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Ritsumeikan Asia Pacific University
Faculty Offices B425
1-1 Jumonjibaru, Beppu, Oita, 8748577, Japan
+81 977 78 1074
[perspectives@apbersociety.org](mailto:perspectives@apbersociety.org)
Editor’s Note

The Summer 2015 issue of Perspectives is a collection of various topics in contemporaneous business and economics contributed by young and emerging researchers coming from Japan, Indonesia, and the Philippines. The six articles in this issue profoundly contribute to the continuing discourse on management, innovation, economics, marketing, and finance. All of which employed state-of-the-art mixed research methodologies (qualitative and quantitative).

In this issue, we showcase a legal approach in doing research. Antonio A. Ligon (The inequitable appeal by management in labor proceedings: Does it violate the equal protection clause of the Philippine Constitution?) discussed and analyzed the execution of decisions pending appeal against management in favor of workers with monetary awards and reinstatement claim from a decision of the National Labor Relations Commissions (NLRC) to the higher court. Ligon presented the seeming lack of protection on the part of the management on labor cases where the national labor relations commission rule in favor of the employees. The study utilized actual decided cases by the Court in relation to the issue, which constitutes jurisprudence on the matter.

We also have a study that analyzes disruptive innovation in the electric vehicle market, written by Michael Frohman (Applying the theory of disruptive innovation to recent developments in the electric vehicle market). The study analyzed recent developments in the electric vehicle market to see if the principles introduced through disruptive innovation theory have held true for this potentially disruptive technology. Approaches from industry incumbents such as Nissan, GM, and BMW were contrasted against the strategy of industry newcomer Tesla Motors in order to analyze the applicability and predictive ability of Christensen’s theories. Frohman found that the theory has held up well in areas such as incumbent use of sustaining technologies.

An article employing fuzzy set analysis is also featured in this issue. Luksi Visita (Using fuzzy set analysis to examine the determinants of repurchase intention and buyers’ satisfaction in online group buying phenomenon) examined the effect of reputation, trust, and perceived quality toward customer satisfaction and repurchases intention using qualitative comparative analysis (QCA) fuzzy set. Results supported previous studies that perceived website quality affects high customer satisfaction in online group buying. Meanwhile high repurchase intention is affected by not only perceived website quality, but also by trust towards the vendors and sellers.

We also feature an empirical study on economic-political issues. Carlo Anton G. Arguelles (Economic growth and political regimes: Dynamic panel estimation on the growth experiences of political regimes) analysed different political structures by adapting the theoretical framework of Ehrlich and Liu (1999), dataset by Assiotis and Sylwester (2013), and dynamic panel estimators of Arellano and Bond (1991) and Arellano and Bover (1995) that eliminate endogeneity. The variables of income inequality and corruption are key determinants in examining the economic success of political regimes. Results revealed that income inequality has a robust negative relationship with economic growth in any regime. Corruption has varying effects on
the economy. Democracies and autocracies have distinctive reactions towards these issues thus creating different economic environments.

On the other hand, a theoretical economic study is also included in this issue. Christine Joy U. Cheng and Harvin John O. Sy (A study on interrupted consumption: Effects on consumer’s utility from positive experiences) created a model assessing whether the length of the consumption has an effect on overall consumer utility. Results show that different lengths of interruption on positive experiences and varying lengths of periods of consumption increase consumer utility. As such, producers can now manipulate how they market their products and services to the consumers to make it more appealing and at the same time be able to give them higher satisfaction.

Finally, an article in the field of finance written by Diana Margarita A. Bautista, Berkeley Novak T. Enriquez, Juan Paulo S. Molina, and Imee Lanie H. Uy (The negative relationship between stock market and foreign exchange market in the Philippines: 2006 – 2013) is also featured in this issue. Their study examined the relationship between the stock market and foreign exchange market of the Philippines using daily data of the exchange rate of the Philippine peso pegged to the US dollar and the PSEi closing price. They employed the Granger’s Causality on a VAR Framework and the Correlation Test to understand the nexus between the two markets. Results showed that the two financial markets are negatively correlated, which has implications on the hedging and diversification of a corporation’s portfolio as volatility of the foreign exchange rate influences a firm’s value.

The authors of the articles in this issue of Perspectives laid emphasis on certain developments in their respective fields by identifying pertinent issues and proposing means by which to address them. The challenge now is for stakeholders and end-users of their studies to see the changes in the external environment and adapt to these changes in a dynamic and optimistic perspective. In behalf of the Advisory Editorial Board, I would like to express gratitude to all the contributors for making Perspectives their journal of choice in publishing their research articles.

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The inequitable appeal by management in labor proceedings: Does it violate the equal protection clause of the Philippine Constitution?

Antonio A. Ligon
De La Salle University
Manila, Philippines
antonio.ligon@dlsu.edu.ph

ABSTRACT
This study analyzes the execution of decisions pending appeal against management in favor of workers with monetary awards and reinstatement claim from a decision of the National Labor Relations Commissions to the higher court. It presents the seeming lack of protection on the part of the management on labor cases where the national labor relations commission rule in favor of the employees. Despite pending appeal by the management or the employer, and while the case is being deliberated in the appeal court either or both by Court of Appeals or Supreme Court, the employees may file for execution pending appeal, the monetary award and the reinstatement therefore is implemented against the employer. It will also show that despite the appeal of the management or the employer being granted or the decision for monetary award and reinstatement reversed by the Appeal Court, the management or the employer has no recourse to recover what was paid to the employees even if the appeal court rules that the national labor relations commission committed error in its decision and/or even if its decision is characterized with grave abuse of discretion. In the light of such unfairness or inequity the main issue being addressed in this paper is whether or not, such inequity is a violation of the equal protection clause provided by the Constitution. In support of the discussion and conclusion on the issue, this study utilized actual decided cases by the Court in relation to the issue, which constitutes jurisprudence on the matter.

JEL Classification: J8, K31
Keywords: labor standards, labor law

INTRODUCTION

Appeal as used in this paper means the elevation of decisions for the review of higher courts. Both judicial and administrative proceedings contain provisions with regard to the filing of an appeal, although there are slight differences in the procedural aspect of appeal proceedings among civil, criminal, and administrative proceedings. Ordinarily, an appeal shall prevent the execution of a decision of a lower court; the decision becomes final only after the higher court affirms the
appealed decision, after entry of final judgment then execution processes set in. Simply stated, until the appeal is decided the decision is not considered final, and if it is not yet final, the decision cannot yet be implemented against the losing party. However, appeal in a labor proceeding is different, because implementation or execution of the monetary award against the management or the employer can be done despite the existence of the employer’s appeal to the higher court, which pertains to the Court of Appeals or the Supreme Court. Even if the appeal is granted and therefore the decision by the National Labor Relations Commissions is found erroneous or one characterized with grave abuse of discretion, by the higher Court, there is no provisions in the law or even in the decisions by the higher court to allow management or employer to recover what was paid based on the erroneous decision.

The apparent unfairness resulting from the appeal procedure with regard to filing an appeal in relation to decisions of labor arbitrers or the National Labor Relations Commission (NLRC) to the higher court will be shown by revisiting and analyzing the substantive and procedural aspect of the appeal in labor cases.

In revisiting the substantive and procedural aspect, the reader is requested to understand the concept of jurisdiction as a starting point. Jurisdiction is the authority to decide a case, and not the decision rendered therein, while appellate jurisdiction is the authority of a superior tribunal to revise, reverse, correct, or affirm the decisions of an inferior court or quasi-judicial agency, that is, the NLRC, having the attributes of court in certain cases where such decisions are brought before the superior court pursuant to law. The superior court as already emphasized, refers, of course, to the Court of Appeals and/or to the Supreme Court. The decision of the higher court should revise and correct the proceedings in a cause already instituted, and should not create the cause.

The highlight of the paper is the issue of whether the substantive and procedural aspect of the appeal, i.e. the execution pending appeal by the employer or the management in a case where monetary award or reinstatement order is ruled by the National Labor Relations Commissions violates the right to equal protection of the laws under the Constitution. The research objective is to find out and analyze why up to now despite the seeming unfairness and inequity, there has been no amendment or change in the substantive and procedural aspect of the appeal in labor proceedings and why the higher court particularly the Supreme Court recognize such execution pending appeal

This study will emphasize that the element of employer-employee relationship is necessary for cases to fall under the jurisdiction of the Labor Arbiters or the National Relations Commissions in an appeal in labor proceedings. As any controversy outside of the employer–employee relationship will not be relevant to the problem statement considering the ordinary appeal does not involve implementation of the decision while the appeal is pending. In fact, “The requirement of employer-employee relationship is jurisdictional for the provisions of the Labor Code to apply.”

To understand the substantive and the procedural aspect the laws relating to labor and appeal therein, it is important to review what the laws or statues provide.
LAWS GOVERNING THE APPELLATE PROCEDURE FOR LABOR CASES

The laws or statutory provisions governing appellate procedure are found in Presidential Decree No. 442, also known as the Labor Code of the Philippines, as well as the 2005 Revised Rules of Procedure of the National Labor Relations Commission (NLRC), which took effect on January 6, 2006, hereinafter referred to as the NLRC Rules of 2005 for brevity. Some provisions of the Rules of Court may also be applicable in labor cases, as the NLRC Rules of 2005 provide for the suppletory application of the Rules of Court in the absence of applicable provisions from the NLRC Rules.

A labor case has its beginnings under the jurisdiction of the Labor Arbiter. A Labor arbiter is similar to a judge of a lower court, while the proceedings under him are not necessarily adversarial as that of an ordinary court. In fact, a non-lawyer may appear before a labor arbiter when the person is the party to the case; when he represents a legitimate labor organization, as defined under Article 212 and 242 of the Labor Code, as amended, which is a party to the case; when the person represents a member or members of a legitimate labor organization that is existing within the employer’s establishment, who are parties to the case or when the person is the owner or president of a corporation or establishment which is a party to the case. Just like the Judge in ordinary court, the Labor Arbiter will aim at amicably settling the case upon a fair compromise; (2) determining the real parties in interest; (3) determining the necessity of amending the complaint and including all causes of action; (4) defining and simplifying the issues in the case; (5) entering into admissions or stipulations of facts; and (6) threshing out all other preliminary matters. This is normally done during the mandatory conciliation and mediation conference, which is called for the purpose by the Labor Arbiter.

The Labor arbiter is the one “clothed with the original and exclusive authority to conduct compulsory arbitration. Under Article 217” of the Labor Code, the jurisdiction of the labor arbiters and the commissions are as follows:

JURISDICTION OF THE LABOR ARBITERS AND THE COMMISSION

(a) Except as otherwise provided under this Code, the Labor Arbiter shall have original and exclusive jurisdiction to hear and decide within thirty (30) calendar days after the submission of the case by the parties for decision without extension, even in the absence of stenographic notes, the following cases involving all workers, whether agricultural or non-agricultural:

1. Unfair labor practice cases;
2. Termination disputes;
3. If accompanied with a claim for reinstatement, those cases that workers may file involving wages, rates of pay, hours of work, and other terms and conditions of employment;
4. Claims for actual, moral exemplary, and other forms of damages arising from the employer-employee relations;
5. Cases arising from any violation of Article 264 of this Code, including questions involving the legality of strikes and lockouts;
6. Except claims for Employees Compensation, Social Security, Medicare, and maternity benefits, all other claims arising from employer-employee relations, including those of persons in domestic or household service, involving an amount exceeding five thousand pesos (P5,000.00) regardless of whether accompanied with a claim for reinstatement.

(b) The Commission shall have exclusive appellate jurisdiction over all cases decided by Labor Arbiters.

(c) Cases arising from the interpretation of collective bargaining agreements and those arising from the interpretation or enforcement of company personnel policies shall be disposed of by the Labor Arbiter by referring the same to the grievance machinery and voluntary arbitration as may be provided in said agreements.

As part of the jurisdictional power of the Labor Arbiter, he is expected to take full control and personally conduct the hearing or clarificatory conference and may ask questions for the purpose of clarifying points of law or facts involved in the case. The Labor Arbiter, just like in ordinary court proceedings, may allow the presentation of testimonial evidence with right of cross-examination by the opposing party and shall limit the presentation of evidence to matters relevant to the issue before him/her and necessary for a just and speedy disposition of the case.

Once the hearing or clarificatory conference is terminated within thirty calendar days from the date of the initial clarificatory conference, the Labor Arbiter makes a decision.

**EFFECT OF THE DECISION OF THE LABOR ARBITER**
The decisions, awards, or orders of the Labor Arbiter are considered final and executory within ten (10) calendar days from receipt of such decisions, awards, or orders by any or both parties, unless appealed to the Commission. Here we find a practice similar to that of the regular courts, where the filing of an appeal concerning a decision in a labor case prevents the said decision from becoming final and executory. However, unlike in the regular courts where a motion for reconsideration is usually submitted before an appeal, a motion for reconsideration of a Labor Arbiter’s decision is not allowed. Section 15, Rule V of the NLRC Rules of 2005, provides such:
Motions for Reconsideration/Petition for Relief from Judgment

No motions for reconsiderations/petitions for relief from judgment of any decision, resolution, or order of the Labor Arbiter shall be allowed. However, when one such motion for reconsideration is filed, it shall be treated as an appeal, provided that it complies with the requirements for perfecting an appeal. In the case of a petition for relief from judgment, the Labor Arbiter shall elevate the case to the Commission for disposition.

As stated, a motion for reconsideration regarding a decision by the Labor Arbiter is prohibited; however, it is not without effect, for it can be treated as an appeal itself. It should be noted that in civil cases covered by the rules on summary procedure, the filing of prohibited pleadings like motions for reconsideration will not give any relief to the party, while the act of doing so in a regular civil cases other than one covered by the rules on summary procedure is a step allowed before making an appeal.

The Appellate Procedures in the Labor Code

As for the provisions for filing an appeal in relation to labor cases, the same can be found in the Labor Code as well:

Art. 223. Appeal

Decisions, awards, or orders of the Labor Arbiter are final and executory unless appealed to the Commission by any or both parties within ten (10) calendar days from receipt of such decisions, awards, or orders. Such appeal may be entertained only on any of the following grounds:

(a) If there is prima facie evidence of abuse of discretion on the part of the Labor Arbiter;
(b) If the decision, order, or award was secured through fraud or coercion, including graft and corruption;
(c) If made purely on questions of law;
(d) If serious errors in the finding of facts are raised which would cause grave or irreparable damage or injury to the appellant.

In case of a judgment involving a monetary award, an appeal by the employer may be perfected only upon the posting of a cash or surety bond issued by a reputable bonding company duly accredited by the Commission, in the amount equivalent to the monetary award in the judgment appealed from.

In any event, the decision of the Labor Arbiter reinstating a dismissed or separated employee, insofar as the reinstatement aspect is concerned, shall immediately be executory, even pending appeal. The employee shall either be admitted back to work under the same terms and conditions prevailing prior to his dismissal or separation, or, at the option of the employer, merely reinstated in the payroll. The posting of a
bond by the employer shall not stay the execution for reinstatement provided herein.

To discourage frivolous or dilatory appeals, the Commission or the Labor Arbiter shall impose reasonable penalty, including fines or censures, upon the erring parties.

In all cases, the appellant shall furnish a copy of the memorandum of appeal to the party who shall file an answer not later than ten (10) calendar days from receipt thereof.

The Commission shall decide all cases within twenty (20) calendar days from receipt of the answer to the appellee. The decision of the Commission shall be final and executory after ten calendar (10) days from receipt thereof by the parties.

Any law enforcement agency may be deputized by the Secretary of Labor and Employment or the Commission in the enforcement of decisions, awards, or orders.

The appeal of the decision of the Labor Arbiter to the National Labor Relations Commissions requires the following: (1) Timeliness of appeal – filing of the appeal within the ten (10) calendar days period; (2) Payment of appeal fees; and (3) in case of a monetary award, the posting of a cash or surety bond. Such appeal fees and the memorandum of appeal must be filed within the ten-day reglementary period.

Once an appeal is filed, the Labor Arbiter loses jurisdiction over the case. All motions or pleadings pertaining thereto shall thereafter be addressed to and filed with the Commission. The general rule is that the perfection of an appeal to the NLRC shall prevent the execution of the Labor Arbiter’s decision, and there is nothing objectionable at this stage. It is only when the decision includes an order of reinstatement of a dismissed or separated employee that a situation where inequity is evident arises. This is because the Labor Arbiter, who has supposedly lost jurisdiction over a case due to the perfection of an appeal pertaining to it, will issue a partial writ of execution even while the appeal is pending. Said writ will direct the employer to immediately reinstate the dismissed employee either physically or in the payroll only and to pay the reinstated employee his corresponding salary.

The immediate order of reinstatement of a dismissed or separated employee either through actual reinstatement or if not possible because of strained relationship between management and the worker, by payroll reinstatement, notwithstanding the fact that such decision is being questioned in the higher court is the focal point of this paper. Hence:

The Issue: Does execution of monetary award and reinstatement pending appeal in favor of the worker violate the equal protection clause of the Constitution?
The equal protection is provided in second paragraph of Section 1 of Article III of the 1987 Constitution:

“No Person shall be deprived of life liberty or property without due process of law, nor shall any person be denied equal protection of laws.”

The guarantee of this constitutional right shall mean that all persons or things similarly situated should be treated alike, both as to rights conferred and responsibilities imposed. It is the view of many that execution pending appeal against the management in effect does not give equal protection of laws to the latter because the procedure as discussed above almost ignore whatever will be the decision of the higher court since decision of the labor arbiter even if found erroneous in the end shall have been executed already.

While this issue might have been raised in various petitions to the highest court, the jurisprudence seems to disfavor the observation that there is unfairness on the side of the management in the execution pending appeal in labor case.

A leading case where the unfairness of the compulsory reinstatement of a dismissed employee as an issue has been raised is the case of Aris (Phil.) Inc. v. NLRC, et al., where the petitioner argued against the execution of the order of reinstatement pending appeal. According to his arguments, it is oppressive, unreasonable, and is a violation of due process and the employer’s self-protection which will result in the following: (a) the employer would be compelled to hire additional employees or adjust the duties of other employees simply to have someone watch over the reinstated employee to prevent the commission of further acts prejudicial to the employer; (b) reinstatement of an undeserving, if not undesirable, employee may demoralize the rank and file; and (c) it may encourage and embolden not only the reinstated employees but also other employee to commit similar, if not graver, infractions.

The response of the Supreme Court to this contention, in an en banc resolution, was to justify the constitutionality of a provision for reinstatement pending appeal. The Court maintained that it is a valid exercise of police power of the State and the contested provision “is then police legislation.” The Court also reasoned that: “The execution pending appeal is interlinked with the right to appeal. One cannot be divorced from the other. The latter may be availed of by the losing party or a party who is not satisfied with a judgment, while the former may be applied for by the prevailing party during the pendency of the appeal. The right to appeal, however, is not a constitutional, natural, or inherent right. It is a statutory privilege of statutory origin and therefore, available only if granted or provided by statute. The law may then validly provide limitations or qualifications thereto or relief to the prevailing party in the event an appeal is interposed by the losing party. Execution pending appeal is one such relief long recognized in this jurisdiction. The Revised Rules of Court allows execution pending appeal and the grant thereof is left to the discretion of the court upon good reasons to be stated in a special order.”
As for the appellate procedure pertaining to the elevation of an NLRC decision to the Court of Appeals, the Labor Code does not provide for such. To fill this void, the Supreme Court came out with a decision in the landmark case St. Martin Funeral Homes v. NLRC where it ruled that the way to appeal the decisions of the NLRC is through a special civil action of certiorari (under Rule 65 of the Rules of Court) to the Court of Appeals instead of the Supreme Court, in line with the doctrine of the hierarchy of courts. Speaking through Justice Regalado, the ponente of the decision, the Court held that:

“The Court is of considered opinion that ever since appeals from the NLRC to the Supreme Court were eliminated, the legislative intendment was that the special civil action of certiorari was and still is the proper vehicle for judicial review and addressed to the appellate courts”

“All references in the amended Section 9 of B.P. 129 to supposed appeals from the NLRC to the Supreme Court are interpreted and hereby declared to mean and refer to petitions for certiorari under Rule 65 - consequently, all such petitions should henceforth be initially filed in the Court of Appeals in strict observance of the doctrine on the hierarchy of courts as the appropriate forum for the relief desired.”

Generally, the appeal to the CA of decisions of the NLRC necessitates the filing of a motion for reconsideration corresponding to the principle of exhaustion of administrative remedies. Of course, motion for reconsideration may be dispensed with when it is deemed useless or, as decided by the Supreme Court, “(1) when the issue raised is one purely of law; (2) where public interest is involved; (3) in case of urgency; and (4) where special circumstances warrant immediate or more direct action. On the other hand, among the accepted exception to the rule of exhaustion of administrative remedies are: (1) where the question in dispute is purely legal one; and (2) where the controverted act is patently illegal or was performed without jurisdiction or in excess of jurisdiction.”

The perfection of an appeal of the decision of the Labor Arbiter to the NLRC will stay the execution of said decision, except when an order of reinstatement of a dismissed employee is involved. The Supreme Court has already established the constitutionality of mandatory reinstatement as previously mentioned. But the appeal of a decision of the NLRC to the Court of Appeals is a different story.

As mandated by the 2005 Revised Rules of Procedure of the NLRC, unlike the situation wherein the perfection of an appeal of the Labor Arbiter’s decision will suspend the execution of a questioned ruling, except in cases where the reinstatement of a dismissed employee is mandatory, a petition for certiorari with the Court of Appeals or the Supreme Court shall not stay the execution of the assailed decision unless a restraining order is issued by said courts. This, then, is what legal practitioner; those on the side of management in particular, are concerned about, because it is where the possibility for inequity on the part of management arises.
Suppose, for instance, that there should be case wherein the ruling of the NLRC is unfavorable to management. Of course, the losing party will elevate the matter to a higher court by way of a petition for certiorari under Rule 65 of the Rules of Court. However, if the assailed NLRC ruling includes a monetary judgment, then despite the filing of the petition for certiorari, management can be compelled to pay said monetary judgment to the other party because their appeal will not stay the decision. The NLRC Rules of 2005 provides that the execution of such judgment be immediate upon demand, and should there be failure or refusal by the losing party to do so, then the Sheriff is authorized to immediately proceed against the cash deposit or surety bond posted by the losing party. Given all these, it would seem that whatever be the decision with regard to the appeal, the same will become moot and academic.

It is not unusual that a Labor Arbiter will dismiss baseless money claims of a laborer against her employer. However, upon appeal of the matter to the NLRC, the same might be set aside by the latter and even award the monetary claims of the worker. Subsequently, the Labor Arbiter shall issue a Writ of Execution on the decision of the NLRC in favor of the laborer thru garnishment of the bank account of management. Now, despite the appeal filed by the management pending in the Court of Appeals and despite favorable ruling in favor of the management, and even despite finality of the favorable ruling in the Supreme Court, the monetary judgment had already been executed, hence, there was no way for the management to recover the monetary claims garnished from them.

The Supreme Court, in a recent case of Bergonio v. Southeast Asian Airlines, G.R. No. 195227, April 21, 2014 speaking through Justice Brion reasoned that execution of the reinstatement order pending appeal is also an exercise of the Constitutional right of an employee to security of tenure. The highest Court said:

"In Pioneer Texturizing Corp. v. NLRC, et. al., 26 decided in 1997, the Court clarified once and for all this self-executory nature of a reinstatement order. After tracing back the various Court rulings interpreting the amendments introduced by Republic Act No. 671527 on the reinstatement aspect of a labor decision under Article 223 of the Labor Code, the Court concluded that to otherwise "require the application for and issuance of a writ of execution as prerequisites for the execution of a reinstatement award would certainly betray and run counter to the very object and intent of Article 223, i.e., the immediate execution of a reinstatement order.

In short, therefore, with respect to decisions reinstating employees, that is, for the laborers to report back to work, the law itself has determined a sufficiently overwhelming reason for its immediate and automatic execution even pending appeal. The employer is duty-bound to reinstate the employee, failing which, the employer is liable instead to pay the dismissed employee’s salary. The Court’s consistent and prevailing treatment and interpretation of the reinstatement order as immediately enforceable, in fact, merely underscores the right to security of tenure of employees that the Constitution protects."

Appeals are given great importance because it provides a venue for parties dissatisfied with decisions of lower courts and other bodies for arbitration to bring the matter to the attention of the higher courts, so that justice,
sometimes impeded by the human conditions of the people involved in a case, may be served. As such, the procedural rules corresponding to appeals, including those for labor cases, should be established in pursuit of this noble goal as well. But as seen in execution pending appeal in labor cases a favorable ruling for management, such is a Pyrrhic victory because they have been compelled to pay for a monetary judgment, which subsequently, was proven to be unjust. In such a case, management is justified in raising the issue of inequity.

**Non–application of judicial courtesy**

Judicial courtesy is recognized in our jurisdiction wherein even if there is no writ of preliminary injunction or temporary restraining order issued by the higher court, it would be proper for a lower court or court of origin to suspend its proceedings in view of the pending appeal or petition for review in a higher court. The application of judicial courtesy has been modified by the Supreme Court in various cases particularly when the appeal involves a petition for review on certiorari, that is, it questions the agency’s grave abuse in its exercise of jurisdiction on the case, from NLRC’s decision to the Court of Appeals. As pronounced by Supreme Court in case:

“xxx an application for certiorari is an independent action which is not part of continuation of the trial which resulted in the rendition of the judgment complained of. Impliedly, a petition for certiorari pending before a higher court does not necessarily become moot and academic by continuation of the proceedings in the court of origin.”

In Sapphire Securities Phils., et.al. vs. Kevin Khoe, G.R. No. 186020 . March 24, 2010, the court pointed that:

“Besides, the principle of judicial courtesy has already been abandoned for unnecessarily stalling the regular course of proceedings. Section 7, Rule 65 of the Rules of Court, as amended, directs the lower court or tribunal to proceed with the principal case within 10 days from the filing by a party of a petition for certiorari with the higher court, absent the issuance of a temporary restraining order or a writ of preliminary injunction against it. In fact, the undue failure of the lower court to proceed with the principal case is a ground for imposing an administrative charge on the presiding judge. The lower court or tribunal which is the object of the petition for certiorari can no longer use judicial courtesy as an excuse for suspending the proceeding in the principal case.”

Some authorities argue that there is nothing wrong with the issue of execution pending appeal or contend that there is no issue in the first place. After all, the aim of labor legislation is social justice—for laborers in particular—which is attained by ensuring, among others, the elimination of social, cultural, and political inequalities between social classes. However, while labor laws are construed so as to favor the labor sector, the Supreme Court in the case of Sosito v. Aguinaldo Development Corporation (L-48926, December 24, 1987) also recognized the right of management in the application of labor laws:

“While the Constitution is committed to the policy of social justice and the protection of the working class, it should not be supposed that every labor dispute will be automatically decided in favor of labor. Management also has its own rights, which, as such, are entitled to respect and enforcement in the interest of simple fair
play. Out of its concern for those with less privilege in life, this Court has inclined more often that not toward the worker and upheld his cause in his conflicts with the employer. Such favoritism, however, has not blinded us to the rule that justice is in every case for the deserving, to be dispensed in the light of the established facts and the applicable law and doctrine.”

That being said, the interpretation of the Supreme Court is clear: that while the policy established by the Constitution is to provide full protection to labor, it does not mean the oppression or destruction of management. Neither should the noble aim of elimination of inequalities between social classes brought about by differences in economic or political status be taken to mean that one should be given an advantage which, by law, he does not deserve. Labor laws should be construed to favor the side of labor only when doubt exists; where it does not, the law has to be applied as it is.

**OBSERVATIONS AND RECOMMENDATIONS**

There is no doubt that the principle of execution pending appeal in labor laws must have been well-intentioned; however, it is overly protective of labor such that management is left with no remedy whatever the outcome of their appeal may be. Given the situation as discussed above, perhaps it is only right for our lawmakers to review and seriously contemplate revising or amending the provisions on execution pending appeal. Any amendment on the provision allowing the execution pending appeal will not be easy, as the same might also require constitutional amendment. A constitutional amendment will be an issue given the parameters and jurisprudence that execution pending appeal in favor of the worker is part of the social justice provision and protection to the labor sector. Moreover, an amendment which will change the scenario of benefit due to labor sector might be perceived as diminution of whatever they have been provided in the law, which in effect can result of a negative impression on the labor sector. Since the labor sector constitutes a large portion of the constituency of the lawmakers and therefore significant for their political backing, it will be difficult for the lawmakers to go against the status quo of the labor sector having the privilege of exercising the right to execution pending appeal. The issue of the unfairness to management of this execution pending appeal will always be overshadowed by the constitutional protection to labor sector, although the real reason for it not being amended is the lack of political will on the part of the lawmakers because of fear of labor sector’s political backlash.

A careful scrutiny of the appeal in labor proceedings as discussed in this paper clearly shows that it would be more prudent to execute said judgment only upon affirmation by the Court of Appeals or the Supreme Court. However, it is expected though that the labor sector will not readily welcome the idea of amending the provisions of execution pending appeal with regard to NLRC decisions, aside from reasons already mentioned, but also due to time constraints in Philippine courts, final judgment by the higher courts cannot be rendered as swiftly as the parties would like it to be. The author of this paper believes that there are different paths which could be taken by the amendatory process, paths which do not include the total removal of the relief of execution pending appeal, so as to be acceptable to both the side of management and the labor sector. This will require
the participation of both labor and management in an environment where each side will not doubt the intent of the one another, and where a strong and politically mature lawmakers or key players in society are extant.

It can be said that it is but natural for sympathies to be directed to the party which is perceived to have less; however, efforts to alleviate their difficulties, no matter how well-meant, should not come at the cost of unjust disadvantage to the other party. Involved as we are in the field of law, the fundamental principle which governs our discipline, that of justitia nemini neganda est—justice is to be denied to none—is never to be compromised.

REFERENCES

Laws, Rules and Regulation
The 2005 Revised Rules of Procedure of the NLRC (2006), Section 3, Rule I; Section 4, Rule III; Sections 4 and 9, Rule VI; and Sections 5 and 10, Rule XI.
The 1987 Philippine Constitution, Section 1 of Article III

Books

Cases
Alindao vs. Joson, 210 SCRA 211, November 14, 1996
Aris (Phil.) Inc. v. NLRC, et al. G.R. No. 90501, August 5, 1991
BERGONIO v. SOUTHEAST ASIAN AIRLINES, G.R. No. 195227, April 21, 2014
Manila vs. Manzo, G.R. No.163602, September 7, 2011
Philippine Geothermal, Inc. v. NLRC et al., 236 SCRA 371, September 8, 1994.
Spouses Juan J. Diaz and Court of Appeals , 331 SCRA302, April 28, 2000
St. Martin Funeral Homes v. NLRC, 295 SCRA 494.
Applying the theory of disruptive innovation to recent developments in the electric vehicle market

Michael Frohman
Ritsumeikan Asia Pacific University
Beppu, Japan
retasu26@gmail.com

ABSTRACT
Electric Vehicles (EVs) have the potential to disrupt conventional Internal Combustion Engine (ICE) automobiles, which could bring major changes to the economy, the environment, and everyday life for millions of people. Christensen’s (1997) model of Disruptive Innovation (DI) has become a popular way to anticipate future technological change. In Disruptive Innovation, a new product with initially lower performance is released; however, over time, this product improves and adds value in ways that allow it to overcome existing incumbent products. The main goal of this paper is to analyze recent developments in EV market development to see if the principles introduced through DI theory have held true for this potentially disruptive technology. Approaches from industry incumbents such as Nissan, GM, and BMW are contrasted against the strategy of industry newcomer Tesla Motors in order to analyze the applicability and predictive ability of Christensen’s theories. In this analysis, I have found that the theory has held up well in areas such as incumbent use of sustaining technologies; however, in other areas such as disruptive product performance trajectory and the so-called “Jobs To Be Done” paradigm, I have found important differences between what should happen according to the theory and what actually occurred. Based on this finding and the work of other scholars, it may be necessary to add a new categorization of high-end innovation to DI theory.

JEL Classification: M10, O32, O33, M31, L62
Keywords: automotive, innovation, electric vehicles, product development, management of technology

INTRODUCTION
The automobile is on the cusp of a revolution. Advanced computing will allow for self-driving automobiles. Automatic anti-collision brakes are already widely available in the marketplace. Internet capability will connect cars like never before. Perhaps most critically, innovations have allowed alternatives to the traditional Internal Combustion Engine (ICE) to emerge. Gasoline-Electric hybrids such as the Toyota Prius have already proven to be a sales success and Electric Vehicles (EVs) or Plug-In Hybrid Electric Vehicles (PHEVs) are being mass-produced and sold on the market today.
All of this is taking place against a backdrop of increased concern over global warming. A 2014 report from the United Nations Intergovernmental Panel on Climate Change (IPCC) has concluded that flooding, drought, rising sea levels, famine, and animal extinctions are all likely consequences of a warming climate caused by man-made carbon emissions (Gillis, 2014). Furthermore, the transport sector accounted for up to 27% of final energy use and its CO2 emissions are expected to approximately double by the year 2050 (“Climate Change”, 2014). A shift in this sector away from petroleum-based energy could have a huge impact on carbon dioxide emissions.

The advent of the EV may have the greatest ability to affect both the automobile industry and environmental concerns. EVs do not produce tailpipe carbon emissions and can be powered by a large variety of sources, including carbon-free renewable energy such as wind and solar energy. Electric motors are about three times as efficient as ICEs (Tilleman, 2013) and they offer advantages over ICE technology in areas such as torque, noise, acceleration, and required maintenance (Hensley, Newman, & Rogers, 2012).

One way to examine this new technology is to analyze it using existing technological theories that have proven effective in other industries. The results should be of use in predicting the trajectory of EV technology development. Therefore, I would like to look at the most latest developments in the field of EVs through the concepts of Disruptive Innovation (DI), first popularized by Harvard professor Clayton Christensen in books such as The Innovator’s Dilemma (1997). As EVs do not have many of the elements of the dominant ICE technology, I feel that this is an excellent example to look at the automobile industry through the perspective of DI theory.

Christensen and his co-authors have stated that in order to make DI a more robust theory, it needs to be tested in a wide area of fields and technologies. Exceptions to this theory, if any, will help to strengthen the theory overall (Christensen, 2006). Therefore, testing the predictive capability of DI theory, and finding anomalies, if any, should improve the quality of the theory itself.

In order to test these theories, first I will review the basics of DI theory. Next, I will write a literature review featuring related research, criticism, and feedback from other writers. Third, I will write about EV technology at the time of the publishing of Christensen’s first major work, The Innovator’s Dilemma, in 1997. Following that, I will write about developments in the field of EVs from that time of that book’s publishing up to present day. Finally, I will analyze how these market developments and how they fit into DI theory.

**INTRODUCTION TO DISRUPTIVE INNOVATION THEORY**

According to Christensen (1997), there are two main types of technological innovations: Sustaining and Disruptive. Sustaining Innovations are introduced to maintain a previously established performance curve favored by mainstream customers, while Disruptive Innovations “result is worse product performance, at least in the near term... (But) bring to market a very different value proposition that what had been available previously” (Christensen, 1997, pg. xviii). Additionally, sustaining innovations almost always favor incumbent firms, while disruptive innovations almost always favor new market entrants (Christensen,
1997). Also, disruptive innovations almost always use existing materials and technologies packaged in a new or simpler way, while sustaining innovations are more likely to contain exotic or expensive components (Christensen, 1997).

The impetus for DI theory was Christensen’s study of the optical disk drive industry, where industry incumbents “did everything right” but repeatedly fell to industry newcomers when new disk drive sizes appeared. According to Christensen, he wanted to explore this “Innovator’s Dilemma” and find out how well-established, well-run companies could fall to industry entrants time and time again. The theory has been used by Christensen in a wide variety of industries and has been even used to describe a county’s national innovation progress (Christensen, Craig, & Hart, 2001) and as a way to possibly lift millions out of poverty (Hart & Christensen 2002).

Within the category of Disruptive Innovations, Christensen & Raynor (2003) further classified them into two different types: Low-End Disruption and New-Market Disruption. Low-End Disruptions are the type described in the original Innovator’s Dilemma (1997) analysis: these are innovations which often have lower performance than mainstream products along a certain performance trajectory, yet contain other advantages or benefits that appeal to different groups of consumers. New-Market Disruptions, on the other hand, appeal to new value networks and new customers “who previously lacked the money or skills to buy the product, or different situations in which the product can be used” (Christensen & Raynor, 2003, pg. 44). Ultimately these New-Market disruptions target “nonconsumers” who are now able to use these new innovations, as they are more affordable and easier to use than previous products. Both of these types of disruptions gradually improve until they have enough performance to appeal to mainstream consumers.

Another key part of DI theory is the Resources, Processes, and Values (RPV) framework. “Resources” explain what a company has at its disposal, such as capital, labor, and intellectual property; “Processes” explain how a company has learned to do business; and “Values” explain what a company thinks is important and where the company will utilize its resources. Essentially, this framework is used to explain a company’s “abilities and disabilities” (Christensen, 1997). Through this framework, it is possible to see why industry incumbents tend to fail at disruption, while industry newcomers are typically much more successful. Incumbents often have significant advantages in areas such as resources, but their internal processes and values do not accommodate changing from sustaining to disruptive innovations. In other words, “an organization’s capabilities become its disabilities when disruption is afoot” (Christensen & Raynor, 2003, pg. 177).

One more concept that is often used in Christensen’s DI analysis is the “Jobs To Be Done” model. This is a different way of thinking about market segmentation; instead of breaking down the market by traditional elements such as age, gender, and income, the “Jobs to be Done” model asks a different question entirely: What kind of “job” are customers trying to accomplish when they use a certain product? This approach is more circumstance-based and takes a closer look at the reasons why customers really want to use a certain product. According to this theory, customers “hire” a product to do a certain “job”, which may not be exactly what the original product designer had anticipated.
Figure 1. Graphical Representation of Disruptive Innovation Theory
Source: Ovans (2011)

LITERATURE REVIEW
Disruptive Innovation theory has attracted a large amount of attention since its introduction. The Innovator’s Dilemma was rated by The Economist as one of the six most important business books ever (Lambert, 2014), and the concept for DI was included in Harvard Business Review’s list of “Charts that Changed the World” (Ovans, 2011). It has been called “seminal and groundbreaking” (Schmidt & Druehl, 2008) and has “received extensive coverage in business publications” and been “cited extensively by scholars working in diverse disciplines and topic areas” (Danneels, 2004).

For all of its influence, the theory has found detractors as well. Many writers have found various issues with the theory, ranging from vague definitions to its suitability as a predictive theory. For example, Sood and Tellis (2011) have identified at least four weaknesses with the theory: tautological or shifting meanings, ambiguous application, scarcity of empirical evidence, and a lack of predictive capability. Another response was from Danneels (2004), who determined that the theory was in need of much more clarification and research. He posits several themes and questions for future potential research in this area, including improved definitions, suitability for predictive use, the abilities of some incumbents to survive disruptions, and the relative merits of being customer-oriented or establishing spin-off organizations to pursue disruptive innovations. Danneels encourages using “the foundation provided by Christensen for theory
testing purposes” in the hope that it would be more useful as a predictive model, as opposed to its current “after the fact” ex post analysis.

Other writers have recommended adjustments or additions to the Disruptive Innovation framework. Hardman, Steinberger-Wilckens & van der Horst (2013) recommended a three-point test for potential disruptions: whether or not the technology is disruptive to market leaders, disruptive to end users, or disruptive to infrastructure. Meanwhile, Markides (2006) suggested that the Disruptive Innovation model be split into two different types: business model innovations and radical product innovations. Business model innovations included such examples as Dell and Southwest Airlines, while radical product innovations are “new-to-the-world” products such as personal computers and mobile phones that “disturb prevailing consumer habits and behaviors in a major way”.

Utterback and Acee (2005) discuss the need to consider other discontinuous forms of technological change, as opposed to Christensen’s focus on “attacks from below”. They find several situations where innovations start at the higher end tiers of the market and then move gradually downwards until they reach the mass market-in exact opposite fashion to the mechanisms proposed in Christensen’s Disruptive Innovation theory. Examples of this phenomenon include compact discs displacing audio tapes and vinyl records, electronic fuel injectors displacing carburetors, and electric calculators displacing slide rules.

Schmidt and Druehl (2008) also proposed further distinctions in Disruptive Innovation theory by dividing up disruptive encroachment into four different categories, one of high end encroachment and three of low end encroachment. The purpose of this distinction was to further clarify the different mechanisms by which a new, disruptive product can affect market leaders. They also emphasize the need to constantly project changes not only performance but also in cost, and the importance for both incumbents and newcomers to consider all four types of encroachment in their framework. Positioning new products and technologies is critical to the success or failures of new innovations, and directly interacts with many of the main concepts of Disruptive Innovation theory. Schmidt and Van Der Rhee (2014) also recommend considering a higher-end approach for new disruptive technologies, instead of simply focusing on the bottom of the market and moving up.

Christensen responded to many of these criticisms in a 2006 article that discussed the development of Disruptive Innovation theory over time and also introduced an overall framework for theory building in general. To Christensen, theory building is an “iterative” process that “builds cumulatively” over time. Accordingly, finding anomalies in a theory is actually an opportunity to improve and re-assess the theory in question, and therefore they should be sought out whenever possible. He responds to many common criticisms, saying that Disruptive Innovation theory is not “post-hoc” and much of the confusion regarding the theory involves the many different meanings and connotations of the word “disruption” in the English language.

As for the ability of Disruptive Innovation theory to be predictive, Christensen (2006) references several cases, including Intel, which successfully developed its low-end Celeron processor in response to the threat of disruptive threats from below. As for the prospects of a high-end disruption, Christensen
seems open to the idea that it might make a useful addition to DI theory. However, he insisted that it used a different choice of words to make its meaning more unambiguous and to separate the concept from low-end or new-market disruptions.

The automobile industry itself has several distinctive factors that should be incorporated in any analysis of the field. For decades, the industry has been “locked in” by the ICE engine and its interlinking network of car dealerships, gas stations, and auto mechanics (Cowan & Hulten, 1996). The industry has been dominated by a handful of oligopolistic firms for decades, supported by path dependencies and complimentary support networks (Pilkington & Dyerson, 2004). Wells and Nieuwenhuis (2012) found that the automobile mobility system in particular is resistant to change at the regime level, and that the major carmakers themselves play a major part in maintaining this stability. The industry is also protected from change by large barriers to both entry and exit, which discourages the formation of competing alternatives.

Existing literature also reveals a wide variety of significant barriers to widespread EV adoption. The cars themselves often suffer from “costly batteries, small ranges, slow speeds, and difficult and time-consuming recharging conditions” (Hoyer, 2008). Beyond the cars themselves, though, a wide variety of issues were identified by Browne, O’Mahoney, & Caulfield (2012) including mid-term barriers such as public perception of limited driving range and lack of charging points, and long-term barriers include infrastructural challenges and overcoming ICE lock-in and path dependence.

**RESEARCH OBJECTIVES**

In his 1997 book, *The Innovator’s Dilemma: When New Technologies Cause Great Firms to Fail*, Christensen identified electric vehicles (EVs) as a disruptive innovation and a “potential future threat” to automobile industry. In fact, an entire chapter of the book was devoted to a case study of EVs as a future potential disruption. While Christensen (1997) has said that the findings in that case study should not represent the “right” way to sell EVs nor an explicit prediction as to the future of EVs (pg. 235), it is nevertheless a useful exercise to see how the person credited with creating DI theory would apply the theory in this situation.

In the case study, Christensen (1997) recommended several courses of action for a theoretical company that was developing and selling an EV in the late 1990’s. These included: charting the trajectory of market demands (pg. 237), finding non-mainstream markets where the product’s weaknesses can becomes its strengths (242), making the product simple, reliable, and convenient (245), introducing the car at a low price point (246), finding new distribution channels for the product (248), and spinning off or creating a new organization that would be content to sell products at low volumes (250).

Since the publication of *The Innovator’s Dilemma*, the development of Lithium-ion (Li-ion) batteries has enabled increased battery capacity and decreased weight compared to earlier materials (Vayrynen & Salminen, 2012; “Fact #607”, 2010). As a result, EVs of today have increased performance compared to those of 1997 and the market prospects for EVs have changed dramatically.
In this research, I will analyze the predictive capability of Disruptive Innovation (DI) theory by comparing post-1997 developments in the EV market against what was stated in Christensen’s theories. To date I have been unable to find updates to the applicability of disruptive innovation theory to EV technology. My goal is to fill in this gap through my analysis and therefore contribute to the development of DI theory as a whole.

In particular, I intend to focus on areas of Sustaining vs. Disruptive technological development in established firms, the application of corporate-level Resources, Processes, and Values (RPVs) in the development of disruptive technology, the importance of distribution methods for disruptive products, and the application of the “Jobs to be Done” model to marketing disruptive products. Additionally, I will analyze the case of Tesla Motors, which as a newcomer with a disruptive innovation in an established industry should provide the best platform for analyzing DI theory and predictions.

**RESEARCH DISCUSSION**

**History of EVs to 1997.** Despite the recent advances in EV technology, the concept of using electricity to propel an automobile has been around for a long time. In fact, the first EVs predate the first Benz ICE model (Hoyer, 2008). There are records of EVs as far back as 1834 and they accounted for around one-third of all automobile production at the turn of the 20th Century (Kley, Lerch, & Dallinger, 2011). This early, turbulent period in the automobile industry saw competition between a large number of companies selling gasoline, electric, and steam powered cars, as is often seen in a “fermenting” technology before the emergence of a dominant design (Sierzchula, Bakker, Maat & van Wee, 2012). However, the introduction of the electric starter by Charles Kettering in 1912 greatly improved the performance and utility of ICE vehicles and contributed to a downturn in EV sales (Midler & Beaume, 2010).

In the following decades of the mid-20th century, the ICE cemented itself as the dominant design of personal automobiles through the adoption of mass production techniques, and led to a case of technology “lock-in” which discouraged the use of competing technologies (Cowan & Hulten, 1996). These kinds of dominant designs become embedded in “product architecture, technology, usage specifications through regulations as well as design rules, customer’s preferences or performance criteria” (Midler & Beaume, 2010). As a result, the business concept of the mass-produced vehicle powered by an ICE has “literally been built into the fabric of contemporary life” (Wells & Nieuwenhuis, 2012). When a dominant design emerges, it usually leads to a small number of firms controlling the market, which gradually took place over the post-war era (Sierzchula et. al 2012) Pollution concerns and the 1970s Oil Shocks led to some EV prototyping, but none of them were able to reach the mass market (Hoyer, 2008). Essentially, the trajectory of battery technology was stopped from around 1915 to the 1990’s (Cowan & Hulten, 1996).

However, the introduction of a Zero Emission Vehicle (ZEV) mandate by the California Air Resources Board (CARB) in the 1990’s once again led to increased interest in EVs from major manufacturers (Schierzula et al., 2012). Major carmakers, such as GM with the EV1, developed EVs in order to meet the
CARB mandate so that they could continue to sell conventional vehicles in the massive California market (Fletcher, 2011). However, during the entire time of EV1’s production, GM management was lobbying against the CARB mandate, leading to a conflict of interest for the company (Paine, 2006). While the EV1 was leased to a limited number of consumers in selected markets in order to meet this mandate, its heavy, underpowered lead acid batteries in early models greatly limited its utility and range (Fletcher, 2011). Similar battery problems hurt this 1990’s electric-car renaissance, and as a result it was “oversold”, primarily due to battery size, cost, and charging concerns (Hoyer, 2008).

This is the period in which Christensen wrote The Innovator’s Dilemma and the setting for his case study on the disruptive potential of electric vehicles. By the mid-1990’s, batteries were still waiting for a “breakthrough” that would increase the car’s range at high speeds (Cowan & Hulten, 1996). Given the limited technology available at the time, it was not unreasonable to suspect that EVs would be suited to only low-end applications for the foreseeable future.

History of EVs post-1997. The advent of the Lithium-ion (Li-ion) battery brought about the potential for great change in EV development. At first used in consumer electronics, the Li-ion battery was then scaled-up to fit the larger needs of moving a heavy vehicle (Fletcher, 2011). This fits with Christensen’s (1997) theory that disruptive innovations usually use existing technology in a new way. In the 2000s, battery technology gradually shifted from nickel-based batteries to lithium-ion based batteries, as EV manufacturers determined that lithium-based batteries were the best current solution for competing with ICE vehicles. This new, promising energy storage solution led to rapid growth and investment in EVs. Starting especially in 2008, a large number of EV producers began appearing in the industry, which is once again a sign of a “fermenting” technology that is undergoing rapid growth (Sierzchula et. al, 2012).

With the advances in Li-ion battery power, mass market EV production from mainstream incumbent carmakers once again became a possibility. This led to a variety of products and strategies from major carmakers, such as the Nissan Leaf, the BMW i3, and “compliance cars”, which are a limited group of EVs that exist primarily to fulfill zero-emission vehicles mandates.

Nissan Leaf The Nissan Leaf is a battery-only EV that in many ways is similar to any mainstream automobile produced by an incumbent carmaker. It has a hatchback design that can sit up to five people and has sufficient performance for everyday urban and highway driving. It has been the highest selling EV in history, with over 119,000 sales worldwide as of June 2014, enough to outpace the original Toyota Prius over a similar timeframe (Griemel, 2014).

At Nissan’s Oppama factory in Japan, the Leaf uses the same assembly line as other conventional automobile models such as the Juke and Cube. At each point in the assembly line where ICE components are attached to the automobile, the manufacturing process simply substitutes the equivalent electric part for each ICE part. For example, at the point in the assembly line where the gas tank is attached to an ICE model, the battery pack is attached to the bottom of the Leaf. Likewise, where the ICE engine is attached to a Juke or Cube, the manufacturing process simply substitutes the electric motor and inverter for the Leaf. In this way, the Leaf is completely integrated into the same assembly line as conventional ICE
automobiles. The doors, interior, accessories, and wheels are all processed at the same time on the same line, regardless of whether or not the car is an EV or an ICE.

**BMW i3** BMW has developed a new “i” division to develop eco-friendly automobiles that make use of battery-powered drivetrains (Squatriglia, 2011). The first two models are the i3, an all-electric city car, and the i8, a plug-in hybrid supercar that combines an electric motor and a gasoline engine for high performance. The main contribution of the i3 to EV discussion is the car’s extensive use of new, lightweight carbon fiber technologies in the car’s frame (Lavrinc, 2013). As the batteries of EVs are quite heavy, the car’s weight and efficiency becomes much more critical and carmakers need to find ways to reduce the weight of the car in other areas (Pilkington & Dyerson, 2004). As a result of BMW’s carbon fiber chassis, the car’s weight is greatly reduced, thereby increasing the car’s range and drivability despite the extra weight from the its batteries.

**Compliance Cars** There is a category of EVs known as “compliance cars”; these have been produced mainly in order to meet government mandates such as emission regulations. As a result, these are typically produced in very low numbers for a certain area or region, and are leased rather than sold to customers. Often, as these cars are loss-making for the manufacturer, the number of compliance cars produced is the bare minimum necessary to fulfill the mandate.

The most famous example might be GM’s EV1, which was produced in the 1990’s to meet CARB’s ZEV mandate. Several compliance cars still exist today, especially in California, such as the Fiat 500e, the Chevrolet Spark EV, and the Honda Fit EV, among others. Typically these are existing ICE models that have been modified to use electric drivetrains. In DI theory, such usage of disruptive innovations inside a sustaining framework has been referred to as “cramming” and usually leads to unsatisfactory results for both companies and consumers (Christensen, Anthony, & Roth, 2004).

**Tesla Motors Background.** Entering the mainstream automotive market is not an easy task. Barriers to entry are extremely high and include factors such as “manufacturing scale, brand equity, channel relationships, customer management, and capital” (Hensley, et al 2012). In addition to these barriers, the industry itself has shown significant regime stability over the years which protects the interests of incumbents and discourages the success of industry newcomers (Wells & Nieuwenhuis, 2012). Nevertheless, the advancement of Li-ion battery technology has opened the door to new companies like Tesla that are looking to make an impact on the market (Sierzchula, et al 2012).

Headquartered in Palo Alto, California, Tesla Motors was founded in 2003 with the goal of producing electric cars powered by lithium-ion batteries. CEO Elon Musk has stated that the goal for Tesla was to spread the use of green energy and energy independence through the adoption of electric cars (Musk, 2006). He has said that a major goal of starting the company was not necessarily to be profitable, but to push the technology and stature of EVs in the mass market (DeMatio & Zenlea, 2012).

The company’s first product, the Tesla Roadster, was released in 2008 with a list price of $121,000 (“The electric-fuel-trade”, 2009). The car combined a Lotus Elise-based frame with a lithium-ion battery-powered electric powertrain for
high-end sports car performance. This model was targeted at early adopters who were willing to pay a premium for new technology, and served as a way to refine manufacturing techniques with the goal of gradually moving towards more affordable mass-market automobiles in the future.

The Tesla Roadster was a textbook case of a “new market disruption” as explained by Van der Rhee et al. (2014). It had high performance metrics in core attributes favored by mainstream consumers (handling and acceleration), but it also introduced high performance in a secondary attribute as well (efficiency and low carbon emissions). This new kind of combination attracted consumers from a wide area: according to Gallon (2009), “just as many Prius as Porsche 911 buyers purchased the Tesla Roadster”. Additionally, per Gallon (2009), this high-end approach was reflected in the incomes of these consumers as over 80 percent of Roadster buyers had incomes over $100,000.

Tesla began selling their next car, the Model S, in 2012. As opposed to the sporty Roadster, the Model S is a luxury four-door sedan, designed to compete with offerings from makers such as BMW and Audi. The Model S, like the Roadster, also continues to use Tesla’s lithium-ion based drivetrain. Unlike the Lotus-based Roadster, however, all of the main components of the Model S are unique. Much of the car’s manufacturing, from battery production to extensive aluminum frame stamping, is handled on-site at the former GM/Toyota NUMMI factory in Fremont, California (Markus, 2012).

The Model S received a significant endorsement in November 2012, as it was named the winner of Motor Trend magazine’s annual Car of the Year competition. The magazine’s editors praised the car’s performance, acceleration, luxury, style, handling, and roomy cabin in addition to its highly efficient powertrain (MacKenzie, 2012). Additional mainstream praise came from the American publication Consumer Reports, which gave the car a score of 99 out of 100, tying it for the “highest-ever test rating” (White, 2013).

The next planned model for Tesla, the Model X, is slated to be a crossover SUV with seating for seven riders and all-wheel drive. Along with its electric drivetrain, the Model X will have unique styling designs such as “falcon wing” rear doors. Its positioning as a crossover all-wheel drive SUV will make electric vehicles more accessible while broadening to company’s potential market.

As part of CEO Elon Musk’s plan to continue developing increasingly accessible and mass-market electric cars, the company’s third generation automobile is expected to be a lower-priced sedan that is competitive with entry-level luxury vehicles such as the BMW 3 series (DeMatio & Zenlea, 2012). The car, now known as the Model 3, is still in its development stages as of this writing, but its development remains a major focus of the company moving forward.

A key part of the company’s future development will be its “Gigafactory” to produce Li-ion batteries at extremely high volumes. The plans are for the factory to be located near Reno, Nevada and to produce enough batteries for over 500,000 cars- more than the entire global production of 2013. The goal is that by increasing economies of scale, Tesla can bring down the price of batteries, especially for its planned Model 3 (Trop & Caldwell, 2014).
**Tesla Motors: Product Philosophy.** From the beginning, Tesla Motors wanted to be seen as a company that made more than "just" electric automobiles. Tesla hoped to go head-to-head with the world’s leading manufacturers not just in green technology, but also in areas such as performance. As explained by CEO Elon Musk:

“The goal of the Model S is to create the best car in the world, and to show that an electric car can be the best car in the world... Previously, people thought of the electric car as being quite compromised. They’d buy the car because it was electric instead of because it was the best car. That’s the problem for widespread adoption of electric vehicles.” (Markus, 2012; video 4:10)

In other words, Tesla’s goal was that they did not feel that consumers had to sacrifice in order to drive electric cars. According to Musk, EVs could be just as stylish, useful, sporty, and fun as other automobiles. This strategy could be seen in the Model S, which combined conventional luxury car styling with rapid acceleration from its electric drivetrain.

Tesla did not want the pre-existing image of “electric cars” define its products. *Motor Trend* endorsed this view, saying that the car “delivers everything you’d expect from a premium sedan” and that it’s “not some eco-mobile with tiny wheels and dorky proportions” (MacKenzie, 2012). Similarly, Model S’s styling is more compatible with the common image of a luxury sedan. This is supported by another auto design critic, who said that the Model S is a “good-looking, reassuring design, clearly different from the Kamm-based aerodynamic shape of the Prius”, although its design approach is meant to “hide the technical radicalism in a cloak of invisibility” (Cumberford, 2012).

Tesla’s focus on high-end battery technology has allowed them to produce cars with driving ranges well in excess of other EVs. The 85 kWh Model S has an estimated range of 265 miles, compared to an EPA-rated 84 miles for the Nissan Leaf and 81 miles for the BMW i3 ("Compare", 2014). Extended driving range is crucial to the acceptance of EVs; one survey stated that 53% of consumers wanted EV range equal to a full tank of gas (“Plug-In”, 2011). Tesla has also developed a network of fast charging stations called “Superchargers” that allow Model S owners to quickly recharge their battery while on long road trips (Ohnsman, 2013).

**Tesla Motors: Disruptive Car Design.** Designing cars around an electric motor also opens up new possibilities for car design. Lead designer Franz von Holzhausen explained this approach by stating "We turned a lot of preconceived notions on their head and said, 'Why does it have to be that way? (Zenlea, 2012)"

With Tesla’s low mounted battery and compact, rear-mounted engine, designers have much more freedom than with conventional automobiles. The lack of any sort of driveshaft opens up the interior of the vehicle, and additional luggage space can be found in both the front and the back of the car.

Another advantage of electric motors is that they have on-demand torque and do not need to be revved for maximum performance like conventional
engines. What this means for drivers is instantaneous, powerful, and smooth acceleration. The Model S (P85 version) uses its electric motor to go from 0-60 MPH in 3.9 seconds, which is comparable to many of the world’s best sports cars (Reynolds, 2012). Additionally, the weight from the low-mounted, heavy battery provides an extremely low center of gravity compared to most gasoline engine cars, improving the car’s handling characteristics.

Much of Tesla’s company culture (in other words, its Resources, Processes, and Values) is reflected in its Silicon Valley origins. Preproduction cars are known as “alpha” and “beta” cars, even critics referred to the company’s products in software terms, calling Tesla’s cars “vaporware” (Kong, 2011). Venture Capital funding was a key part in getting the company started, with several funding rounds providing tens of millions of dollars for the company. This Silicon Valley mindset also makes their development much more nimble and open to change than established car companies. In fact, Toyota head Akio Toyoda has referenced the company’s “entrepreneurial culture” as of the reasons he chose to work with Tesla (Davis, 2010), although Toyota later broke off from their relationship with Tesla in order to focus on hybrids and hydrogen fuel-cell technology (Griemel, 2014).

Retail Strategy Tesla developed a retail strategy that is unique from traditional carmakers. Instead of a traditional independent dealership model, the company sells cars directly to consumers, either online or in special retail showrooms. Comparable to Apple Stores, these are located in high-end metropolitan shopping districts, and customers can custom-design their new automobile in the showroom.

Tesla, as a new entrant, was able to develop their own, completely new RPV structure and sidestep the entire traditional dealership system. Non-commissioned salespeople work in each showroom to answer potential customer’s questions and arrange for test drives. Interactive touch-screen displays line the showroom’s walls and allow customers to learn about the Model S at their convenience. Cars are ordered via the internet and delivered directly to customers. There is no need for the traditional dealership cost structure.

ANALYSIS OF AUTOMOTIVE MARKET DEVELOPMENTS THROUGH DI THEORY

Sustaining Innovations in the ICE Automotive Industry

DI Theory in regards to Sustaining Innovations fits very well with incumbent ICE carmaker’s strategies. Mainstream car makers have worked hard and spent significant sums of money and resources towards gradual, sustaining innovation in automobiles and ICE technology. In fact, the improvements in primary performance attributes such as horsepower and acceleration have improved quite consistently for decades (“Fact #800”, 2013). Additionally, since gas prices spiked in the mid-2000s, gas mileage has also improved on a consistent trajectory (“Eco-Driving Index”, 2014). Still, despite these changes, “the structure of the (automotive) regime has adjusted in certain specific ways while the fundamentals have remained intact” (Wells & Nieuwenhuis, 2012). As stated succinctly by Ford executive chairman Bill Ford, “... for 100 years pretty much all we had was the internal-combustion engine. Of course, it changed and was
refined, but you didn’t have revolutions; you had evolutions” (Bonini & Kaas, 2010).

How did carmakers achieve these consistent, sustaining innovations in speed, horsepower, and (recently) fuel efficiency? One way is through employing technologies such as electronic direct fuel injection, turbochargers, Continuously Variable Transmissions (CVTs), higher compression ratios, hybrid drivetrains, cylinder deactivation, and variable valve timing (Figure 2). These technologies are all examples of Sustaining Innovations. They are being produced by incumbent firms, work in established value chains, and improve performance along the primary attributes that are most valued by mainstream consumers, such as horsepower and fuel efficiency.

As these can be incorporated into existing ICE design and value networks, they do not present a challenge towards the way that each company does their business. For example, turbochargers can be used to make more power out of smaller engine displacements, but do not require any dramatic changes to the fueling infrastructure. Usage of these Sustaining Innovations has rapidly increased in recent years as carmakers look to maintain or increase car performance while improving its fuel efficiency (“Fact #658”, 2011). Increased transmission gearing has also been another example of Sustaining Technologies that gradually improve a car’s efficiency along an established trajectory. On average, cars in the US had transmissions with only 3.3 gears in 1979, while by 2012 that number had increased to 5.7 gears (“Fact #803”, 2013).
Analysis: Tesla’s Top-Down Product Strategy

Traditional DI theory says that disruptive production should start at the low end of the market, and then gradually move upwards over time. One classic example is steel “minimills”, which started out making simple rebar and then gradually moved upmarket towards sheet steel (Christensen, 1997). Where would Tesla fit into this framework? Tesla has not targeted Low-End or New-Market type disruptions. With the sporty Roadster, the company started at the highest-end, most demanding supercar segment, and then with the Model S moved slightly downwards towards a relatively less-demanding luxury sedan market. For the Model X, the company hopes to further broaden the company’s appeal by selling a car in the popular crossover SUV market. This is planned to be followed by another move downward in terms of market position with its mainstream Model 3 sedan.

With these moves, Tesla is going after lucrative customers in major, mainstream markets against entrenched, well-established incumbents that are well-motivated to protect their turf. According to Christensen (1997), this is the kind of strategy that should lead to failure time and time again.

Yet there is some theoretical precedent for this pattern of product development. Van der Rhee, Schmidt and Van Orden (2012) have identified the possibility of new products to “encroach” on the high end of the market first and then gradually move downwards to the mainstream. Such an approach has been further explained by Schmidt and Van der Rhee (2014), who used Tesla’s Roadster as an example of a new kind of technological approach to new product introduction that starts at the high end of the market and eventually moves downwards.
When comparing Tesla’s products to other automobiles, it quickly becomes apparent that they have extremely high performance in two areas: performance (in this case, acceleration), and efficiency (in this case, fuel mileage through Miles Per Gallon [MPG] or the energy-equivalent electric Miles Per Gallon [eMPG]). If these two performance metrics are put onto a simple graph, the Model S and Roadster’s unique value proposition becomes clear: no other car can offer the same amount of performance and energy efficiency. This is the kind of novel value that would allow Tesla to have more “pricing power” and allow them to create demand at the high end of the market (van der Rhee, Schmidt & Van Orden, 2012; also Hardman et al 2013).

Through the analysis in Figure 4, four groups of cars become clear. First, in the lower left quadrant, are high-end ICE sports cars with high performance but poor fuel efficiency. Next, in the upper left quadrant, are conventional ICE or hybrid automobiles that offer a practical balance between speed and efficiency. In the upper right quadrant, competing EVs from incumbent carmakers have high efficiency, but at the cost of performance. Finally, in the lower right quadrant, Tesla’s automobiles offer a unique value proposition—acceleration comparable to high-end sports cars, but with a much higher efficiency. Tesla’s products also offer much greater range than competing EVs.

There is a clear downward trajectory line to be drawn from the Roadster to the Model S to the upcoming Model 3 mainstream sedan. Critical to this strategy, as pointed out by Van der Rhee et al (2012), is the need to rapidly achieve cost reductions in their move down-market. This fits directly into the company’s plans to construct their “Gigafactory” with a large enough scale of...
economy to drive down battery costs. Doing this should create a “virtuous cycle” of increasingly lower costs, improvement from learning effects, and higher sales volumes.

**Figure 5: Tesla Motors Product Strategy**

**Sales & Distribution Networks.** The RPVs of existing car distribution networks would not appear to support the introduction of a new technology such as EVs. Traditional dealers are dependent on the business model of ICE automobiles. ICE automobiles can be sold relatively quickly to consumers who are already familiar with the technology, and re-servicing ICES provides revenues from activities such as oil changes and periodic maintenance. A 2013 McKinsey study found that new car sales only have a 2% profit margin for traditional dealers, and these dealers are dependent on financing and maintenance in order to turn a profit (“Innovating”, 2013). The simpler electric motors found in EVs do not need maintenance such as oil changes or belt replacements. As such, EVs do not fit into existing dealer’s RPV model of making money.

Similarly, while ICES are familiar to customers, EVs are relatively new to most of the population and sale of these EVs requires significant time and effort from salespeople to explain the ins and outs of ownership. For instance, in a 2011 consumer survey, 70 percent of respondents said that either “did not understand EVs enough to consider them when making my next car purchase” or that “I understand about EVs, but need to know more before I can consider them” (“Plug-in”, 2011). As a result, a salesperson has to devote more time to each customer. From tax breaks and rebates to charging times, driving ranges, specialized equipment and battery warranties, there are a variety of additional factors that must be considered and discussed when purchasing EVs. This is at odds the traditional commission-based income structure, which favors relatively quick sales to a larger number of customers. So from both the manager and employee standpoint of traditional dealers, EVs do not match their RPV preferences. The new technology is at odds with how they are used to making money.
There has been anecdotal evidence from a variety of sources that salespeople at traditional dealerships are downplaying or actively discouraging customers that are interested in EV purchases, such as in the case of the EV1 (Paine, 2006). Further reports exist of BMW dealerships being unable to properly prepare their sales force to sell their new line of i3 EVs (Noland, 2014). In another example, a Consumer Reports survey found that some dealer salespeople were not knowledgeable about electric vehicles and often steered customers who asked about EVs towards more conventional automobiles (Evarts, 2014).

The Resources/Processes/Values (RPV) paradigm helps explain the rationale behind Tesla avoiding the traditional dealership model found with established carmakers. Its showroom retail model is a much better fit as there is no need to worry about distracted salesmen, or competing for attention against other ICE models on the same dealer lot. In the company’s own words, “Selling directly allows us to most effectively communicate the unique benefits of electric cars to potential customers” (Musk & Ahuja, 2014). This fits well with Christensen’s DI theory (1997), which states that disruptive innovations often need to develop their own, independent distribution network.

Corporate-Level RPV. Even though incumbent carmakers such as Nissan and BMW have produced EVs, these models tend to be similar in size and performance to traditional mainstream products and are sold through existing dealership networks. This approach allows incumbents to use their existing expertise and resources from ICE production in the EV market. Additionally this allowed the incumbents to target segments with higher production volumes (Sierzchula et. al, 2012). This emphasis on established incumbents targeting large markets and existing customers fits exactly with Christensen’s (1997) theories. Such an emphasis could be seen with GM’s early apprehension to the EV market, where the company would only be interested if it was a “billion dollar business” (Fletcher, 2011, pg. 36).

Meanwhile, startup carmakers, which were not as constrained by existing RPV models, were much more likely to produce EVs in a variety of ranges including niche markets such as low-speed vehicles and sports cars (Sierzchula, et. al 2012). Resource allocation also played a role in the development of the cars through the type of employees that would work on EV projects. For example, in the 1990’s, being assigned to an EV project in General Motors was avoided and seen as a “career killer” by engineers (Fletcher, 2011, pg. 70). On the other hand, Tesla Motors was made from the very beginning with the goal of spreading EV technology throughout the industry, even if it meant that that company failed (DeMatio & Zenlea, 2012). This divergence in corporate outlooks can be seen as an example of “asymmetric motivation” as explained by Christensen, Anthony, & Roth (2004). While it would be far too easy for GM to disregard the nascent EV market, for Tesla the entire future of the company was at stake.

Nissan has shown that it is possible to integrate EVs into currently existing incumbent manufacturing processes as the Leaf can be assembled on the exact same line as conventional ICE models such as the Juke. Furthermore, as a standard sized hatchback with conventional performance, the overall design of the Leaf has been made to fit in with traditional carmaker design concepts. This follows the findings of Wells and Nieuwhuis (2012), who state that “the industry
overall prefers to make electric vehicles as traditional as possible, even if this does compromise performance”.

The “Jobs To Be Done” Model. In analyzing transportation options, Christensen & Raynor (2003) tend to look at the “job” of transportation as simply moving from one location to another. The car itself is seen as a utilitarian form of transport, little more than a tool to complete the “job”. This is not limited to Christensen and his co-authors; forecasts of EV sales often portray consumers as “rational agents” making “utility-based” decisions, yet drivers are often concerned with gaining enjoyment or making identity-based decisions with their automobiles (Graham-Rowe, Gardner, Abraham, Skippon, Dittmar, Hutchins & Stannard, 2012).

Yet a quick look at the marketplace shows that cars are “hired” for a variety of reasons, such as to be status symbols, for the fun of driving, or to be a good parent.

Consumer surveys have backed up this sentiment. A 2013 study suggests that “marketing a brand image is just as important as building reliable vehicles” (“J.D. Power and Associates”, 2013). The same study also states that “one third (33%) of shoppers avoid a model because they do not like its exterior look or design”, and “nearly one in five (17%) of new vehicle shoppers avoid a model because they don’t like the image that it portrays”. Furthermore, 25% of new-vehicle shoppers avoid hybrid or electric vehicles because of exterior styling. As a result, carmakers need to avoid actively “turning off” potential EV customers through awkward or polarizing designs. As stated by Graham-Rowe, et al (2012), the image of explicitly environmentally-friendly or “green” cars is actually a negative for many consumers. Tesla engineers used this outlook when designing the Model S, which achieved a low 0.24 drag coefficient, better than the Toyota Prius or Chevrolet Volt, yet “without those cars’ gawky styling” (Zenlea, 2012).

The “Jobs To Be Done” model also affects how consumers would approach the issue of EV driving ranges. According to Pearre, Kempton, Guensler, & Elango (2011), the vast majority of needed daily range is 50 miles or less. Using a low-end disruption framework, carmakers should then focus on having just enough performance to meet that typical daily need. However, as their own literature review shows, “travelers are likely to want a vehicle to cover most of their own heterogeneous needs over time, not the needs of the average driver, nor even their own average travel profile” (Pearre et al, 2011). Even if the average driver only needs a range above 150 miles for nine days each year, many consumers will no doubt balk at driving a second car or getting a rental, as Pearre et al (2011) suggest. Simply put, the “Jobs to be Done” model does not account for many consumer’s real-world range anxiety issues.

CONCLUSIONS
As a result of analyzing Christensen’s (1997) theories in the field of electric vehicles, I have found mixed levels of success, with some results matching DI theory, while others went against what should have happened. Overall, while many parts of the theory remain strong, there are a few points for improvement that may be worth further consideration.

I have found evidence for the following assertions that match with Christensen’s theories: the use of Sustaining Innovations by established
carmakers; Corporate Level Resources, Processes, and Values that either encourage or inhibit development of disruptive products; and the importance of developing independent distribution channels for disruptive products.

For the use of Sustaining Innovations, over the history of the ICE there has been a clear pattern of established carmakers gradually creating faster, more powerful, and more efficient engines through incremental technological improvements and sustaining innovations such as turbochargers. Meanwhile, Corporate Level RPV has played a large role in encouraging or inhibiting the development or electric vehicles. Perhaps most visibly in the case of GM, conflicting RPVs inside the massive company lead to great difficulty when selling and supporting disruptive innovations such as the EV1. Meanwhile, Tesla, as a new company with a clear vision and much more nimble structure, was able to focus on high performance Li-ion based EVs from the very beginning.

In regards to distribution channels for disruptive products, Tesla’s showroom strategy has shown the importance of developing independent distribution channels for disruptive products. Incumbent carmakers and their dealerships have a deep interest in continuing the standard business model of current ICE-based automobiles. Meanwhile, Tesla’s approach shows the benefits of an unfamiliar form of transportation to new consumers, without having to compete with attention from ICE products.

However, there remains the question of the applicability of the “Jobs to be Done” theory in the automotive industry. Marketers and researches alike should ask themselves what “job” drivers are really trying to accomplish. Is it utilitarian transportation on their daily work commute, self-expressive styling, or personal enjoyment? Or is it some combination of all three? The answer probably depends on the driver, and could change day to day. More clarification in this area could lead to a better understanding of suitable disruptive products for the marketplace.

Another point of divergence is Tesla’s top-down product strategy. Instead of taking a disruptive innovation and moving upmarket, Tesla has taken the exact opposite approach by starting at the highest, most demanding parts of the market, and then gradually moving downwards towards the mainstream (Schmidt & van der Rhee, 2014). This contradicts directly with standard DI Theory, which states that disruptive products should be simple, cheap, easy to use, and only have the bare minimum level of functionality to meet market demand. Christensen (2006) has shown a willingness to consider this kind of theoretical framework, however he has insisted that it go by a different name and that “high-end disruption” would be a misleading term.

**FURTHER RESEARCH**

Other researchers, similar to Schmidt and Van Der Rhee (2014) and Utterback and Acee (2005), may be able to search for any other such examples of Disruptive Innovations that have succeeded at “high end” disruptions, instead of at the low end or through targeting non-consumers. If further examples of this phenomenon can be found, it may prompt an addition to Disruptive Innovation theory. As Christensen, Anthony, & Roth (2004) have said, “the discovery of anomalous
phenomena is the pivotal element in the process of building improved theory” (pg. 276).

Additionally, depending on future battery technology developments, a low-end disruptive EV of some sort may appear in lower-end markets that do not require the same level of performance of mainstream ones. If this can occur, it would finally fulfill Christensen’s scenario of a truly low-end disruptive electric vehicle.

REFERENCES
Evarts, E. (2014). Dealers not always plugged in about electric cars, Consumer


United States: Sony Pictures Classics.


Vayrynen, A. & Salminen J. (2012). Lithium ion battery production. *Journal of*
Using fuzzy set analysis to examine the determinants of repurchase intention and buyers’ satisfaction in online group buying phenomenon

Luksi Visita
Universitas Gadjah Mada
Yogyakarta, Indonesia
luksivisita@gmail.com

ABSTRACT
Online group buying is a new business strategy in Yogyakarta, Indonesia. The concept is to get low priced products or services with more volume of orders. Building on previous studies, I examined the effect of reputation, trust, and perceived quality of consumer satisfaction and repurchase intention using qualitative comparative analysis (QCA) fuzzy set. I also added new variables namely social media usage and peer-reference in social media. QCA is known by its function to assess and to analyze different combinations of causations and complexity. Related to consumer behavior, results supported previous studies that perceived website quality affects high consumer satisfaction in online group buying. Meanwhile, high repurchase intention is affected not only by perceived website quality but also by trust towards the vendors and sellers. The rest of the determinants are known to partially affect the outcomes.

JEL Classification: D11, L81
Keywords: online group buying, customer satisfaction, repurchase intention, fuzzy set, QCA

INTRODUCTION
The Internet is becoming more accessible and it opens a lot of possibilities and opportunities, including improvement in business, especially in terms of how corporations do their marketing communications and promotions. One of the potential options for business players is online group buying. The concept of online group buying basically sells products to more consumers, with discounts as the trade-off. In practice, consumers will choose deals that they desired, and when the volume target is fulfilled, the deal is granted and consumers get significant amounts of discounts for the products.

This study examines antecedents of satisfaction and purchase intention in online group buying. The predicted antecedents are the reputation of online group buying, perceived quality of the website, and trust towards the online group buying and towards the sellers in the online group buying. This study added the role of social media and peer reference in social media. These additional variables are expected to influence the outcomes, since there is a strong relation with the
outcomes. Social media is a very powerful tool used by companies, government to promote their activities or products. Meanwhile, peer reference in social media itself is the recommendation from other people. This study used the fuzzy set methodology as part of the qualitative comparative analysis. The objective of is to find out whether the result will support previous studies, which mostly used regression.

The internet-oriented research is growing nowadays with a lot of research related to e-commerce. This study will contribute to understanding more the behavior of people in online group buying, by adding the role of social media and peer reference. Furthermore, with fuzzy set methodology, this study will analyze what are the best combinations of antecedents that can have a maximum outcome.

**LITERATURE REVIEW**
This study looked into five determinants of consumers’ satisfaction and repurchase intention in online group buying. Four of them represent the management of the website, and one of them represents the external factor: the role of peers and peer communication. Online group buying is a way of selling, which rely on voucher discount usage. The more people have a deal or showing an intention to buy, the more it is possible for consumers to get discounts for certain products and services. In Indonesia, there are several famous online group-buying systems such as Groupon, disdus.com, lakupon.com, deal.co.id, ogahrugi.com, valado.com, and mbakdiskon.com. The mechanisms of these online group-buying basically is like online purchases. The buyers view a certain deal that he/she is interested in, chooses the deal or discount, and waits until a certain amount of time in order to see whether the volume of that product/service deal has been fulfilled. When the volume is already fulfilled, buyers confirm the deal, make a payment which is discounted, and website vendor sends an email confirming the purchase of the deal. The coupon will be applicable over a time period, and when the buyers wish to avail of the discount coupon, he/she brings the email confirmation to the seller. Online group buying is effective for new businesses that have not gain of attention yet, and the process of attracting more consumers. The reputation of the vendor of online group buying is important since the more people acknowledge the vendor and befriend with vendor’s social media, the more people know about the deal information and the faster information is be disseminated. Therefore, in the end, more people notice the deal and the seller’s brand. The target market for this method is middle-lower class and an online group buying is prominent among students. In some regions like Yogyakarta, which has several universities and colleges, online group buying is more preferred.

Products are commonly valued based on reputation. The same thing also applies to online group buying. From the explanation above, a key factor to online group buying vendor achievement. Web sites with good reputation tend to get more attention and hence attract consumers. In some cases, reputation can even forecast future performance (Resnick & Zeckhauser, 2012); have a direct relation with loyalty in an online setting (Caruana & Ewing, 2010); and is said to be a good tool for identifying good-faith seller (Jin & Kato, 2006). Shiao and Luo (2012) explained that reputation is part of a social process and somehow by the
knowledge sharing of provider’s website, it can add more intangible assets (such as better reputation, increased personal status, and increase positive feelings from a provider). The authors who support that website’s reputation play an important role for repurchases intention and consumers’ satisfaction are Hsu, Chang, and Lee (2014), Cheng and Huang (2012), Shiau and Luo (2012). Reputation sometimes also becomes a measurement and a factor for someone to finally decide to purchase products. This phenomenon is actually vital and commonly act as consideration for providers of online group buying websites. Several aspects cause bad reputation namely fraud, obscurity, or inaccuracy in giving information. These, later on, forms bad quality perception, which is also related to trust, and cause consumers hesitate to purchase from the same vendor. Therefore, the author supports that reputation is related and affects purchase intention and satisfaction of consumers.

According to Hsu, et al (2014), perceived quality of a website in online group buying consists of three parts: system quality, information quality, and service quality. Perceived web quality is a matter of perspective, especially on how consumers’ opinion and view related website of the provider. Perceived quality of a website can be accounted as a precise measurement because it is seen objectively from the consumers’ point of view. Perceived quality of a website also allows the business owner or researchers analyze which part of the website needs more improvement. Website quality was explained to have a direct and positive impact on consumers’ satisfaction (Bai, Law & Wen, 2008). In some cases, website quality outlined into several other aspects such as design, interactivity, informative, security responsiveness and trust; altogether they affect consumers’ satisfaction (Lin, 2007). Other studies who also found that perceived quality play a role in a business are Kim and Niehm (2009), Wells, Valacich, and Hess (2001), and also Hwang and Kim (2007). Hsu, et al (2014) added that the seller’s perceived web quality affect consumers’ satisfaction, also because seller’s perceived web quality can give additional perception about information quality and service quality from the sellers’ perspective. However, this paper only considers perceived web quality from the consumer’s perspective because it is seen as sufficient to represent the quality of websites.

Trust is one of the outcomes of bad management skills and lack of quality management from the provider. Trust is related strongly to other aspects and also triggered by one or more unpleasant occurrences. Trust is very important in the e-commerce business since there is no face-to-face interaction between buyers and sellers; buyers sometimes do not see the physical appearance of the products, and hence trust is vital in online businesses. Gefen, Karahanna, and Straub (2013) described that trust can be achieved from several things: understanding that the vendor gets nothing from fraud and that there is a safety mechanism in e-commerce. Him, Sia, and Lee (2006) finds that trust has the ability to lead to actual buying behaviors. Yoon (2002) also agrees that trust affecting the online-purchase intention.

Social media is now having a rapid growth, especially among generation X who get most exposure towards technology and Internet development. In this global era, a lot of businesses involve themselves in the hype of online selling. A lot of corporations maximize their online media and social media such as website,
facebook, twitter, etc. As Lang (2010) cites in Habibi, Laroche, and Richard (2013) people spend a third of their daily life being online. Furthermore, consumers of online or Internet actively have a part and give contribution for the content (Habibi, Laroche & Richard, 2013). This understanding more or less becomes a strong justification on how companies should consider their online management skills. Some other authors believe that offering different platforms and different kinds of social media might affect brand loyalty (Erdogmus & Cicek, 2012). Mangold and Faulds (2009) stated that social media is a hybrid element in businesses’ marketing mix. Submarani and Rajagopalan (2003) studied about knowledge-sharing activity and influence in social media marketing. In a more advanced explanation, social media’s role in boosting peer communication was known to have an impact towards purchase decisions directly and indirectly (Wang, Yu & Wei, 2012). The online management skills in this case also include the ability of a company to have an active offering of their deals and fast response when communicating with consumers in social media.

**Figure 1. The Research Model**

Bamberger and Biron (2007) as cited in Tai, Hong, Chang, and Chen (2012) defined peer reference as a result of the level of trust and experience in a social communication context. Tai et al (2012) also argue that reference or the ability of someone to refer to something provides for better understanding of products of the company. Peer reference, in this case, can be understood as the influence of peers and friends inside an online or social media circles. Friends that recommend something on Facebook, relatives, and family members that re-tweet some information related with the online group-buying provider, and so on. By this condition, the author argues that the possibility of someone to purchase products gets higher when his/her relatives refer to a certain product or online group buying provider. Peers are known to have an influence towards product and brand decision (Childers & Rao, 1992). Ward (1974) and Churchill and Moschis (1979) cited in Wang, Yu, and Wei (2012) it is believed that interactions with peers is a fundamental act that can influence someone’s attitude upon products.
RESEARCH METHODOLOGY

Data collection and cases
The data was collected through online survey of people who experienced online group buying. Because of the nature of QCA (fuzzy set) that considers the opposite outcome from a pile of data, it is not a problem to have a medium amount of data sample, around 105 cases (Devers, 2013). There is an 11-data sample (cases) in total and two of them have incomplete data, in other words, the questionnaires from participants who did not fill all the survey’s questions are dropped.

Methods
The first step is data gathering through a questionnaire, using Likert scale - the questions reflecting participants’ perspectives upon each causal condition. Because of the scarcity of sample data, the author decided to include the two defective samples, by doing some adjustments. There are seven sections in the survey, which measure each variable.

Table 1. Variables’ measurement

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Measurement</th>
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<tbody>
<tr>
<td>Website’s reputation (Hsu et al, 2014; Shiao &amp; Luo, 2012)</td>
<td>1. Online group buying website that I ever used is a famous vendor that is well-known by a lot of people and my relatives</td>
</tr>
<tr>
<td></td>
<td>2. Online group buying website that I ever used is an online group buying vendor which has good reputation</td>
</tr>
<tr>
<td></td>
<td>3. Online group buying website that I ever used is an online group buying vendor which has a good reputation because of its honesty</td>
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</tbody>
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| Perceived quality of the website (Hsu et al, 2014)                           | 1. Online group buying website that I ever used, gave good service to me                                                                     |
|                                                                             | 2. I feel an easiness in accessing content of online group buying website that I’ve used                                                    |
|                                                                             | 3. The online group buying website that I ever used gave me precise information                                                            |
|                                                                             | 4. The online group buying website that I ever used, gave me the latest (up-to-date) information                                              |

| Trust towards the web and trust towards the sellers on the website (Shiao & Luo, 2012; Hsu et al, 2014) | 1. Online group buying website that I ever used is a secure website                                                                           |
|                                                                                                       | 2. Online group buying website that I ever used is a trusted website                                                                          |
|                                                                                                       | 3. Online group buying website that I ever used is a reliable website                                                                         |
|                                                                                                       | 4. I feel secure to have a transaction with online group buying that I ever used                                                               |
|                                                                                                       | 5. I’m sure that I will get any fraud incident by using that online group buying website                                                        |
|                                                                                                       | 6. I have trust towards the sellers within the online group buying website                                                                     |
|                                                                                                       | 7. The sellers within the online group buying website gave a trustable impression                                                             |

| Maximization of social media usage (Wang et al, 2012)                              | 1. The online group buying website has a social media that I follow (or befriend)                                                             |
2. The online group buying website often shares information about service and product selling by the sellers in the social media
3. The online group buying website actively interacts with the candidate of buyers in the social media
4. The social media account which is owned by the online group buying website is an active account and got a fast response

Peer reference & peer communication in social media (Tai et al, 2012; Wang et al, 2012)
1. I often talk about products and services which are offered by the social media account of online group buying website with my peers
2. I often show the products and services which are offered by the social media account of online group buying to my peers
3. I often get information about products and services which are offered by online group buying website through the social media which are shared by my peers
4. In the social media, my peers often suggest to me to purchase products and services which are offered by social media account of that online group buying website

Consumers’ satisfaction (Tai et al, 2012; Shiao & Luo, 2012)
1. I feel very satisfied with my experience purchasing something in that online group buying vendor
2. I feel very pleased with my experience purchasing something in that online group buying vendor
3. I’m not regretting my decision to purchase product/service from the online group buying vendor
4. I think buying product and service through that online group buying vendor is a good idea

Repurchase intention (Tai et al, 2012; Shiao & Luo, 2012)
1. I have the intention to use that online group buying vendor again in the future
2. I have the intention to continue to use that online group buying vendor again in the future
3. I think I will buy products and services which are offered by the online group buying vendor in the future

Each variables measurement will have a maximum value, as a result of accumulation. For example, measurement “repurchase intention” will have a maximum number of 15. Each sample’s number will then be divided by this maximum number, and then multiplied by the maximum threshold of fuzzy set (in this paper, the author uses 1, 3, and 5 as the threshold).

The second step is calibrating the raw data into fuzzy sets by using three-value scheme (1,3, 5 as threshold). The third step is analyzed with fuzzy set truth table, and also selects the frequency and the consistency threshold. In this paper, the author uses a value of 0.95 as the cutoff consistency. Ragin (2008) cited in Skarmeas, Leonidou, and Saridakis (2014), mentioned that consistency measures the degree which solution is the suitable one for the outcome. After the numbers are calibrated into a value, which is appropriate for the software to compute,
there will be many possibilities of outcome and variables that the researcher desired. In other words, the researcher is able to decide what kind of outcome is expected. This is one example that differentiates qualitative comparative analysis with regression. The researcher is able to set and able to figure out in an opposite condition of the outcome, what independent variables are needed. Additionally, the author is also able to set the opposite of independent variables, and figure out the final result of the outcome. The last step is to choose from three options: parsimonious, intermediate, and complex; and finally, interpret the data result.

RESULTS
This part presents two analyses: the first examines what condition causes the repurchase intention and consumer satisfaction, and the second examines what condition causes the absence of repurchase intention and consumer satisfaction.

The models for analyses are:
1. $cs = f(RW, PWQ, TS, MoSMU, SMPC)$
2. ${\sim}cs = f(RW, PWQ, TS, MoSMU, SMPC)$
3. $ri = f(RW, PWQ, TS, MoSMU, SMPC)$
4. ${\sim}ri = f(RW, PWQ, TS, MoSMU, SMPC)$

Symbol (\textasciitilde) indicate a negation, with this explanation for each letter:
1. “$cs$” = consumers’ satisfaction
2. “$ri$” = repurchase intention
3. “$RW$” = reputation of website (vendor)
4. “$PWQ$” = perceived web quality
5. “$TS$” = Trust
6. “$MoSMU$” = Maximization of social media usage
7. “$SMPC$” = Social media peer communication

Table 2. Data of un-calibrated variables

<table>
<thead>
<tr>
<th>Case</th>
<th>RW</th>
<th>PWQ</th>
<th>TS</th>
<th>MoSMU</th>
<th>SMPC</th>
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<tr>
<td>1</td>
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Table 3. Data of calibrated variables

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<tr>
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<td>0.16</td>
<td>0.75</td>
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</tr>
<tr>
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</tbody>
</table>

Originally, the fuzzy set analysis will have three types of solutions: complex, intermediate, and parsimonious. This study focuses on the complex results. Research results are adapted from Skarmeas, Leonidou, and Saridakis (2014). Complex solution is used because it contains no basic notion, as Elliot (2013) and Ragin and Sonnett (2005) cited in Skarmeas, Leonidou, and Saridakis (2014). The cutoff for this research is 0.95, which means that the lower combination values less than this number will not be used.

Table 4. Complex solution for the outcome findings

<table>
<thead>
<tr>
<th>Complex solution</th>
<th>Raw coverage</th>
<th>Unique coverage</th>
<th>Consistency</th>
</tr>
</thead>
</table>

Customers' satisfaction findings
Model: cs = f(rw, pwq, ts, mosmu, smpc)
- rw*pwq*ts*mosmu*~smpc 0.310296 0.050776 0.940171
- rw*pwq*ts*mosmu~smpc 0.595204 0.236954 0.995283
- rw*pwq*ts~mosmu*smcp 0.373766 0.016925 1.000000
- rw*pwq*~ts*mosmu*smcp 0.339915 0.035261 1.000000
Solution coverage: 0.710860; solution consistency: 0.969231
Frequency cutoff: 1.000000; consistency cutoff: 0.940171

Repurchase intention findings
Model: ri = f(rw, pwq, ts, mosmu, smpc)
- rw*pwq*ts*mosmu 0.817346 0.203679 0.996795
- rw*pwq*ts*smpc 0.618922 0.005256 0.979210
- ~rw*pwq*ts~mosmu~smpc 0.307490 0.065703 1.000000
Solution coverage: 0.888305; solution consistency: 0.985423
Frequency cutoff: 1.000000; consistency cutoff: 0.969811

Consumers' satisfaction
From the complex solution, there are several combinations of antecedents that can result in high consumers' satisfaction. The first pathway indicates that high
reputation, high perceived website quality, high trust, and high maximization of social media usage lead to high consumers’ satisfaction (consistency = 0.90; coverage = 0.79). The second pathway consists of high reputation, high perceived website quality, high trust, and high peer reference in social media communication (consistency = 0.88; coverage = 0.60). The third pathway consists of high reputation, high perceived website quality, high maximization of social media usage, and high peer reference in social media communication (consistency = 0.88; coverage = 0.619). The last pathway consists of low reputation, high perceived quality of the website, high trust, low maximization of social media usage, and low peer reference in social media communication (consistency = 0.94; coverage = 0.31). Refer to Skarmeas, Leonidou, and Saridakis (2014), there are several antecedents, which sometimes occur as high determinant, and sometimes they occur as low determinants. This indicates that that certain antecedents or conditions are not those essential for the outcomes. However, by seeing the consistency and coverage, and how many times the determinant occur in a pathway, some ‘inconsistent’ antecedents should not be ignored completely.

Repurchase intention
From the complex, the first pathway that can lead to high repurchase intention consists of high reputation, high perceived website quality, high trust, and high maximization of social media usage (consistency = 0.99; coverage = 0.81). The second pathway consists of high reputation, high perceived website quality, high trust, and high peer reference in social media communication (consistency = 0.97; coverage = 0.61). The third pathway consists of high reputation, high perceived website quality, high maximization of social media usage, and high peer reference in social media communication (consistency = 0.94; coverage = 0.61). The fourth pathway consists of low reputation, high perceived website quality, high trust, low maximization of social media usage, and low peer reference in social media communication (consistency = 1.00; coverage = 0.30).

DISCUSSION OF THE RESEARCH FINDINGS
This study uses the fuzzy set methodology as an alternative research method. One of the goals is to compare whether the results validate previous research. In reference to Skarmeas, Leonidou, and Saridakis (2014), Table 4 shows complex solution design.

In Table 5, the small black circles indicate a high presence of a condition, and small white circles indicate the low presence of a condition. Large black (or white) circles indicate a core and necessary condition of presence (or absence). Blank spaces indicate, “don’t care”. The “Φ” indicates a not necessary condition. Ticks (V) indicate that the hypothesis is supported; an “X” indicates that the hypothesis is not supported and “Φ” indicates that the hypothesis is supported partially. From the table above, it can be seen that there are three determinants, which support the previous research on, repurchase intention and consumers’ satisfaction.

Perceived website quality is found as the only strong determinant towards high consumers’ satisfaction. In this paper, quality can be described as vendor’s website service, precise information, up-to-date information and ease for
the consumers. The rest of the predicted determinants are found to be conditionally affecting the high consumers’ satisfaction. However, by seeing the occurrence in the path, the consistency, and the coverage value, some determinants strongly affect (reputation, trust, and maximization of social media usage). Peer reference conditionally affects consumers’ satisfaction. This might be caused by the indirect relationship between peer reference and consumers’ satisfaction.

For the other outcome, perceived web quality is seen as a strong determinant of repurchase intention. Trust towards the vendors and sellers are also a strong determinant of repurchase intention. These findings support the previous studies. Social media maximization and peer reference in social media communication are known to affect repurchase intention conditionally. In reality, this condition might be caused by others factors such as the duration a consumer spends time online, or how close the relationship is with the peers.

### Table 5. Solution and pathways

<table>
<thead>
<tr>
<th>Outcome condition</th>
<th>Customers' satisfaction pathways</th>
<th>Repurchase intention pathways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reputation</td>
<td>1st 2nd 3rd 4th Conclusion</td>
<td>1st 2nd 3rd Conclusion</td>
</tr>
<tr>
<td>Perceived website quality</td>
<td>● ● ● ● ● (H1)</td>
<td>● ● ● ● ● (H2)</td>
</tr>
<tr>
<td>Trust (to vendor and sellers)</td>
<td>● ● ● ● ● (H3)</td>
<td>● ● ● ● ● (H4)</td>
</tr>
<tr>
<td>Maximization of social media usage</td>
<td>● ● ● ● ● (H5)</td>
<td>● ● ● ● ● (H6)</td>
</tr>
<tr>
<td>Peer reference in social media communication</td>
<td>● ● ● ● ● (H7)</td>
<td>● ● ● ● ● (H8)</td>
</tr>
</tbody>
</table>

### CONCLUSIONS

This study provides additional references on consumers’ satisfaction and repurchases intention, especially in an online group buying case. By using fuzzy set, this study calculates complex and more possible conditions and combinations that the previous studies have not covered yet. Although results show strong support only on the role of perceived website quality, variable trust and reputation are still debatable in terms of how they showed almost full condition support of the hypothesis. The role of social media and peer reference is not really contributive, as what was predicted. However, there are still minor pathways and conditions to fulfill the hypothesis. There is strong possibility that this rejection of support is due to the complex outcome mode. If the option is changed into the parsimonious outcome, the result seems to change. This study suggests other perspectives and possibilities of new methods in order to complement and enrich previous research works.

The limitation of this study is assessed on the development of the measurement and questionnaire items. The author refers to previous fuzzy set research and builds measurement of variables by exploring previous literature. This effort seems incomplete and not thorough enough since there is no clear mechanism on how the sequence and consideration of item measurements are chosen. Future studies should be able to understand how well the variable
measurement in a fuzzy set is constructed and make a distinctive view of the forming process of item measurement in the qualitative comparative analysis. Finally, another drawback of the paper is the choice of variables. In some previous papers, there are variables, which are supported having a direct effect on the outcome, but those variables are not included in this paper. Future research should analyze and carefully select the best independent variables for this topic.

REFERENCES


Devers, K.J, et all. (2013). Using Qualitative Comparative Analysis (QCA) to study patient-centered medical homes. pp 1 - 36


Economic growth and political regimes: Dynamic panel estimation on the growth experiences of political regimes

Carlo Anton G. Arguelles
De La Salle University
Manila, Philippines
carlo_arguelles@dlsu.edu.ph

ABSTRACT
Economic theory suggests that political regimes are one of the fundamental causes of economic growth, (Acemoglu, 2007). But, the relationship between growth and institutions is seemingly non-linear. The literature found that there are problems of endogeneity between regimes and economic growth. Empirical studies have adapted advanced methods such as interaction terms and dynamic panel estimators for unbiased and consistent results. The purpose of this research is to use these advanced methods to better our understanding on the growth experiences of different political institutions. This paper analyses different political structures through the use of the theoretical framework of Ehrlich and Liu (1999), a dataset by Assiotis and Sylwester (2013) and dynamic panel estimators of Arellano & Bond (1991) and Arellano and Bover (1995) that eliminate endogeneity. The variables of income inequality and corruption are key determinants in examining the economic success of political regimes. This study hypothesizes that political institutions affect the economic impact and magnitude of income inequality and corruption. The results show that income inequality has a robust negative relationship with economic growth in any regime. Corruption, on the other hand, has varying effect on the economy. Democracies and autocracies have distinctive reactions towards these issues thus creating different economic environments. Furthermore, the data suggests that autocracies tend to have extreme values of growth unlike democracies that generally have stable growth rates.

JEL Classifications: O40, O43, O50
Keywords: economic growth, income inequality, corruption, dynamic panel estimation, interaction terms

INTRODUCTION
Government and economies around the world have one common goal of economic growth but there are obstacles such as income inequality, corruption, and poverty. In 2013, the Philippines boasted a GDP growth of 7.8 percent, which made it the fastest growing country in Asia (NSCB, 2013). The growth of the Philippines came from the success of the manufacturing, construction sectors, and the increases in government and consumer spending (Santos, 2013). The ADB (2009) reported that over the past 40 years the Philippines had low to moderate growth because of weak employment generation, high inflation rates, increasing...
population growth and other factors. Among these problems were two influential variables: income inequality and corruption. Based on a study by Stratbase Research Institute, the Philippines had the highest income inequality out of all the ASEAN countries (Ho, 2011). The Philippines also remains to be one of the most corrupt countries in the world (Salaverria, 2012). Organizations such as the World Bank and the UN stress that income inequality and corruption are negative factors for growth that have to be eliminated. Research on the economic impacts of corruption and income inequality could help explain the growth differentials within and between countries.

Corruption and income inequality is common across all countries but there are institutions that control these quite well. Based from the dataset, countries such as Canada, Sweden, Finland, Denmark and others are seen to have strong policies against corruption and below average income inequality. A common trait among these countries is the political regime of democracy. The statistics show that these countries have strong tendencies towards democratic policies. In contrast to this, there are autocratic regimes in the dataset with above average income inequality and weak policies against corruption. The data may be telling us that there are trends when it comes to political institutions.

The problem that this study tackles is the disparity in growth of countries that is seemingly caused by corruption, income inequality and political institutions. From this problem, the research question formulated is: “do different political regimes affect the economic impact and magnitude of income inequality and corruption?” The study answers this by using a panel dataset that contains 119 countries, that ranges from 1984-2007 and the use of interaction terms and dynamic panel regression. The objective of this paper is to analyse the relationships of income inequality, corruption, political institutions and their interactions towards growth experiences. The significance of this research is that it may show which political institution generally is optimal for economic growth. Furthermore, the results can help create regime specific policies to handle economic issues regarding corruption and inequality.

REVIEW OF RELATED LITERATURE

Todaro and Smith (2012) defined economic growth as “the steady process of by which the productive capacity of the economy is increased over time to bring about rising levels of national output and income”. As time passed, many theories of growth have been developed. There are 3 prominent growth theories: Classical Growth Theory, Neoclassical Growth Theory and Endogenous Growth Theory. First, The Classical Growth Theory by Smith, Ricardo and Malthus proposes that economic output is determined by capital, labor, land and technological state (Higgins, n.d.). Second, the Neoclassical Growth Theory or the Solow Swan Model shows that that there are diminishing returns of capital and labor and that capital accumulation or savings is an important factor in economic growth (Blanchard, 2003). This model also includes how technological progress helps capital become more productive for the economy, which leads to a higher steady state of economic growth. Finally, Endogenous growth theory states that there are factors determined endogenously such as technological progress, human capital and etc. that dictate economic growth (Romer, 1986 and Lucas, 1988).
The theories focused on essential variables for economic growth such as capital, labor and technological progress. It is empirically proven that these variables raise economic growth but there are countries that cannot invest in these. Acemoglu (2007) theorizes that these variables are proximate causes of growth rather than fundamental causes of growth. The fundamental causes of growth are luck, geography, institutions and culture. North & Thomas (1973) claims that the variables in the earlier growth theories are not causes of growth but instead they are growth. These fundamental causes will be explained in the theoretical framework. The fundamental cause of growth, institutions, seems to be the most significant out of all the other causes, (Acemoglu, 2007) because of its feasibility to be studied and impact on growth.

There are many empirical studies on how an institution affects growth. These empirical studies use variables that measure characteristics of the institutions. Wacziarg & Tavares (2001) showed that democratic institutions affected growth through different channels such as human capital, physical capital, income inequality, openness, etc. The overall effects show that democracy is moderately negative. In addition to this, a study by Barro (1996) states that political freedom has a weak non-linear effect on growth. He shows that increasing political rights has diminishing marginal returns to economic growth. However, Acemoglu, Johnson & Robinson (2004) say that institutions are endogenous determined by the economy. The endogeneity of institutions can lead to inaccurate estimations and conclusions about the effect of institutions on economic growth.

Acemoglu (2007) points out the case of Korea as a “natural experiment” to test out the institutions hypothesis. In 1948, the political situation in Korea led to a division of the state into two: The Democratic People’s Republic of Korea (Communist) and the Republic of Korea (Democracy). Data coming from Maddison (2001) shows that in 2000 GDP per capita of South Korea was $16,100 while the GDP per capita of North Korea was only $1000. This “natural experiment” shows how institutions could make a difference in the economic outcomes of countries. The examination of the case between South Korea and North Korea implies that democratic and non-democratic regimes can have different growth trajectories.

Przeworski and Limongi (1993) found out that there is a difference between institutions (property rights, etc.) and regimes. Their results show that political regimes do not have a significant effect on economic growth. There are other factors of the institutions such as law, policies and regulations that have a greater influence on economic growth rather than political regimes. The authors present a table with the results of 18 statistical studies that show different conclusions on the effect of political regimes and economic growth. The findings were as follows: 8 findings stated that democracy promotes growth, 8 studies support that economies with autocracies grow faster and 5 papers that concluded that the political regime does not make a difference in economic growth. The variation in the studies is attributed to the problems estimation such as simultaneity, endogeneity and selection bias.

A study by Assiotis and Sylwester (2013) examines if the effects of corruption differ across different forms of government. They address the issues of heterogeneity of corruption and democracy of each country by using panel with
dummy variables that represent time and space invariant variables. Their results found that strong democracies tend to have higher income than other countries. Their findings also suggest that decreasing corruption in autocracies would have a greater positive effect on economic growth rather than decreasing corruption in democracies. They found that increasing the control of corruption in strong democracies could decrease growth because corruption can bypass inefficient regulations.

When institutions are studied there are a lot of things to consider. Acemoglu (2007) proposes that the rules of the institutions can be broken which means that there is room for corruption. Aidt (2003) defines corruption as “an act in which the power of public office is used for personal gain in a manner that contravenes the rules of the game”. An example of this is opening a jewelry store in Russia is next to impossible because of the stringent regulations (Mirnov, 2005). These regulations can be bypassed by offering bribes. Aidt (2003) calls this “efficient corruption”. The study of Leff (1964) and Huntington (1968) suggest that corruption can help institutions with glaring inefficiencies have better economic growth. However findings suggest “despite the potential positive effects of corruption there will be negative effects in the medium run and the long run” (Akai, Horiuchi & Sakata, 2005).

The studies mentioned do not consider the institutional differences between the countries so this means that their results on corruption on the countries may not be accurate. The paper of Heckleman & Powell (2008) examines that different levels of economic freedom affect the economic benefit of corruption, which would affect economic growth. Their study found out in countries where economic freedom is limited corruption is growth enhancing. Another study by Aidt et al (2007) found out that corruption in high quality political institutions has a significant and negative effect on growth, while corruption in low quality political institutions has no significant impact on growth.

Another factor that is present in every institution is economic inequality. The relationship of income inequality and economic growth has been subjected to many theoretical and empirical studies. The most prominent relationship between income inequality and economic growth is the Kuznets Curve. The Kuznets Curve is an inverted U shaped curve with GDP per capita on the horizontal axis and income inequality on the vertical axis. This shows that the relationship between GDP per capita and income inequality is quadratic.

There are also empirical studies that show how income inequality affects economic growth. The relationship between income inequality and rates of growth and investment is not as strong as it is thought to be (Barro, 1999). His results imply that the Kuznets Curve may not be enough to explain the income differences within countries. The regressions show that “growth tends to fall with greater inequality when per capita GDP is below around $2000 (1985 U.S. dollars) and to rise with inequality when per capita GDP is above $2000”.

There is also an empirical study that accounts for the differences in political regimes and institutions and examines how income inequality affects these countries. Clarke (1993) finds that income inequality has a negatively robust effect on economic growth on democracies and autocracies. However, Barro (1990) states that income inequality is significant but has a small effect on growth.
The results also show that income inequality seems to have a greater effect on economic growth in democracies rather than autocracies.

There are studies that examine income inequality and corruption and how they affect economic growth. A research by Li, Xi and Zou (2000) examined how corruption affects income distribution and economic growth. The results that countries with very high and very low corruption have low inequality rates, corruption also takes a large part in income inequality in developing and industrial countries and that corruption slows down economic growth. However, another study by Alonso, Davoodi and Gupta (1998) shows that countries with high levels of corruption would increase income inequality and poverty by reducing economic growth.

**THEORETICAL FRAMEWORK**

This study uses modern growth theory by Acemoglu (2007) as a theoretical basis. Table 1 shows the fundamental causes of growth.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luck</td>
<td>The Luck Hypothesis states that countries with very similar characteristics can still vastly differ in economic growth and development because of the presence of multiple equilibria.</td>
</tr>
<tr>
<td>Geography</td>
<td>The Geography Hypothesis refers to the environmental endowment a country has and how it affects economic growth and development.</td>
</tr>
<tr>
<td>Culture</td>
<td>The Culture Hypothesis says that different beliefs, values and preferences can affect the economic decisions of an individual.</td>
</tr>
<tr>
<td>Institutions</td>
<td>The Institutions Hypothesis states that laws and policies can affect economic incentives thus affecting the investment climate for technology, physical capital and human capital.</td>
</tr>
</tbody>
</table>

Source: (Acemoglu, 2007)

The main focus of this paper is the institution hypothesis. North (1990) defines institutions as the “rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction”. The implication of this is that institutions structure the incentives of social, political and economic actions that affect growth outcomes. There are three critical points from this definition. The first point is that institutions are man-made; this means that it can be changed to obtain different economic outcomes. The second point is that the regulations set by the institutions can be broken by acts related to corruption. The third point is that constraints set by institutions such as property rights; laws and regulations can affect how individuals act which could affect economic growth. These are points of analysis that are important to consider in the results of the study.

The institution hypothesis along with the definition of North (1990) conceptualizes a “good institution” as an institution that encourages investment,
technological progress, and efficient allocation of resources (Acemoglu, 2007). Institutions that do not encourage these variables have a higher probability of having lower economic growth.

The panel setting of the data captures the other factors of geography and culture. Lastly, luck is a difficult variable to model. However, it can be simulated by the error term that is found in the econometric model. The main driver of the model is political institutions but the other causes of growth cannot be ignored.

A model on corruption and growth

A model by Ehrlich and Liu (1999) applies the institution hypothesis. This model shows how endogenous corruption and growth reach equilibrium in different political regimes. The model examines the equilibrium of balanced growth. Balanced growth contains two types of investments: human capital and political capital. Human capital is investment that promotes economic growth whereas political capital is the source of social loss because of corruption. There are two cases, one involves homogenous agents and the other involves heterogeneous agents.

The homogenous model involves economic agents, government size and intervention, investments variables (human and political capital) and etc. The model describes how economic agents that are workers and bureaucrats have the ability to invest in human capital, political capital or both. The model also assumes that these economic agents maximize utility. However, these economic agents can’t directly choose an allocation because it goes through many things such as government intervention and etc. Once the economic agents are able to invest in their optimal amounts of human and political capital there is a possible of three results. These three steady states are poverty trap development, stagnant and developing equilibrium and persistent growth equilibrium. Government intervention can also determine what steady state an economy would end up in. The model shows that government intervention can also help the economy but after a certain level increasing government intervention can cause a decrease in the steady state of an economy.

The heterogeneous model uses the same variables but splits the economic agent into two: worker and bureaucrat. There are also two cases to consider the competitive and monopolistic case. The competitive case represents democracies because it shows bureaucrats compete for power. The monopolistic case is similar to autocratic regimes because it shows the bureaucrats in a centralized system. The difference of these models is in the level of government intervention and the size of the government. The main implication of this model is that monopolistic systems have the ability to have equal or higher growth (but not necessarily total output) as the competitive system. This happens as long as the monopolistic system is efficiently managed. This model also has the same conclusion as the homogenous model when it says that government intervention at high levels could retard growth by negatively affecting accumulation of human capital. This is generally the case for autocracies because of the “iron hand” of the leaders. However, the ability of the autocratic leader to maintain policies for long-term growth is very important for the economy.
EMPIRICAL METHODOLOGY

Model Specification
The base model that this paper is from Ehrlich & Lui (1999). The empirical model (equation 1) uses variables such as log of GDP per capita government intervention (LRGDPC), dummy variables for regimes (COMM), government intervention (G) time (T), fixed effects (α) and interaction terms.

\[ LRGDPC = a + aT + (aT \times IG) + (aT \times COMM) + aLIG + aCOMM \] (1)

From this model, Assiotis & Sylwester (2013) created their own specification to examine the effects of democracy, corruption and income inequality on growth, Equation 2. They replaced G with the variable DEM and they also added corruption to the empirical model. The basis for adding the variable CO is in the theoretical model of Ehrlich and Lui (1990) wherein they involve corruption with regimes. Their model initially uses the variables \( \alpha_i \) and \( \eta_t \) to represent the time and space fixed effects. \( Y \) represents the growth rate of GDP per capita which is the dependent variable. The model also contains an interaction term between the control of corruption and the extent of democracy. The vector, \( X \), signifies control variables that the authors used later on in their estimations. \( \varepsilon \) is the idiosyncratic error term.

\[ Y_{it} = \alpha_i + \eta_t + \delta(CO)_{it} + \zeta(DEM)_{it} + \theta(CO \times DEM)_{it} + X'_{it} \Gamma + \varepsilon_{it} \quad \text{where } i = 1,2,..I \quad t = 1,2,..T \] (2)

The contribution of this paper to the literature is adding the variable of income inequality and interaction terms that involve it with the current variables of DEM and CO. Equation 3 is the main econometric model for this study. GINI represents a standardized measure of income inequality. Dynamic panel data estimators are used to estimate this model instead of fixed effects. These estimators are difference GMM and system GMM.

\[ Y_{it} = Y_{it} = \rho + \delta(CO)_{it} + \zeta(DEM)_{it} + \gamma(GINI)_{it} + \theta(CO \times DEM)_{it} + \beta(GINI \times DEM)_{it} + \sigma(GINI \times CO)_{it} + \nu(GINI \times CO \times DEM)_{it} + X'_{it} + \varepsilon_{it} \]

where \( i = 1,2,..I \quad t = 1,2,..T \) (3)

The Data
This study used the panel dataset of Assiotis and Sylwester (2013). Their panel dataset ranges from 1984-2007 and it contains 119 countries.

Table 2. Description of the Dataset

<table>
<thead>
<tr>
<th>Variable in the Model</th>
<th>Name in the Model</th>
<th>Description</th>
<th>Unit of Measurement</th>
<th>Source</th>
<th>Apriori Expectation</th>
<th>Theoretical Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth rate of GDP per Capita</td>
<td>Y</td>
<td>Dependent Variable</td>
<td>%</td>
<td>Penn World Tables (Version 6.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastil Index</td>
<td>DEM</td>
<td>Opinions of experts about political rights and individual liberties present in a country.</td>
<td>Ranges from 0-6 where 6 represents the highest form of democracy</td>
<td>Freedom House</td>
<td>–</td>
<td>Democracies tend to have lower growth rates because of tragedy of commons</td>
</tr>
<tr>
<td>Control of Corruption Index</td>
<td>CO</td>
<td>Opinions of experts on the likelihood that government officials would demand bribes.</td>
<td>Ranges from 0-6 where 6 represents low levels of corruption</td>
<td>Political Risk Services Inc.</td>
<td>+</td>
<td>Controlling corruption is shown to have beneficial distribution effects</td>
</tr>
<tr>
<td>Income Inequality</td>
<td>GINI</td>
<td>Estimate of Gini index of inequality in equalized household disposable income</td>
<td>Ranges from 0-100 where 100 represents highest level on income inequality</td>
<td>Standardized World Income Inequality Database</td>
<td>–</td>
<td>Income inequality reduces economic participation</td>
</tr>
</tbody>
</table>

**Interaction Term 1**  
(DEM x CO)  
Numerical  
Generated by Stata  
+  
Democracies with strong corruption control would have better growth rates. Democracies tend to reduce income inequality through welfare policies.  

**Interaction Term 2**  
(GINI X DEM)  
Numerical  
Generated by Stata  
+  
Countries with high income inequality would benefit from reduction of corruption. Income inequality will harm any type of government.  

**Interaction Term 3**  
(CO X GINI)  
Numerical  
Generated by Stata  
+  
Income inequality reduces GDP per capita (Y/N)  

**Interaction Term 4**  
(CO X GINI X DEM)  
Numerical  
Generated by Stata  
–  
POPGRGROW- GOV + INV +  

Population growth, government purchases, and investment  

Control Variables  

Penn World Tables (Version 6.3), World Bank, WGI  

Source: Assiotis and Sylwester (2013)  

**Estimation Method**  
This paper used difference GMM and system GMM. These estimations are based from the notion of panel instrumental variable regression from
Anderson & Hsiao (1981) does not exploit all the available information thus a GMM context is needed (Baum, 2013). Arellano & Bond (1991) follow the concept of Anderson & Hsiao (1981) that instrumental variables can be found internally by creating lags of the endogenous variables and the dependent variable but they also add GMM to correct the dynamic panel bias. It is also important to note that instrumental variables also take care of other econometric problems such as measurement error and simultaneity (Wooldridge, 2013).

**Difference GMM**

The first estimation procedure to discuss is the difference GMM. This method takes the first difference of the model to remove individual effects and time-invariant variables (Hurlin, 2010). After this, difference GMM makes estimators that are based on moment conditions which are made from the further lagged values of the dependent variable (order 2 and beyond) and the first differenced errors (Drukker, 2008). These lags and differences will be used as instruments in a GMM context or system of equations that has one equation per time period (Roodman, 2009). There are more orthogonal conditions (GMM type moment conditions) that improve efficiency of the difference GMM (Baus, 2013).

To further analyse the difference GMM method, this paper uses the equations of Baltagi (2009) to show the process. First, assume that there is a dynamic panel regression represented by equation 4. The error term here is assumed to be i.i.d with a mean of zero and a constant variance. The individual effect and the error term, \( v_{i,t} \), are assumed to be independent among themselves and each other. The individual effect in the error term of \( u_{i,t} \) needs to be eliminated for proper estimations. Taking the first difference of the equation as shown in equation 5 does this.

\[
y_{i,t} = \tilde{\delta}y_{i,t-1} + u_{i,t} \quad \text{where} \quad u_{i,t} = \mu_t + v_{i,t}
\]  

Equation 5 serves as the general equation for difference GMM. Baltagi (2009) shows the case where \( T=3 \) and how many instruments can be used.

\[
y_{i,t} - y_{i,t-1} = \tilde{\delta}(y_{i,t-1} - y_{i,t-2}) + (u_{i,t} - u_{i,t-1})
\]  

Using the general formula of difference GMM (equation 5), the econometric equations of this paper can be derived. There are two equations that are derived. Equation 6 contains the focus and control variables but the interaction terms will not be included. Based from its structure, equation 6 contains 92 instruments. The variables of Y, CO, DEM and GINI will contribute 22 instruments. The exogenous variables and the constant each contribute 1 instrument. This makes the total instruments 92 (88+4).

\[
(y_{j,t} - y_{j,t-1}) = \tilde{\alpha}(Y_{j,t} - Y_{j,t-1}) + \tilde{\beta}(CO_{j,t} - CO_{j,t-1}) + \tilde{\zeta}(DEM_{j,t} - DEM_{j,t-1}) + \tilde{\gamma}(GINI_{j,t} - GINI_{j,t-1}) + (X_{j,t} - X_{j,t-1}) + (\varepsilon_{j,t} - \varepsilon_{j,t-1})
\]  

The second equation that is derived contains all the variables used in this study. The interaction terms are considered exogenous variable. The interaction terms contribute one instrument each. This makes the instrument count for equation 7, 96.
\[
(Y_{it} - Y_{it-1}) = \alpha(Y_{it} - Y_{it-1}) + \delta(CO_{it} - CO_{it-1}) + \gamma(DEM_{it} - DEM_{it-1}) + \gamma(GINI_{it} - GINI_{it-1}) + \beta(DEMCO_{it} - DEMCO_{it-1}) + \gamma(GINDEMCO_{it} - GINDEMCO_{it-1}) + \epsilon_{it} \\
+ \epsilon_{it-1}
\]  

(7)

However, the disadvantage of this is that the number of instruments is dependent on the number of time periods that are available. “The number of instruments produced will be quadratic in T, the length of time series available” (Baus, 2013). A dataset with many time periods will have the problem of too many instruments that could lead to misleading results, (Roodman, 2009). Limiting the number of lags used in the equation can ensure robustness of results.

**System GMM**

The main weakness of the difference GMM is that the first differenced estimators of the variables can serve as weak instruments (Arellano & Bover, 1995; Blundell & Bond, 1998). System GMM was proposed as a remedy to this problem. Drukker (2008) says that the system GMM “uses additional moment conditions in which lagged differences of the dependent variable are orthogonal to levels of the disturbances”. These additional moments come from the assumption that the panel level effects are not related to the first difference of the dependent variable. Roodman (2009) states that orthogonal deviations are used as instruments to fill in unbalanced panels to ensure more precise estimates.

Equation 8 shows the additional condition of the system GMM that increases the number of valid instruments. Based from this condition, it is clear that we only have to add \((T-2)\) instruments in system GMM. This is an extra restriction to ensure efficient results. However, the model specification of the system GMM is similar to difference GMM except that there are more instruments included.

\[
E(u_{i,t}, \Delta y_{i,t-1}) = 0
\]

(8)

The variable count increases in the system GMM. When we run equation 6 in a system GMM setting, there will be 88 added instruments. These 88 instruments come from the variables of growth, gini, dem and co. This equates to 180 instruments that is in a system GMM setting. The same procedure applies to equation 7 where there will be 184 instruments that will be used in a system GMM setting.

**Diagnostic Tests**

After estimation, there are diagnostic tests to be performed. The first diagnostic that should be done is then Hansen-Sargan test. It is likely that estimated models are over identified due to the generation of instruments. This test verifies the validity of the over identification of the model (Roodman, 2009). The null hypothesis of the test is that the over identification of the instruments are valid. Rejection of the hypothesis raises suspicion on the validity of the model specification. Baltagi (2009) shows the formula of the Sargan test for over identifying restrictions (Equation 9).

\[
m = \Delta \hat{v}'W[ \sum_{i=1}^{N} W_i'(\Delta \hat{v}_i)(\Delta \hat{v}_i)'W_i]^{-1}v \quad \text{where} \quad (\Delta \hat{v}'W) \chi^2_{p-K-1}
\]

(9)
This equation represents $W$ as the instrument matrix which is a diagonal matrix that contains all the instruments in its diagonals, and $\hat{\epsilon}$ as the residuals from the difference GMM estimation. The variable $p$ refers to the number of columns in the instrument matrix, $W$. A favourable test results is an insignificant test result. Rejection of the null hypothesis would mean that the model specification is invalid thus we cannot use the difference GMM estimator.

However, Roodman (2009) says that the Hansen-Sargan test should be questioned on because of its weakness such as sensitivity to heteroscedasticity across the panels, sensitivity to increasing moment conditions and the nature of the GMM that would cause this test to fail. Whenever the Hansen-Sargen test is significant robusting of the standard errors is needed.

After robusting the standard errors, there has to be a test for serial correlation in first differenced errors (Drukker, 2008). The independence of the level error and the second differenced error ensures that the GMM estimator would be consistent. Arellano & Bond (1991) show this test as represent by equation 10. This test is based on the residuals of the first difference equation.

$$m = \frac{\hat{\epsilon}_{t-2} \hat{\epsilon}_t}{\hat{\epsilon}_t^{1/2}}$$

RESULTS

Table 4 shows the moments of the focus variables of this study. The descriptive stats of DEM show that the countries in this dataset tend to have more democratic regimes rather than authoritarian regimes but there is an above average presence of extreme cases of regimes. The data of CO show that countries have moderate policies on corruption. This dataset also shows that the countries tend to have equal income distributions, but there is a large variation in the distribution to consider. The variable of growth shows that countries generally experience a positive growth rate per year but the standard deviation shows that the growth experiences are volatile throughout the dataset.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEM</td>
<td>2827</td>
<td>3.385037</td>
<td>2.000852</td>
<td>-.1724484</td>
<td>1.677996</td>
</tr>
<tr>
<td>CO</td>
<td>2801</td>
<td>3.099711</td>
<td>1.398082</td>
<td>.3189257</td>
<td>2.60256</td>
</tr>
<tr>
<td>GINI</td>
<td>2119</td>
<td>39.98861</td>
<td>10.28706</td>
<td>.1224008</td>
<td>2.274226</td>
</tr>
<tr>
<td>GROWTH</td>
<td>2831</td>
<td>1.663465</td>
<td>6.639813</td>
<td>.1424894</td>
<td>28.58783</td>
</tr>
</tbody>
</table>

Final Regression

The table below shows the four final regressions for this study. The first equation is difference GMM without interaction terms. The second equation is difference GMM with interaction terms. The third equation is system GMM without interaction terms. The fourth equation is system GMM with interaction terms. These estimations also use the minimum required number of instruments to ensure the robustness of the results. These instruments were taken from growth, GINI, DEM and CO. The first order lag of growth was created by Stata and
included it as one of the regressors because of its dynamic nature. The first order lags of GINI, DEM and CO were created because these variables are suspected to be endogenous because of simultaneity and measurement errors.

### Table 5. Final Regression Results and Interpretation

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(difference) growth</th>
<th>(difference) growth</th>
<th>(system) growth</th>
<th>(system) growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.growth</td>
<td>0.0622</td>
<td>0.0538</td>
<td>0.0968</td>
<td>0.0933</td>
</tr>
<tr>
<td></td>
<td>(0.0688)</td>
<td>(0.0694)</td>
<td>(0.0638)</td>
<td>(0.0642)</td>
</tr>
<tr>
<td>dem</td>
<td>-0.270</td>
<td>-19.20*</td>
<td>-0.0147</td>
<td>-8.883*</td>
</tr>
<tr>
<td></td>
<td>(0.764)</td>
<td>(11.00)</td>
<td>(0.386)</td>
<td>(4.648)</td>
</tr>
<tr>
<td>gini</td>
<td>-0.526**</td>
<td>-2.671**</td>
<td>-0.0963**</td>
<td>-0.897**</td>
</tr>
<tr>
<td></td>
<td>(0.224)</td>
<td>(1.178)</td>
<td>(0.0488)</td>
<td>(0.434)</td>
</tr>
<tr>
<td>co</td>
<td>-0.925*</td>
<td>-32.96*</td>
<td>-0.863**</td>
<td>-8.693</td>
</tr>
<tr>
<td></td>
<td>(0.510)</td>
<td>(19.05)</td>
<td>(0.261)</td>
<td>(6.831)</td>
</tr>
<tr>
<td>gov</td>
<td>0.152</td>
<td>0.126</td>
<td>0.147</td>
<td>0.158</td>
</tr>
<tr>
<td></td>
<td>(0.302)</td>
<td>(0.308)</td>
<td>(0.133)</td>
<td>(0.141)</td>
</tr>
<tr>
<td>inv</td>
<td>0.176</td>
<td>0.171</td>
<td>0.107*</td>
<td>0.128**</td>
</tr>
<tr>
<td></td>
<td>(0.116)</td>
<td>(0.118)</td>
<td>(0.0606)</td>
<td>(0.0646)</td>
</tr>
<tr>
<td>popgrow</td>
<td>-0.128</td>
<td>-0.237</td>
<td>0.341</td>
<td>-0.00294</td>
</tr>
<tr>
<td></td>
<td>(0.411)</td>
<td>(0.492)</td>
<td>(0.290)</td>
<td>(0.298)</td>
</tr>
<tr>
<td>demco</td>
<td>5.746</td>
<td>1.735</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.729)</td>
<td>(1.364)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gini0dem</td>
<td>0.446*</td>
<td>0.206**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.244)</td>
<td>(0.105)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gino0</td>
<td>0.744*</td>
<td>0.186</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.426)</td>
<td>(0.148)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gini0demco</td>
<td>-0.133</td>
<td>-0.0408</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0841)</td>
<td>(0.0308)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>21.20*</td>
<td>113.8**</td>
<td>3.496</td>
<td>38.13**</td>
</tr>
<tr>
<td></td>
<td>(11.89)</td>
<td>(53.56)</td>
<td>(3.482)</td>
<td>(18.52)</td>
</tr>
</tbody>
</table>

Observations | 1,942 | 1,942 | 2,052 | 2,052 |
Number of countries | 108 | 108 | 108 | 108 |
Number of instruments | 92 | 96 | 180 | 184 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

All of these results are specified to have robust standard errors because the Hansen-Sagan test is significant for all. This means that there is heteroscedasticity across observations or the model specification may be wrong. There is indeed group-wise heteroscedasticity in the dataset when tested using the command `xttest3`. Thus, the weakness of the Hansen-Sargan Test is present and the null hypothesis will always be rejected. However, the literature supports the model specification thus we eliminate the conclusion of wrong model
specification. Robusting standard errors will correct the heteroscedasticity. After robusting, there has to be a test for serial autocorrelation of the first and second differenced error. The test for serial autocorrelation for all models show that there is serial autocorrelation present in the first differenced error but there is no autocorrelation in the second differenced error. This is to ensure the consistency of GMM instruments (Baltagi, 2009).

**Interpretation of Focus Variables**

The first variable to examine is GINI. The results show that GINI has a negative and statistically robust effect throughout all the models. This implies that inclusive growth is a goal that every country should aim for because income inequality is a universal problem. Countries with high-income inequality experience a separation between sectors of society. This separation consists of differences in standard of living, education quality, political polarization and etc. These differences in society can create a dysfunctional environment for economic growth. Policymakers should address this problem to avoid consequences such as increased poverty rate, crime rates, lower life expectancy, weakening of their regime and other negative effects.

The second variable to analyze is CO. The results show that CO is statistically significant on the 90% level in both difference GMM models and significant on the 95 percent level in the first system GMM model. It seems that there is a consistently negative relationship between CO and economic growth. This is a strange result because a country with a system that minimizes corruption reduces resource loss thus is better for economic growth. This implies that there may be consequences on economic growth for countries with a high CO rating. According to Aidt (2003), the Coase Theorem supports that bribes can improve economic outcomes between the economic agents from the private and public sector. In the absence of bribery, politicians could be using government resources in less inefficient manners, which do not maximize social outcome, (Shleifer & Vishny, 1994). This there is a trade-off between economic growth and stringent policies.

Lastly, the variable DEM is shown to be significant at the 90% level in difference GMM and system GMM with interaction terms. The results show that DEM has a consistent negative effect on economic growth. This negative effect may come from the structure of a democracy, which enhances the opportunity for “tragedy of commons”. Hardin (1968) defines “tragedy of commons” as a situation where individuals aim for private benefit without considering the consequences on society. This is emulated in the theoretical framework of Ehrlich & Liu (1999). They show that democracies have economic agents that maximize private benefit with no regard to social benefit. Whereas, the autocracies controlled by an “efficient” central planner aims for the optimal social profit to maintain the regime. Theoretically, an efficient autocracy can attain the same economic growth rate as a democracy, (Ehrlich and Liu, 1999). However, this relationship is not robust because it is not significant at the 95 percent level.
Interpretation of the Interaction Terms

The interaction term GINIDEM is significant in the difference GMM in a 90% level and in the system GMM in a 95% level. GINIDEM has a positive relationship with economic growth. This result shows that countries with high rates of income inequality can benefit from having strong democracies. Democracies focus more on distribution of wealth rather than autocracies. Politicians in democracies have a higher incentive to reduce income inequality to maintain their political standing. This is different for autocracies because the incentive is smaller due to a secure political position. Democratic politicians aim to create policies that would attract those in the lower strata of society such as scholarship programs, conditional cash transfers and universal health care to maintain political power.

The interaction term of GINICO is significant at the 90% level in the difference GMM estimation. Furthermore, the interaction term GINICO shows that strong corruption policies can increase growth by reducing corruption in countries with high-income inequality. Corruption is a source of income inequality due to the misallocation of resources. Reducing the amount of corruption in a country by increasing the intensity of anti-corruption policies can increase economic growth. This shows that despite the possible direct negative relationship between growth and control of corruption, there is a benefit in increasing the stringency of policies in countries with higher level of inequality.

There are also insignificant interaction terms to be analysed. The first insignificant interaction term is DEMCO. This shows that strong democracies with strong anti-corruption policies would result into positive economic growth but it is statistically insignificant. There may be some countries that have well-built democracies and anti-corruption policies that increase growth thus the positive sign of DEMCO. But, the insignificance means that this relationship does not necessarily hold for all countries. This is where the luck hypothesis applies (Acemoglu, 2007). The luck hypothesis states “countries with very similar characteristics can still vastly differ in economic growth and development because of the presence of multiple equilibria.” This implies that countries with similar political regimes and configurations do not necessarily the experience the same positive effect presented by DEMCO.

The last insignificant interaction term is GINIDEMCO. The estimations show that this variable has a negative effect on growth. The results imply that the negative effect of income inequality may be stronger in institutions that are more democratic and have stronger anti-corruption policies. A reason for this is that income inequality creates political distortions that harm the economy. The political instability may cause the policies to be ineffective as stated by interaction term of GINIDEM and GINICO. The interaction term shows that democracies experience greater negative effects to growth due to political distortions rather than autocracies. However, the statistical insignificance implies that this relationship does not hold for all economies or that there may be no relationship at all. The insignificance of the interaction term suggests there is no “optimal” political regime. This means that regardless of political inclination high economic growth can be achieved.
Difference GMM and System GMM

The selection between the difference GMM and the system GMM is important for analysis. Research on the dynamic panel estimation method suggests that system GMM is the superior model. Arellano & Bover (1995) researched that system GMM is a better estimation process because of the additional moment conditions that correct the weakness of difference GMM. But, analysis of the difference GMM may give additional insight on economic disparity within and between countries.

The difference GMM equation shows that statistically significant focus variables are GINI, DEM, CO, GINIDEM and GINICO. This estimation also shows that the insignificant variables are DEMCO and GINIDEMCO. The message of this equation is that income inequality, democracy and control of corruption have inverse relationships with growth. The interactions terms show that countries with high income inequality can benefit from strong democracies and stringent anti-corruption policies. The results also imply that countries with strong democracies and anticorruption policies do not necessarily attain high economic growth. There also seems to be no optimal political regime to handle both income inequality and corruption. An interesting result is that the lag of growth is insignificant which shows that your growth rate in the current period may not always follow the trend of the previous period because of external and internal factors.

The system GMM results show the statistically significant focus variables are GINI, DEM and GINIDEM. This estimation also presents that the focus variables of CO, DEMCO, GINICO and GINIDEMCO are statistically insignificant. The system GMM has similar results to the difference GMM in terms of the economic effects of income inequality and democracies. The interaction term presents that countries with high income inequality can benefit from democracies and that there seems to be no optimal political regime to handle corruption and income inequality. This shows that the control of corruption may not have a consistent effect because of heterogeneity across countries. The estimation also shows that the lag of economic growth is also insignificant. The two models are consistent with each other except for the insignificance of control of corruption and DEMCO.

Country Specific Cases

This section analyzes country specific cases of growth experiences. Growth data that are found in the 1-10 percentiles and 90-99 percentiles are considered extreme growth experiences. The other data points are general growth experiences. Segregation of these two helps analyze country specific cases. The table shows extreme growth experiences and descriptive statistics.

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Growth Rates</th>
<th>Average DEM</th>
<th>Average CO</th>
<th>Average GINI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%-10%</td>
<td>-64.36023%</td>
<td>2.20</td>
<td>2.54</td>
<td>45.03</td>
</tr>
<tr>
<td></td>
<td>4.359348%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90%-100%</td>
<td>7.12708%</td>
<td>2.85</td>
<td>2.75</td>
<td>41.44</td>
</tr>
<tr>
<td></td>
<td>88.74834%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Extreme Growth Distributions and Descriptive Statistics
These are called extreme growth experiences because it is very rare to see these cases happen. As the percentiles suggest these growths are at the extreme points of the growth distribution. It seems that extreme growth experiences happen in countries that lean towards authoritarian regimes. The data shows that these countries have lenient approaches to dealing with corruption. Another common characteristic between the countries is income inequality is above average.

These extreme growth rates affect estimations of the difference and system GMM. A possible explanation for the negative relationship of DEM to economic growth is because extreme growth rates may have skewed the regression. Further analysis is done in this section.

When the data was filtered for extreme growth experiences, there were countries that had very high and low growth rates. Examples of these countries are the Philippines, South Korea, Iraq, Liberia, Singapore, China and many more. Majority of the countries in this category are developing countries. This implies that developing countries are prone to extreme growth rates and have weaker democracies (or lean towards autocratic regimes).

The next step is to filter the data using both conditions to account for countries with extreme growth rates on both sides of the distribution. Table 7 presents the descriptive statistics for all countries that experienced extreme growth rates from 1984-2007.

<table>
<thead>
<tr>
<th>Table 7. Extreme Growth Experiences and Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average DEM</td>
</tr>
<tr>
<td>2.52</td>
</tr>
</tbody>
</table>

Table 7 affirms that countries that experience extreme growth rates lean towards more authoritarian regimes and have lenient policies towards corruption. This also shows these countries also have income inequality that is above average. It can be concluded that developing countries are more likely to have unstable conditions, weaker democracies and above average income inequality. However, they have potential to reach higher growth rates because there is a higher economic opportunity in these countries.

<table>
<thead>
<tr>
<th>Table 8. General Growth Experience and Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentile</td>
</tr>
<tr>
<td>11%-89%</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

This table shows that countries with average growth rates are more likely to be democratic rather than autocratic. These countries also have stricter policies on corruption as compared to the countries with extreme growth rates. The countries here also have lower income inequality. The data implies that democratic countries are more prone to stable growth rates. Examples of countries that have general growth experiences are Canada, Denmark, France, India, Japan, Netherlands, United States and etc. The dataset shows that...
developed countries are more likely to have democracies and stable growth rates. This is because these countries have properly exploited the economic opportunity in their situation. Economic stability is more of a priority for developed countries rather than developing countries.

**CONCLUSIONS**

The main question of this study is “do different political regimes affect the economic impact and magnitude of income inequality and corruption?” Based from the empirical results, political regimes do not change how income inequality and corruption affect economic growth. Income inequality is negatively related to economic growth across regimes. Corruption, on the other hand, can have positive and negative effects on economic growth in all regimes. It can positively affect economic growth by promoting efficiency in economic processes. Conversely, corruption can negatively affect economic growth by creating inefficient allocations of resources. This study finds that the role of a political regime is that it determines the reaction of the economy to corruption and income inequality. These reactions have varying economic outcomes. Thus, political regimes do not affect the natural effects of corruption and income inequality.

There are different reactions by these institutions. First, income inequality is handled differently in democracies rather than autocracies. There is pressure for democracies to reduce income inequality because political longevity of the politicians depends on the satisfaction of the people. Autocracies, on the other hand, do not experience the same type of pressure because of secure government positions. Second, the mechanism of corruption is different between these regimes. Autocracies can theoretically maximize the benefits of corruption while minimizing the costs of corruption through systemic corruption (Ehrlich and Liu, 1999). Autocracies can extract the highest possible benefit without inducing significant harm on the regime. Democracies experience the tragedy of commons in the practice of corruption (Assiotis and Sylwester, 2013). This is when economic agents maximize profits without regard to social costs. The different responses of these political institutions are what create growth disparities within and between countries.

The analysis of extreme and general growth experiences supports the findings of the difference and system GMM. Democracies tend to have steadier and smaller growth rates rather than autocracies that can have extreme growth rates. The steady growth rates are attributed to the ability of the democracies to uphold peace and stability within the country. Also, countries with steady growth rates are generally classified as developed thus opportunity of economic growth is lower. Autocracies, on the other hand, are prone to many conflicts and cases of corruption, which affect growth and income distribution. Most autocracies are developing countries, which means there is opportunity for extreme growth rates such as development of niche markets, development of economic sectors and etc. Lastly, the reaction of democracies to economic and political issues is likely to be moderate thus ensuring stable effects. The reactions of autocracies to the same issues could be drastic that result to extreme changes in economic environment.
RECOMMENDATIONS

The first policy recommendation is that policymakers from both types of governments should aim for inclusive growth and reduction of income inequality. The estimations show that there is a consistent negative relationship between economic growth and income inequality throughout all regimes. Improving the income inequality would reap benefits for both autocracies and democracies. There would not only be economic benefits but political benefits as well. The main political benefit is that the political longevity in both systems will improve because the people will trust the system more. This avoids potential political distortions that would harm the regime. This means that both types of governments have the incentive to reduce income inequality to increase economic growth and protect the current regime. Improving educational systems, allowing for the inflow of foreign investment to help MSMEs, welfare programs such as conditional cash transfer and others can reduce income inequality.

The second policy recommendation is that lawmakers should focus on more severe forms of corruption rather than petty corruption. Petty corruption defined by Transparency International (2014) is “everyday abuse of entrusted power by low- and mid-level public officials in their interactions with ordinary citizens.” Whereas political corruption defined by the same organization is “manipulation of policies, institutions and rules of procedure in the allocation of resources and financing by political decision makers, who abuse their position to sustain their power, status and wealth.” Focusing on the elimination of petty corruption may lead to more inefficient economic processes. Instead, the elimination of political or grand forms of corruption is feasible and it can create opportunities for higher economic benefits. This policy recommendation pushes for the minimization of corruption rather than the elimination of corruption. This is when foreign and local bodies have to work together to audit government agencies that are suspected of corruption.

The results of the study show that there is no optimal institution that all countries should emulate. There is a mixture of both economics and culture in dealing with economic agents or citizens of your country as shown by Acemoglu (2007). The third policy recommendation is that political regimes and configurations should be fit towards the culture of the people rather than the economy. This means that creating laws not only has economic impacts but culturally effects as well. Culture plays a vital role in economic growth because it characterizes the economic agents, their behaviour and reactions towards policies. The objective of political regimes is to maximize the potential of the economic agents and minimize behaviour that slows down growth. Policymakers and legislative bodies have to be sensitive to the culture of the people. For example, passing a divorce bill in the Philippines will be very difficult since the Catholic Church has a strong bearing on the opinions of the people. Policymakers have to find a way to pass this law without harming religious customs and the like. The burden is on think tanks and organizations to research on the economic and cultural factors that affect the success and impact of the policy. The sensitivity to both factors will help create policies that are suited for the people thus creating a better chance for economic development.
REFERENCES


Salaverria, L. B. (2012, December 5). Philippines remains one of most corrupt countries—survey. Retrieved from Inquirer website:
http://globalnation.inquirer.net/58823/philippines-remains-one-of-most-corrupt-countries-survey

Santos, M. (2013, June 4). Philippines is fastest growing Asian country for first quarter of 2013. Retrieved from Inquirer website:
http://newsinfo.inquirer.net/417531/philippines-is-fastest-growing-asian-country-for-first-quarter-of-2013


http://www.transparency.org/whoweare/organisation/faqs_on_corruption/2/


The negative relationship between stock market and foreign exchange market in the Philippines: 2006 – 2013

Diana Margarita A. Bautista  
De La Salle University  
Manila, Philippines  
dai_bautista@yahoo.com

Berkeley Novak T. Enriquez  
De La Salle University  
Manila, Philippines  
mikoooe3@yahoo.com

Juan Paulo S. Molina  
De La Salle University  
Manila, Philippines  
Jpaulo_molina@yahoo.com

Imee Lanie H. Uy  
De La Salle University  
Manila, Philippines  
imeelanieu@yahoo.com

ABSTRACT
As the Philippines continuously work to build a stable and developed financial market, an important factor to consider is the relationship of the existing and active financial markets in the country, which are the stock market, and the foreign exchange market. Other countries have studied their interaction in the past and this is not a surprise considering that while both markets are seen to be indicators of macroeconomic growth in a country, these markets are also the most sensitive segments of a financial system. While examining the relationship of both financial markets, the data used for the study includes the daily data of the exchange rate of the Philippine peso pegged to the US dollar and the PSEi closing price. To accurately measure this relationship, the study made use of the Granger's Causality on a VAR Framework and the Correlation Test to further comprehend the nexus between the two markets. In addition to this, an Impulse Response Function was also conducted to trace the dynamic interaction among the variables. The study resulted to a bilateral relationship between the foreign exchange market and the stock market in the Philippines during the years 2006-2013. Also, with the employment of the Correlation Test it was determined that the two financial markets are negatively correlated throughout the research. Findings of the study are particularly helpful for the hedging and diversification of a corporation’s portfolio as volatility of the foreign exchange rate influences a firm’s value. Government officials and policy makers of a country (especially its central bank) will also be aided in their decision-making on both monetary and fiscal policies.

JEL Classification: D53, E44  
Keywords: stock market, foreign exchange market

INTRODUCTION
Through the years, the Philippine financial system has been growing gradually with the implementation of monetary, economic and fiscal policies by the government and its central bank, the Bangko Sentral ng Pilipinas (BSP). These
policies were huge contributions to the growing development of the country. During the post war years, the basic pattern of the Philippine economy required a transformation as it was thoroughly devastated by World War II. At that time, the Philippines needed payment from the United States government for war damage and an influx of capital to go along with it.

There was a worldwide movement in the 1990’s toward financial openness, which led to the growth of financial asset markets in less developed economies. Gulati and Kakhani (2012) stated, “the foreign exchange market and the stock market are the most sensitive segments of the financial system and are considered as the barometers of economic growth through which the country’s exposure towards the outer world is readily felt”. With this, we find it very important to know the relationship of the stock market and the foreign exchange market.

There have been numerous studies conducted in the past that examined the relationship of stock returns and foreign exchange within different countries having scopes and methodologies, which yielded different results. However, these studies focus on different countries which all differ in degrees of foreign exchange controls, foreign exchange rate system, economic and financial status, and development of their stock markets. This study will be a more recent work as compared to the others that covered years from the 1990’s until the early 2000’s. Also, different methodologies were used by the previous studies that will lead to different results as these methods have their own limitations and may not reveal consistent results as if other methodologies were used. This will also focus on just the Philippines’ financial markets which are the stock market and the foreign exchange market – both of which still have a lot more to go through in terms of their development. Other financial products may not be present in the Philippines as compared to other countries, which ultimately alter the results, obviously showing more of how the Philippines are in terms of financial markets.

Thus, the main uncertainty now is whether the relationship between foreign exchange market and stock market is statistically significant in the Philippines. In order to further understand the Philippine financial markets, it is vital to identify the association between the stock market and foreign exchange market.

Our paper aims to answer, identify and investigate the association between the stock market and foreign exchange market. Our research ultimately revolves around determining the two-way relationship between the stock closing level (i.e closing level of PSEi) and foreign exchange rates (i.e PHP/USD) in the Philippines from 2006 to 2013 with the use of Granger’s (1969, 1988) causality test and correlation test.

To examine this extensively, our paper presents four objectives:

● To identify whether a unidirectional relationship exists between the closing level of the Philippine Stock Exchange index (PSEi) and the foreign exchange rate (PHP pegged to USD), where stock closing level causes the movement of foreign exchange rate with the use of Granger’s (1969, 1988) causality.

● To identify whether a unidirectional relationship exists between the foreign exchange rate (PHP pegged to USD) and the closing level of the
PSEi, where foreign exchange rate causes the movement of stock closing level with the use of Granger’s (1969, 1988) causality.

- To identify whether a bilateral relationship exists between the closing level of the PSEi and the foreign exchange rate (PHP pegged to USD), where both markets influence each other’s movement with the use of Granger’s (1969, 1988) causality.
- To identify whether the stock index, PSEi is positively or negatively correlated with the foreign exchange rate (PHP pegged to USD), with the use of the correlation test.

In determining the relationship between the stock market and the foreign exchange market, we have adopted the following research hypotheses to be tested. The first set of hypothesis indicates whether a unidirectional causality exists between the stock index, PSEi and the peso-dollar exchange rate, where specifically the closing level of PSEi causes the movement of the peso-dollar exchange rate.

Ho₁: Stock index, PSEi does not cause the change in peso-dollar exchange rate.
Ha₁: Stock index, PSEi causes the change in peso-dollar exchange rate.

The second set of hypothesis indicates whether a unidirectional causality exists between the peso-dollar exchange rate and the stock index, PSEi, where specifically peso-dollar exchange rate causes the movement of the closing level of PSEi.

Ho₂: The peso-dollar exchange rate does not cause the change in the stock index, PSEi.
Ha₂: The peso-dollar exchange rate causes the change in the stock index, PSEi.

The third set of hypothesis indicates whether a bilateral causality exists between the peso-dollar exchange rate and the closing level of the PSEi, where a two way relationship can be attained.

Ho₃: There is no bilateral relationship between the stock index, PSEi and the peso-dollar exchange rate.
Ha₃: A bilateral relationship exists between the stock index, PSEi and the peso-dollar exchange rate.

Lastly, the fourth set of hypothesis indicates the degree of association between the closing level of PSEi and the peso-dollar exchange rate; where they can either have a direct or an indirect relationship.

Ho₄: PSEi has no significant correlation with the peso-dollar exchange rate.
Ha₄: PSEi has significant correlation with the peso-dollar exchange rate.
DATA ANALYSIS
Daily observations on the stock market index and foreign exchange rate of the Philippine peso pegged to the US dollar for a period of 8 years (from January 2006 to December 2013) will be covered for the purpose of our study. We considered the population of this study as the whole Philippine stock market and chose the closing level of PSEi as its sample; since PSEi represents the movement of the entire Philippine stock market. The PSEi is a financial basket composed of the thirty biggest public companies in the Philippines chosen to represent the general movement of stock market prices. It is a capitalization-weighted index composed of stocks representative of the Industrial, Properties, Services, Holding Firms, Financial and Mining & Oil sectors of the Philippines (Bloomberg, 2014).

On the other hand, with regards to the foreign exchange market, we went with the most common determinant which is the peso-dollar exchange rate as their sample, due to the fact that the US dollars are considered as the world’s currency and accepted almost everywhere according to an article from Global Financial Data. Both selected samples were also selected by Gulati and Kakhani (2012) in their study. The daily peso-dollar exchange rate was obtained from the BSP online website while its respective verification will be in accordance to the Central Bank of the United States of America.

Our study will use a causal and correlational design in determining the relationship of the stock index, PSEi and the foreign exchange rate (PHP pegged to USD) in the Philippines from 2006 to 2013. The causal research design is utilized with regards to our study employing a Granger’s (1969, 1988) causality test. Taken from an article from Monroe College, a causal research design intends to establish that a cause-and-effect relationship exist amongst variables. This design will assess the variables (i.e the closing level of the PSEi and the peso-dollar exchange rate) in a more precise manner, pinpointing certain connections; that a change in PSEi can potentially influence the movement of the foreign exchange rate (PHP pegged to USD) or vice versa.

According to Shaughnessy et al (2012), “correlation exists when two different measures of the same people, events, or things vary together that is, when scores on one variable co-vary with scores on another variable”. Therefore, a correlational study will help determine the association between two variables (i.e the PSEi and pesos-dollar exchange rate, for this study) with the aid of different approaches such as the correlation test where it can be ascertained whether they are positively or negatively correlated. The use of this test will help detect particular outcomes that can affect decision-making (Shaughnessy et al, 2002). It is imperative for this study to identify the relationship (i.e positive or negative) between the two variables, the PSEi and the peso-dollar exchange rate. Different econometric techniques were designed to prove the connection between the stock market and the foreign exchange market.
THEORETICAL FRAMEWORK

Efficient Market Hypothesis

The efficient market hypothesis characterizes an efficient financial market as one whose value is emulated from available information (Wang 2006). The Efficient market hypothesis establishes the premise that the market may not be overtaken due to its collective knowledge. According to the book of Aswath Damodaran (2012) entitled, “Investment Valuation”, the efficient market hypothesis does not assume that all the respective prices of investments are at all times of its intrinsic value; but merely that the deviations that occur are unbiased throughout the market. This stems from the supposed “random walk” characteristic wherein there should be an equal (or random) chance that the investment’s current price would move in either direction, (Jones and Netter, 2008).

Portfolio Balance Approach

According to a journal article published in Harvard, the portfolio balance approach takes into account relative prices of foreign and domestic investment options and the arbitrage opportunity between the two (Frankel, 1983). This arbitrage opportunity is then a contributing factor to the exchange rate fluctuations. This approach was also used as part of a theoretical framework in a study regarding the relationship between the stock prices and exchange rates in the EU and USA (Stavarek, 2005). Under the assumption that the foreign exchange rate regime is floating, the portfolio balance approach justifies the unidirectional causality of a country’s stock market towards the same country’s respective foreign exchange market (Nath and Samantha, 2003). The theory argues that currency prices are just as susceptible to the price impact of supply and demand. A booming stock market for example would attract plenty of foreign investors. This would result into a demand and simultaneous appreciation of that respective currency.

Flow Oriented Model

The flow oriented model on the other hand explains unidirectional causality between the foreign exchange market and the stock market. According to Dornbush and Fischer (1980), this model argues that any form of foreign exchange fluctuation would affect the international competitiveness of the country in the form of the firm’s returns or stock price. There have been several studies that have reported a strong relationship between stock prices and the foreign exchange rate (Agrawal, 2010). For instance, that the currency appreciation negatively affects the profitability of an export dominant country which would most likely cause a similar effect on its respective stock price (and vice versa). According to a journal article published by the Asian Journal of Business and Management Sciences, a reduction in the stock prices which follows the flow oriented model, would connote a reduction in the country’s liquidity and the wealth of the local investors (Agyapong, 2012). This would result in a reduction in the interest rates which would entail capital outflows which would ultimately lead to the depreciation of the respective currency.
These theoretical frameworks were also used by former studies with regards to further understanding the relationship between the two markets. The figure below shows the results of previous studies made regarding relationship of the stock market and foreign exchange market.

“E” represents the foreign exchange rate
“S” represents the stock market index
“*” represents the study was made in India, Korea and Pakistan
“#” represents the study was made in the Philippines

METHODOLOGY
The employment of a unit-root test is necessary to ascertain that the regression executed is free from any bias that can question the reliability of the results (Mahadeva & Robinson, 2004). The test revolves around the data, examining
whether they have stationary or non-stationary variables. As described by Mahadeva and Robinson (2004), the variables are considered non-stationary, when the variables escalate or when they don’t escalate but the results of modernization remains throughout the period of the study. To innovate unit-root testing, the Augmented Dickey-Fuller (ADF) test was done by Dickey and Fuller (Fuller, 1976). This unit root testing was used by Abdalla and Murinde (1997), Nath and Samata (2003), Yalama (2009) and Rjoub (2012) in their respective studies to check whether the data were stationary. It is crucial to remember that the ADF test adds the lagged difference of the dependent in order to handle the possible serial correlation in the error term (Gujarati and Porter, 2009, p758).

The study conducted by Faegh and Rajashekar (2014) with the subject of correlation between financial markets in India encountered data problems where their data was deemed non-stationary by the Augmented Dickey Fuller test. Because this would cause errors in the regression, the recourse they took was to transform their data to a first difference in order for it to be stationary (Faegh and Rajashekar, 2014). It is stated that regressing data in its first difference form often eliminates multicollinearity (Gujarati and Porter, 2009, p.417). The first difference of a time series is defined as the series of changes from one period to the next. If \(Y_t\) denotes the value of the time series \(Y\) and period \(t\), then the first difference of \(Y\) at period \(t\) is equal to \(Y_t - Y_{t-1}\) (Nau, 2014). It is expected that the first-difference estimator will substantially underestimate the true impact of the lagged dependent variable, particularly if \(y\) is large. With this, the first-difference estimator will yield a statistically significant result (Verbeek, 2008). Another advantage of this approach is that, whether the random of fixed model is appropriate, it is able to remove the latent heterogeneity from the model (Greene, 2010).

Generally speaking, a vast majority of economic variable data sets are non-stationary and may possibly fall victim to the spurious regression problem. This is the case when two unrelated time-series data have been tested under conventional methods and the results apparently yielded a significant relationship. According to Gujarati and Porter (2009), “since the estimated error term are based on the estimated cointegrating parameter \(\beta_2\), the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) critical significance values are not quite appropriate”. It is believed that the Engle-Granger (EG) test serves as a solution to this.

In an economic journal article published by the University Putra Malaysia published in 2004, it was stated that when performing autoregressive models, the pre requirement in its application would be to determine the autoregressive lag length. “Generally, in structure modeling, an investigator must often choose a suitable model among a collection of visible candidates” as stated by Neath (1999). Among the model selection tools are the Akaike Information Criterion, the Schwarz Information Criterion (also known as the Baysean Information Criterion), Hannan-Quinn Information Criterion and the Final Prediction Model (Liew, 2004). For the purpose of this study, the Akaike Information Criterion will be implemented.

\[
AIC_p = -2T[\ln(\hat{\sigma}_p^2)] + 2p
\]
The Akaike Information Criterion (AIC) was introduced by Hirotugu Akaike in 1973. This model selection criterion uses the “Max Likelihood Principle” which as its underlying basis. Today, the AIC is the most generally accepted model selection tool (Cavanaugh, 2012). An important characteristic of the AIC is its flexibility when it comes to model selection. Basically, the AIC is designed to determine the model what will most accurately predict and will be less concerned with having too much parameter. “Since there is no true model in practice, consistency might not be a relevant property in application” (Shibata, 1980). This would deem AIC, the asymptotically efficient model, to be regarded as the most generally acceptable model. The advantage of AIC is that it takes into the account the probability that there is no true model, which makes it favorable to an array of statistical frameworks (Tsai, n.d.). Another advantage would be that the criterion also designed for minimizing forecasting error variances (Babu & Rao, 2012). AIC however has been constantly been criticized as well due to its inconsistency and impossibility to be asymmetrically precise in which other models may do so.

The Vector Autoregression (VAR) model was developed by Christopher Sims when he wanted to eliminate the current distinction between endogenous and exogenous variables (Gujarati and Porter, 2009, p.784). An article from Reed College defines exogenous variables as variables that are not affected by any changes in the endogenous variable (or dependent) or any other variable in the equation. Stock and Watson (2001) defined VAR as:

“This simple framework provides a systematic way to capture rich dynamics in multiple time series, and the statistical toolkit that came with VARs was easy to use and interpret. As Sims (1980) and others argued in a series of influential early papers, VARs hold out the promise of providing a coherent and credible approach to data description, forecasting, structural inference, and policy analysis.”

VAR is believed to be simple method, since it makes use of the usual Ordinary Least Square (OLS) method, also there is no need for determining to whether the indicated variables are dependent or independent variables; “all variables in VAR are dependent” (Gujarati & Porter, 2009).

If cointegration has been detected between the series, it implies that there is a long-term equilibrium relationship between them. The Vector Error Correction Model (VECM) is then applied in order for the short-run properties of the cointegrated series to be evaluated. However, if there a cointegration does not exist, the VECM is no longer required and the data may go straight to Granger’s causality test for the causal links between the two variables to be established (Asari et al, 2011). When it comes to cointegrated variables, the VAR framework may only be an appropriate model after using a vector error correction model. The model sets the parameter constraints on the cointegrated variables on the equation (Parker, 2014). The equation is fit to the first differences and will include an error-correction term that measures the previous period’s deviation from the long-run equilibrium (Parker, 2014).
According to Gulati and Kakhani (2012), to further investigate the relationship of the stock market and the foreign exchange market Granger’s (1969, 1988) causality test is employed. As proposed by Granger (1969), this test states that if past values of a variable, closing level of PSEi significantly forecast the value of the other variable, foreign exchange rate (PHP pegged to USD), then the closing level of PSEi Causes the change in foreign exchange rate and vice versa.

The correlation coefficient is used to compute for correlation and the coefficient ranges from -1 and +1 (Gulati & Kakhani, 2012). A correlation coefficient of +1 which is known to be a perfect positive correlation implies that as one security moves, the either security will move in the same direction whether it is up or down. Alternatively, a correlation coefficient of -1, which is a perfect negative correlation, means that as one security moves, the other security will move in the opposite direction. Lastly, if the correlation coefficient is 0, it is said that there is no correlation with the movements of the securities and this ultimately means that they randomly move.

Even after running the Granger-causality test, there is still a chance that the results do not show the complete story behind the interactions between the variables in a system. Often in applied work, it is highly recommended to discover “the response of one variable to an impulse in another variable in a system that involves a number of further variables as well” (Rossi, 2010). This means investigating the impulse response relationship between two variables (in this case the stock market and the foreign exchange market in the Philippines) in a higher dimension. Given that a reaction of one variable exists to another variable’s impulse, it is then possible to state the impulse causal for the reaction (Rossi, 2010).

Impulse response function (IRF) is then used to trace dynamic interaction among variables. It displays how the dynamic response of all the variables in the system to a shock in each variable (Mishra and Paul, 2008). Before computing for the IRF, it is important to make sure that the variables are ordered and that the system is represented by a moving average process (Mishra & Paul, 2008).

The function is also used to understand the implied dynamics of a VAR model and answers the basic question that covers how a change in one variable affects the system in the future (Russell, 2014). The IRF in VAR is used to determine the response of the dependent variable to certain shocks to the equation, especially when the coefficient has alternate signs (Gujarati and Porter, 2009, p.798). In a VAR framework, impulse responses trace the response of the current and future values of each variable to a one-unit increase or a one-standard deviation increase in the current value of one of the VAR errors, assuming that the error returns to zero in subsequent periods and that all the other errors are equal to zero (Iacoviello, 2009).

RESULTS AND DISCUSSION
The Augmented Dickey-Fuller Test was used to check whether the unit root problem exist with the peso-dollar exchange rate and PSEi data to avoid the “problem of spurious regression” as Rjoub (2012) stated. According to an article from the American University (2011), in understanding the results from Stata with regards to the Augmented Dickey-Fuller Test, when the p-value for Z-score or the
Z (t) is less than or equal to a specified significance level, the null hypothesis (i.e. $H_0 = \text{data is non-stationary}$) is rejected. In addition to this, when the absolute value of the t-statistics is greater than the absolute value of the 1% critical value then the null hypothesis is also rejected. Both p-values of the Z (t) are greater than any significant level (i.e. 0.01, 0.05, and 0.1) and their respective absolute value of t-statistics are less than the absolute value of the 10% critical value; therefore the data is non-stationary.

### Augmented Dickey-Fuller Test of the peso-dollar exchange rate.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z (t)</td>
<td>-2.366</td>
<td>-3.43</td>
<td>-2.86</td>
</tr>
</tbody>
</table>

MacKinnon approximate p-value for Z (t) = 0.1517

### Augmented Dickey-Fuller Test of the PSEi.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z (t)</td>
<td>-0.587</td>
<td>-3.43</td>
<td>-2.86</td>
</tr>
</tbody>
</table>

MacKinnon approximate p-value for Z (t) = 0.8739

To solve the unit root problem, we decided to use the first difference method, which was also used by Faegh and Rajashekar (2014) in their study to eliminate said drawback. This technique will take the latest value of the peso-dollar exchange rate and PSEi and subtract it to the previous value respectively; this can also be called as “change” or $\Delta$. The first difference data is also found in Appendix A. To make sure that the first differenced data is free from the unit problem, the Augmented Dickey-Fuller Test was once again done.

### Augmented Dickey-Fuller Test of the change in peso-dollar exchange rate after employing the first difference method.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z (t)</td>
<td>-38.121</td>
<td>-3.43</td>
<td>-2.86</td>
</tr>
</tbody>
</table>

MacKinnon approximate p-value for Z (t) = 0.0000

### Augmented Dickey-Fuller Test of the PSEi after employing the first difference method.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z (t)</td>
<td>-39.54</td>
<td>-3.43</td>
<td>-2.86</td>
</tr>
</tbody>
</table>

MacKinnon approximate p-value for Z (t) = 0.0000

Both p-values of the Z (t) are less than any significant level (i.e. 0.01, 0.05, and 0.1) and their respective absolute value of t-statistics are greater than the absolute value of the 10 percent critical value; therefore the null hypothesis (i.e. $H_0 = \text{data is non-stationary}$) is rejected.
It is essential to establish whether the two variables, namely the peso-dollar exchange rate and the PSEi is cointegrated or not. We employed the Engle-Granger cointegration test to check for the said matter. In addition to this, Engle-Granger cointegration test does not only measure the long run co-movement of the two variables, but also transform a non-stationarity data into a stationary data (Boero, 2009). The same method was done in the research by Raza and Aravan (2014) and Zia and Rahman (2011).

Augmented Dickey-Fuller Test for e for the Engle-Granger Cointegration Test

<table>
<thead>
<tr>
<th>Statistics</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z (t)</td>
<td>-39.938</td>
<td>-3.430</td>
<td>-2.860</td>
</tr>
<tr>
<td>MacKinnon approximate p-value for Z (t) = 0.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As explained, when the p-value for Z (t) is less than the significant level which in this case is 0.05, therefore, the data is non-stationary. In Table 8, the p-value for Z (t) that is 0.000 is less than the significant level 0.05, for this reason e is stationary. According to Boero (2009), if e is stationary therefore the peso-dollar exchange rate and the PSEi are cointegrated.

To proceed, it is crucial to determine the appropriate number of lags in this study, since when having more than the ideal may result in forecast errors while having too few lags on the other hand may cause the model to miss out of relevant information, this is according to an article from Princeton University. With the help of Stata, the number of lags needed can be determine, since it can conduct results that includes different criterion for optimal lag selection, among these are the FPE, AIC, HQC and the SIC. When all four have a similar result in selecting the number of lags, whichever result they produce would be deemed the ideal one for practitioners. When they are not in accordance in the other hand, we shall be implementing the lag selection of AIC as it is the most flexible and generally accepted modelling selection tool. For the purpose of our study, selection criterions were conducted for both directions of data and came up with identical results.

Optimal Lag Selection when the dependent variable is the peso-dollar exchange rate and the independent variable is the PSEi.

<table>
<thead>
<tr>
<th>lag</th>
<th>LL</th>
<th>LR</th>
<th>DF</th>
<th>P</th>
<th>FPE</th>
<th>AIC</th>
<th>HQIC</th>
<th>SBIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-9758.9</td>
<td>74.430</td>
<td>9.98561</td>
<td>9.98771</td>
<td>9.99132</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-9584.7</td>
<td>348.42</td>
<td>9.81149</td>
<td>9.81778</td>
<td>9.82861</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-9569.2</td>
<td>31.101</td>
<td>9.79967</td>
<td>9.81016*</td>
<td>9.8282*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-9562.7</td>
<td>13.039</td>
<td>9.79709</td>
<td>9.81178</td>
<td>9.83704</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-9556.2</td>
<td>12.926*</td>
<td>61.4865*</td>
<td>9.79457*</td>
<td>9.81345</td>
<td>9.84593</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The value with "**" represents the number of the lags for the said criterion.
Optimal lag selection when the dependent variable is the PSEi and the independent variable is the peso-dollar exchange rate.

<table>
<thead>
<tr>
<th>lag</th>
<th>LL</th>
<th>LR</th>
<th>Df</th>
<th>P</th>
<th>FPE</th>
<th>AIC</th>
<th>HQIC</th>
<th>SBIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-9758.9</td>
<td>74.4301</td>
<td></td>
<td></td>
<td></td>
<td>9.9856</td>
<td>9.9877</td>
<td>9.9913</td>
</tr>
<tr>
<td>1</td>
<td>-9584.7</td>
<td>348.42</td>
<td>4</td>
<td>0</td>
<td>62.5353</td>
<td>9.81149</td>
<td>9.8177</td>
<td>9.8286</td>
</tr>
<tr>
<td>2</td>
<td>-9569.2</td>
<td>31.101</td>
<td>4</td>
<td>0</td>
<td>61.8007</td>
<td>9.79967</td>
<td>9.8101</td>
<td>9.8282</td>
</tr>
<tr>
<td>3</td>
<td>-9562.7</td>
<td>13.039</td>
<td>4</td>
<td>0.11</td>
<td>61.6417</td>
<td>9.79709</td>
<td>9.8117</td>
<td>9.8370</td>
</tr>
<tr>
<td>4</td>
<td>-9556.2</td>
<td>12.926*</td>
<td>4</td>
<td>0.012</td>
<td>61.4865*</td>
<td>9.79457*</td>
<td>9.8134</td>
<td>9.8459</td>
</tr>
</tbody>
</table>

Note: The value with "*" represents the number of the lags for the said criterion.

According to AIC and FPE in both tables, the optimal number of lags is four, HQC and SIC on the other hand says that the optimal number of lags is two. Since we have already deemed AIC to be the primary information criterion for this research, the number of lags to be included in the model is four.

Vector Autoregression

|         | Coef.  | P>|z|   | [95% Conf. Interval] |
|---------|--------|-------|---------------------|
| Der     |        |       |                     |
| Der     |        |       |                     |
| L1      | 0.1512491 | 0.000 | .1068233 | .1956749 |
| L2      | -0.0221262 | 0.334 | -0.067024 | 0.0227715 |
| L3      | 0.0013894 | 0.951 | -0.0433176 | 0.0460695 |
| L4      | -0.0019269 | 0.926 | -0.0428572 | 0.0390035 |
| Dpsei   |        |       |                     |
| L1      | -0.0011849 | 0.000 | -0.0013122 | -0.0010576 |
| L2      | 0.0003519 | 0.000 | .0002142 | .0004897 |
| L3      | -0.0001335 | 0.059 | -.000272 | 5.05e-06 |
| L4      | -0.0000187 | 0.791 | -0.0001568 | .0001194 |
| _cons  | -0.001714 | 0.613 | -.008364 | .004936 |
| Dpsei   |        |       |                     |
| Der     |        |       |                     |
| L1      | -18.28194 | 0.020 | -33.73761 | -2.826258 |
| L2      | -17.23958 | 0.031 | -32.85944 | -1.61972 |
| L3      | -9.206896 | 0.246 | -24.76042 | 6.346628 |
| L4      | 8.665989 | 0.233 | -5.573608 | 22.90559 |
| Dpsei   |        |       |                     |
| L1      | 0.1017909 | 0.000 | 0.0575082 | 0.1460736 |
| L2      | -0.0609498 | 0.013 | -0.1088812 | -0.0130185 |
| L3      | -0.0599362 | 0.015 | -0.1081206 | -0.0117517 |
| L4      | -0.0806038 | 0.001 | -0.1286324 | -0.0325752 |
| _cons  | 1.967278 | 0.096 | -.3462339 | 4.280789 |

The Vector Autoregression (VAR) model basically provides linear relationship functions of all the variables involved including the lagged values of each variable. According to Statacorp (n.d.), the only prerequisite to this function is testing the data and declaring it to be of time-series format. It is imperative to
realize that the execution of the VAR and Granger’s Causality on a VAR framework should be simultaneous in testing the effects of the independent variable to the dependent variable, this serves as a prerequisite in using Stata, according to Statacorp (n.d.). As anticipated, the two set of VAR and Granger’s Causality produced identical results, whether the dependent variable is the peso-dollar exchange rate or the PSEi.

In the previous table, L1 denotes the value for yesterday or when \( t-1 \), L2 denotes the value two days earlier or when \( t-2 \), L3 denotes the value three days earlier or when \( t-3 \), and L4 denotes the value four days earlier or when \( t-4 \). In interpreting the results in Table 11, it is crucial to take into consideration the different lag values as part of the regression equation, that L4 affects L3 which also affects L2 then affects L1 and that every one of these lag values altogether influence the present value of a certain variable. To read between the lines, each significant lagged values will be interpreted, this only include coefficients that have p-values less than 0.05, since this is tested in a 95% confidence interval.

When the dependent variable is the change in the peso-dollar exchange rate then the independent variables include all statistically significant lagged coefficients of both the change in peso-dollar exchange rate and the change in PSEi. Variables included as dependent variables are L1 of the change in peso-dollar exchange rate (p-value of 0.000 < 0.05), L1 of the change in PSEi (p-value of 0.000 < 0.05), and L2 of the change in PSEi (p-value of 0.000 < 0.05). Since the coefficient of the constant or the intercept is insignificant (p-value of 0.613 > 0.05), hence it is not included in the statistically significant regression equation. This scenario is represented in Equation 29.3.

\[
\text{Der}_t = 0.1512491\text{Der}_{t-1} + \text{Dpsei}_t + \mu \quad (29.1)
\]
\[
\text{Dpsei}_t = -0.0011849\text{Dpsei}_{t-1} + 0.0003519\text{Dpsei}_{t-2} + \mu \quad (29.2)
\]
\[
\text{Der}_t = 0.1512491\text{Der}_{t-1} + (-0.0011849\text{Dpsei}_{t-1} + 0.0003519\text{Dpsei}_{t-2}) + \mu \quad (29.3)
\]

As seen in Equation 29.1, a per unit increase in the change (\( \Delta \)) of peso-dollar exchange rate yesterday would increase the change (\( \Delta \)) of peso-dollar exchange rate today by 0.1512491. In Equation 29.2, it is interpreted as a per unit increase in the \( \Delta \) of PSEi yesterday would decrease the \( \Delta \) of PSEi today by 0.0011849. And that a per unit increase in the \( \Delta \) of the PSEi two days prior would increase the \( \Delta \) of PSEi today by 0.0003519. The change of sign from increase to decrease of the effects of the \( \Delta \) of PSEi two days prior and yesterday respectively is due to the volatility of the stock market. Thus, we can combine all these by saying a per unit increase in the \( \Delta \) of peso-dollar yesterday will increase the \( \Delta \) of peso-dollar today by 0.1512491 also, a per unit increase in the \( \Delta \) of the PSEi today can decrease or increase the \( \Delta \) of peso-dollar today by the value depending on what is concluded in Equation 29.2.

When the dependent variable is the change in the PSEi then the independent variables include all statistically significant lagged coefficients of both
the change in PSEi and the change in peso-dollar exchange rate. Variables included as dependent variables are L1 of the change in peso-dollar exchange rate (p-value of 0.020 < 0.05), L2 of the change in peso-dollar exchange rate (p-value of 0.031 < 0.05), L1 of the change in PSEi (p-value of 0.000 < 0.05), L2 of the change in PSEi (p-value of 0.013 < 0.05), L3 of the change in PSEi (p-value of 0.015 < 0.05), and L4 of the change in PSEi (p-value of 0.001 < 0.05). Since the coefficient of the constant or the intercept is insignificant (p-value of 0.096 > 0.05), hence it is not included in the statistically significant regression equation. This scenario is represented in Equation 31.3.

\[ Dpsei_t = Der_t + 0.1017909Dpsei_{t-1} - 0.0609498Dpsei_{t-2} - 0.0599362Dpsei_{t-3} - 0.0806032Dpsei_{t-4} + \mu \]  
\[ Der_t = -18.28194Der_{t-1} - 17.23958Der_{t-2} + \mu \]  
\[ Dpsei_t = (-18.28194Der_{t-1} - 17.23958Der_{t-2}) + 0.1017909Dpsei_{t-1} - 0.0609498Dpsei_{t-2} - 0.0599362Dpsei_{t-3} - 0.0806032Dpsei_{t-4} + \mu \]

As seen in Equation 30.1, a per unit increase in the \( \Delta \) of the PSEi yesterday would increase the \( \Delta \) of PSEi today by 0.1017909. Also, a per unit increase in the \( \Delta \) of the PSEi two days prior would decrease the \( \Delta \) of PSEi today by 0.0609498. Moreover, a per unit increase in the \( \Delta \) of the PSEi three days prior would decrease the \( \Delta \) of PSEi today by 0.0599362 and that a per unit increase in the \( \Delta \) of the PSEi four days prior would decrease the \( \Delta \) of PSEi today by 0.0806032. The change of sign from decrease to increase of the effects towards the \( \Delta \) of PSEi today is due to the randomness of the stock market. As seen in Equation 30.2, a per unit increase in the \( \Delta \) of the peso-dollar exchange rate yesterday would decrease the \( \Delta \) of peso-dollar exchange rate today by 18.28194, and that a per unit increase in the \( \Delta \) of the peso-dollar exchange rate two days prior would decrease the \( \Delta \) of peso-dollar exchange rate today by 17.23958. Thus, we can combine all these by saying a per unit increase in the \( \Delta \) of peso-dollar today will decrease the \( \Delta \) of PSEi today by the value depending on what is concluded in Equation 30.2. Also, a per unit increase in the \( \Delta \) of the PSEi yesterday, two days prior, three days prior and four days prior would increase the \( \Delta \) of PSEi today by 0.1017909, decrease the \( \Delta \) of PSEi today by 0.0609498, decrease the \( \Delta \) of PSEi today by 0.0599362, decrease the \( \Delta \) of PSEi today by 0.0806032 respectively.

Since the two variables are cointegrated, we also employed a vector error correction model (VECM) to amend any error in the said equation. The outcome of the VECM is in fact reasonably similar with the findings published by VAR.
Vector Error Correction Model

|     | Coef. | P>|z| | [95% Conf. Interval] |
|-----|-------|------|----------------------|
| D_er |       |      |                      |
| _ce1 |       |      |                      |
| L1.  | -     | 0.018| -.0061406            | -.0005804 |
|      | 0.0033605 |      |                      |
| er   |       |      |                      |
| L1D. | 0.1517985 | 0.000| 0.1073205            | 0.1962766 |
| L2D. | -0.0212171 | 0.335| -0.0661716           | 0.0237374 |
| L3D. | 0.0022643 | 0.921| -0.0424989           | 0.0470275 |
| L4D. | -0.0012982 | 0.950| -0.0422778           | 0.0396814 |
| psei |       |      |                      |
| L1D. | -0.0011798 | 0.000| -.0013073            | -0.0010523 |
|      |         |      |                      |
| L2D. | 0.0003534 | 0.000| 0.0002155            | 0.0004914 |
| L3D. | -0.0001311 | 0.064| -0.0002698           | 7.57e-06  |
| L4D. | -0.0000164 | 0.816| -.0001546            | 0.0001218 |
| _cons | 0.0170399 | 0.048| .000157              | .0339228  |
| D_psei |       |      |                      |
| _ce1 |       |      |                      |
| L1.  | .3524836 | 0.476| -.6159692            | 1.320936  |
| er   |       |      |                      |
| L1D. | -18.33957 | 0.020| -33.83371            | -2.845426 |
| L2D. | -17.33494 | 0.030| -32.99504            | -1.674834 |
| L3D. | -9.298661 | 0.242| -24.89212            | 6.294794  |
| L4D. | 8.600046  | 0.238| -5.675393            | 22.87549  |
| Psei |       |      |                      |
| L1D. | .1012512 | 0.000| .0568359             | .1456666  |
| L2D. | -.0611063 | 0.013| -.1091564            | -.0130563 |
| L3D. | -.0601833 | 0.015| -.1084899            | -.0118767 |
| L4D. | -.0808456 | 0.001| -.1289958            | -.0326954 |
| _cons | .0001625 | 1.000| -5.881072            | 5.881397  |

In the previous table, L1 denotes the value of the correction of error for yesterday or when t-1, L1D denotes the Δ in value today, L2D denotes the Δ in
value two days earlier or when t-2, L3D denotes the Δ in value three days earlier or when t-3, and L4D denotes the Δ in value four days earlier or when t-4. In interpreting the results in Table 12, it is crucial to take into consideration the different lag values as part of the regression equation, that L4D affects L3D which also affects L2D then affects L1D and that every one of these lag values altogether influence the present value of a certain variable. Looking carefully, only statistically significant Δ in lagged values will be interpreted, the equation will only contain coefficients that have p-values less than 0.05, since this is tested in a 95% confidence interval.

When the dependent variable is the change in the peso-dollar exchange rate then the independent variables include all statistically significant coefficients of Δ in lagged values of both the peso-dollar exchange rate and the PSEi. Variables included as dependent variables are L1D of the peso-dollar exchange rate (p-value of 0.000 < 0.05), L1D of the PSEi (p-value of 0.000 < 0.05), and L2D of the PSEi (p-value of 0.000 < 0.05). Also the L1 coefficient of the correction of error is also included given that its p-value of 0.018 is less than 0.05. Since the coefficient of the constant or the intercept is significant (p-value of 0.048 < 0.05), hence it is included in the statistically significant regression equation. This scenario is represented in Equation 31.3

$$D_{ert} = 0.0170399 + 0.1517985e_{rt-1} + psei_t + \mu \quad (31.1)$$

$$psei_t = -0.0011798psei_{t-1} + 0.0003534psei_{t-2} + \mu \quad (31.2)$$

$$D_{er} = 0.0170399 + 0.1517985e_{rt-1} + (-0.0011798psei_{t-1} + 0.0003534psei_{t-2}) + (-0.0033605c_{ei_{t-1}}) + \mu \quad (31.3)$$

As seen in Equation 31.1, given that intercept is equal to 0.0170399, a per unit increase in the change (Δ) of peso-dollar exchange rate yesterday would increase the change (Δ) of peso-dollar exchange rate today by 0.1517985. In Equation 31.2, it is interpreted as a per unit increase in the Δ of PSEi yesterday would decrease the Δ of PSEi today by 0.0011798. And that per unit increase in the Δ of the PSEi two days prior would increase the Δ of PSEi today by 0.0003534. The change of sign from increase to decrease of the effects of the Δ of PSEi two days prior and yesterday respectively is due to the volatility of the stock market. Thus, we can combine all these by saying a per unit increase in the Δ of peso-dollar yesterday will increase the Δ of peso-dollar today by 0.1517985, a per unit increase in the Δ of the PSEi today can decrease or increase the Δ of peso-dollar today by the value depending on what is concluded in Equation 31.2, also a per unit increase in the correction of error decreases Δ of peso-dollar today by 0.0033605. Equation 31.3 also includes an intercept of 0.0170399.

When the dependent variable is the change in the PSEi then the independent variables include all statistically significant coefficients of Δ in lagged
values of both the PSEi and the peso-dollar exchange rate. Variables included as dependent variables are L1D of the peso-dollar exchange rate (p-value of 0.020 < 0.05), L2D of the peso-dollar exchange rate (p-value of 0.030 < 0.05), L1D of the PSEi (p-value of 0.000 < 0.05), and L2D of the PSEi (p-value of 0.013 < 0.05), L3D of the PSEi (p-value of 0.015 < 0.05), and L4D of the PSEi (p-value of 0.001 < 0.05). Since both the coefficient of the intercept (p-value of 0.096 > 0.05) and the correction of error (p-value of .476 > 0.05) is insignificant, hence it is not included in the statistically significant regression equation.

\[
\begin{align*}
D_{psei_t} &= \varepsilon_t + 0.1012512psei_{t-1} - 0.0611063psei_{t-2} \\
&\quad - 0.0601833psei_{t-3} - 0.0808456psei_{t-4} + \mu \\
&= (-18.33957\varepsilon_{t-1} - 17.33494\varepsilon_{t-2} + \mu (32.1) \\
\varepsilon_t &= -18.33957\varepsilon_{t-1} - 17.33494\varepsilon_{t-2} + \mu (32.2)
\end{align*}
\]

\[
D_{psei_t} = (-18.33957\varepsilon_{t-1} - 17.33494\varepsilon_{t-2}) + 0.1012512psei_{t-1} \\
&\quad - 0.0611063psei_{t-2} - 0.0601833psei_{t-3} - 0.0808456psei_{t-4} + \mu (32.3)
\]

As seen in Equation 32.1, a per unit increase in the Δ of the PSEi yesterday would increase the Δ of PSEi today by 0.1012512. Also, a per unit increase in the Δ of the PSEi two days prior would decrease the Δ of PSEi today by 0.0611063. Moreover, a per unit increase in the Δ of the PSEi three days prior would decrease the Δ of PSEi today by 0.0601833 and that a per unit increase in the Δ of the PSEi four days prior would decrease the Δ of PSEi today by 0.0808456. The change of sign from decrease to increase of the effects towards the Δ of PSEi today is due to the randomness of the stock market. As seen in Equation 32.2, a per unit increase in the Δ of the peso-dollar exchange rate yesterday would decrease the Δ of peso-dollar exchange rate today by 18.33957, and that a per unit increase in the Δ of the peso-dollar exchange rate two days prior would decrease the Δ of peso-dollar exchange rate today by 17.33494. Thus, we can combine all these by saying a per unit increase in the Δ of peso-dollar exchange today will decrease the Δ of PSEi today by the value depending on what is concluded in Equation 32.2 also, a per unit increase in the Δ of the PSEi yesterday, two days prior, three days prior and four days prior would increase the Δ of PSEi today by 0.1012512, decrease the Δ of PSEi today by 0.0601833, decrease the Δ of PSEi today by 0.0808456 respectively.

In comparing the VAR vis-a-vis the VECM, it is believed that the latter will provide a more accurate assumption of the regression, in view of the fact that it includes a variable, correction of error which by its name itself corrects the error in the equation. However, in order to answer the main objective of this research a Granger’s Causality test must be employed, which can only be constructed if done simultaneously with the VAR model.
Granger’s Causality

<table>
<thead>
<tr>
<th>Equation</th>
<th>Excluded</th>
<th>Chi2</th>
<th>df</th>
<th>Prob&gt;chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Der</td>
<td>Dpsei</td>
<td>347.31</td>
<td>4</td>
<td>0.000</td>
</tr>
<tr>
<td>Der</td>
<td>All</td>
<td>347.31</td>
<td>4</td>
<td>0.000</td>
</tr>
<tr>
<td>Dpsei</td>
<td>Der</td>
<td>15.024</td>
<td>4</td>
<td>0.005</td>
</tr>
<tr>
<td>Dpsei</td>
<td>All</td>
<td>15.024</td>
<td>4</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Note: The results of causality between the two variables, whether the dependent variable is the peso-dollar exchange rate or the PSEi and the independent variable as the PSEi or the peso-dollar exchange rate respectively.

Understanding the results of the Granger’s Causality, when Prob>chi2 is less than the significant level (i.e. 0.05) then the null hypothesis that indicates no relationship exist is rejected. As seen in Table 13, the Prob>chi2, 0.000 is less than the significant level 0.05 therefore the first difference (Δ) of the peso-dollar exchange rate affects the first difference (Δ) of the PSEi; on the other hand, the Δ of the PSEi also affects Δ of the peso-dollar exchange rate, given that it’s Prob>chi2, 0.005 is less than the significant level 0.05. With this, the null hypothesis (H03) that there is no bilateral relationship between the stock index, PSEi and the peso-dollar exchange rate is rejected. In a nutshell, a bilateral relationship exists between the two variables, albeit the switching of the dependent and independent variables; where a change in value of the first difference of the peso-dollar exchange rate influences the volatility in the value of the first difference of the PSEi.. Likewise, a change in value of the first difference of the PSEi sways the fluctuations of the first differenced value of the peso-dollar exchange rate.

Having established that a bilateral relationship is present between the two markets, a correlation test will be used to uncover a deeper understanding of the nexus between the two variables. As stated by Gulati and Kakhani (2012), the correlation coefficients in the correlation method range from -1 to +1. A correlation coefficient of +1 is known as a perfect positive correlation while a correlation coefficient of -1 is a perfect negative correlation. A perfect positive correlation indicates that if one variable moves, the other variable will move in the same direction whether it is up or down. A perfect negative correlation however will cause the other variable to move the opposite direction if one variable moves up or down. Furthermore, if the correlation coefficient is 0, it is apparent that there is no correlation between the movements of the variables indicating that they do not affect each other. Understanding further, the correlation coefficient is considered weak or low if it is less than or equal to 0.35 while a correlation coefficient is deemed moderate if it is more than 0.35 but is less than or equal to 0.67 and it is regard as high if the correlation coefficient is more than 0.67 but is less than or equal to 1.0 (Taylor, 1990).
Correlation Test

<table>
<thead>
<tr>
<th></th>
<th>der</th>
<th>dpsei</th>
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</thead>
<tbody>
<tr>
<td>der</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>dpsei</td>
<td>-0.1114</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Note: the results of the correlation test whether the dependent variable is the peso-dollar exchange rate or the PSEi and when the independent variable is the PSEi or the peso-dollar exchange rate respectively.

As exhibited in the table, the test indicates that the two variables are negatively correlated with each other, which rejects the null hypothesis ($H_0$) that states that PSEi has no significant correlation with the peso-dollar exchange rate. The findings imply an inverse relationship where when the first differenced value of the peso-dollar exchange rate increases or domestic currency depreciation occurs, the first differenced value of the stock index decreases, whereas, when the first differenced value of the peso-dollar exchange rate decreases or domestic currency appreciation occurs, the first differenced value of stock index increases. Given that the correlation coefficient of first differenced value of the peso-dollar exchange rate and first differenced value of the PSEi is -0.1114, the correlation coefficient is considered weak. The idea of a weak or a very less degree of correlation between the two markets was also concluded by Gulati and Kakhani (2012) in their study. This indicates that the relationship between the PSEi and the peso-dollar exchange rate is far from linear but both variables does affect each other negatively. With the two variables having a very less degree of negative correlation between each other, it is evident that a bilateral relationship exists between the PSEi and the peso-dollar exchange rate.

To ascertain the reaction of the dependent variable to different shocks in the equation, an impulse response function was constructed. The below figure exhibits the impulse response function graph where the blue line represents the impulse response function and the grey area is the 95% confidence interval for the IRF when the peso-dollar exchange rate is the dependent variable and PSEi is the independent variable.
As seen in the above figure, the first differenced value of the peso-dollar exchange rate will initially decrease, but will increase eventually and converge itself to zero. Given that the first differences is calculated as the value today minus the value of yesterday, then having a zero difference implies that the value today of the peso-dollar exchange rate is identical to its value yesterday. This would mean that the first differenced values of the peso-dollar exchange rate would stabilize in the long run. The grey area or the 95% confidence interval on the other hand, shows the range of the first differenced values of the peso-dollar exchange rate.

The next figure exhibits the impulse response function graph where the blue line represents the impulse response function and the grey area is the 95% confidence interval for the IRF when the PSEi is the dependent variable and the peso-dollar exchange rate is the independent variable.

The first differenced value of the PSEi will primarily experience a downfall, but sooner or later increase and fluctuates itself to converge at zero. Given that the first differences is calculated as the value today minus the value of yesterday, then having a zero difference implies that the value today of the PSEi is identical to its value yesterday. This indicates that in the long run, the first differenced values of the PSEi would stabilize. The grey area or the 95% confidence interval on the other hand, shows the range of the first differenced values of the PSEi.

As shown in the table below, the null hypotheses stating that the stock index, PSEi does not cause the change in peso-dollar exchange rate and the peso-dollar exchange rate does not cause the change in the stock index, PSEi are accepted, while the null hypotheses stating that there is no bilateral relationship between the stock index, PSEi and the peso-dollar exchange rate and PSEi has no significant correlation with the peso-dollar exchange rate are rejected.
Hypothesis | Results
--- | ---
Ho₁: Stock index, PSEi does not cause the change in peso-dollar exchange rate. | REJECT
Ha₁: Stock index, PSEi causes the change in peso-dollar exchange rate. | ACCEPT
Ho₂: The peso-dollar exchange rate does not cause the change in the stock index, PSEi. | REJECT
Ha₂: The peso-dollar exchange rate causes the change in the stock index, PSEi. | ACCEPT
Ho₃: There is no bilateral relationship between the stock index, PSEi and the foreign exchange rate. | REJECT
Ha₃: A bilateral relationship exists between the stock index, PSEi and the foreign exchange rate. | ACCEPT
Ho₄: PSEi has no significant correlation with the peso-dollar exchange rate. | REJECT
Ha₄: PSEi has significant correlation with the peso-dollar exchange rate. | ACCEPT

**CONCLUSION**

The negative correlation coefficient between the two markets is also found in the following studies “Integration of Financial Markets in India: An Empirical Analysis” by Jena, Murty & Narasimhan (2012) and “Stock Prices and Exchange Rates Dynamics: Evidence from Emerging Markets” by Rjoub (2012). The studies by Jena, Murty & Narasimhan (2012) and Rjoub (2012) also concluded a bilateral relationship between the stock market and the foreign exchange market. However, this was contradicting to the results concluded by Gulati and Kakhani (2012) stating a very less degree of positive relationship exists between the two markets in India. A potential cause of disparity is that the studies were done in different countries.

To expand on this further, there are many ways to analyze the influence of stock prices on the exchange rate of a country. One way to analyze this is the portfolio balance approach (Bahmani-Oskooee and Sohrabian, 1992). This approach believes that “if the impact of an external parameter influences the stock market to go up, the domestic investor’s wealth increases, raising the demand for the currency according to the investment portfolio equilibrium theory,” (Tsai, 2012). The increased money demand then pushes the interest rates to rise, which absorbs the inflow of foreign capital and then finally, causes the domestic currency to appreciate. Investors become more optimistic regarding the stock market of a country which attracts foreign capital investors to increase their investment in the country’s stock market due to the speculative demand of the public, which indirectly causes the appreciation of the country’s currency (Tsai, 2012).

There is another theory believed by Aggarwal (1981) that opposes the portfolio balance approach and claims that the International Trading Effect should in fact, create a positive relationship between the two markets. He claims that a change in a country’s exchange rate does not only affect the stock prices of multinational and export orient firms; it can also affect domestic firms. The profitability of a multinational firm is continuously affected by the changes in the exchange rate as the value of its foreign operations increases or decreases, depending on the change of exchange rate (Tsai, 2012). So when the exchange rate depreciates, which corresponds to an increase in domestic currency, the competitiveness of exports will increase as more international firms will be enticed to purchase domestic products with the increased power of the foreign currency and the input cost of imports will increase as well (Joseph, 2002). This in turn will generally cause a positive effect for export firms and then an increase in stock prices and a negative effect for import firms that will eventually cause a decrease in stock prices.

It is understood that the stock prices are expected to react to changes in exchange rates. With the effect of exchange rates on the balance sheets of multinational companies, depreciation could cause a rise or downfall on the value of a company depending on whether the company mainly imports or export, whether it owns foreign units and whether it hedges against exchange rate fluctuation. Heavy importers, such as the Philippines, will suffer from higher costs due to the currency depreciation and will have their earnings decreased, thus causing share prices to decrease (Dimitrova, 2005).
In the case of the Philippines, according to Aurelio Montinola III in an interview with the Oxford Business Group in 2010, has not been as heavily dependent on exports as the rest of Asia. Domestic production and employment rely more on local demand than external markets (Oxford Business Group, 2010). Asian Development Bank also stated in their study, “Outlook 2013: Asia’s Energy Challenge” that the Philippines will remain heavily dependent on energy imports, especially oil (Olchondra, 2013). With this being said, it makes more sense that the Philippines follows the portfolio balance approach more than the international trading effect to explain the relationship between the two markets.

It was also noticed by Hookway and Larano (2009) that the Philippines was less affected by the global financial crisis but is also less able to recover when the economic situation around the globe improves — all this because the Philippines does not depend heavily on foreign trade. As stated by Luz Lorenzo, a regional economist with ATR-Kim Eng Securities Ltd. in Manila, "The Philippines is less sensitive to changes in foreign demand. That could mean problems persist here when the situation is beginning to turn around elsewhere." (Hookway and Larano, 2009). To emphasize the lack of export dependence of the Philippines, it was ranked 58th on the hierarchy of exporters around the world by a government website (i.e Central Intelligence Agency), while India was in the 19th place. Taking this into consideration, the positive relationship concluded by Gulati and Kakhani (2012) in India can potentially be caused by the International Trading Effect.

The negative bilateral relationship between the two markets can also be explained by investor’s confidence that pertains to products Filipinos are willing to invest in, whether it is in the foreign exchange (FOREX) or stocks. Dimitrova (2005) explained that in the event of an expected depreciation in domestic currency, causing the increase of numerical value of the peso as against to the US dollar (eg. 40PHP/USD to 50PHP/USD), investors and portfolio managers will be more skeptical with the future performance of companies and lean on investing in the FOREX market, since this assures them a profit of 10PHP/USD, taken from the example. The investor’s choice to invest in FOREX causes the fall of demand towards the stock market and therefore leads to the decrease of the stock index. Another fragment of investor’s confidence is concern with investor’s preference with regards to geography. In a study conducted by Manulife (2014), it was concluded that Philippine investors prefer to invest in developed economies such as Japan, Singapore, Australia and North America over emerging Asian economies. Taking an economic standpoint, the instant Filipinos invest in foreign countries or economies; the Philippine economy diminishes and would therefore cause the decline of stock prices and as a result, the domestic currency depreciates. However, in the event that Filipino investors choose to invest more in the Philippines then this will boost the Philippine economy that would increase stock prices and cause the appreciation of peso accordingly.

Another reason involves the understanding of Philippine’s foreign debts. The moment domestic currency depreciates, the debt becomes more expensive to pay and therefore pilot its way to decrease the Philippine’s economy and therefore causes the decline of the stock index. On the other hand, appreciation of domestic currency causes a boom in the economy of the Philippines and therefore causes the increase in the stock index. In layman’s term, when currency...
depreciates that is 40PHP/USD becomes 50PHP/USD, foreign debt increases that pilot the domestic economy to a downfall and therefore leads to a decrease of the stock index. The figure below shows evidence that the external debt of the Philippines moves directly with the peso-dollar exchange rate, but indirectly with the PSEi throughout the period of our study.

The above figure exhibits the movement of external debt of the Philippines to the United States (US), the PSEi and the peso-dollar exchange rate from 2006 to 2013. The axis on the left is for the external debt and PSEi, while the axis on the right is for the exchange rate. Source: Bangko Sentral ng Pilipinas (BSP)

It is important to study the relationship between these two financial markets especially in the Philippines as they are still under developed. This can improve the decision making of the different stakeholders, which are corporations, stock market investors and foreign investors, financial institutions, government officials, importers, exporters and the general public. Understanding this relationship would help predict future movements in each market which would allow authorities to better manage the economy, as well working toward the establishment of an efficient financial market in the Philippines. According to Timmermann (2004), having an efficient market would eliminate risk-free opportunities and unfair advantages in generating large profits. With this, any information made public reflects all relevant information and is already being enacted upon by the market.

REFERENCES

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Aaligide, P., Panagiotidis, T., & Zhang, X. Causal Relationship between Stock Prices and


Boubakera, A., & Salma, J. (n.d.). Greek crisis, stock market volatility and foreign


Lim, J., & Bautista, C. (2002). External Liberalization, Growth and Distribution in the


Olchondra, R. T. (2013, June 13). PH to remain heavily dependent on oil imports—


A study on interrupted consumption: Effects on consumer’s utility from positive experiences

Christine Joy U. Cheng  
De La Salle University  
Manila, Philippines  
christinejoycheng@gmail.com

Harvin John O. Sy  
De La Salle University  
Manila, Philippines  
beng_harvin@yahoo.com

ABSTRACT
A study conducted by Nelson and Meyvis (2008) claims that interruptions in consumption affects a consumer’s overall utility either positively or negatively, depending on its nature. While this research focused on empirical results based on a series of experiments, Loewenstein (1987) illustrated analytically how delayed consumption and anticipation affect future consumption. We now modify Loewenstein’s (1987) model by adding another consumption period before the said delay in consumption to make it seem like the consumption was interrupted. Analytical results were then derived to assess if Nelson and Meyvis’ (2008) arguments hold when it comes to positive experiences. In other words, the new model created was subjected through different cases wherein the length of the consumption and the break were manipulated to test if these had an effect on overall consumer utility. The effect of an interruption on negative experiences however were not considered in the study. Our results show that different lengths of interruption on positive experiences and varying lengths of periods of consumption do in fact increase consumer utility. With this information, producers can now manipulate how they market their products and services to the consumers to make it more appealing and at the same time be able to give them higher satisfaction.

JEL Classification: D11, D21, E03, E21
Keywords: anticipation, consumption, delay, interruption, utility

INTRODUCTION
Is the overall utility of a consumer towards positive experiences, like goods and services, affected by an interruption in consumption? In a study done by Nelson and Meyvis (2008), it was found out through a series of experiments that...

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1 Utility from an economists’ perspective is the numerical indicator of a person’s preference for different items, may it be products, jobs or leisure time. In an average scenario, the total utility of a person increases as he consumes more of the said good. However, his utility will increase at a slower pace as even more of the said good is consumed, which is the concept of diminishing marginal utility. Diminishing marginal utility happens when an individual gets less additional benefit upon increasing consumption of a particular good (Taylor & Weerapana, 2013).

2 Interruption is a stop to a certain event (Hartung, 2009).

3 Consumption is defined as the usage of products with the primary goal of satisfying one’s desire to experience pleasure or derive enjoyment (Raghunathan & Irwin, 2001).
interrupting consumption disrupts adaptation\textsuperscript{4} to hedonic experiences. However, the study did not consider the different lengths of consumption and interruption, and how this can have an effect to the consumer’s overall utility. Furthermore, Marshall’s (1891) work failed to consider the factor of expectation in determining a consumer’s utility from consumption. This will be the primary concern of this study.

**Statement of problem**

Do interruptions on positive experiences have a positive effect on consumer utility? As was shown in Nelson and Meyvis (2008) results, interruptions on positive experiences do increase overall utility. However, these results exist from experiments and it is not sure if these hold true in general.

**Objectives of study**

To be able to see if Nelson and Meyvis’ (2008) findings are true, Loewenstein’s (1987) model will be modified to find out if:

1. Breaks increase a consumer’s overall utility;
2. Prolonging a break will increase a consumer’s overall utility further; and
3. Varying consumption lengths have an effect on a consumer’s overall utility.

**Significance of study**

As businessmen and economists, it is important that we understand how a person responds to a particular stimulus, in this case an interruption, and be able to use it to our advantage. Through the findings of this study, industries and businessmen will be able to successfully market their products or services to the consumers to make it more appealing than it really is. Specifically, knowing how breaks enhance a consumer’s total utility will allow producers of goods and services to maximize their potential benefits.

For instance in the stock market, by knowing how consumers respond to breaks and anticipation, a company can use this to make their stocks more appealing. They can manipulate these breaks in such a way that it will increase a buyer’s perception of a particular stock thereby boosting potential value. On the other hand, if they anticipate that a stock’s value will depreciate, they can sell it instantly instead of prolonging it so that buyers will no longer have time to anticipate or think about the possible loss.

**Scope and limitations**

Since there is no specific model available that fits Nelson and Meyvis’ (2008) findings perfectly, a new intertemporal utility model based from Loewenstein’s (1987) paper will be created. In his model, both desirable and undesirable consumption were taken into consideration. However, for the purpose of this study, only desirable consumption would be taken into account. Since there are numerous outside forces that can easily affect a consumer’s utility

\textsuperscript{4}Adaptation is defined as the process of increasing satiation of a consumer throughout the consumption.
from consumption, all things not included in the model are held constant.

REVIEW OF RELATED LITERATURE

 Interruption of certain consumptions have several effects to the next consumption experience. In this section, we will first properly define the types of interruption. Then, we will discuss the reasons behind why consumers choose to delay consumption in the first place. Moreover, we will be stating several studies conducted to compare an interruption’s positive and negative effects through a consumer and producer’s perspective. Finally, Loewenstein’s (1987) model, which is the basis of the new model, will be discussed.

A complete stop

The common notion of an interruption is a complete stop to the consumption of a good or a service before continuing further. In the study done by Nelson & Meyvis (2008), they used a massage chair product testing as an example. During the consumer’s consumption or massage experience, they completely stopped or interrupted the massage in the middle, and then continued again after a few seconds. Another example was inserting a break in an enjoyable song. Instead of one continuous consumption, the song was divided into two by a pause in the middle. In both cases, results showed that consumers actually acquired higher utility when positive experiences were interrupted. On the other hand, the study also tackled how a complete stop will affect a negative consumption such as a loud noise. It showed that when consumers were interrupted in the middle of a negative experience, they tend to have lower utility.

Partitioning

Some experiences do not need to be completely disrupted but just seem discontinuous, which is the case of partitioning. This is the second type of interruption. Let’s take the consumption of chips for example. Instead of getting your usual one large bag of chips which you easily consume until the end, you are given three small bags that will sum up to the same amount as the big bag, however partitioned into smaller packs. Will your consumption remain unchanged? Will your utility remain unchanged? This study conducted by Cheema and Soman (2008) has shown that resources like food and money were consumed at a slower rate when they were partitioned. This can be explained by the fact that instead of deciding once, a consumer ends up deciding several times because a resource is broken-up into several pieces. Instead of their moves being automatic, it transforms to being more deliberative. Applying this to our chips example, eating the next piece of chip is typically a thoughtless process, however opening a new bag of chips draws attention to the decision and therefore deliberation arises.

Reasons for delayed consumption

Now we know what interruptions are, why would a consumer even choose to delay consumption in the first place? One reason for procrastinating consumption is when a person wants to avoid it or if they have too many other things to do (Solomon & Rothblum, 1984). Instead of going straight to the
consumption, they tend to delay it in order to finish other things. Another reason for procrastination is when a person has a negative emotional response to a certain experience and finds it unpleasant (Milgram & Sroloff et al, 1988). If a person had a negative experience of consuming the certain good or service from the past, it is likely that he will delay any future consumption because he is trying to avoid it. However, since this study focuses on the consumption of pleasurable goods and services, these two reasons are ruled out, and other reasons are considered. One reason why people delay their decision to consume is when they are uncertain about the resulting consequences (Hogarth & Michaud et al, 1980). More often than not, since they are uncertain of the future, they tend to find the need to obtain someone else’s advice or assistance, in order for them to make the right decision (Amato & Bradshaw, 1985). Delay can also be made because of the possible regret they will get when they pay now and see the prices fall later (Simonson, 1992). This is precisely the reason why in this study, a consumer’s wealth is held constant wherein all consumers are assumed to have equal ability of consuming a certain good or service. Lastly, a consumer delays consumption of new innovations or newly improved products because they are suspicious of its quality (Horsky, 1990) or expect that its quality will improve (Holak & Lehmann et al, 1987). Now after consumers have delayed enough for any of these reasons, they finally stop delaying and start consuming once that reason is addressed or superseded (Greenleaf & Lehmann, 1995).

Positive effects from a consumer’s perspective

We now move on to the positive and negative effects of an interruption in a consumer and producer’s perspective. Several studies have shown that waiting for pleasurable experiences derive positive outcomes (Nelson & Meyvis, 2008). This is due to the anticipation that arises while waiting for the next consumption (Caplin & Leahy, 2001). A research done by Loewenstein & Prelec (1993) supports this with the findings that people prefer to anticipate and savour enjoyable outcomes, before finally consuming them. Since future consumption impacts instantaneous utility or immediate wellbeing (Faria & Mcadam, 2013), when a person is asked to wait, especially for a positive experience, anticipation tends to increase and therefore making the overall consumption experience more pleasurable.

According to Nelson & Meyvis (2008), interruptions disrupt adaptation to a consumer’s experience and therefore avoid diminishing marginal utility. In the theory of natural selection by Charles Darwin, it was stipulated that adaptation is a normal occurrence in order to survive. It is because of this reason that humans have an innate ability to adapt to anything but the most extreme circumstances. However, according to Alland’s (1975) study, these extreme cases do not apply to goods and services. When adaptation occurs, especially swift hedonic adaptation, this destroys a consumer’s lasting happiness (Lyubomirsy, 2014). Thus, a break would not only be interrupting consumption but also the adaptation to the said consumption.

Another reason why a consumer’s utility increases with an interruption is due to the fact that when there is anticipation of a pleasurable consumption, mental images are formed and decisions are based on these imagery-related
processes (Shiv & Huber, 2000). Since anticipation is influenced by visceral factors which are consumer emotions that are drive states, like a craving that result from biological feedback from the body, these factors come into play when there is vividness of the consumption experience (Nowlis & Mandel et al, 2004). In other words, the clearer the mental image is, the greater a person can anticipate it. After making consumers wait, with a clear image of what they are about to consumer placed in their head, their consumption resulted to a higher enjoyment since they were already clearly and vividly anticipating it.

As shown in the study by Nelson & Meyvis (2008), external agents may actually have the ability to improve a consumer’s experience better than they do themselves which is why breaks showed an improvement in a person’s consumption. However, the impact of the break or delay in consumption depends on the degree of the wait to consume and the anticipation of the pleasurable consumption (Nowlis & Mandel et al, 2004). Since interruptions have a lengthening effect on perceived durations of consumption, it prolongs the pleasure derived from the whole consumption process, and therefore improving the total consumption experience (Schiffman & Greist-Bousquet, 1992). Improving total consumption will then of course make the person happier, even for just a short while, and thus increasing total utility. Though, to make the increase in happiness sustainable, the added improvement must be resistant to adaptation (Hsee & Xu et al, 2008) and must not be a simple one-time burst of pleasure (Lyubomirsky, 2014).

**Positive effects from a producer’s perspective**

After looking at the consumer’s perspective, we now look at the producer’s point of view. Research has shown that interruptions surprisingly cause people to perform their main task faster while maintaining the same level of quality of work (Zijlstra & Leonora et al, 1999). In the case of an employee, interruption of his main line of work with another line of work only makes him labour on the former faster while preserving its quality. This is more profitable for the company or employers since their workers are actually being more productive; doing more work and yet retaining their quality level.

**Negative effects from a consumer’s perspective**

We now move on to the negative effects of interruptions from a consumer’s point of view. When it comes to mundane, utilitarian activities wherein producing hedonic or visceral effects are unlikely, a break tends to have a negative impact on a consumer (Hirschman & Holbrook, 1982). One example is a study done by Loewenstein and Prelec (1992) wherein they point out that discounted utility theory, which assumes a positive discount rate, is the reason behind interruptions having a negative effect on a person’s utility. This means that a consumer prefers to consume a certain product sooner than later. This argument tells us that consumers will not enjoy a product or service as much if you make them wait for it, or if you interrupt them in the middle of it. Adding to this is the fact that another study has found out that anticipated delay decreases the value of the rewards (Mischel & Grusec et al, 1969). If a consumer expects, and knows that there will be an interruption in his future consumption, its value in
his mind decreases, and therefore decreasing overall utility. Furthermore, another study has shown that delays can result in anxiety and stress which could result to a negative consumption experience (Dellaert & Kahn, 1999). When placed in a position where a consumer has to wait for something, there is this uneasiness for making him wait and thus the postponement of consumption makes a person feel anxious because of the uncertainty of what may come.

On another note, a break may also have a negative effect on the consumer due to the fact that after an interruption, a consumer’s preference for a high-quality-high-priced product increases (Liu, 2008). This presents to us the idea that consumers will always want to experience higher utility after a break and therefore they will choose a high-quality-high-priced product, believing that this will satisfy them. This is bad for consumers and good for producers since the former is now willing to pay more to the latter. Besides that, making a consumer ‘want’ a certain product or service can make them have impulsive choices and opt for a smaller sooner reward rather than a larger later reward. Making the consumer ‘like’ a certain product or service on the other hand makes them opt for a larger later reward instead of the smaller sooner reward (Lades, 2012). However, a consumer normally chooses something they can have now even if it has smaller benefits than waiting to consume something with larger benefits in the future (Kapteyn & Teppa, 2003). This proves to us that consumers are impatient, especially when they are not convinced enough of the added benefits of waiting to consume a certain product or service.

Another negative effect of interruption from a consumer’s perspective is that once a certain consumption is interrupted, consumers are more likely to choose the highly desirable good or service even when it is the high-risk option rather than the highly feasible one (Liu, 2008). Moreover, if they do this repeatedly, habituation will arise. If at first consumers respond positively to portioning wherein they consume less, habituation decreases the amount of attention paid to partitions (Cheema & Soman, 2008). This is an application of adaptation because the consumers are slowly getting used to the partitions thus it does not affect their decision process anymore. When a consumer fails to anticipate adaptation, this results to a diminishing product or service enjoyment (Wang & Novemsky et al, 2009).

Negative effects from a producer’s perspective

We now move on to the negative aspects of a delayed consumption from a producer’s point of view. First of all, uncontrollable interruptions on a consumer’s primary task decreases a consumer’s willingness to pay, although it may increase the company’s brand awareness and recognition (Acquisti & Spiekermann, 2011). The example given was pop-up ads. Yes, consumers are more aware of the product, but they only get irritated from being disturbed from whatever they were doing, and thus associate the product to a negative response.

Another is the fact that in a study by Cheema & Soman (2008), they showed that goods are consumed at a slower rate when they are partitioned. Adding to that is the fact that people consume even less when they have greater aversion for overconsumption. This is not advantageous for producers since their ultimate goal is for consumers to consume more of what they are offering.
However, after a partition was broken, consumers tend to consume readily until they reach the next partition (Cheema & Soman, 2008). This shows that consumers do not care anymore about the consequences of their consumption of the next partition. Therefore once a producer breaks the barrier for the next consumption, they can now gain from a consumer’s readiness to consume.

Having a break in between consumption gives a consumer time to think or decide. When this happens, accurately predicting how the experience will feel like after the break alters one’s decision making on products and services (Wang & Novemsky et al, 2009). This makes the person hesitate whether to consume again or not. Moreover, when consumption is only imagined, the frustrating effects of the wait far outweigh the anticipated pleasure which results in a decrease in consumption enjoyment depending on the decision task (Nowlis & Mandel et al, 2004). This is again, not good for the producers because even though the interruption in consumption was meant to increase a consumer’s overall utility, it makes a consumer doubt instead. Therefore, a producer must make sure that during the said interruption, a consumer will not hesitate to consume again.

Another negative effect of a delay for a producer is when you make a consumer wait for something they are already expecting. For customers, speed of service is important no matter what the circumstance may be. You cannot simply make them wait for a product or service. A customer waiting for something can feel rather dragging and could cause negative feedback (Taylor, 1994). The best thing the company providing the service can do is to make the wait pleasurable for the consumers or make the anticipation worthwhile. In the context of a restaurant, it is normal for a customer to wait in line for their turn to be seated. However, not all customers are patient enough to wait for their turn. One thing that the restaurant owner can do is to design their waiting area next to the kitchen where the sights and aromas of the food might arouse a consumer’s anticipation (Nowlis & Mandel et al, 2004). This gives them a preview of what they can have if they wait for their turn, and therefore increases their anticipation and the clarity of their future consumption.

Loewenstein’s model

Moving on to the model, in the study done by Loewenstein (1987), he assumes that an individual evaluates a delayed act of consumption according to the integral of discounted utility from anticipation and consumption that it yields. Thus, the present value $Y$ (measured in dollars) of a delayed act of consumption is defined by:

\[ U(Y) = \int_0^\alpha \frac{\alpha}{\delta} U(x) e^{-\delta(T-t)} \left(1-e^{-\delta L}\right) e^{-r(t-t_0)} dt + \int_T^{T+T_1} U(x) e^{-r(t-t_0)} \]

The conclusions of Loewenstein are the following:

1. Delaying is more likely when $\alpha$ is large and $\delta$ is small. This means that a consumer is more likely to gain higher utility from delay when they have a clear picture of what they are consuming in their head.

2. Delaying is more likely when consumption is fleeting. Since the consumer only gets so much from a fleeting consumption, delaying this will prolong perceived duration of consumption and therefore give the consumer higher utility.
FRAMEWORK

The model to be presented explores the question of how an individual's utility changes when presented with a break in between consumption. As previously stated, we assume that the break to be inserted is a positive experience. Since we are trying to see if Nelson and Meyvis' (2008) results are true, we are adding another consumption period in Loewenstein’s (1987) model. Thus, instead of just having anticipation and consumption, we now have the first period of consumption, a break, and the second period of consumption.

As depicted in figure 1, an individual at time $T_1$ to consume for the duration of $L_1$ wherein after, the break starts and anticipation of the consumption of good $x$ occurs. After anticipation, the individual consumes again at $T_2$ for the duration of $L_2$. Consumption is assumed to yield a constant stream of utility, $U(x)$, beginning at time $T_1$ and continuing for duration $L_1$ and then another constant utility for consumption beginning at time $T_2$ and continuing for duration $L_2$, after which it drops to zero. In other words, $T_1$ is the beginning of the first consumption period and $T_2$ for the second. $L_1$ and $L_2$ are the lengths of consumption respectively, and $U(x)$ is the satisfaction one experiences while consuming a certain good or service. Formally:

$$U_t^{c1}(x, T_1, L_1) = U(x) \text{ for } T_1 \leq t \leq T_1 + L_1,$$

$$U_t^{c2}(x, T_2, L_2) = U(x) \text{ for } T_2 \leq t \leq T_2 + L_2,$$

$$= 0 \text{ otherwise}$$

where $U_t^{ci}$ for $i = 1, 2$ indicates utility experienced at time $t$ from consumption.

To illustrate:

![Timeline of consumption](image)

Figure 1. Timeline of consumption

At any time $t$ between $T_1 + L_1$ and $T_2$, the consumer derives utility from anticipation, $U_t^B$. Utility from anticipation is assumed to be proportional to the integral of utility from consumption at a discounted rate of $\delta$. However, this is not the conventional discount rate because it is a measure of the degree to which the individual derives immediate utility from anticipated consumption.

Moving on to the break, utility at each point $t$ can be due to savouring\(^5\) of future consumption. Therefore, taking this into consideration and solving for utility at each point $t$ is equal to:

$$U_t^B(x, T_2, L_2) = \alpha \int_{T_2}^{T_2 + L_2} e^{-\delta(t-r)} U(x) \, dr$$

This formulation has four desirable properties:

\(^5\) Savouring is the positive utility derived from anticipation of future consumption.
(1) The intensity of the anticipation will be greater the longer the time period;
(2) The intensity of the anticipation will also be greater the more intensely one expects to enjoy it;
(3) The nearer the date of consumption, the greater the intensity of the pleasure from anticipation becomes; and
(4) The intensity of anticipation increases faster and faster as the time for consumption grows closer.

In the current formulation, utility from the break denoted as \( U^B \) is a positive function of \( L_2 \), the duration of the second consumption; a positive function of \( U(x) \), the utility derived from consumption; and a negative function of \( (T_2 - t) \), the time delay prior to the second consumption. Adding to that is that the second derivative of \( U^B \) with respect to \( (T_2 - t) \) is positive, showing that utility from the break increases or decreases at an increasing rate.

Since overall utility of the consumer is derived from the utility they get from consuming before and after the break, plus the anticipation and the memory of past consumption, we now have the present value of \( Y \), which is measured in dollars, to be defined by:

\[
U(Y) = \int_{T_1}^{T_1+L_1} U(x) e^{-r(T_1-t)} dt + \int_{T_1+L_1}^{T_2} \frac{\alpha}{T_2-t} U(x) e^{-\delta(T_2-t)} (1 - e^{-\delta L_2}) e^{-r(T_2-t)} dt + \int_{T_2}^{T_2+L_2} U(x) e^{-r(T_2-t)} dt
\]

where

\[
U(Y) \text{ is a ratio scale utility function with positive first and negative second derivative;}
\]

\( T_1 \) is the beginning of the first consumption;
\( L_1 \) is the length of the first consumption;
\( T_2 \) is the beginning of the second consumption;
\( L_2 \) is the length of the second consumption;
\( t \) is any point where a consumer derives utility;
\( r \) is the conventional discount rate used to discount future utility from all sources;
\( \alpha \) is a measure of the vividness\(^6\) of a particular outcome; and
\( \delta \) is a measure of a consumer’s preoccupation with the future.

This is the main model of the study. In this equation, the first term represents utility from the first consumption, the second term represents utility from the break and the third term represents utility from the second consumption. In the model, three things are considered:

(1) Memory of past consumption;
(2) Sensation of present consumption; and
(3) Anticipation of future consumption.

Setting \( T_1 = 0 \) for simplicity, and integrating:

\[
U(Y) = U(x)[1 - e^{-rL_1}] + \frac{\alpha}{\delta(-r)} (e^{-rT_2} - e^{-\delta T_2 + \delta L_1 - rL_1})(1 - e^{-\delta L_2}) + \frac{1}{r} e^{-rT_2}(1 - e^{-rL_2})]
\]

\( \delta \) and \( \alpha \) define to the relationship between \( U^B \) and \( U^C \). A consumer with a low \( \delta \) savours outcomes even if they will occur in the distant future. On the other

---

\(^6\) Vividness is how clear a person can picture a certain consumption in his mind
\(^7\) See appendix for calculations of all equations
hand, a large $\alpha$ means that the consumer has a clear picture of the consumption formed in his head. Factors that increase $\alpha$ or decrease $\delta$ raise the utility from savouring. Since a rational person will take into account future outcomes, like saving up for their retirement, even when they do not instantly savour or dread those outcomes, it is assumed that $\delta > r$.

**Conditions**

Since interruptions are controlled by the producer, the model only works with the assumption that the break or interruption in consumption is welcomed by the consumer. If consumers are given the choice to consume again or not, producers can no longer apply the model to manipulate the consumption experience and make it more pleasurable. Therefore, the consumer is assumed to always consume again after the first consumption. It is also assumed that consumers are not under any budget constraint and will not consider anything monetary during the whole consumption experience. Finally, an interruption would be ideal at the point before a consumer reaches satiation as to prevent possible irritation from disruption of consumption while a consumer is climbing up the utility curve.

**RESULTS AND ANALYSIS**

The model works under the condition in which people will prefer to delay desired consumption as much as possible. Desired consumption will be delayed when $(\partial Y/\partial T_2) > 0$. In other words, desired consumption will be delayed when the net present value of consumption, taking into account both savouring and consumption itself, increases as a function of time delay. Since $U(Y)$ is monotonically increasing, this condition is the same with $\partial U(Y)/\partial T_2 > 0$.

Differentiating the integrated model with respect to $T_2$:

$$\frac{\partial U(Y)}{\partial T_2} = U(x) \left[ \frac{1}{r} (1 - e^{-rL_1}) \right]$$

$$+ \frac{\alpha}{\delta(\delta - r)} \left( \delta e^{-\delta T_2 + \delta L_1 - rL_1} - re^{-rT_2} \right) \left( 1 - e^{-\delta L_2} \right)$$

$$- e^{-rT_2} \left( 1 - e^{-rL_2} \right)$$

The first term in the brackets is the sensation of the present consumption. The second term on the other hand is the marginal benefit from savouring delayed consumption. Lastly, the third term is the marginal cost of delay, in terms of increased discounting of consumption.

Consumption will be deferred when $\partial U(Y)/\partial T_2$ is positive for $T_2 = 0$. Setting $T_2 = 0$:

$$\left. \frac{\partial U(Y)}{\partial T_2} \right|_{T_2=0} = U(x) \left[ \frac{1}{r} (1 - e^{-rL_1}) + U(x) \frac{\alpha}{\delta(\delta - r)} \left( \delta e^{L_1(\delta - r)} - r \right) \right.$$

$$\left. - e^{-\delta L_2} \right) - U(x) \left( 1 - e^{-rL_2} \right)$$

A necessary and sufficient condition for delaying desired consumption is therefore:

$$\frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left( \delta e^{L_1(\delta - r)} - r \right) \left( 1 - e^{-\delta L_2} \right) >$$

$(1 - e^{-rL_2})$

We already know that $\delta > r$ and that $\alpha, \delta$ and $r$ are $\epsilon (0, 1)$. However, we do not know exactly what $L_1$ and $L_2$ are. Therefore, there exist three assumptions

(7) \hspace{1cm} (8) \hspace{1cm} (9)
when consumption will be deferred when $\partial U / \partial T_2$ is positive for $T_2 = 0$.

**Proposition 1**

If $L_1 \geq L_2$, then $\partial U(Y)/\partial T_2 > 0$ $\forall \alpha \in (0,1)$. When the first period of consumption is longer than or equal to the second, the consumer’s overall utility increases due to the increase in the length of the break, regardless if consumption is vivid or not. In the case of the massage chair, the guitar lessons, basketball practice, salon pampering and even teambuilding activities, this is all assuming that $L_1$ is greater than or equal to $L_2$. In these scenarios, an increase in the length of interruption would always lead to a higher utility for as long as the second period of consumption is equal, or shorter than the first.

During a massage, for let us say an hour, the masseuse decides to take a break to divide the massage into two, thirty minute parts. This proposition tells us that this in turn gives the consumer a higher utility since it disrupts a person’s adaptation and they are able to anticipate the next part of the massage before continuing further. Therefore, since the consumer is now expecting the second part of the massage and already has an idea of how good it feels, there is added utility during the wait.

The same goes for guitar lessons and basketball practice. In these scenarios, people don’t usually imagine what’s going to happen next, they just go with the flow until it is over. Thus, inserting a break in between will increase their utility because of anticipation of a pleasurable experience.

However, the salon pampering and teambuilding activities work better when $L_1$ is greater than $L_2$. Since a consumer derives pleasure from salon pampering but is not really imagining or picturing what the second consumption would look like, therefore low vividness, then the second consumption must be shorter than the first for there to be an increase in utility when there is an interruption.

Whenever one goes to a salon to have a pampering session like having your nails done or getting your hair cut, there is a small chance that you are imagining the whole process. Thus, for there to be an increase in utility when a break is inserted during the pampering session, the second part of the session must be shorter than the first. This is due to the fact that although the person derives utility from both sessions, a person has lower patience now on the second consumption since there was no clear picture of what was going to happen. Furthermore, although anticipation was present, it is not that much.

When it comes to team building events, a break would also increases utility only if the second consumption is shorter than the first because these are not the type of events that a consumer creates vivid images of in his head. These are the types of events where a person just goes with the flow.

Therefore, when the producer or company wants to interrupt services like salon pampering and teambuilding activities, they must make sure that the second consumption will be shorter so that their consumers will still derive higher utility. Also, they must make sure that consumers are not in a hurry and are having a pleasurable break for this proposition to work.
Proposition 2

If $L_2 > L_1$ and $\alpha$ is large, then $\partial U(Y)/\partial T_2 > 0$. When the second period of consumption is longer than the first, the consumer's overall utility only increases from the increase in the length of the break when vividness of consumption is high. Examples of events or consumption that make a consumer create vivid images in his head are shows, video games and dance music, as pointed out in the background of the study. This is the case assuming $L_1$ is less than $L_2$.

Shows like Broadway plays and musicals are good examples of consumption wherein a consumer creates a clear picture in his head. In these events, there are intermissions which are usually inserted before the climax of the story. Thus, during the break, consumers have this high anticipation for what is going to happen next since they have already created a vivid image in their minds of what is going to happen next. In these types of events, since a consumer has a clear picture, the producers can make the second part of the production longer than the first and the consumers will still derive higher utility from the break.

When it comes to adventure type of video games, placing a mini game before the longer part of the adventure also gives the player higher utility since they have already formed a clear picture in their mind of what they are playing with, just like the Broadway musicals.

Lastly, EDMs are the type of music that have drops in them. A drop is when the part of the song you can dance to begins. Before the drop, there is usually a build-up wherein the anticipation of the listener greatly increases as it comes near the drop because the music tends to get louder and more intense. The build-up can be considered as the “break” in EDMs. Therefore, as the break increases, the utility of the listener increases even if the second part of the song is longer than the first because they have already created a clear picture of what is going to happen due to the build-up before the drop. After the drop, listeners can now enjoy uninterrupted dance music.

Therefore, to be sure that an interruption in consumption would increase overall utility, a consumption experience must be clearly imaginable so that it can be looked forward to by the consumer.

After knowing the different effects of an increase in the length of the break considering the different lengths of $L_1$ and $L_2$, we now move on to the effects of an increase in the length of the first and second consumption, holding the break constant.

Proposition 3

$\partial U(Y)/\partial L_1$ and $\partial U(Y)/\partial L_2$ are both $> 0$. An increase in the length of the first and second consumption increases a consumer’s overall utility, holding the break constant. This is already a known fact and can be applied anywhere, may it be consumption of food, beverages, services, etc. Of course, when a customer is given more to consume, his utility will increase, as long as the point of satiation is not reached.

Proposition 4

If $\delta - r$ is large, then $\partial U(Y)/\partial L_2 > \partial U(Y)/\partial L_1$. An increase in the length of the second consumption has a greater effect than an increase in the length of the
first consumption when consumers consider future outcomes more than the present. An example would be Chinese restaurants. In these types of restaurants, customers are first given appetizers like dim sum, for example, and then made to wait long before the main course is brought out. Here, the first consumption are the appetizers and the second consumption is the main course. Chinese restaurants know that customers want the main course more than the appetizers which make them more future oriented. Therefore, increasing the main course over the appetizers will lead to a greater increase in customer utility and satisfaction.

Further Analysis
We now move on to the cross partial derivative of $U(Y)$ with respect to the lengths of consumption $L_i$ for $i = 1, 2$ and $T_2$.

Proposition 5
\[
\frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} > 0
\]

Proposition 6
If $\alpha$ is large, then $\frac{\partial^2 U(Y)}{\partial L_2 \partial T_2} > 0$

CONCLUSION
The theoretical model was able to show the effects of varying magnitudes of interruption, placed on different points of consumption experiences. We have verified that interruptions in consumption disrupt adaptation, prolong perceived duration of consumption and raise anticipation. It is only a matter of how we can manipulate this information for our benefit.

The paper has proven three main points:
1. An interruption will always be beneficial if the first consumption is longer than the second;
2. The reverse will only be beneficial if the second consumption can be vividly imagined by the consumer; and
3. Increasing the second part of the consumption will always be better than increasing the first if the consumer is future oriented.

Given the findings above, we can readily see how this can be applied to real life scenarios. For example, in marketing let us say a particular brand of chips, a company can manipulate the taste test to make the consumption pleasurable for the consumer. Instead of giving the consumer one whole bag of chips to try out, it can give him three smaller packets so that he will have a break in between consumption. This will unknowingly make the consumer enjoy the chips more than if he were given one full bag. The company can also form vivid images for the consumer to imagine so that his overall utility would further increase. It can show videos of other customers enjoying its product, such as how rich and flavourful it looks in good lighting.

Whenever a particular circumstance involves a consumption for a duration of time, a producer or a capitalist can maximize potential gains either by managing both the breaks and anticipation present in the entire consumption experience or creating a vivid mental image. The manner of which is to be determined by the
type of products or the objectives of the producer. By effectively applying these principles, the producers will be able to give their consumers a higher satisfaction and as a result will increase their willingness to pay. This in turn will lead to an increase in the producer’s profit.

RECOMMENDATION FOR FUTURE RESEARCH
Since the research is only focused on the results and implications of positive experiences, a possible extension to this paper will be to find out the results for negative experiences. We already know that when it comes to a negative experience, a consumer will want it to be over with quickly. However, the reasons behind this were not tackled in this study. Another possible extension is to have an empirical test to prove our model. Since the paper is a theoretical extension to Nelson and Meyvis' (2008) empirical research, a few empirical extensions to our model will also prove useful.

REFERENCES


Schiffman, N. & Greist-Bousquet, S. (1992). The effect of task interruption and
closure on perceived duration. 	extit{Bulletin Of The Psychonomic Society}, 30 (1),
Simonson, I. (1992). The influence of anticipating regret and responsibility on
purchase decisions. 	extit{Journal Of Consumer Research}, 19 (June), pp. 105-118.
cognitive-behavioral correlates. 	extit{Journal Of Counseling Psychology}, 31
(October), pp. 503-509.
Taylor, J. & Weerapana, A. (2013). Economics. 7th ed. N.p.: South-Western,
Taylor, S. (1994). Waiting for service: the relationship between delays and
2014].
	extit{Journal Of Consumer Research}, 36 (2), pp. 149-159. Retrieved from:
work: effects of interrupted activities. 	extit{Journal Of Occupational And
Organizational Psychology}, 72 (2), pp. 163-185.
APPENDIX A

Proposition 1
If $L_1 \geq L_2$, then $\partial U(Y)/\partial T_2 > 0 \forall \alpha \in (0, 1)$

Proof
Assuming $L_1 = L_2$ in equation (8) then
$$-r L_1 = -r L_2 \Rightarrow$$
$$1 - e^{-r L_1} = 1 - e^{-r L_2}$$

We know that $r \in (0, 1)$ then
$$\frac{1}{r} (1 - e^{-r L_1}) > (1 - e^{-r L_2}) \Rightarrow$$
$$\frac{1}{r} (1 - e^{-r L_1}) + \frac{\alpha}{\delta(\delta - r)} (\delta e^{L_1(\delta - r)} - r)(1 - e^{-\delta L_2}) >$$
$$(1 - e^{-r L_2}) \Rightarrow$$
$$\frac{1}{r} (1 - e^{-r L_1}) + \frac{\alpha}{\delta(\delta - r)} (\delta e^{L_1(\delta - r)} - r)(1 - e^{-\delta L_2}) - (1 - e^{-r L_2}) > 0$$

∴ If $L_1 = L_2$, then $\partial U(Y)/\partial T_2 > 0$

Assuming $L_1 > L_2$ in equation (8) then
$$r L_1 > r L_2 \Rightarrow$$
$$e^{-r L_1} < e^{-r L_2} \Rightarrow$$
$$1 - e^{-r L_1} > (1 - e^{-r L_2})$$

We know that $r \in (0, 1)$ then
$$\frac{1}{r} (1 - e^{-r L_1}) > (1 - e^{-r L_2}) \Rightarrow$$
$$\frac{1}{r} (1 - e^{-r L_1}) + \frac{\alpha}{\delta(\delta - r)} (\delta e^{L_1(\delta - r)} - r)(1 - e^{-\delta L_2}) >$$
$$(1 - e^{-r L_2}) \Rightarrow$$
$$\frac{1}{r} (1 - e^{-r L_1}) + \frac{\alpha}{\delta(\delta - r)} (\delta e^{L_1(\delta - r)} - r)(1 - e^{-\delta L_2}) - (1 - e^{-r L_2}) > 0$$

∴ If $L_1 > L_2$, then $\partial U(Y)/\partial T_2 > 0 \quad \Box$

Proposition 2
If $L_2 > L_1$ and $\alpha$ is large, then $\partial U(Y)/\partial T_2 > 0$

Proof
Assuming $L_1 < L_2$ and $\alpha$ is large in equation (8) then
$$r L_1 < r L_2 \Rightarrow$$
$$e^{-r L_1} > e^{-r L_2} \Rightarrow$$
$$(1 - e^{-r L_1}) < (1 - e^{-r L_2})$$

We know that $\alpha$ is large then
$$\frac{\alpha}{\delta(\delta - r)} (\delta e^{L_1(\delta - r)} - r)(1 - e^{-\delta L_2}) > (1 - e^{-r L_2}) \Rightarrow$$
$$\frac{1}{r} (1 - e^{-r L_1}) + \frac{\alpha}{\delta(\delta - r)} (\delta e^{L_1(\delta - r)} - r)(1 - e^{-\delta L_2}) >$$
$$(1 - e^{-r L_2}) \Rightarrow$$
$$\frac{1}{r} (1 - e^{-r L_1}) + \frac{\alpha}{\delta(\delta - r)} (\delta e^{L_1(\delta - r)} - r)(1 - e^{-\delta L_2}) - (1 - e^{-r L_2}) > 0$$

∴ If $L_1 < L_2$ and $\alpha$ is large, then $\partial U(Y)/\partial T_2 > 0 \quad \Box$

Proposition 3
$\partial U(Y)/\partial L_1$ and $\partial U(Y)/\partial L_2$ are both $> 0$

Proof
Differentiating the integrated model with respect to $L_1$:

\[
\frac{\partial U(Y)}{\partial L_1} = U(x)\left[\frac{1}{r} (1 + re^{-rL_1}) + \alpha \left( e^{-rT_2} - \delta e^{-\delta T_2 + \delta L_1 - rL_1} + \frac{1}{r} e^{-rT_2}(1 - e^{-rL_2}) \right) \right] 
\]

We know that

\[
\frac{1}{r} (1 + re^{-rL_1}) + \alpha \left( e^{-rT_2} - \delta e^{-\delta T_2 + \delta L_1 - rL_1} + \frac{1}{r} e^{-rT_2}(1 - e^{-rL_2}) \right) > 0
\]

\[\therefore \frac{\partial U(Y)}{\partial L_1} > 0 \]

Differentiating the integrated model with respect to $L_2$:

\[
\frac{\partial U(Y)}{\partial L_2} =
\]

\[
U(x)\left[\frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left( e^{-rT_2} - \delta e^{-\delta T_2 + \delta L_1 - rL_1} \right) \left( 1 + \delta e^{-\delta L_2} \right) + \frac{1}{r} e^{-rT_2}(1 + re^{-rL_2}) \right]
\]

We know that

\[
\frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left( e^{-rT_2} - \delta e^{-\delta T_2 + \delta L_1 - rL_1} \right) \left( 1 + \delta e^{-\delta L_2} \right) + \frac{1}{r} e^{-rT_2}(1 + re^{-rL_2}) > 0
\]

\[\therefore \frac{\partial U(Y)}{\partial L_2} > 0 \quad \Box
\]

**Proposition 4**

If $\delta - r$ is large, then $\frac{\partial U(Y)}{\partial L_2} > \frac{\partial U(Y)}{\partial L_1}$

**Proof**

We know that the first term of $\frac{\partial U(Y)}{\partial L_1} > \frac{\partial U(Y)}{\partial L_2}$

\[
\frac{1}{r} (1 + re^{-rL_1}) > \frac{1}{r} (1 - e^{-rL_1})
\]

We also know that the third term of $\frac{\partial U(Y)}{\partial L_1} < \frac{\partial U(Y)}{\partial L_2}$

\[
\frac{1}{r} e^{-rT_2}(1 + re^{-rL_2}) < \frac{1}{r} e^{-rT_2}(1 - e^{-rL_2})
\]

Assuming $\delta - r$ is large then the second term of $\frac{\partial U(Y)}{\partial L_1} < \frac{\partial U(Y)}{\partial L_2}$

\[
\frac{\alpha}{\delta(\delta - r)} \left( e^{-rT_2} - \delta e^{-\delta T_2 + \delta L_1 - rL_1} \right) <
\]

\[
\left( 1 - e^{-rL_1} \right) + \frac{\alpha}{\delta(\delta - r)} \left( e^{-rT_2} - \delta e^{-\delta T_2 + \delta L_1 - rL_1} \right) \left( 1 + \delta e^{-\delta L_2} \right) + \frac{1}{r} e^{-rT_2}(1 + re^{-rL_2})
\]

\[\therefore \frac{1}{r} e^{-rT_2}(1 - e^{-rL_2}) \]

\[\therefore \text{If } \delta - r \text{ is large, then } \frac{\partial U(Y)}{\partial L_2} > \frac{\partial U(Y)}{\partial L_1} \quad \Box
\]

**Proposition 5**

$\frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} > 0$

**Proof**

Differentiating the integrated model with respect to $L_1$ and $T_2$:

\[
\frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} = U(x)\left[\frac{1}{r} (1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left( \delta e^{-\delta T_2 + \delta L_1 - rL_1} - \delta re^{-\delta T_2 + \delta L_1 - rL_1} - re^{-rT_2} \right) \right]
\]

\[\frac{1}{r} e^{-rT_2}(1 - e^{-rL_2}) - e^{-rT_2}(1 -
\]

\[\Box\]
Consumption will be deferred as the increase in $L_1$ increases $U(Y)$ when $\frac{\partial^2 U(Y)}{\partial L_1 \partial T_2}$ is positive for $T_2 = 0$. Setting $T_2 = 0$:

$$\left. \frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} \right|_{T_2=0} = U(x) \frac{1}{r}(1 + re^{-rL_1}) + U(x) \frac{\alpha}{\delta(\delta-r)} \left( \delta^2 e^{L_1(\delta-r)} - \delta re^{L_1(\delta-r)} - r \right) (1 - e^{-\delta L_2})$$  \hspace{1cm} (12)

$$e^{-rL_2})]$$

A necessary and sufficient condition for delaying desired consumption as the increase in $L_1$ increases $U(Y)$ is therefore,

$$\left. \frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} \right|_{T_2=0} = U(x) \frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta^2 e^{L_1(\delta-r)} - \delta re^{L_1(\delta-r)} - r \right) (1 - e^{-\delta L_2})$$

$$e^{-\delta L_2}) > (1 - e^{-rL_2})$$

We know that

$$\frac{1}{r}(1 + re^{-rL_1}) > (1 - e^{-rL_2}) \rightarrow$$

$$\frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta^2 e^{L_1(\delta-r)} - \delta re^{L_1(\delta-r)} - r \right) (1 - e^{-\delta L_2}) >$$

$$\frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta^2 e^{L_1(\delta-r)} - \delta re^{L_1(\delta-r)} - r \right) (1 - e^{-\delta L_2}) >$$

$$\frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta^2 e^{L_1(\delta-r)} - \delta re^{L_1(\delta-r)} - r \right) (1 - e^{-\delta L_2}) > (1 - e^{-rL_2}) > 0$$

\[\therefore \frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} > 0 \]  \hspace{1cm} \Box

**Proposition 6**

If $\alpha$ is large, then $\frac{\partial^2 U(Y)}{\partial L_2 \partial T_2} > 0$

\[\text{Proof}\]

Differentiating the integrated model with respect to $L_2$ and $T_2$:

$$\frac{\partial^2 U(Y)}{\partial L_2 \partial T_2} = U(x) \frac{1}{r}(1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta e^{-\delta L_2} - e^{-rT_2}(1 + re^{-rL_2}) \right)$$  \hspace{1cm} (13)

Consumption will be deferred as the increase in $L_2$ increases $U(Y)$ when $\frac{\partial^2 U(Y)}{\partial L_2 \partial T_2}$ is positive for $T_2 = 0$. Setting $T_2 = 0$:

$$\left. \frac{\partial^2 U(Y)}{\partial L_2 \partial T_2} \right|_{T_2=0} = U(x) \frac{1}{r}(1 - e^{-rL_1}) + U(x) \frac{\alpha}{\delta(\delta-r)} \left( \delta e^{L_1(\delta-r)} - r \right) (1 + re^{-rL_2})$$

$$e^{-rL_2})]$$

A necessary and sufficient condition for delaying desired consumption as the increase in $L_2$ increases $U(Y)$ is therefore,

$$\left. \frac{\partial^2 U(Y)}{\partial L_2 \partial T_2} \right|_{T_2=0} = U(x) \frac{1}{r}(1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta e^{L_1(\delta-r)} - r \right) (1 + re^{-\delta L_2}) >$$

$$\frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta e^{L_1(\delta-r)} - r \right) (1 + re^{-\delta L_2}) >$$

$$\frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta e^{L_1(\delta-r)} - r \right) (1 + re^{-\delta L_2}) > (1 + re^{-rL_2}) > 0$$

\[\therefore \text{If } \alpha \text{ is large, then } \frac{\partial^2 U(Y)}{\partial L_2 \partial T_2} > 0 \]  \hspace{1cm} \Box

**APPENDIX B**
Solution for (6):

Setting $T_1 = 0$ and integrating, we now have:

\[
\int_0^{T_1} e^{-rt} dt + \int_{L_1}^{T_2} e^{-\delta(T_2-t)}(1 - e^{-\delta L_2}) e^{-rt} dt + \int_{T_2}^{T_2 + L_2} e^{-rt} dt
\]

(A) \hspace{2cm} (B) \hspace{2cm} (C)

\[A: \int e^{-rt} dt \hspace{2cm} u = -rt; \, du = -r \, dt; \, dt = \left(-\frac{1}{r}\right) du\]

\[= \int e^u \left(-\frac{1}{r}\right) du \hspace{2cm} \int e^u du = e^u \hspace{2cm} u = -rt\]

\[= -\frac{1}{r} e^u \hspace{2cm} \frac{1}{r} e^{\frac{1}{r}u} \]

\[= -\frac{1}{r} e^{-rt} \hspace{2cm} \frac{1}{r} e^{-\delta L_1}\]

\[= -\frac{1}{r} \ln(1 - e^{-\delta L_1})\]

\[2. \lim_{t \to L_1} \left(-\frac{e^{-rt}}{r}\right) - \lim_{t \to 0} \left(-\frac{e^{-rt}}{r}\right) \]

\[= -\frac{1}{r} \lim_{t \to L_1} e^{-rt} - e^{-\delta L_1} \]

\[= -\frac{1}{r} \frac{e^{-\delta L_1}}{1 - e^{-\delta L_1}} \]

\[= \frac{1}{r} \left(1 - e^{-\delta L_1}\right)\]

\[B: \int \frac{a}{\delta} e^{-\delta(T_2-t)}(1 - e^{-\delta L_2}) e^{-rt} dt \hspace{2cm} u = -\delta T_2 + \delta t - rt; \, du = \delta - r; \, dt = \frac{1}{\delta - r} du\]

\[= \int \frac{a}{\delta} e^{-\delta T_2 + \delta t - rt} du \hspace{2cm} \int e^u du = e^u \hspace{2cm} u = -\delta T_2 + \delta t - rt\]

\[= \frac{a}{\delta} \left(1 - e^{-\delta L_2}\right) e^u \left(\frac{1}{\delta - r}\right) du \]

\[= \frac{a}{\delta} \left(1 - e^{-\delta L_2}\right) e^u \left(\frac{1}{\delta - r}\right) du \]

\[= \frac{a}{\delta} \left(1 - e^{-\delta L_2}\right) e^{-\delta T_2 + \delta t - rt} \]

\[= \frac{a}{\delta} \left(1 - e^{-\delta L_2}\right) e^{-\delta T_2 + \delta t - rt} \]

\[2. \lim_{t \to T_2} \left[\frac{a(1 - e^{-\delta L_2}) e^{-\delta T_2 + \delta t - rt}}{\delta(\delta - r)} \right] - \lim_{t \to L_1} \left[\frac{a(1 - e^{-\delta L_2}) e^{-\delta T_2 + \delta t - rt}}{\delta(\delta - r)} \right] \]

\[= \frac{a}{\delta(\delta - r)} \left(1 - e^{-\delta L_2}\right) \lim_{t \to T_2} \left(e^{-\delta T_2 + \delta t - rt}\right) - \frac{a}{\delta(\delta - r)} (1 - e^{-\delta L_2}) \lim_{t \to L_1} \left(e^{-\delta T_2 + \delta t - rt}\right) \]

\[= \frac{a}{\delta(\delta - r)} \left(1 - e^{-\delta L_2}\right) e^{-\delta T_2 + \delta L_1 - r L_1} \]

\[= \frac{a}{\delta(\delta - r)} \left(1 - e^{-\delta L_2}\right) e^{-\delta T_2 + \delta L_1 - r L_1} \]

\[= \frac{a}{\delta(\delta - r)} \left(1 - e^{-\delta L_2}\right) e^{-\delta T_2 + \delta L_1 - r L_1} \]

\[= \frac{a}{\delta(\delta - r)} \left(1 - e^{-\delta L_2}\right) \left(1 - e^{-\delta L_2}\right) \]

\[= \frac{a}{\delta(\delta - r)} \left(1 - e^{-\delta L_2}\right) \left(1 - e^{-\delta L_2}\right) \]

\[C: \int e^{-rt} dt \hspace{2cm} u = -rt; \, du = -r \, dt; \, dt = \left(-\frac{1}{r}\right) du\]

\[= \int e^u \left(-\frac{1}{r}\right) du \]

\[= 124\]
\[ \int e^u \, du = e^u \]
\[ = \frac{1}{r} e^{ru} \]
\[ = \frac{1}{r} e^{-rt} \]
\[ = \frac{e^{-rt}}{r} \]

2. \[ \lim_{t \to T_{2+L_2}} \left( \frac{e^{-rt}}{r} \right) - \lim_{t \to T_2} \left( \frac{e^{-rt}}{r} \right) \]
\[ = \frac{1}{r} \lim_{t \to T_{2+L_2}} e^{-rt} - \frac{1}{r} \lim_{t \to T_2} e^{-rt} \]
\[ = \frac{e^{-r(T_2+L_2)}}{r} - \frac{e^{-rT_2}}{r} \]
\[ = \frac{e^{-rT_2} - e^{-rT_2-rL_2}}{r} \]
\[ = \frac{1}{r} e^{-rT_2} (1 - e^{-rL_2}) \]

\[ U(Y) = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} (e^{-rT_2} - e^{-\delta T_2+\delta L_1-rL_1}) (1 - e^{-\delta L_2}) + \]
\[ \frac{1}{r} e^{-rT_2} (1 - e^{-rL_2}) \]

Solution for (7):
\[ \frac{\partial U(Y)}{\partial T_2} = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left[ \frac{d}{dT_2} (e^{-rT_2}) - \frac{d}{dT_2} (e^{-\delta T_2+\delta L_1-rL_1}) \right] (1 - e^{-\delta L_2}) + \]
\[ \frac{1}{r} e^{-rT_2} (1 - e^{-rL_2}) \]
\[ = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left[ e^{-rT_2} \frac{d}{dT_2} (-rT_2) - e^{-\delta T_2+\delta L_1-rL_1} \frac{d}{dT_2} (-\delta T_2 + \delta L_1) \right] (1 - e^{-\delta L_2}) \]
\[ \delta L_1 - \frac{rL_1}{r} \right) (1 - e^{-\delta L_2}) + \frac{1}{r} e^{-rT_2} \frac{d}{dT_2} (-rT_2) (1 - e^{-rL_2}) \]
\[ = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left[ e^{-rT_2} (-r) - e^{-\delta T_2+\delta L_1-rL_1} (-\delta) \right] (1 - e^{-\delta L_2}) + \]
\[ \frac{1}{r} e^{-rT_2} (-r) (1 - e^{-rL_2}) \]
\[ = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} (\delta e^{-\delta T_2+\delta L_1-rL_1} - re^{-rT_2}) (1 - e^{-\delta L_2}) - \]
\[ e^{-rT_2} (1 - e^{-rL_2}) \]

Solution for (8):
\[ \frac{\partial U(Y)}{\partial T_2} \bigg|_{T_2=0} = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta e^{-\delta(0)+\delta L_1-rL_1} - re^{-r(0)} \right) (1 - e^{-\delta L_2}) - \]
\[ e^{-r(0)} (1 - e^{-rL_2}) \]
\[ = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left( \delta e^{L_1(\delta-r) - r} \right) (1 - e^{-\delta L_2}) - (1 - e^{-rL_2}) \]

Solution for (9):
\[ \frac{\partial U(Y)}{\partial L_1} = \frac{1}{r} \left[ 1 - \frac{d}{dL_1} (e^{-rL_1}) \right] + \frac{\alpha}{\delta(\delta-r)} \left[ e^{-rT_2} - \frac{d}{dL_1} (e^{-\delta T_2+\delta L_1-rL_1}) \right] (1 - e^{-\delta L_2}) + \]
\[ \frac{1}{r} e^{-rT_2} (1 - e^{-rL_2}) \]
\[ = \frac{1}{r} \left[ 1 - e^{-rL_1} \frac{d}{dL_1} (-rL_1) \right] + \frac{\alpha}{\delta(\delta-r)} \left[ e^{-rT_2} - e^{-\delta T_2+\delta L_1-rL_1} \frac{d}{dL_1} (-\delta T_2 + \delta L_1) \right] (1 - e^{-\delta L_2}) \]
\[ \delta L_1 - \frac{rL_1}{r} \right) (1 - e^{-\delta L_2}) + \frac{1}{r} e^{-rT_2} (1 - e^{-rL_2}) \]
\[ = \frac{1}{r} (1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta-r)} \left[ e^{-rT_2} - e^{-\delta T_2+\delta L_1-rL_1} (\delta - r) \right] (1 - e^{-\delta L_2}) + \]
\[ \frac{1}{r} e^{-rT_2} (1 - e^{-rL_2}) \]
Solution for (10):
\[
\frac{\partial U(Y)}{\partial L_2} = \frac{1}{r}(1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)}(1 - e^{-\delta T_2 + \delta L_1 - rL_1})\left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - \frac{d}{dL_2} (e^{-rL_2})\right]
\]
\[
= \frac{1}{r}(1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)}(1 - e^{-\delta T_2 + \delta L_1 - rL_1})\left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]
\[
= \frac{1}{r}(1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)}(1 - e^{-\delta T_2 + \delta L_1 - rL_1})\left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]
\[
= \frac{1}{r}(1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} (1 - e^{-\delta T_2 + \delta L_1 - rL_1})(1 + \delta e^{-\delta L_2}) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]

Solution for (11):
\[
\frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} = \frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[\frac{d}{dT_2} (e^{-rT_2}) - e^{-\delta T_2 + \delta L_1 - rL_1}\right] + \frac{d}{dT_2} \left(e^{-\delta T_2 + \delta L_1 - rL_1}\right)\left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]
\[
= \frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[e^{-rT_2} \left(-r\right) - \delta e^{-\delta T_2 + \delta L_1 - rL_1} \frac{d}{dT_2} (-\delta T_2 + \delta L_1 - rL_1)\right] \left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]
\[
= \frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[e^{-rT_2} \left(-r\right) - \delta e^{-\delta T_2 + \delta L_1 - rL_1} \frac{d}{dT_2} (-\delta T_2 + \delta L_1 - rL_1)\right] \left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]
\[
= \frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[\delta^2 e^{-\delta T_2 + \delta L_1 - rL_1} - \delta^2 e^{-\delta T_2 + \delta L_1 - rL_1}\right] \left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]

Solution for (12):
\[
\frac{\partial^2 U(Y)}{\partial L_1 \partial T_2} = \frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[\delta^2 e^{-\delta T_2 + \delta L_1 - rL_1} - \delta^2 e^{-\delta T_2 + \delta L_1 - rL_1}\right] \left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]
\[
= \frac{1}{r}(1 + re^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[\delta^2 e^{-\delta T_2 + \delta L_1 - rL_1} - \delta^2 e^{-\delta T_2 + \delta L_1 - rL_1}\right] \left(1 - e^{-\delta L_2}\right) + \frac{1}{r} e^{-rT_2} \left[1 - e^{-rL_2}\right]
\]

Solution for (13):
\[
\frac{\partial^2 U(Y)}{dL_2 \partial T_2} = \frac{1}{r}(1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[\frac{d}{dT_2} (e^{-rT_2}) - \frac{d}{dT_2} \left(e^{-\delta T_2 + \delta L_1 - rL_1}\right)\right] \left(1 + \delta e^{-\delta L_2}\right) + \frac{1}{r} \frac{d}{dT_2} \left(e^{-rT_2}\right) \left(1 + re^{-rL_2}\right)
\]
\[
\delta L_1 - \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[ e^{-rT_2} \frac{d}{dT_2} (-rT_2) - e^{-\delta T_2 + \delta L_1 - rL_1} \frac{d}{dT_2} (-\delta T_2 + \delta T_2 + \delta L_1 - rL_1) - \frac{1}{r} e^{-rT_2} \frac{d}{dT_2} (-rT_2) (1 + re^{-rL_2}) \right] (1 + re^{-rL_2}) \\
\delta L_2 + \frac{1}{r} e^{-rT_2} (-r) (1 + re^{-rL_2}) \\
= \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left[ \delta e^{-\delta T_2 + \delta L_1 - rL_1 - rT_2} (1 + \delta e^{-\delta L_2}) - e^{-rT_2} (1 + re^{-rL_2}) \right]
\]

Solution for (14):
\[
\frac{\partial^2 U(y)}{\partial L_2 \partial T_2}_{T_2=0} = \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left( \delta e^{-\delta(0) + \delta L_1 - rL_1} - re^{-r(0)} \right) (1 + \delta e^{-\delta L_2}) - e^{-r(0)} (1 + re^{-rL_2}) \\
= \frac{1}{r} (1 - e^{-rL_1}) + \frac{\alpha}{\delta(\delta - r)} \left( \delta e^{L_1(\delta - r)} - r \right) (1 + \delta e^{-\delta L_2}) - (1 + re^{-rL_2})
\]
Contributors

Carlo Anton G. Arguelles is currently finishing his masters in economics at De La Salle University. He has research experience in the Philippine APEC Study Center Network (PASCN) exploring topics on micro small and medium enterprises (MSMEs), free trade agreements (FTAs) and the ASEAN integration. His current research interests include political economy, economics of education, migration and remittances and economic development.

Diana Margarita A. Bautista graduated Cum Laude from De La Salle University in 2015 with an undergraduate degree in Finance. Her thesis was given the Outstanding Undergraduate Thesis Award upon completion.

Christine Joy U. Cheng obtained her bachelor’s degree in applied economies from De La Salle University. Her research interest includes

Berkeley Novak T. Enriquez earned his undergraduate degree in Finance at De La Salle University, with an Honorable Mention Award. His thesis was given the Outstanding Undergraduate Thesis Award upon completion.

Antonio A. Ligon obtained his degree in Liberal Arts – Commerce; major in Economics & Accounting, from De La Salle University (DLSU). He obtained his Bachelor of Laws degree from the Ateneo de Manila University. As a lawyer, he was appointed and served as the youngest executive director of Integrated Bar of the Philippines. He participated in the Strategic Public Sector Negotiation Program of Harvard University’s John F. Kennedy School of Government. He has taught public administration at the Bulacan State University and in DLSU, as an assistant professor on commercial laws and taxation. He is currently the chairman of DLSU’s Commercial Law Department. He contributes to public service by providing free legal advice nationwide through radio over DWIZ.

Juan Paulo S. Molina graduated Cum Laude from De La Salle University with an undergraduate degree in Finance. His thesis was given the Outstanding Undergraduate Thesis Award upon completion.

Harvin John O. Sy obtained his bachelor’s degree in applied economies from De La Salle University. His research interest includes

Imee Lanie H. Uy graduated from De La Salle University with an Honorable Mention Award for her undergraduate degree in Finance. She was also a Regional Champion in the 16th Inter-Collegiate Finance Competition sponsored by the Financial Executives Institute of the Philippines and JP Morgan Chase & Co., where her team won fifth place – overall.
Luksi Visita earned her Bachelor’s degree in Financial Management from the Universitas Islam Indonesia. She is currently taking a Magister science program from the Economic and Business Faculty of Universitas Gadjah Mada, Indonesia. Her research interests include strategic management, international business, leadership, SME study, industrial organization, and business trade.
Guidelines for Contributors

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In addition to the above types of articles, *Perspectives* also welcomes critiques, short notes, or comments on previously published articles and consequently, rejoinders from the authors of these articles. Short articles which are not full-length research papers, but the content of which adds new insights into or knowledge to their respective fields will be considered. These short articles and comments shall be included under a separate section called - Research Notes.

PUBLICATION DETAILS

*Perspectives* is a bi-annual peer reviewed journal of APBERS Conferences and the Asia Pacific Business and Economics Research Society. The two issues are released every summer and winter in Japan, which coincides with, but not limited to, the APBERS Conferences.
Our double blind peer-review process is composed of faculty from Ritsumeikan Asia Pacific University, Japan, keynote speakers from the APBERS Conferences, and academic networks of the editors from scholarly journals. We do not charge for review fee, hence, the peer review process is determined based on the matching of the topic and the expertise of the reviewer.

The journal comes with the one time annual membership of presenting authors in the APBERS Conferences. Annual membership to the Asia Pacific Business & Economics Research Society is USD70. For non-members, a printed copy may be requested for USD30 per issue inclusive of standard mailing costs.

REVIEW PROCESS

Papers may be published two ways: (1) presentation at APBERS Conferences; (2) and via direct submission to APBERS.

Presented papers at the APBERS Conferences are evaluated by the review panel composed of the conference chairs, keynote speakers, and APBERS board members. Outstanding papers are invited for submission to the peer review process.

Papers are then reviewed by an Advisory Editorial Board and invited experts in the fields of business and economics. A ten-point grading scale is used. Papers with more than 90 percent score are considering a clean acceptance and the authors may or may not considering the comments of the reviewers. Papers with 80 to 89 percent are considered minor acceptance with required revisions from the reviewers. Papers with 70 to 79 percent score are considered accepted with required major revisions. Papers scoring below 70 are returned to the authors with constructive comments. Each author of a paper not accepted is given a written notice of the action taken on his/her paper.

From the pool of articles reviewed, six or more papers are reviewed again by the Editor-in-Chief and the Managing Editor. If more revisions are required, the papers are sent back to the authors for revision and re-submission. The Editorial Board of the APBEP reserves the right to keep copies of all papers submitted.

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Manuscripts submitted must not have been published or accepted for publication elsewhere. Authors may e-mail their submissions to the Editor at johnpaolorivera@apbersociety.org and perspectives@apbersociety.org.

STYLE GUIDELINES

A manuscript should be written in APA style. It should be typed single spaced, on B5 paper (17.6-cm. x 25.01-cm.), with a margin of 2.54-cm. on top and bottom and 3.17-cm. on the left and right. It should not exceed 20 pages, inclusive of text, tables, figures, references, and appendices. The manuscript should be typed with
Calibri 10 pt. font. The right-hand margin should have justified alignment. Equations must be numbered. Footnotes should not be used for reference purposes and should be avoided when possible. All references and/or content notes must be placed at the end of the text. A detailed set of style guidelines will be sent to the author once a manuscript is accepted for publication.

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The mandatory word processor for the final version is Microsoft Word. The author should also submit a short profile for inclusion in the section - The Contributors. It should include the complete name of the author, academic and/or professional affiliations, educational background, e-mail address and research themes.

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For correspondence, contact:

THE EDITOR
Asia Pacific Business & Economics Perspectives
Ritsumeikan Asia Pacific University
Faculty Offices, B425
1-1 Jumonjibaru, Beppu, Oita, 8748577, Japan
Telephone No. +81977 78 1074
perspectives@apbersociety.org