EXAMINATION I

Economics

Corporate Finance

Financial Accounting and Financial Statement Analysis

Equity Valuation and Analysis

Solutions

Final examination

September 2014

S Q1 March14 : Economics

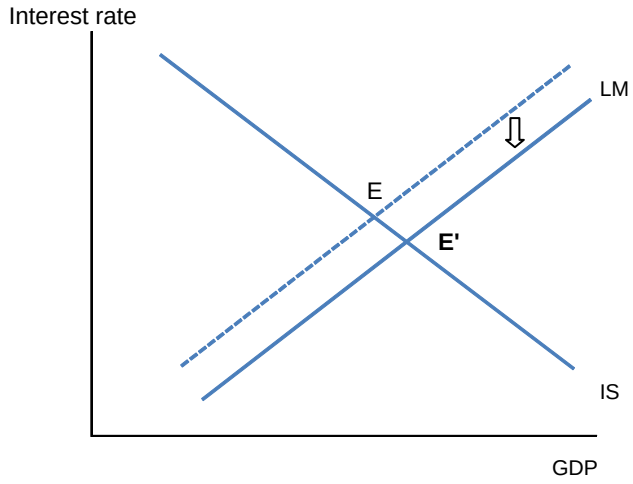
a)
a1)
Monetary base consists of cash currency and commercial bank reserve deposits with the central bank.

a2)
1. Loans of funds to commercial financial institutions (private-sector banks) and other institutions that have transactions with the central bank.
2. Purchase from the market and holding of short-term securities and long-term government bonds issued by the government.
3. Temporary purchase with re-sale conditions of short-term securities and long-term government bonds etc. issued by the government (short-term holding).
4. Purchase of bills and commercial paper (CP) issued by private companies by discounting the interest rate.

a3)
The monetary base supplied by the central bank is initially entered into financial institution (bank) accounts as cash or cash equivalents. Financial institutions use a part of these funds as reserve deposits required by the central bank, and any remaining funds to lend to companies and other economic actors. Companies etc. use the funds in capital investment and other business activities. These actions result in an increase in economic activity. The funds used for business activities also make their way to other companies and individuals and are entrusted to banks as deposits. Banks once again use deposited funds, other than those required for reserve deposits, to lend to economic actors.

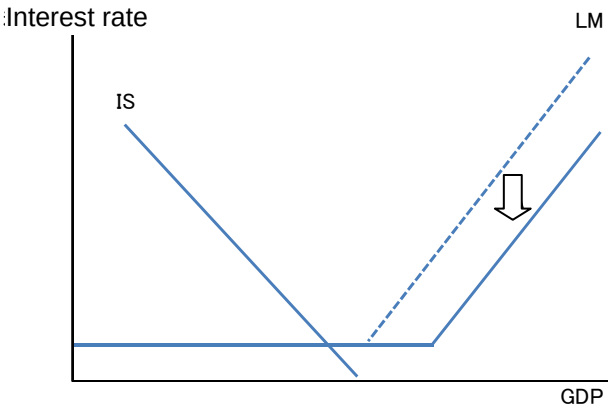
This creates a circulation of funds resulting in several times more deposits being entrusted to banks than the monetary base initially supplied. The money stock is the volume of bank deposits, and is therefore several times greater than the monetary base. This phenomenon is referred to as the "credit creation function" of banks. The size of credit creation is determined by the size of corporate etc. demand for funds, the reserve deposit rate that the central bank requires against bank deposits, and the amount of funds supplied to companies etc. that ultimately return to the banking sector in the form of deposits.

b)
b1)
Additional supply of the monetary base is a form of monetary easing, and therefore shifts the LM curve downwards. As a result, the interest rate declines and capital investment becomes more active, resulting in an increase in production volume (GDP). However, the increase in production volume results in greater demand for money, which offsets a part of the impact of the additional supply of the monetary base. As a result, the new equilibrium point shifts from E to E.'



b2)
The increase in the additional supply of monetary base causes interest rates to decline. Uncovered interest parity says that a decline in interest rates under floating exchange rates will result in a depreciation of the home country currency (a weaker foreign exchange rate). If the Marshall-Lerner condition is satisfied, the depreciation of the foreign exchange rate will cause exports to increase and imports to decline. In other words, there will be an increase in net exports, which will result in an increase in domestic economic activity.

b3)
For the additional supply of the monetary base to achieve the targeted monetary easing impact and energize economic activity, it is necessary that companies etc. actually have a latent demand for funds and that the decline in interest rates causes this demand for funds to be manifested. However, Japanese interest rates are already close to zero percent, and companies etc. presumably have abundant cash and cash equivalents on hand. Therefore, additional supply of the monetary base by the Bank of Japan did not energize production activities or cause GDP to increase. In the IS-LM model, this can be expressed as being in a "liquidity trap", as indicated in the figure.



c)
The Fisher equation says that the nominal interest rate is the real interest rate plus the expected inflation rate. The question says that there is an expectation that a 2% inflation rate will be achieved in 5 years and that no other conditions change. If the Fisher equation is to hold true, therefore, the short-term nominal interest rate in 5 years' time will be 1 + 2 = 3%.

S Q2 March14 : Financial Accounting and Financial Statement Analysis

(All amounts in thousand CU.)

a)
Total-debt-to-equity ratio = Total debt / Equity = 240,000 / 40,000 = 600%

b)
01.01.N2:

Liabilities:	Increase of 98,000
Equity:	No impact
Total-debt-to-equity ratio:	845% = 338,000 / 40,000

31.12.N2:

Liabilities:	Increase of 98,469 = 98,000 + (98,000 · 0.0456) – (100,000 · 0.04)
Equity:	Decrease of 4,469 = 98,000 · 0.0456
Total-debt-to-equity ratio:	952.6% = 338,469 / 35,531

c)
01.01.N2:

Liabilities:	Increase of 92,740
Equity:	Increase of 7,260 = 100,000 – 92,740
Total-debt-to-equity ratio:	704.1% = 332,740 / 47,260

31.12.N2:

Liabilities:	Increase of 94,450 = 92,740 + (92,740 · 0.04) – (100,000 · 0.02)
Equity:	Increase of 3,550 = 7,260 – (92,740 · 0.04)
Total-debt-to-equity ratio:	768.0% = 334,450 / 43,550

	31.12.N2	31.12.N3	31.12.N4	31.12.N5	Total
Interest	2,000	2,000	2,000	2,000	8,000
Repayment				100,000	100,000
Total	2,000	2,000	2,000	102,000	108,000
Discount factor	0.9615	0.9246	0.8890	0.8548	-
Present value	1,923	1,849	1,778	87,190	92,740
Par value					100,000
Conversion right					7,260

d)
01.01.N2:

Liabilities:	Increase of 100,000
Equity:	No impact
Total-debt-to-equity ratio:	850.0% = 340,000 / 40,000

31.12.N2:
Analysis of year N2 lease payment:
Interest: 100,000 · 6.4% = 6,400
Repayment: 24,000 – 6,400 = 17,600

Liabilities:	Increase of 82,400 = 100,000 – 17,600
Equity:	Decrease of 6,400
Total-debt-to-equity ratio:	959.5% = 322,400 / 33,600

e)
e1)
Analysis of the price paid for the acquisition of C:

Net assets (book value):	160,000 – 130,000 =	30,000
Hidden appreciation of assets:	180,000 – 160,000 =	20,000
– Tax on hidden appreciation:	20,000 · 25% =	– 5,000
= Net identifiable assets:		45,000
Goodwill (balance):		5,000
= Price paid:		50,000

Consolidated liabilities:

ABC liabilities	240,000
New borrowing	50,000
C liabilities	130,000
Deferred taxes	5,000 (tax on hidden appreciation of assets)
Total	425,000
Consolidated equity:	No impact
Total-debt-to-equity ratio:	1,062.5% = 425,000 / 40,000

e2)
Partial goodwill method:
Net identifiable assets = 45,000 (cf. question e1)
Minority interests: 45,000 · 40% = 18,000

Consolidated liabilities:

ABC liabilities	240,000
New borrowing	35,000
C liabilities	130,000
Deferred taxes	5,000 (tax on latent PV)
Total	410,000
Consolidated equity:	
ABC equity	40,000
Minority interests	18,000
Total	58,000
Total-debt-to-equity ratio:	706.9% = 410,000 / 58,000

Full goodwill method:
Minority interests: 48,000 · 40 % = 19,200

Consolidated liabilities:	410,000 (cf. partial goodwill method)
Consolidated equity:	40,000 + 19,200 = 59,200
Total-debt-to-equity ratio:	692.6% = 410,000 / 59,200

S Q3 March14 : Corporate Finance / Equity valuation and analysis

a)
a1)
Research and development expenses as well as marketing expenses should not be included in the project valuation as they are sunk costs.

a2)

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Revenues		80.0	86.4	93.3	100.8	108.8	117.5	
Operating Costs and Expenses		-33.6	-36.3	-39.2	-42.3	-45.7	-49.4	
Depreciation		-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	
EBIT		36.4	40.1	44.1	48.5	53.1	58.2	
Taxes		-10.9	-12.0	-13.2	-14.5	-15.9	-17.5	
Net Income		25.5	28.1	30.9	33.9	37.2	40.7	
+ Depreciation		10.0	10.0	10.0	10.0	10.0	10.0	
Change in NWC		-8.0	-0.6	-0.7	-0.7	-0.8	-0.9	11.8
Investment	-60							
FCF	**-60**	**27.5**	**37.4**	**40.2**	**43.2**	**46.4**	**49.9**	**11.8**

b)
b1)
The correct answer to the question is: Yes, I agree.

Generally:
In capital budgeting, the discount rate should reflect the risk characteristics of the project. In a world where the CAPM holds, we may consider two risks:
- The business or operational risk of the cash flows expected from the project;
- The financial risk related to the way the project is financed.

The two types of risk affect the systematic risk of the project measured by the beta.

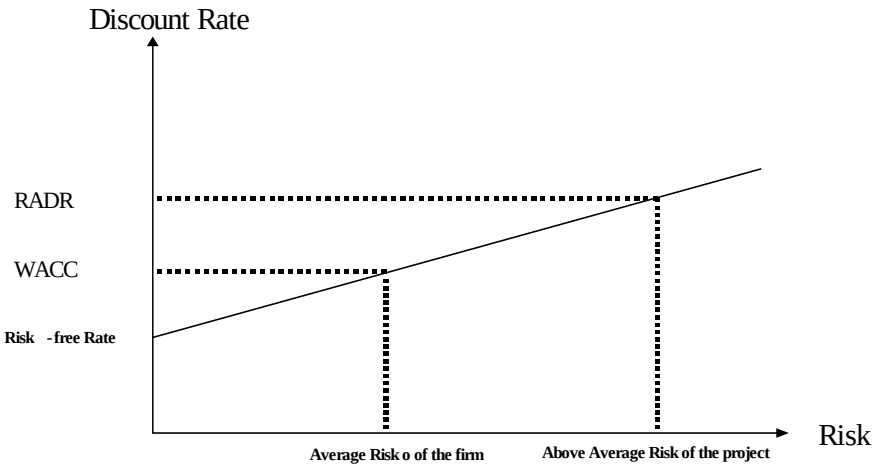
Business or operational risk:
The project is related to a new business, different from the operations in place. So the systematic nature of the cash flows is different and the project should then command its own (asset) beta.

Financial risk:
In a real world, depending on the size of the new project relative to the firm's current operations and on the difference in the financing structure (targeted debt-to-equity ratio of the project vs current debt-to-equity ratio of the firm) the cost of equity and the cost of debt for the project may differ from the respective capital costs of the firm. (On the basis of the given information, candidates cannot definitively say whether financial risk of the project is differing substantially from the firm's current financial risk).

Alternative answer:

The discount rate to be used in determining the NPV depends upon the risk of the project. Normally, it is assumed that the project under consideration is an average risk project and thus the cash flows from the project are as risky as the cash flows from the regular operations of the firm. Thus, when the project is an average risk project, one can safely use the weighted average cost of capital (WACC) as the discount rate in NPV calculations.

This assumption, however, may not be valid in certain situations. If the project that is considered is not in the normal line of the business of the firm, then one must consider applying a different discount rate to discount cash flows from the project. The procedure that is recommended in such a case is to determine a risk-adjusted discount rate for the project based on the risk of the project. The following diagram will provide an indication as to how this can be implemented.



b2)
Average equity beta of comparables = 1.13
Average D/E of comparables = 0.35

Beta unlevered (asset beta):

$$\beta_L = \beta_U\left(1+(1-t_c)\frac{D}{E}\right)$$

$$1.13 = \beta_U \cdot (1+(1-0.3)\cdot 0.35)$$

$\beta_u = 0.908$

b3)
Beta of the project:

$$\beta_L = \beta_U\left(1+(1-t_c)\frac{D}{E}\right) = (1+(1-0.3)\cdot 1)\cdot 0.908 = 1.543$$

Cost of equity capital = risk free rate + β · market risk premium = 3% + 1.543 · 4% = 9.17%

$$WACC = r_d \cdot (1-t_c)\cdot\frac{D}{D+E} + r_e \cdot \frac{E}{D+E} = 5\%\cdot(1-30\%)\cdot 50\% + 9.17\%\cdot 50\% = 6.34\%$$

c)
c1)

Year	0	1	2	3	4	5	6
loan	10.00						
principal repayment (a)		1.67	1.67	1.67	1.67	1.67	1.67
residual debt	10.00	8.33	6.67	5.00	3.33	1.67	-
interest paid (b)		0.35	0.29	0.23	0.18	0.12	0.06
Cash flows on subs. Loan (a + b)		2.02	1.96	1.90	1.84	1.78	1.73
PV of cash flows @ 5%		1.92	1.78	1.64	1.52	1.40	1.29
PV of sub. loan	**9.55**						

NPV of subsidized loan	0.45 (= 10.00 - 9.55)

[Note: The precise PV of sub. loan is 9.538.]

c2)
The difference between the face value of the loan and its present value is 10.00 - 9.55 = 0.45.

Economic Interpratation:
The amount of 0.45 is corresponding to the value of the local authority's subsidies to Beauty Alliance. This is because currently, the market requires for a 6-year bond issued by Beauty Alliance a yield to maturity of 5%. Therefore, a bond with a coupon of 3.5% and a nominal value of 10 could only be placed with investors at a price of 9.55.

Thus the value of the local authority’s subsidies to Beauty Alliance is worth 0.45.

S Q4 March14 : Equity valuation and analysis

a)
a1)
Let the pay-out ratio be denoted by π. Sustainable growth rates are:
For company X: $g_X = ROE_X \cdot (1-\pi_X) = 0.04 \cdot (1-0.6) = 0.016$
For company Y: $g_Y = ROE_Y \cdot (1-\pi_Y) = 0.07 \cdot (1-0.5) = 0.035$

a2)
CAPM's rates for the two companies are:
$k_X = 0.02 + 1.1 \cdot (0.05 - 0.02) = 0.053$
$k_Y = 0.02 + 1.4 \cdot (0.05 - 0.02) = 0.062$

Dividends per share paid on June 30th 2014 are:
$Div_X = 1.6 \cdot 0.6 = 0.96$
$Div_Y = 0.9 \cdot 0.5 = 0.45$

So the ex-dividend stock prices on July 1st 2014 for the two companies are:
$$P_X = \frac{0.96 \cdot 1.016}{0.053 - 0.016} = 26.361$$
$$P_Y = \frac{0.45 \cdot 1.035}{0.062 - 0.035} = 17.25$$

b)
b1)
Recalling that the DDM pricing formula is:
$$P_0 = \frac{Div_0(1+g)}{k-g}$$
As long as $k > g$, the constraint on g is $-1 < g < k$. If $g > k$, then it will result that $P_0 < 0$, But this is not possible due to stocks' limited liability feature. The same can be said if $g < -1$, as a particular case, if $g = -1$ then $P_0 = 0$ and the company is bankrupt.

This being said, g can get any value between -1 and k leading to a positive stock price so that a negative, but greater than -1, value for g is acceptable for the DDM pricing formula.

b2)
The sustainable rate of growth $g_X = ROE \cdot (1-\pi)$ can be negative if either the return on equity is negative (this, of course, occurs when a company experiences a loss rather than a profit.), or the pay-out ratio is greater than 1 (i.e. either a company paying a dividend that is higher than earnings, or a company buying back own shares for an amount that is higher than earnings, or a company returning an amount of money to shareholders that is greater than earnings!).

c)
c1)
The dividend company X will pay in 2024 will be:

$$\text{Div}_{2024} = \text{Div}_{2014} \cdot (1-0.05)^{10} = 0.96 \cdot (1-0.05)^{10} = 0.5748$$

c2)
Dividends for years 2015 and 2016 will be:

$$\text{Div}_{2015} = \text{Div}_{2014} \cdot (1-0.05) = 0.96 \cdot (1-0.05) = 0.912$$

$$\text{Div}_{2016} = \text{Div}_{2014} \cdot (1-0.05)^2 = 0.96 \cdot (1-0.05)^2 = 0.8664$$

The stock price is then as follows:

$$P_X = \frac{0.912}{1.053} + \frac{0.8664}{1.053^2} + \frac{0.8664 \cdot 1.03}{0.053-0.03} \cdot \frac{1}{1.053^2} = 36.64$$

d)
d1)
The ex-dividend stock price on July 1st 2014 is:

$$P_{X,2014} = \frac{0.96 \cdot 1.03}{0.053-0.03} = 42.991$$

As the dividend paid in year 2017 by company X will be:

$$\text{Div}_{2017} = \text{Div}_{2014} \cdot 1.03^3 = 0.96 \cdot 1.03^3 = 1.049$$

And the ex-dividend stock price on July 1st 2016 will be:

$$P_{X,2016} = \frac{1.049}{0.053-0.03} = 45.609$$

Dividends retained by the investor are:

$$\text{Div}_{2015} = 0.96 \cdot 1.03 = 0.989$$

$$\text{Div}_{2016} = 0.96 \cdot 1.03^2 = 1.0185$$

The internal rate of return is the yearly rate z that makes the net present value of the investment be equal to 0. This means that the following equation must be solved:

$$-42.991 + \frac{0.989}{1+z} + \frac{1.0185+45.609}{(1+z)^2} = 0$$

This equation has two solutions. The relevant one is $z = 0.053$ (i.e. 5.3%), being the other less than -1.

d2)
In question d1) above the purchase price of the stock (as of July 1st, 2014) as well as the selling price of the stock (as of July 1st, 2016) have been computed by using the Dividend Discount Model and by applying a discount rate that has been determined with the Capital Asset Pricing Model. This, in turn leads to an internal rate of return (IRR) on the (above) investment that must be equal to the discount rate determined with the Capital Asset Pricing Model.

Stock price $P_{X,2014}$ is the sum of discounted future dividends paid by company X to stockholders and can be written as:

$$P_{X,2014} = \frac{Div_{2015}}{1+k_X} + \frac{Div_{2016} + P_{X,2016}}{(1+k_x)^2}$$

or, equivalently, as:

$$-P_{X,2014} + \frac{Div_{2015}}{1+k_X} + \frac{Div_{2016} + P_{X,2016}}{(1+k_x)^2} = 0$$

This equation is the one used above to compute the internal rate of return, so it must carry the same rate.