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Instructional Note

Investment Portfolio Simulation: An Assessment Task in Finance

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Abstract

The use of an investment portfolio simulation as an assessment task is intended to reinforce learning by involving students in practical application of theoretical principles in a real-time actual financial market. Simulation as a teaching pedagogy promotes individual involvement and provides students with a deeper understanding of the issues, and skills involved. The simulation is designed to engage students in learn by actually applying theory to actual events occurring on the Australian Stock Exchange.

Key words: *Investment portfolio management; financial management; simulation.*

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PsycINFO Classification: 3530
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Introduction

Financial planning is a recently evolved discipline that can trace its theoretical underpinnings to the fields of accounting, finance, general insurance, life assurance and law. Graduates require technical skills and a broad range of theoretical knowledge in addition to specific adherence to legal requirements (Goetz, Tombs & Hampton, 2005). Financial planning is by its very nature an applied profession in much the same way as accounting, law, medicine, nursing and veterinarian science.

Investment portfolios are an essential component of superannuation funds in general and are especially pertinent in the context of self-managed superannuation funds in Australia. Investment portfolios are therefore an important aspect in the education of students in preparation for their transition to a financial planning career. Here the emphasis needs to be placed on the realities of dealing with investments in the market place. What has been labelled as experiential learning (Kolb, 1984) or active learning (Bonwell & Eison, 1991).

Experiential learning is effectively 'the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience' (Kolb 1984, 41) The experiential learning model of Kolb (1984) was successfully used by Svinicki and Dixon (1987) as the framework for selecting and sequencing classroom activities that supported the development of problem solving skills and was claimed to be even of benefit for students with different learning styles. By contrast active learning 'involves students in doing things and thinking about the things they are doing' (Bonwell & Eison, 1991, 2). In simple terms both theoretical approaches are concerned with the concept of learning by doing (Chang, Gomes, & Schorfheide, 2002).

Various disciplines have used experiential learning to address learning objectives such as, accounting (Eckardt, Selen & Wynder, 2015), business statistics (Hakeem 2001), organizational theory (Blunsdon, Reed, McNeil & McEachern 2003), marketing (Sautter, Pratt & Shanahan 2000), and macro economics (Gremmen & Potters 1997). An approach to providing experiential learning which has relevance in the business environment is a simulation. The design and implementation of simulations are pedagogically based and seek to replicate real world situations by use of activities such as games, scenarios, role-play, all of which involve decision making experiences (London, 1970).

Simulation Learning Objectives

The learning objectives of this task are aligned with the learning outcomes of a business finance course. These attributes are identified as:

- *Critical Thinking /Analytical skills*; each student is required to analyse the data and prepare a report regarding their investment portfolio decisions, its performance, buying / selling of investments, as well justifying their decisions.
- *Understanding and Interpretation*; each student has to manage the investment portfolio and is required to demonstrate the extent of their knowledge.
- *Application of Business Finance theory and techniques*; each student has to demonstrate their knowledge of the various finance issues inherent in the case study.

Assessment is based upon the ability of the student to apply the theory and tools to establish, monitor, and adjust to market changes in a real-time environment.

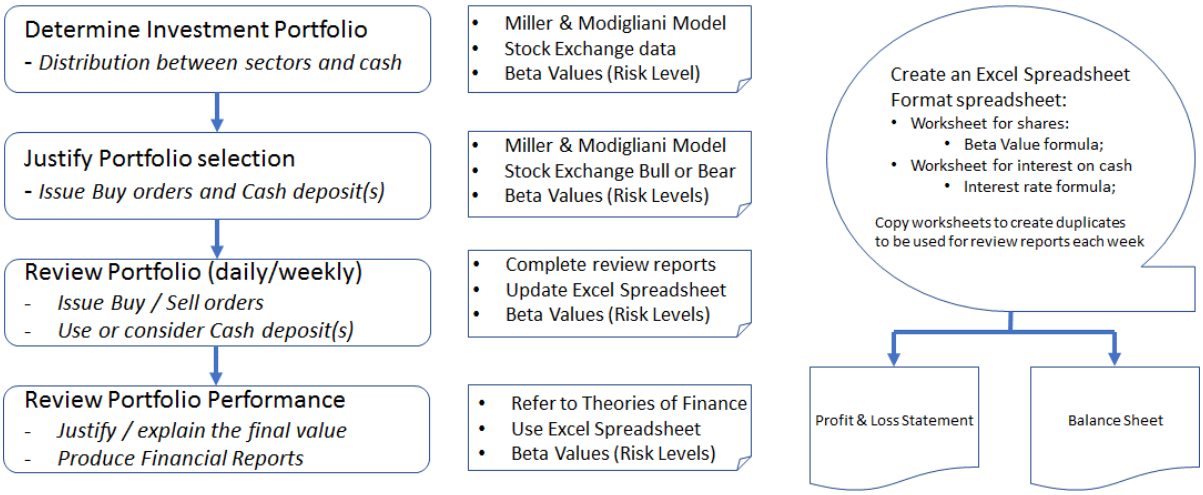
Implementation Guidelines

Students are instructed that they are required to read and monitor the financial newspapers as well as internet updates on the Australian Stock Exchange and the global financial market. The explanation for this is that they are expected to apply financial theory to the establishment of an Investment Portfolio and to then monitor and report on their investment decisions. Students are advised that the simulation is intended to reinforce their learning by immersing them in the real-time activities of creating and maintain an investment portfolio. Further guidance may be given in the form of excel spreadsheet template depending upon the extent of the student experience with creating Excel spreadsheets and using formulas.

The investment simulation instructions are provided to the students (verbally, in hardcopy and on the course Blackboard site) along with the assessment rubric and the basic flow chart. Students are then asked if they have any questions and are advised that should they have any questions during the simulation they should raise them through the specific site established under the Blackboard Discussion Board for the simulation. Students are given 10 weeks to undertake the simulation because of the need to assess the outcomes and provide feedback and debrief. The basic stages of the simulation are summarised in the flowchart presented in Diagram 1.

Diagram 1.

Stages of the Investment Portfolio Simulation



Assessment Method

To enhance the comprehension of the method of assessment process the students are provided with a rubric (diagram 2) which is aligned with the learning objectives and the extent of the level of performance that is expected to achieve any one of the different grades. Assessment is made of the weekly reports and the quality of explanation given to justify their decisions to buy and or sell along with the need to maintain the desired beta level which is in effect their predetermined risk level. Variations from this risk level need to be strongly justified by the students as should they be managing the portfolio for a client they would need to keep to the risk level of that client. The theory used in their reports is also evaluated for its relevance and appropriateness, consideration will also need to be given to any changes in the local and or global market that may have an impact on the portfolio value. The final analysis is concerned with the extent that the portfolio has changed in value, this will require comparison of the results for the entire cohort to determine which student achieved the highest growth, marks for levels may be calculated based upon a bell curve and also the actual overall stock market performance for period.

The following alphabetical index approach is used to link the various sections to the learning outcomes:

(A) Critical Thinking / Analytical skills
Ability to reason logically, to analyse, to deconstruct, synthesise and evaluate data, providing evidence and arguments in support of the decisions made.

(B) Understanding & Interpretation
Demonstrate cognitive and technical skills, attitudes and abilities directly related to the finance sector in regards to the investment portfolio.

(C) Application of Business Finance theory and techniques
Demonstrates core theoretical, content and practical elements in the finance discipline with application to the investment portfolio.

Diagram 2.

Investment Portfolio Simulation Assessment Rubric

Investment Portfolio Simulation					
Issue / Criteria	**Excellent**	**Very Good**	**Good**	**Satisfactory**	**Less than Satisfactory**
Selection of Investment Portfolio (Calculations) **25%** **(A), (B) & (C)**	Exemplary work! Demonstrated **highly astute** knowledge with **comprehensive** level of application & understanding.	Demonstrated **comprehensive** level of application and understanding.	Demonstrated understanding & ability to apply knowledge.	Mostly Correct. Demonstrated **minimum/ limited** understanding and knowledge.	Not correct. Mostly wrong. Understanding & knowledge **not demonstrated.**
Share Market Weekly Monitoring & Analysis **25%** **(A), (B) & (C)**	Exemplary work!. Reflections **are precise and thorough** with **highly comprehensive detailed** explanations of performance. Shares traded to plan (very active).	Reflections **are thorough** with **comprehensive** explanations of performance. Shares traded on a regular basis (active).	Reflections **are somewhat relevant** with **general** explanations of performance. Shares traded irregularly (reactive).	Reflections **are limited** with **minimal** explanations of performance. Limited trading of shares.	Reflections **are rushed** with **insufficient** explanations of performance. No or little trading.
Financial Performance of the Portfolio **25%** **(B) & (C)**	Value of Investment Portfolio as per relevant percentile of results. A compelling justification.	Value of Investment Portfolio as per relevant percentile of results. A convincing justification.	Value of Investment Portfolio as per relevant percentile of results. A pertinent valid justification.	The value of the Investment Portfolio remained above initial amount. Low percentile of results.	The value of the Investment Portfolio declined. Lower percentile of results.
Justification from Theory and clarification of market and global trends **25%** **(B) & (C)**	Exemplary work!. Demonstrated **highly astute** knowledge of topic. A compelling argument.	Demonstrated and applied **comprehensive** knowledge of topic. A convincing argument.	Demonstrated and applied knowledge of topic. A pertinent valid argument.	Mostly Correct. Demonstrated **minimum/ limited** understanding and knowledge.	Not correct. Mostly wrong. Understanding & knowledge **not demonstrated**

The Simulation Overview

Investment Portfolio – Major Assignment Task

You are required to establish and manage an investment portfolio of $1,000,000.00 AUS over the next 10 weeks. You must invest a minimum of 90% in Shares on the Australian Stock Exchange, the other 10% may be invested in a bank account, a short-term term deposit or the Short-Term Money Market. The requirement is to build capital growth and increase the value of the $1 million dollars whilst maintaining the initially identified (stated) Beta Risk level.

The portfolio selection requires you to provide an analysis of the shares you select to buy and the basis for your management of the portfolio for the duration of the 10 weeks. Management of the portfolio will require you make very clear in your report the Trading Strategy you intend to use. The analysis should include the industry sector for each and every share in your portfolio.

You must specify the level of beta risk of your portfolio that you intend to maintain and show how the beta values of the shares you have chosen produce/meet the chosen beta level for the portfolio.

You are allowed some degree of flexibility in preparation and structure of your initial report. However, it must show your awareness of the theoretical issues concerned with Portfolio selection and management.

Buying and/or Selling Shares:

For each parcel of shares in a particular Company you must provide (that is complete) a Buy/Sell form – the form is as follows:

BUY/SELL: No.: .....

Notification Date: .....

Student Name:.....

Student ID #: .....

Shares in (Company Name & ID):

Number of Shares:

Price: $
Beta Factor:
Total: $
Transaction cost (0.01%): $
New Portfolio Value: $

Acknowledged/ Lodgement date:
Received by:

The price of the shares must be the price on the Stock Exchange as at the date you register the lodgement of the buy or sell.

You are required to provide a summary table every 2 weeks of progress of the Share Portfolio using the headings and format as per Table 1.

Table 1.
Summary of Share Investments

QTY	Share Description	Beta	Port/ Beta	Buy/ Sell #	Buy Price Per share	Price per share now	Buy Value Total	Present Value	Gross (Book) Profit/Loss	Distribution %
5000	AAA	1.2643	0.0942	1	$ 14.50	$ 14.40	$ 72,500.00	$ 72,000.00	-$ 500.00	7.45%
6500	BBB	0.5158	0.0954	1	$ 27.36	$ 27.50	$ 177,840.00	$ 178,750.00	$ 910.00	18.50%
7500	JJJ Mining	1.8739	0.4619	1	$ 31.85	$ 31.75	$ 238,875.00	$ 238,125.00	-$ 750.00	24.65%
8000	WWW Mining	1.2669	0.6258	1	$ 58.50	$ 59.65	$ 468,000.00	$ 477,200.00	$ 9,200.00	49.40%
			1.2774		**Gross Value**		**$ 957,215.00**	**$966,075.00**	$ 8,860.00	100.00%

Students should note the level of the portfolio beta and comment on any movement from the initial investment stage through each reporting period (every 2 weeks). The intention should be to maintain this as close as possible to the desired portfolio beta level. The discussion should draw on the theory pertaining to the need for diversification of the portfolio and the interpretation of beta values against the market.

For example, in the portfolio reported in Table 1 above the portfolio beta is 1.2774, this is indicating a risk level higher than the market (the market is represented as a beta of 1.00) so the decision to invest in this group of shares is arguably about the student seeking higher returns than the market. The initial portfolio beta was 1.2786 so this change is not dramatic and the basic level is still representative of the initial decision of the student. In this case the returns as measured by the growth in the share values would seem to confirm that the decision was indeed the correct one. However, this will depend on the state of the market during the period and students are just as likely to find that a down turn in the market could have serious consequences for their portfolio. A valuable learning lesson for students since the volatility of the market is for the most part unpredictable and made even more problematic by the global economic environment.

For any Cash or Short-Term Money market investments use the headings and format as per Table 2.

Table 2.
Summary of Cash Investments

Bank / Financial Institution	Amount Invested	Interest Rate	Term (date)	Interest Earned
EastPac	$ 1,827.78	0.00%	N/A	$ -
Stitch	$40,000.00	6.50%	60 days	$ 427.40

Further analysis reveals that the student has chosen to operate a normal bank account and invest a lump sum in a 60 days short-term deposit. The normal bank account earns no interest while the short-term deposit attracts a 6.5% interest rate. By comparison the interest earned on the share portfolio is a mere 0.93% so the cash investment was a wise decision on the part of the student since the intention is to grow the value of the amount of $1,000,000 by as much as possible within the short period of time.

The final stage of the simulation is to produce a set of financial reports dealing with the investment of the $1,000,000. For this stage students are encouraged to adopt a very simple approach involving a basic Income Statement and Balance Sheet. There is an expectation that students should be familiar with financial accounting reports at this stage of their degree so no additional instructions are considered necessary. In addition to the capital growth of the share portfolio students also need to monitor and be aware of any distribution of dividends and this is an area that warrants inclusion in the financial reports. Examples of the Income Statement and Balance Sheet are presented in Tables 3 and 4.

Table 3.
Income Statement

Revenue:		
Gain on sale of shares	$ -	
Gain on share values	$ 8,860.00	
Dividends received	$ 150.00	
Interest	$ 427.40	
		$ 9,437.40
Expenses:		
Costs of Buying and Selling	$ 957.22	
Other expenses	$ -	
		$ 957.22
Profit		**$ 8,480.18**

From the Income Statement it is apparent that the student did not make any sales and that the only transactions were the original acquisition of the shares as indicated by the costs of buying and selling. One good point in the favour of this student is that the dividends are included in the revenue.

Table 4.
Balance Sheet

Assets:		
Cash at Bank	$ 42,405.18	
Share Portfolio	$ 966,075.00	
		$ 1,008,480.18
Owners' Equity:		
Capital		**$ 1,008,480.18**

The Balance Sheet is simple but to the point, the student has made the adjustments to the cash at bank to reflect the transactions. How this profit compares to the other students is something that will need to be considered in evaluating a mark. Should there have been a down turn or conversely an increase in the market during the period it will be reflected in the performance of all the students' results. Hence, should a global financial crisis have occurred during this time period then all the students' would have been adversely affected.

Summary

This simulation relies on the use of the data available from the Australian Stock Exchange which may be sourced from the internet or from the major financial newspapers. Students are required to employ spreadsheet skills to create and maintain their portfolio data and to extract reports to be submitted every 2 weeks. The use of a learning management system (LMS) such as Blackboard is useful in regards to the submission of all transactions and reports by the students, this approach provides specific information regarding date, time and frequency of all such interaction by each individual student.

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Appendix A.

Example of Beta Calculations derived in Excel Spreadsheet

Ind	**AAA**
-0.002	-0.022
-0.006	-0.057
0.014	0.017
0.008	0.024
-0.011	-0.028
0.023	0.012
-0.017	-0.031
-0.013	-0.01
0.028	0.015

Beta	1.2643
Alpha	-0.0123
R	0.7467
R2	0.5575

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.746661439
R Square	0.557503305
Adjusted R Square	0.494289491
Standard Error	0.01963824
Observations	9

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.003401266	0.003401266	8.819327	0.020815561
Residual	7	0.002699623	0.00038566		
Total	8	0.006100889			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	-0.01226023	0.006643788	-1.84536804	0.107495	-0.027970296
X Variable 1	1.264254386	0.425712833	2.969735203	0.020816	0.257603497