

Inserting P_3 into the dividend-growth model yields:

$$69.04\,CU = \frac{4.3125 \cdot (1+g)}{0.15 - g}$$

which can be solved for g:
$69.04\,\text{CU} \cdot (0.15 - g) = 4.3125\,\text{CU} \cdot (1 + g) \Rightarrow g = 8.24\%$

b)
b1)
The 'financing advantage' of the convertible debt offering can be calculated by discounting the interest payments of 5% p.a. at the required rate of return of 6%:

$$\text{Value}_{\text{DebtOffering}} = +1{,}000 - \frac{50}{1.06} - \frac{50}{1.06^2} - \frac{50}{1.06^3} - \frac{50}{1.06^4} - \frac{1050}{1.06^5} = 42.12\,\text{CU}$$

Actually, the current market value of a straight bond offering with a coupon of 5% p.a. would be CU 957.88 per bond. Therefore, the company appears to lock in a 'financing advantage' of CU 42.12 per bond. However, a convertible bond consists of a debt and an equity component. Therefore, the amount of CU 42.12 reflects the implicit market value of the equity component of the convertible bond (conversion premium) and is additional equity for the firm.

b2)
Initial weighted average cost of capital (WACC) consists of 100% equity. Therefore, the WACC is equal to the cost of equity capital:
$r_{WACC} = r_{Equity} = 4\% + 1.25 \cdot (12\% - 4\%) = 14.00\%$

After the financing transactions, the ratio of debt to assets is 50%. Due to the increase in financial risk, Telecom North's beta and cost of equity capital will change.

Calculate the asset beta (i.e. as per the original unlevered beta) of Telecom North:
$\beta_{Asset} = \beta_{Equity} = 1.25$

Releverage the beta to reflect the target debt level of 50% (debt to assets) which corresponds to a ratio of 1 (50/50) debt to equity:

$$\beta_{Equity} = \beta_{Asset} \cdot \left(1 + (1 - t) \cdot \frac{D}{E}\right) = 1.25 \cdot \left(1 + (1 - 0.4) \cdot 1\right) = 2.00$$

Calculate the new cost of equity capital using the CAPM:
$r_{Equity} = 4\% + 2.00 \cdot (12\% - 4\%) = 20.00\%$

Calculate the weighted average cost of capital:
$r_{WACC} = 0.5 \cdot 20.00\% + 0.5 \cdot 6.00\% \cdot (1 - 0.4) = 11.80\%$

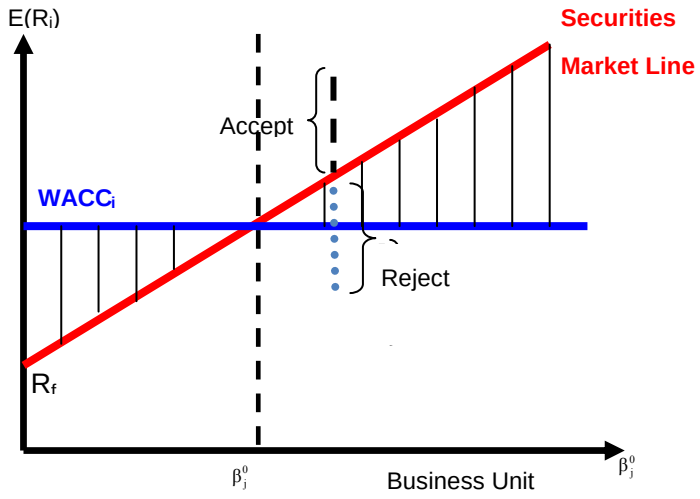
b3)
Bond Offering: Issuing bonds has primarily two benefits which help to lower the cost of capital of the firm. Interest payments are deductible from taxable income and therefore lower income taxes. This tax shield raises available free cash flows. Paying out cash in the form of interest coupons also helps to lower agency problems because managers can no longer accumulate excess cash reserves which could – depending on the use of this excess cash – reduce return on capital.

Selling of Real Estate: This transaction allows the firm to dispose of non-operating assets, that currently do not contribute to profit, and lower the amount of capital employed, which in turn,

improves returns on invested capital. Therefore, this transaction is also suitable to raise firm value.

Share Buyback: Distributing excess cash reserves by buying back shares from investors lowers agency problems for the same reason as making interest payments. Furthermore, it also lowers capital employed, raising returns available to remaining shareholders.

c)
In capital budgeting, the relevant risk of a project is its contribution to the risk of the entire firm. Therefore, the incremental cash flows of the project need to be discounted at the project-specific cost of capital which takes this into account. Graphically this can be shown as follows:



Thus, even if a given project earns the WACC it should not be realized if it does not earn its project-specific cost of capital. Applying these insights to Overbeck's strategic proposal, the project-specific beta has to be used in order to calculate the cost of capital and to evaluate the project. The project's beta equals 1.6.

Using the CAPM, the cost of equity capital for this new project equal

$$r_{Equity} = 4\% + 1.6 \cdot (12\% - 4\%) = 16.80\%$$

Thus, Overbeck underestimated the cost of equity capital for this project because he failed to take project-specific risk into account.

The impact of the project on shareholder value is given by its net present value:

$$\begin{aligned} Value_{LongHaul} &= -750{,}000 + \frac{70{,}000}{1+0.168} + \frac{95{,}000}{(1+0.168)^2} + \frac{110{,}000}{(1+0.168)^3} + \frac{1}{(1+0.168)^3} \cdot \frac{110{,}000 \cdot 1.03}{0.168 - 0.03} \\ &= -36{,}142.56\,CU \end{aligned}$$

This means that the cross-selling project is not profitable under the assumptions given. Thus, contrary to Overbeck's projections, the capital market will lower its estimate of Telecom North's value and the announcement of the project should be accompanied by negative abnormal stock returns.

S Q4 March14 : Equity valuation and analysis / Corporate Finance

a)
a1)
Free cash flow to equity (FCFE)
= Net profits + depreciation charge- capital expenditure- increase in net working capital + increase in debt; therefore:
2014 FCFE = 1,839 · (1 - 0.35) + 1,866 - 2,417 - 102 + 0 = 542.35 (million dollars)
2015 FCFE = 1,902 · (1 - 0.35) + 1,998 - 2,570 - 126 + 0 = 538.3 (million dollars)
2016 FCFE = 2,125 · (1 - 0.35) + 2,176 - 2,796 - 142 + 0 = 619.25 (million dollars)

a2)
Value of operating assets = Present value of future FCFE:

$$= \frac{542.35}{1.11} + \frac{538.30}{1.11^2} + \frac{619.25}{1.11^3} + \frac{619.25 \cdot (1 + 0.07)}{0.11 - 0.07} \cdot \frac{1}{1.11^3} = 13{,}490.43 \text{ (million dollars)}$$

Value of equity = Value of operating assets + cash:
= 13,490.43 + 2,000 = 15,490.43 (million dollars)

Theoretical share price = 15,490.43 / 100 = 154.9 (dollars)

b)
b1)
Forecast net profits this year from new business = Investment amount in new business x rate of return of new business:
= 2,000 · 0.14 = 280 (million dollars)

Free cash flow to equity (FCFE) of new business = Net profits from new business - net investments in new business:
= 280 - (280 · 0.35) = 182 (million dollars)

b2)
The operating assets of the new business generate net profits of 14%, and 35% of net profits is net investment (increase in operating assets); therefore:
Growth rate of new business operating assets = 14 · 0.35 = 4.9%.

The new business has a constant annual rate of return on operating assets, so the growth rate of new business FCFE is also 4.9%.

Value of new business
= Present value of new business FCFE
= New business' FCFE forecast this year / (required rate of return of new business - growth rate of new business FCFE)
= 182 / (0.13 - 0.049) = 2,246.91 (million dollars)

Net present value of new business:
= Value of new business - investment amount (surplus cash)
= 2,246.91 - 2000 = 246.91 (million dollars)

Therefore, if the new business is launched, the value of the equity will increase by 246.91 million dollars. (The price per share will increase by 246.91 / 100 = 2.47 dollars.)

c)
c1)
Issued and outstanding shares after share repurchase = Issued and outstanding shares before share repurchase – (Share purchase amount / share price):
= 100 – (2,000 / 160) = 87.5 (million shares)

Theoretical share price after share repurchase = Value of operating assets / issued and outstanding shares after share repurchase:
= 14,000 / 87.5 = 160 (dollars)

c2)
Tax shield from debt interest = Debt amount x interest rate x corporate income tax rate:
= 2,000 · 0.05 · 0.35 = 35 (million dollars)

Present value of tax shield = Tax shield / debt interest rate:
= 35 / 0.05 = 700 (million dollars)

Value of equity after share repurchase = Value of operating assets + cash + present value of tax shield- debt amount:
= 14,000 + 2,000 + 700 - 2,000 = 14,700 (million dollars)

Theoretical share price after share repurchase = Value of stock/number of shares:
= 14,700 / 87.5 = 168 (dollars)