

Anson Wong, 2023

Volume 5, pp. 14-22

Received: 19th April 2023

Revised: 20th July 2023, 29th July 2023

Accepted: 02nd August 2023

Date of Publication: 07th November 2023

This paper can be cited as: Wong, A. (2023). An Experimental Approach to Understanding Exchange Rate Determination. *Docens Series in Education*, 5, 14-22.

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## **AN EXPERIMENTAL APPROACH TO UNDERSTANDING EXCHANGE RATE DETERMINATION**

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### **Abstract**

*The objective of this study is to emphasize the importance of in-class experiments in enhancing students' learning experiences. In this study, I have utilized an in-class experiment to help students appreciate the significance of economics and political factors, along with relevant news, in determining exchange rates. I aim to provide students with a hands-on experience that enables them to better understand and apply their subject knowledge to explain exchange rate movements, such as interest rate parity. The results of the study demonstrate a significant and positive correlation between students' project results from the classroom experiment and their academic performance in the subject. The innovative teaching approach, which includes the in-class experiment method, has significantly facilitated students in achieving better academic performance. Overall, this study highlights the importance of incorporating interactive and experiential learning approaches in the classroom to enhance students' understanding and application of subject knowledge. The use of in-class experiments can be an effective teaching tool that helps students to connect theoretical concepts with real-world applications, thereby improving their academic performance.*

## **Keywords**

International Finance, Exchange Rate Determination, Classroom Experiment, Student Engagement

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## **1. Introduction**

In recent years, there have been several classroom experiments conducted to study exchange rate determination. The experiments typically involve students participating in a simulated market, where they can buy and sell currencies and observe the impact of various macroeconomic factors on exchange rates.

In the project, I will conduct an in-class experiment on foreign exchange rate forecasts appropriate for university students engaged in international finance subjects. Students engage in the experiment need to contend to manage simulated portfolios of five foreign currencies over 5 weeks. Each class will involve 20 minutes of trading of currencies by students. Students will benefit from a better understanding of exchange rate movements and portfolio risk management. The experiment also tests the Interest Rate Parity theory, forward rate model, random walk model, efficient markets hypothesis, and technical analysis model.

### **1.1. Objectives of the Study**

There are two primary project objectives in this classroom experiment. The first is to make students familiar with the random nature of exchange rate movement. The second is to let them understand the efficiency of foreign exchange markets and the portfolio trade-off between return and risk. To this end, my experiment requests students to apply the relevant economics and finance theories and relevant market information to explain and predict the exchange rate movement. I expect the experiment could stimulate students to “behave like an analyst” to apply their knowledge, raw economic data, and market information to analyse actual economic problems.

### **1.2. Significance of the Study**

Numerous studies confirmed that classroom experiments on multinational finance and economics proved as an efficient and useful approach to illustrate fundamental economic concepts and theories to students such as intra-industry trade (Isgut & Rosenblat, 2005 and Yamarik, 2018) and the role of factor endowments (Hamlen & Hamlen, 2012), imperfect competition and, price differentiations (Laury & Holt, 1999 and Johnson, 2010) and comparative advantage (Stodder, 1994; Hauptert, 1996 and Mason, 2001).

However, most of them were not talking about Hong Kong and their finding seldom reported the impact of using classroom experiments on student learning efficiency in international financial management. Hence, the study is to fill in the gap to collect relevant information to investigate the impacts of experiments on the learning performance of Hong Kong university students in finance multinational classes.

The study makes several contributions to enhancing learning and teaching. The first is to make students better understand the nature of the exchange rate movement. The experiment could allow students to apply their knowledge and actual market data to solve the related actual finance problem that is vital for their learning outcomes in the experiment. Coyle (2012) shows employers are often disappointed with students' lack of "practical knowledge of data handling." To this end, our experiment exposes students to exchange rate data and relevant market information to forecast and determine the exchange rate movement.

Secondly, joining this classroom experiment can provide students with hands-on experience to understand exchange rate determination as they can apply their subject knowledge such as interest rate parity, purchasing power parity, technical analysis, and the efficient market hypothesis to explain the historical exchange rate movement and forecast the exchange rate. In addition, reflecting on this experiment at the end of the semester, students need to make a presentation to present their findings and submit their written report to summarize what they learned in the classroom experiment.

The structure of the study is organized as follows. First will present the background of the study including a set of research questions based on relevant literature in Section 2. In Section 3, I will provide an experiment design, methodology, and instruments. The result analysis is provided in Section 4. Section 5 will be the conclusion of the study.

## **2. Literature Review**

Over the past decade, academic literature on the classroom experiment of exchange rate determination has focused on the use of the experiment as a teaching tool for students. It is an effective way to demonstrate the concept of exchange rate determination, as well as to illustrate the effects of different economic policies. Studies have also shown that the experiment can be used to help students understand the importance of macroeconomic variables in determining exchange rates, as well as to develop their analytical skills. Additionally, the experiment has been used to explore the impact of different exchange rate regimes on the economy and to assess the effectiveness of different policy tools in influencing exchange rates. Finally, research has

suggested that the classroom experiment of exchange rate determination can be used to improve student engagement and understanding of the subject.

The classroom experiment of exchange rate determination has become an increasingly popular tool for teaching international finance and economics over the past decade. Studies have found that the experiment provides students with a better understanding of the determinants of exchange rates, as well as a better appreciation of the complexities of exchange rate determination (Schindler, 2009). Other studies have reported that the classroom experiment is useful for introducing students to the concept of foreign exchange risk, as well as for demonstrating the implications of different exchange rate regimes (Sanchez-Robles et al., 2018). Additionally, research has suggested that the experiment can be used to introduce and discuss the role of speculation in exchange rate determination.

Classroom experiments on business, finance, and economics subjects have been confirmed as a very useful approach to explaining students to relevant theories and models such as imperfect competition and, price differentiations (Laury & Holt, 1999; Johnson 2010; Emerson & Taylor, 2004; Terrion & Lennox, 2012 and Mukherji et al, 2018) and comparative advantage (Stodder, 1994 and Mason, 2001) and the role of factor endowments (Tohamy & Mixon, 2003; Hamlen & Hamlen, 2012). Moreover, in-class experiments such as group projects on the exchange rate determination can be used to validate concepts and theories in international trade and finance along with the impacts of news on exchange rates (Chiang, 2007; Johnson, 2018; Hazlett & Ganje, 1999) and the purchasing power parity (Laury & Holt, 1999; Mitchell et al., 2009). Based on these studies, I come up with the research question to assume that the students' group project results in the classroom experiment are positively associated with their academic performance. It is believed that using classroom experiments can improve their understanding of drivers of exchange rate movement.

### **3. Methodology**

#### **3.1. Experiment Design and Sample Size**

In the classroom experiment, students of the international finance subject are assigned into small groups of two to three students and each group is provided with a list of international currencies and their corresponding exchange rates. Each group must identify the factors that they think influence exchange rate determination and also need to present their findings and come up with a consensus on the factors that influence exchange rate determination. After the experiment, the students are expected to be able to identify the factors that influence exchange rate movement.

It is believed that the experiment can improve their understanding of the project as they are gratified with their experience (Cartwright and Stepanova, 2012). Also, students need to write and submit a written report at the end of the semester.

### 3.2. Instrument and Data Collection

In the study, it is estimated that 48 students who are enrolled in the international finance subject, will engage in the group project. I will investigate the relationship between students' project results of the classroom experiment and their academic performance of the subject including the midterm test and final exam results. The regression model used to test the relationship is:

$$\text{Subject performance}_i = \alpha + \beta_1 \text{Project} + \beta_2 \text{Nationality}_i + \beta_3 \text{Gender}_i + \beta_4 \text{Attendance}_i$$

The definitions of all the variables follow:

i.	Subject performance	Mid-term mark, and Final-exam mark
ii.	Project	Project marks
iii.	Nationality	Student's nationality
iv.	Gender	Student's gender
v.	Attendance	Student's in-class participation marks

Students' subject academic performance (including their mid-term mark and final exam mark) is regressed on the independent variable of the study: their project results, nationality, gender, and in-class participation as defined in the regression above-mentioned. The regression models of the study jointly control for "cross-sectional dependence", so the standard errors and the reported t-statistics for the coefficients are unbiased.

## 4. Result Analysis

The descriptive statistics and the correlation coefficients matrix for the variables in the study are shown in **Table 1** and **Table 2** respectively. The results show that the students' mid-term test and final exam marks are positively related, all significant at a 1% level. The project result of the classroom experiment is positively associated with mid-term and final exam results at 1%. The correlation result confirms that the classroom experiment teaching method (project) is significantly related to students' subject assessment results on a univariate basis.

The multivariate regression analyses test the relationship between students’ project results of the classroom experiment and their subject academic performance. **Table 3** presents the regression results for the mid-term mark, and final exam mark, respectively. The last column shows the panel data result. The results from Table 3 suggest students’ academic performance (that is their final exam and midterm test results) can raise if the innovative teaching method- “classroom experiment (project)” was used (three regression models in Table 3 are significant at 5% level, two-tailed). Therefore, the research question is fully confirmed by the empirical results in Table 3. The classroom experiment result is significantly positively related to the mid-term and final-exam results (all are significant at a 5% level).

**Table 1: Descriptive Statistics**

This table presents the summary statistics. The final exam and Midterm are the final and mid-term test scores students obtain, respectively. The project is the group project scores of the classroom experiment that students obtain. Participation is the class participation scores that students obtain.

	Mean	Standard Deviation	Maximum	Minimum
Final exam	80	11.43	95	52.5
Midterm	75	12.50	100	54
Project	75	5.29	88	70
Participation	100	4.23	100	90

*(Source: Self/Authors’ Own Illustration)*

**Table 2: Correlation Coefficients Matrix**

This table presents the correlation matrix for the variables used in our analyses. The final exam and Midterm are the final and mid-term test scores students obtain, respectively. The project is the group project scores of the classroom experiment that students obtain. Participation is the class participation scores that students obtain. Nationality is equal to 1 if students are local (Hong Kong) students and zero otherwise. Gender is equal to 1 if students are male and zero otherwise. P-values are reported in parentheses.

		(a)	(b)	(c)	(d)	(e)	(f)
(a)	<b>Final Exam</b>	1					
(b)	<b>Midterm</b>	0.500 (<.0001)	1				
(c)	<b>Project</b>	0.201 (<.0001)	0.532 (<.0001)	1			
(d)	<b>Nationality</b>	0.407 (0.2151)	0.289 (0.031)	0.131 (0.002)	1		
(e)	<b>Gender</b>	-0.037 (0.377)	-0.123 (0.029)	-0.092 (0.027)	-0.170 (<.0001)	1	

(f)	Participation	-0.021 (0.609)	0.010 (0.8025)	0.035 (0.396)	-0.078 (0.061)	-0.054 (0.198)	1
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*(Source: Self/Authors' Own Illustration)*

**Table 3:** *Determinants of Students' Subject Academic Performance*

This table provides the regression results for assessing the effect of the classroom experiment method (project) on students' academic performance. The dependent variables are Mid-term Mark and Final-exam Mark. The project is the group project scores of the classroom experiment that students obtain. Participation is the class participation scores that students obtain. Nationality is equal to 1 if students are local (Hong Kong) students and zero otherwise. Gender is equal to 1 if students are male and zero otherwise. P-values are reported in parentheses. The robust standard errors method of Petersen (2009) one-dimension clustering is used, and t-Statistics are reported under each coefficient (two-tailed). All numbers are rounded. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Mid-term Mark	Final-exam Mark	Panel Data
Intercept	12.38*** (23.36)	9.26*** (3.25)	8.82*** (4.23)
Project	2.642** (1.98)	2.138** (2.14)	1.985** (2.32)
Participation	6.215** (2.28)	4.271** (2.36)	6.238** (2.12)
Gender	-1.271 (-1.78)	1.418 (0.27)	-0.753 (-0.37)
Nationality	-0.824 (-1.73)	-1.523 (-1.58)	-1.78 (-1.69)
Adj-R <sup>2</sup>	0.112	0.252	0.135
Sample Size	48	48	48

*(Source: Self/Authors' Own Illustration)*

## 5. Conclusions

This study contributes to the ongoing research on whether the classroom experiment can be used to improve students' academic performance. Our results are consistent with the generative theory of learning, which proposes that students learn better when they engage in an appropriate cognitive learning process. By using the classroom experiment", a student-subject lecturer interaction is strengthened, which would lead students to make sense of the presented material,

and in turn, will be reflected in improvements in their midterm exam and final exam. In addition, we also find students' in-class participation performance will affect their academic performance. However, nationality and gender are not significantly related to their subject performance.

Limitations of this study include the small sample size and the fact that it was conducted in a single academic institution. Future research should aim to replicate our findings with larger and more diverse samples. Furthermore, the framework of the experiment study can be further expanded to other subjects such as Management, Marketing, Accounting, and Economics, where students' feedback is crucial for instructors to design the validity of classroom pedagogy.

In conclusion, this study provides valuable information for ongoing research on the impacts of classroom experiments on student learning efficiency. The results can be used as reference materials for instructors in planning their teaching materials and developing innovative assessment methods to improve educational attainment.

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