UNIVERSITI PUTRA MALAYSIA

EXCHANGE RATE DYNAMICS AND ASSET PRICE FORMATION

ALIREZA ZAREI

FEP 2015 8

EXCHANGE RATE DYNAMICS AND ASSET PRICE FORMATION

By

ALIREZA ZAREI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in fulfilment of the Requirements for the Degree of Doctor of Philosophy

November 2015

This Thesis is dedicated

To

my parents, Hossein and Iran Zarei without whom none of my success would be possible

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the Requirements for the Degree of Doctor of Philosophy

EXCHANGE RATE DYNAMICS AND ASSET PRICE FORMATION

By

ALIREZA ZAREI

November 2015

Chairman : Professor Mohamed Ariff, PhD
Faculty : Economics and Management

Numerous studies on, (i) exchange rate behaviour, and (ii) exchange rate effect on stock prices have led to clear disagreement neither on how exchange rate is determined nor on how exchange rate affects stock prices. Purchasing power parity and interest rate parity theorems offered by monetarist suggest significant influences from inflation and interest rates on exchange rates. The first focus of this study is to investigate how these two factors affect exchange rates by introducing control factors, as suggested in recent studies. Second, empirical support for a significant exchange rate effect on stock returns is also not found, so the next proposition is worth investigating a theory-suggested effect on stock returns from exchange rates. In either case, it is pointed out that the use of more powerful econometric methods is the correct way forward to provide results on these two interesting research problems to explore support for evidence on these propositions. Therefore, this research aims to revisit these two topics using newer methodology and a long-length time series data (over 55 years) from eight major countries.

Consensus in the literature is that the two parity theorems are considered puzzles to be resolved by leading researchers. Two eminent scholars have dubbed the lack of support for theories as a "puzzle" as would be detailed in the thesis. Methodological advancements since the early days of research on this topic have shown the following: (i) time series and cross sectional regressions so well entrenched in this line of research actually lead to biased parameter estimation; (ii) panel regression, which is now popular though seldom used by researchers on this topic, is more appropriate and this method has hardly been used; (iii) multi-country panel regressions have been shown to have errors in parameter estimation because of presence of cross sectional dependence, nonstationarity and due to the absence of control on heterogeneity of panel members. Thus, findings in existing literature are likely to change if newer unbiased tests are applied to this research. A number of critical tests (common and mean group estimator, etc.) are conducted so that the panel regression leads to robust measurements. Furthermore, a test on the exchange rate behaviour is conducted for each country to determine the number of structural breaks within the sampled period. Finally, an analysis of cointegration for parity and non-parity variables in the presence of cross-sectional dependence is provided, which is a recently developed advanced procedure.

The findings from applying newer methodology are in support of parity and non-parity factors as significant exchange rate relevant factors. Further, it is founded that exchange

rate is a significant factor for stock index returns in addition to the relevance of other theory-suggested factors. The final estimators from advanced models applied in this study yield significant test statistics verifying the theory-suggested relationship especially when control factors are included along with corrections for unobserved heterogeneity, serial correlations, nonstationarity and cross sectional dependence (all of which are part of new developments in econometric). It is believed that the efficiency of econometric modelling methodology applied in this research has assisted in providing robust estimation of parameters. This thesis is expected to add useful findings relevant to the monetary economics literature.

Abstrak tesis yang dikemukakan kepada Senate Universiti Putra Malayasia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

DINAMIK KADAR PERTUKARAN DAN PEMBENTUKAN HARGA ASET

Oleh

ALIREZA ZAREI

November 2015

Pengerusi : Profesor Mohamed Ariff, PhD
Fakulti : Ekonomi dan Pengurusan

Kajian lepas ke atas terhadap (i) perilaku kadar pertukaran, dan (ii) kesan kadar pertukaran kepada harga saham telah menampilkan ketidaksepakatan yang jelas bagaimana kadar pertukaran ditentukan dan bagaimana kadar pertukaran memberi kesan kepada harga saham. Teori pariti kuasa beli dan kadar faedah yang dikemukakan oleh pakar monetaris mencadangkan pengaruh yang signifikan daripada inflasi dan kadar faedah ke atas kadar pertukaran. Fokus pertama kajian ini adalah untuk menyiasat bagaimana kedua-dua faktor yang mempengaruhi kadar pertukaran dengan memperkenalkan faktor kawalan buat kali pertama, seperti yang dicadangkan dalam kajian terbaru. Kedua, sokongan empirikal untuk menguji kesan kadar pertukaran yang signifikan ke atas pulangan saham juga tidak dijumpai, jadi usul seterusnya adalah berbaloi untuk menyiasat kesan daripada teori yang dicadangkan ke atas pulangan saham daripada kadar pertukaran. Dalam kedua-dua situasi, ia menunjukkan bahawa penggunaan kaedah ekonometrik yang lebih berkuasa adalah cara yang lebih tepat untuk mendapatkan hasil bagi kedua-dua masalah penyelidikan yang menarik untuk mendapatkan sokongan sebagai bukti keterangan usul ini. Oleh itu, kajian ini bertujuan untuk mengkaji semula kedua-dua topik menggunakan metodologi baru dan data bersiri yang panjang (data bulanan untuk lebih dari 55 tahun) dari lapan buah negara utama.

Sepersetujuan dalam sorotan kajian meyatakan kedua-dua teorem pariti tersebut adalah dianggap teka-teki yang perlu diselesaikan oleh penyelidik-penyelidik terkemuka. Dua sarjana yang terbilang telah menyatakan kekurangan sokongan untuk teori sebagai "teka-teki" yang akan diperincikan di dalam tesis. Kemajuan metodologi sejak zaman awal kajian berkenaan topik ini telah menunjukkan perkara-perkara yang berikut: i) Regresi siri masa dan keratan lintang telah berakar umbi dalam kajian ini hingga membawa kepada penganggaran parameter yang berat sebelah; ii) regresi panel, yang kini popular walaupun jarang digunakan oleh penyelidik dalam kajian berkenaan topik ini, adalah lebih sesuai dan kaedah ini hampir tidak digunakan; iii) panel regresi berbilang negara telah menunjukkan kesilapan dalam penganggaran parameter kerana kehadiran sandaran keratan lintang, ketidakpegunan, dan ketiadaan kawalan ke atas keheterogenan unit-unit panel. Oleh itu, hasil kajian dalam sorotan kajian yang sedia ada boleh berubah jika ujian baharu yang tidak berat sebelah digunakan untuk kajian ini. Beberapa ujian kritikal (penganggar biasa dan purata kumpulan, dll.) dijalankan supaya regresi panel menghasilkan anggaran yang mantap. Tambahan pula, satu ujian ke atas perilaku kadar pertukaran dijalankan untuk setiap negara untuk menentukan bilangan pecahan struktur

dalam tempoh sampel. Akhir sekali, analisis bersepadu untuk pembolehubah pariti dan bukan pariti bersama sandaran keratan lintang disediakan, yang merupakan satu prosedur maju yang baru dibangunkan.

Penemuan dalam mengaplikasi metodologi yang lebih baru adalah menyokong faktor-faktor pariti dan bukan pariti sebagai faktor kadar pertukaran signifikan yang relevan. Selain itu, telah ditemukan bahawa kadar pertukaran adalah faktor penting bagi pulangan indeks saham tambahan daripada faktor-faktor relevan yang telah dicadangkan oleh teori. Penganggar akhir daripada model yang maju digunakan dalam kajian ini menghasilkan ujian statistik yang signifikan telah mengesahkan teori hubungan yang dicadangkan, terutamanya apabila faktor-faktor kawalan disertakan bersama-sama dengan pembetulan bagi keheterogenan yang tidak diperhatikan, korelasi bersiri, ketidakpegunan dan sandaran keratan lintang (semua ini adalah sebahagian daripada perkembangan baru dalam ekonometrik). Adalal dipercayai bahawa kecekapan kaedah pemodelan ekonometrik yang digunakan dalam kajian ini telah membantu dalam menyediakan anggaran parameter yang mantap. Tesis ini dijangka dapat menambahkan penemuan berguna yang berkaitan dengan kepustakaan dalam hidang ekonomi kewangan.

ACKNOWLEDGEMENTS

I would like to express my gratitude and appreciation to all those who helped me accomplish this study. I am deeply indebted to my supervisory committee, Professor Dr. Mohamed Ariff, Professor Dr. Annuar Md. Nasir, and Assoc. Professor Dr. Law Siong Hook, all of whose help, stimulating suggestions and encouragement led to completion of this thesis.

I would also like to acknowledge my family who provided me constant encouragement and continued support for this achievement.

I certify that a Thesis Examination Committee has met on 30 November 2015 to conduct the final examination of Alireza Zarei on his thesis entitled "Exchange Rate Dynamics and Asset Price Formation" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

Junaina binti Muhammad, PhD
Senior Lecturer
Faculty of Economics and Management
Universiti Putra Malaysia
(Chairman)

Cheng Fan Fah, PhD
Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Internal Examiner)

Catherine Soke Fun Ho, PhD
Professor
Universiti Teknologi MARA
Malaysia
(External Examiner)

Dev Prasad, PhD
Professor
University of Massachusetts Lowell
United States
(External Examiner)

ZULKARNAIN ZAINAL, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 15 December 2015

This thesis was submitted to the senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy.

The members of the Supervisory Committee were as follows:

Mohamed Ariff, PhD
Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Chairperson)

Annuar Md Nassir, PhD
Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

Law Siong Hook, PhD
Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

BUJANG BIN KIM HUAT, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malayasia

Date:

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustration and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any other institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and Innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software.

Signature: _____ Date: _____

Name and Matric No.: Alireza Zarei, GS34767

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writhing of thesis was under the supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____
Name of
Chairman of
Supervisory
Committee: Mohamed Ariff, PhD

Signature: _____
Name of
Member of
Supervisory
Committee: Annuar Md Nassir, PhD

Signature: _____
Name of
Member of
Supervisory
Committee: Law Siong Hook, PhD

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

GENERAL INTRODUCTION

What determines exchange rate has long been considered a current and significant research topic despite extensive literature. After the breakdown of Bretton Woods Agreement (BWA) in 1973, exchange rate volatility has increased markedly, adding a practical reason for doing continued research on this topic. The aim of this study is to apply a relatively new and advanced methodology to find out key factors associated with exchange rate changes following the demise of BWA. In what follows in the remainder of this chapter, an overall discussion is provided on exchange rate determination and stock pricing in order to identify the research problem of the thesis.

1.1 Background

The BWA broke down in 1971 when the United States of America (U.S.) was of the view that continued use of BWA would deplete its gold stock. The first research problem therefore is to obtain statistical evidence of a structural breakdown in currency regimes, which has yet been done. BWA was negotiated by the Allied countries towards the end of World War II, in order to reintroduce the Gold Standard, which had been abandoned by the United Kingdom in 1933. The assumption was a fixed exchange rate regime would foster post-war trade and correct the defects of the pre-1933 Gold standard. The new agreement took effect in 1944. It aimed (i) to avoid competitive devaluations, (ii) restrictive trade policies (iii) to facilitate countries to a novel gold standard system based on multi-country fixed exchange rate system with three currencies, later expanded to five.

The 44 signatory nations agreed to introduce and maintain a new form of fixed exchange rates among three key currencies then (British Pound, US dollar and French Franc), all of which were fixed against the US dollar. The US dollar itself was convertible at a fixed rate of $35 per ounce of Gold. The signatories, who then became the founding members of the International Monetary Fund (IMF), were to make their national currencies convertible for current account purposes. Thus, BWA was aimed at reducing currency volatility so that international trade could be conducted with lowered currency risk.

Free flotation of major currencies against the U.S. Dollar without a gold backing was initially deemed a temporary reform against speculation in the international capital markets. “But the interim arrangements adopted in March 1973 turned out to be a permanent and [it] marked the end of fixed exchange rates and the beginning of turbulent new period in international monetary relations” (Grilli and Kaminsky, 1991).

1.2 Statement of Research Problem

The above discussion points out a number of issues that are yet to be addressed on exchange rate dynamics since exchange rate plays important role in the context of international economics and finance. In particular, this study aims first to investigate the *worldwide currency regime breakdown* by identifying statistical support on how currencies behaved before, and after the breakdown of BWA. This work has not been

done, which alone could provide a compelling rationale for studying a gap in the literature. Second, using relatively new and advanced methodology, investigate how inflation factor affect currency before and after the breakdown of BWA. The evidence to-date linking inflation to currency changes is still debatable because most studies provide weak evidence on this theorem, if any. Third, this study aims to investigate the effect of relative interest rate differentials on exchange rates using advanced methodology, in line with the tests on inflation effect.

A recent paper by Ho and Ariff (2015) identifies more factors than inflation-cum-interest rates as being relevant to exchange rate changes (others suggest few more non-parity factors). A fourth proposition therefore is to investigate the impact of the so-called *non-parities* on exchange rates. Fifth, theories in financial economics suggest a link between exchange rate and asset prices (Solnik, 1974). Findings reported in studies to-date, mostly using cross sectional tests, have not led to supporting the theory. Using newer methodology namely panel time-series common and mean group estimators (De Hoyos and Sarafidis, 2006; Mark and Sul, 2003; Pesaran and Smith, 1995) and unit-root and cointegration analyses in the presence of cross-sectional dependence (Gengenbach *et al.*, 2006; Maddala and Wu, 1999; Pesaran, 2007; Westerlund, 2007) is expected to reveal robust enough results to link exchange rate to asset pricing theory as well as to address this practical question of exchange rate effect on the huge asset pricing markets across the world (share markets alone are valued at about US$ 29.7 Trillion, in the first half of 2014).

Concerning the two different nominal exchange rate regimes of fixed and floating, there is evidence of substantial systematic differences in the behaviour of real exchange rates under the two systems. The real exchange rates typically show greater short-term variability under the flexible than under the fixed exchange rate system, which is partly due to relatively different adjustments of national price levels as well as international monetary shocks in terms of world inflations, fall of governments, oil crises, recessions, and changes in exchange control, etc.

Following large variations in several exchange rates under the free-floating system, a large number of theoretical and empirical studies resorted to verify how exchange rate is determined (Branson, 1980; Cuddington, 1983; Dornbusch, 1976; Ho and Ariff, 2015; Obstfeld and Stockman, 1985). While the traditional explanation for the exchange rate is based on trade balance terminology in the pre-floating era, from the onset of breakdown of BWA, the exchange rates are mostly determined in a similar fashion with asset market prices also being influenced by exchange rate changes, at least as per theory, though evidence on the latter is still skimpy. More pertinently, the question has to be addressed from monetary economics perspective using the whole economy even for studying the exchange rate effect on stock prices.

Theories on exchange rate determination has to turn to monetary, the currency substitution, and portfolio balance models. The distinction between these modelling approaches is in conjunction with the number of assets and their level of substitutability between domestic and foreign trading nations. Under the monetary approach (Cassel, 1918; Fisher, 1930), the purchasing power parity and interest rate parity theorems play crucial roles in explaining how foreign exchange rates are determined, while the currency substitution models are concerned with the relative exchange rate variations in accordance with the shift in public and private investment portfolio flows across nations. Accordingly, the portfolio balance approach assumes that foreign and domestic bonds

are not perfect substitutes for each other (De Jong, 1991). The focus of this study is more towards the monetary than currency substitution and portfolio balance approach as applied in some studies of exchange rate determination because this approach has been largely neglected especially in studying the non-parities and stock prices.

The literature on the determination of exchange rate is mostly on parity theorems as this approach has had a long history, though with mixed findings from using both time series and/or cross-sectional regressions (panel regression was a recent development). Further, the research literature attempted to show the impact of exchange rate on asset prices since the rise of finance as a separate discipline was firmly established by the 1970s: those studies use mostly similar cross-sectional and sometimes time series regressions. There is, again, no unanimous agreement that there is an exchange rate impact on asset prices because tests of asset pricing theories (see chapter 2 for a listing of theories) for an exchange rate effect have produced such mixed or at best weak results.

Despite numerous studies on exchange rate determinants and the exchange rate effect on asset prices, there is no consensus on which key factors affect exchange rate, nor on how the exchange rate affects asset price. These twin research problems – *exchange rate determination* and *exchange rate impact on asset prices* – deserve to be studied again using newer methodology to see if the theory-suggested factors and their effects are identifiable via newer econometric methods. Another reason for studying these research issues is to see how exchange rates behave under the flexible exchange rate system (as well as under other forms of exchange regimes) in place since 1973 after the breakdown of BWA. Researchers have often suggested an increased volatility of exchange rates under the flexible system, which is a policy-relevant research area on exchange rates (Levich and Amihud, 1994).

Thus, this study aims to find new evidence on (i) time-series behaviour of exchange rates over the sampled period, (ii) what factors affect exchange rates and (iii) whether the exchange rate effect on asset prices are identifiable using more advanced methods to be discussed later in this study. (iv) Development of newer research approaches for resolving erstwhile doubtful results on exchange rate is worthy, in our view, of another research effort.

1.3 Research Objectives

Consistent with the explanations provided in the previous section, a general objective for this study is:

To determine time-series behaviour of exchange rates, identify dynamics of exchange rate and investigate the macroeconomic fundamentals of stock index returns. The sub-objectives of this study are:

1. To identify structural breaks or instabilities in behaviour of nominal exchange rates over the 55-year test period.
2. To determine the association between inflation rates and nominal exchange rates during the Bretton Woods and free-floating exchange rate regimes.
3. To examine the association between interest rates and nominal exchange rates during the Bretton Woods and the floating exchange rate regimes.

4. To investigate the association between recently identified non-parity factors and nominal exchange rates during the Bretton Woods and the floating exchange rate regimes.
5. To identify relative changes in behaviour of stock index returns in response to the exchange rate changes using a strictly monetary-based model.

1.4 Research Questions

In accordance with the research objectives discussed above, the following research questions can be drawn:

1. What are the structural breaks or instabilities in the behaviour of nominal exchange rates over the entire sampled period?
2. Consistent with the theory of Purchasing Power Parity, how and to what extent does the inflation rate correlate with exchange rates before and after the breakdown of BWA?
3. Consistent with the theory of International Fisher Effect, how and to what extent does the interest rate correlate with exchange rates before and after the breakdown of BWA?
4. What is the role of non-parity variables in determination of nominal exchange rates?
5. How and to what extent does the exchange rate impacts stock index returns within a monetary-based approach?

We will operationalize and test these questions using newer methods, which will be discussed in Chapter 3 of this thesis.

1.5 Significant Research Contributions

This study aims to obtain significant contributions in empirical literature concerning the determination of exchange rates and the impact of exchange rates on asset prices. Major contributions of this study can be classified into two broad categories: one, which deals with variable specification, model building and empirical innovations, and the other, which deals with technical and methodological advancements. The aforementioned objectives trigger significant unique contributions falling under one of the two categories. In what follows, we review the contributions concerning the proposed objectives of this study.

1.5.1 Structural Breaks and Exchange Rate Behaviour

In assessing the behaviour of exchange rate over the entire test period, this study applies a test of exchange rate instability and multiple structural breakpoint as developed in Bai and Perron (2003), not yet applied in any exchange rate research to-date. The proposed test allows for multiple unknown breakpoints, a process that is suitable for long time series we use with many likely breaks. The issues concerning the structure and distribution of errors as well as the number of breaks are addressed in their method to provide a general framework that captures different levels of serial correlation in the errors and different distributions of the data. Of advantages arising from this methodology, it can be noted that events that may foster any structural change can be identified accurately. The contribution brought forward by the first sub-objective of this study thus falls within the category of technical and methodological advancements.

1.5.2 Parity and Non-parity Dynamics of Exchange Rate

As noted in the previous sections, this study aims to investigate two major theories on exchange rate determination: Cassel (1918) for PPP and Fisher (1930) for IFE. Despite the fact that these theories have been applied in most studies as well as in practical policy decisions in a variety of contexts, there is still no unanimity of findings on the theory-predicted results. Bahmani-Oskooee *et al.* (2009) call the lack of support for price parity as an unsolved "puzzle". Likewise, Fama (1984) dubbed the lack of evidence for interest rate effect on exchange rate (Uncovered Interest Parity) as a "UIP puzzle". This study proposes a framework to investigate the two parity theorems in solving the puzzles while controlling for a number of already-known non-parity factors identified from the existing literature on exchange rate determination. In other words, we add the recently theorized and tested non-parity factors to the traditional factors of parity conditions. Hence, given the use of new econometric methodologies, the contributions brought forward by the second, third and fourth sub-objectives of this study fall within both categories of empirical modelling innovations and methodological advancements.

1.5.3 Exchange Rate Impact on Stock Prices

Consistent with the sub-objective five, this study investigates the relationship between exchange rate and stock prices. We use the stock indices as proxies for stock prices because monetary modelling requires across-economy variables. Prior exchange rate impact studies have seldom explored stock index returns, which ought to be truly a measure of an economy-wide impact arising from changes in currency exchange rates perpetrating an economy-wide stock index effect. The asset pricing literature reveals that almost all stock pricing studies to-date, which use one or more of the several powerful asset pricing models, have focused on firm-specific factors aimed mostly as valuation of securities at the individual stock level. Unlike the literature, we develop an economy-wide model using strictly monetary and economic variables to restrict the factors specified in the model to aim at theory-relevant broader economy-wide factors. The model building is in line with prediction of Solnik's (1974) International Capital Asset Pricing Model (ICAPM) and also what Chen *et al.* (1986) applied at the macro level in their study.

Research interest on ICAPM's prediction of an exchange rate effect on individual stock prices has declined for some time now following lack of interest in exploring individual stock price reaction to exchange rate changes. The main reason for lack of interest is the knowledge that most studies failed to find a significant exchange rate effect on individual stock price returns. Our motivation to engage in this research from a macro perspective arose from the availability of new and more powerful econometric approaches that are known to overcome some of the major measurement issues in prior studies as well as the interest of the current researchers to measure economy-wide impact by using newer methodology to produce unbiased estimators by building test models strictly within a monetary economics framework: in fact we are in line with the long-ignored classic paper by King (1965). Monetary economics provide powerful variables – inflation, interest rate, exchange rate, and income growth – along with the exchange rate as an economy-wide influence on stock pricing (Solnik, op cit. although his ICAPM was developed for valuing individual assets). We apply new econometric approach to this model in accordance with the test on parity and non-parity factors.

1.6 Significance of Study

Given the fluctuating behaviour of exchange rates, investigation of structural breaks in financial time series can be useful in a number of ways, if verified. One good example is investigating the impact of news and exogenous economic events on the behaviour of exchange rates (Franses, 1998). Likewise, the import, export and trade segments of the market are greatly susceptible to the exchange rate changes in both direct and indirect ways, as far as the operating profit and losses are concerned (Gujarati, 2012).

Based on the theoretical point of view, it can be mentioned that the revival of interest in the theories of exchange rate determination such as in the Purchasing Power Parity (PPP) and the International Fisher Effect (IFE) are in conjunction with a number of factors. Considering the PPP theory, one of the most important factors to be considered is related to the advent of flexible exchange regimes, which triggered substantial fluctuations in the exchange rates, thus affecting policy decisions, corporate planning and engendered speculative activities. Particular misalignments in behaviour of major trading currencies from what is actually believed to be the equilibrium level can be measured with the use of PPP deviations. Assuming that PPP holds, the exchange rate is also a long run equilibrium rate. The PPP also serves as a standard monetary model as an approach advocated by some economists (e.g. (McKinnon and Ohno, 1989)).

The second important point can be attributed to the developments of macroeconomics of the open economy framework. In particular, the PPP theory is considered as a crucial component of balance of payment (BOP) models, which exerts critical influence in the international finance decisions and on investment decision, capital flows and efficiency of markets. In addition, the PPP theory is assumed as a relevant variable in the flexible monetary model of Frenkel (1976), Mussa (1976) and (Bilson, 1978a), while many studies (e.g. (Dornbusch, 1976) have assumed it holds as a long run equilibrium variable. The third factor of interest on PPP is about the cointegration analysis, which has been developing over time, and is useful to provide a statistical representation of relationships, which are of long run in nature.

The concept of International Fisher Effect has also been intensively researched in the context of international finance. Yet the evidence of a significant IFE is mixed or at best moderate. One of the reasons for interest on such an area of work is still related to the floating exchange rate system as in the 1970s coupled with the capital markets' deregulation in the 1980s, resulting in high degree of integration between exchange markets and capital markets across all the countries. The IFE theory can be used as a test for measuring the degree of integration between markets. Second, the linkages between the interest rates of countries can be investigated using the IFE theory. Third, the degree of market efficiency can be addressed based on a notion that forward exchange rate can be used as a benchmark for an unbiased prediction of expected spot exchange rate. The fourth reason is associated with the cointegration analysis as used for testing the international parity conditions, one of which is the IFE condition. The last reason is that IFE can be used as a factor in exchange rate modelling and determination, given the fact that it has been applied as an underlying condition for the sticky price model (Dornbusch, 1976).

At the firm level, exchange rate plays a very critical role in determining the performance of companies especially if the firms carry out large business transactions in other currencies. Any major imbalance or fluctuation in the exchange rate will pose significant

positive or negative impacts on the firms' financial assets and liabilities, which must consolidate in local currency as per accounting and tax laws. Accordingly, the exchange rate risk is the degree of uncertainty relative to changes in foreign currencies or stock prices. If there is an absolute awareness, ahead of time, from the investor's perspective, of the amount that a foreign stock would sell at some specific dates in future or similarly the future exchange rate between the home and foreign currency, there is no foreign exchange risk at all. However, such a situation is impossible, as there are always variations in the purchasing power of a particular currency in relation to its real value, which are unforeseeable.

For this reason, millions of individuals, corporations and financial institutions are involved in investment and trading related activities using foreign exchange in order to take advantage of the discrepancies in the value of exchange rates across different regions and countries. According to the survey of Triennial Central Bank, the amount of daily transactions and trading as of April 2013 reached an average of $5.3 trillion. Thus, it can be noted that exchange rate behaviour plays a significant role in the trading activities, profit and losses of a large population of people throughout the world.

1.7 Organization of Study

The main objective of this study is to evaluate the behaviour of exchange rate and its correlations with a number of parity and non-parity factors in addition to extending the study to include the effect of exchange rate on asset prices. The study covers a period starting from 1960 to 2014, to include the three general exchange rate regimes. This study aims to introduce a newer and advanced methodology to investigate the exchange rate behaviour. Furthermore, a single equation would be applied for the asset pricing determination based on the exchange rate behaviour. To be consistent with the assumption of the models, certain preliminary tests will be carried out as cointegration and structural break test for the identification of the exchange rate behaviour during the whole period of the study. Chapter 2 of this study is a review of parity theories; specifically we use the PPP theory, the IFE theory and the asset pricing theories in order to address the existing gaps in the literature for such theories, with further details than provided in this chapter.

REFERENCES

Adler, M., and Dumas, B. (1977). The Microeconomics of the Firm in an Open Economy. *The American Economic Review, 67*(1), 180-189.

Adler, M., and Dumas, B. (1984). Exposure to currency risk: definition and measurement. *Financial management, 13*, 41-50.

Agmon, T., and Bronfeld, S. (1975). The International Mobility of Short-term Covered Arbitrage Capital. *Journal of Business Finance & Accounting, 2*(2), 269-278.

Akay, G. H., and Cifter, A. (2014). Exchange rate exposure at the firm and industry levels: Evidence from Turkey. *Economic Modelling, 43*, 426-434.

Akram, Q. F., Rime, D., and Sarno, L. (2008). Arbitrage in the foreign exchange market: Turning on the microscope. *Journal of International Economics, 76*(2), 237-253.

Aleati, A., Gottardo, P., and Murgia, M. (2000). The pricing of Italian equity returns. *Economic Notes, 29*(2), 153-177.

Alexius, A. (2001). Uncovered Interest Parity Revisited. *Review of International Economics, 9*(3), 505-517.

Aliber, R. Z. (1973). The Interest Rate Parity Theorem: A Reinterpretation. *Journal of Political Economy, 81*(6), 1451-1459.

Anderson, T. W., and Hsiao, C. (1981). Estimation of dynamic models with error components. *Journal of the American statistical Association, 76*(375), 598-606.

Andersson, J., and Lyhagen, J. (1999). A long memory panel unit root test: PPP revisited. *Stockholm School of Economics Working Paper, 303*.

Andrew, A. P. (1904). The end of the Mexican dollar. *The Quarterly Journal of Economics, 18*(3), 321-356.

Andrews, D. W. (1993). Tests for parameter instability and structural change with unknown change point. *Econometrica: Journal of the Econometric Society, 59*, 817-858.

Andrews, D. W., and Ploberger, W. (1994). Optimal tests when a nuisance parameter is present only under the alternative. *Econometrica: Journal of the Econometric Society, 62*, 1383-1414.

Arellano, M., and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies, 58*(2), 277-297.

Arghyrou, M. G., Gregoriou, A., and Kontonikas, A. (2009). Do real interest rates converge? Evidence from the European union. *Journal of International Financial Markets, Institutions and Money, 19*(3), 447-460.

Arias, G. (2001). *Deviations from Uncovered Interest Parity, lessons to be drawn from currency crises models*: CEFI Working Paper

Ariff, M., Chung, T.-f., and Shamsher, M. (2012). Money supply, interest rate, liquidity and share prices: A test of their linkage using panel data of G-7 countries. *Global Finance Journal, 23*(3), 202-220.

Ariff, M., and Marisetty, V. B. (2012). Panel data approach to identify factors correlated with equity market risk premiums in developed and emerging markets. *Quantitative Finance, 12*(1), 107-118.

Backus, D. K., Gregory, A. W., and Telmer, C. I. (1993). Accounting for forward rates in markets for foreign-currency. *Journal of Finance, 48*(5), 1887-1908.

Badarudin, Z., Ariff, M., and Khalid, A. (2011). Money supply endogeneity and bank stock returns. *Applied financial economics, 21*(14), 1035-1048.

Bahmani-Oskooee, M., Kutan, A. M., and Zhou, S. (2009). Towards solving the PPP puzzle: evidence from 113 countries. *Applied Economics, 41*(24), 3057-3066.

Bai, J. (1997). Estimating multiple breaks one at a time. *Econometric Theory, 13*(03), 315-352.

Bai, J., and Ng, S. (2004). A PANIC attack on unit roots and cointegration. *Econometrica, 72*(4), 1127-1177.

Bai, J., and Perron, P. (1998). Estimating and testing linear models with multiple structural changes. *Econometrica, 66*, 47-78.

Bai, J., and Perron, P. (2003). Computation and analysis of multiple structural change models. *Journal of applied econometrics, 18*(1), 1-22.

Balabkins, N. (1964). *Germany under direct controls: economic aspects of industrial disarmament, 1945-1948*: New Brunswick, NJ.

Baltagi, B. H. (2014). *The Oxford handbook of panel data*. New York: Oxford University Press.

Banerjee, A., and Carrion-i-Silvestre, J. L. (2011). *Testing for panel cointegration using common correlated effects estimators.* Paper presented at the 14th Applied Economics Meeting, Huelva, June.

Banerjee, A., and Carrion-i-Silvestre, J. L. (2015). Cointegration in Panel Data with Structural Breaks and Cross-Section Dependence. *Journal of Applied Econometrics, 30*(1), 1-23.

Banz, R. W. (1981). The relationship between return and market value of common stocks. *Journal of Financial Economics, 9*(1), 3-18.

Bartov, E., and Bodnar, G. M. (1994). Firm valuation, earnings expectations, and the exchange-rate exposure effect. *The Journal of Finance, 49*(5), 1755-1785.

Bartov, E., Bodnar, G. M., and Kaul, A. (1996). Exchange rate variability and the riskiness of US multinational firms: evidence from the breakdown of the Bretton Woods system. *Journal of Financial Economics, 42*(1), 105-132.

Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The Journal of Finance, 32*(3), 663-682.

Baxter, M. (1994). Real exchange rates and real interest differentials: Have we missed the business-cycle relationship? *Journal of Monetary Economics, 33*(1), 5-37.

Bhandari, L. C. (1988). Debt/equity ratio and expected common stock returns: Empirical evidence. *The Journal of Finance, 43*(2), 507-528.

Bilson, J. F. (1978a). The monetary approach to the exchange rate: some empirical evidence. *IMF Staff Papers, 25*(1), 48-75.

Bilson, J. F. (1978b). Rational expectations and the exchange rate. In J. A. Frenkel and H. G. Johnson (Eds.), *The economics of exchange rates* (pp. 75-96). Addison Wesley, Reading, Mass.

Black, F. (1972). Capital market equilibrium with restricted borrowing. *The Journal of Business, 45*(3), 444-455.

Blenman, L. P. (1991). A Model of Covered Interest Arbitrage under Market Segmentation. *Journal of Money, Credit and Banking, 23*(4), 706-717.

Blume, M. E. (1970). Portfolio theory: a step toward its practical application. *The Journal of Business, 43*(2), 152-173.

Blume, M. E., and Friend, I. (1973). A new look at the capital asset pricing model. *The Journal of Finance, 28*(1), 19-34.

Blundell, R., and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics, 87*(1), 115-143.

Bodnar, G. M., and Gentry, W. M. (1993). Exchange rate exposure and industry characteristics: evidence from Canada, Japan, and the USA. *Journal of International Money and Finance, 12*(1), 29-45.

Branson, W. H. (1980). *Asset markets and relative prices in exchange rate determination*: International Finance Section, Department of Economics, Princeton University.

Breitung, J., and Meyer, W. (1991). *Testing for unit roots in panel data: are wages on different bargaining levels cointegrated? Institut fur Quantitative Wirtschaftsforschung*: Working paper

Breitung, J., and Pesaran, M. H. (2008). *Unit roots and cointegration in panels*: Springer.

Breusch, T. S., and Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies, 47*, 239-253.

Bruun, P. (2002). *Coins and history*

Burk, K. (1992). *Good-bye, Great Britain: The 1976 IMF Crisis*: Yale University Press.

Buyst, E., Maes, I., and Pluym, W. (2005). *The Bank, the franc and the euro. A History of the National Bank of Belgium*: Lannoo.

Calvo, G. A., Izquierdo, A., and Talvi, E. (2003). *Sudden stops, the real exchange rate, and fiscal sustainability: Argentina's lessons*: National Bureau of Economic Research

Calvo, G. A., and Reinhart, C. M. (2002). Fear of Floating. *The Quarterly Journal of Economics, 117*(2), 379-408.

Canarella, G., Miller, S. M., and Pollard, S. K. (2014). Purchasing Power Parity Between the UK and Germany: The Euro Era. *Open Economies Review, 25*(4), 677-699.

Caporale, G. M., Kalyvitis, S., and Pittis, N. (2001). Testing for PPP and UIP in an FIML framework: Some evidence for Germany and Japan. *Journal of Policy Modeling, 23*(6), 637-650.

Cappiello, L., and Fearnley, T. A. (2000). *International capm with regime switching garch parameters*: International Center for Financial Asset Management and Engineering

Cassel, G. (1918). Abnormal deviations in international exchanges. *The Economic Journal, 28*(112), 413-415.

Chamberlain, G. (1984). Panel data. In Griliches and M. D. Intriligator (Eds.), *Handbook of econometrics* (Vol. 2, pp. 1247-1318).

Chang, Y. (2002). Nonlinear IV unit root tests in panels with cross-sectional dependency. *Journal of econometrics, 110*(2), 261-292.

Chen, N.-F., Roll, R., and Ross, S. A. (1986). Economic forces and the stock market. *Journal of business, 59*, 383-403.

Cheng, B. S. (1999). Beyond the purchasing power parity: testing for cointegration and causality between exchange rates, prices, and interest rates. *Journal of International Money and Finance, 18*(6), 911-924.

Chinn, M. D., and Meredith, G. (2004). Monetary policy and long-horizon uncovered interest parity. *Imf Staff Papers, 51*(3), 409-430.

Chow, G. C. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica: Journal of the Econometric Society, 28*, 591-605.

Clark, G. (2013). What Were the British Earnings and Prices Then?(New Series). *Measuring Worth, Internet resource* http://www.measuringworth.com/ukearncpi

Coughlin, C. C., and Koedijk, K. (1990). *What do we know about the long-run real exchange rate?* n. w. p. series.

Cowen, T. (1985). *The Marshall Plan: Myths and Realities*

Crucini, M. J., and Yilmazkuday, H. (2014). Understanding long-run price dispersion. *Journal of Monetary Economics, 66*, 226-240.

Cuddington, J. T. (1983). Currency substitution, capital mobility and money demand. *Journal of International Money and Finance, 2*(2), 111-133.

Cuddington, J. T., and Liang, H. (2000). Purchasing power parity over two centuries? *Journal of International Money and Finance, 19*(5), 753-757.

Cumby, R. E., and Obstfeld, M. (1981). A note on exchange-rate expectations and nominal interest differentials: A test of the fisher hypothesis. *The Journal of Finance, 36*(3), 697-703.

Dahlquist, M., and Saellstrom, T. (2002). *An evaluation of international asset pricing models*

Davis, J. L. (1994). The Cross-Section of Realized Stock Returns: The Pre-COMPUSTAT Evidence. *The Journal of Finance, 49*(5), 1579-1593.

Davis, J. L., Fama, E. F., and French, K. R. (2000). Characteristics, covariances, and average returns: 1929 to 1997. *The Journal of Finance, 55*(1), 389-406.

De Hoyos, R. E., and Sarafidis, V. (2006). Testing for cross-sectional dependence in panel-data models. *Stata Journal, 6*(4), 482.

De Jong, E. (1991). *Exchange Rate Determination and Optimal Economic Policy Under Various Exchange Rate Regimes*: Springer-Verlag.

De Santis, G., and Gerard, B. (1998). How big is the premium for currency risk? *Journal of Financial Economics, 49*(3), 375-412.

De Santis, G., Gerard, B., and Hillion, P. (2003). The relevance of currency risk in the EMU. *Journal of Economics and Business, 55*(5), 427-462.

Dewenter, K. L., Higgins, R. C., and Simin, T. T. (2005). Can event study methods solve the currency exposure puzzle? *Pacific-Basin Finance Journal, 13*(2), 119-144.

Dickey, D. A., and Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series With a Unit Root. *Journal of the American Statistical Association, 74*, 427-431.

Dickey, D. A., and Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society, 49*, 1057-1072.

Dimitriou, D., and Simos, T. (2013). Testing purchasing power parity for Japan and the US: A structural-break approach. *Japan and the World Economy, 28*, 53-59.

Dornbusch, R. (1976). Expectations and exchange rate dynamics. *Journal of Political Economy, 84*(6), 1161-1176.

Douglas, G. W. (1967). *Risk in the equity markets: An empirical appraisal of market efficiency.* Yale University.

Dumas, B., and Solnik, B. (1995). The world price of foreign exchange risk. *The journal of finance, 50*(2), 445-479.

Eaton, J., and Turnovsky, S. J. (1983). Exchange Risk, Political Risk, and Macroeconomic Equilibrium. *The American Economic Review, 73*(1), 183-189.

Eberhardt, M., Helmers, C., and Strauss, H. (2013). Do spillovers matter when estimating private returns to R&D? *Review of Economics and Statistics, 95*(2), 436-448.

Edison, H. J. (1987). Purchasing power parity in the long run: A test of the dollar/pound exchange rate (1890-1978). *Journal of Money, Credit and Banking, 19*(3), 376-387.

Edison, H. J., and Melick, W. R. (1992). *Purchasing Power Parity and Uncovered Interest Rate Parity: The United States, 1974-1990*: Board of Governors of the Federal Reserve System.

Edison, H. J., and Melick, W. R. (1999). Alternative approaches to real exchange rates and real interest rates: three up and three down. *International Journal of Finance & Economics, 4*(2), 93-111.

Edison, H. J., and Pauls, B. D. (1993). A re-assessment of the relationship between real exchange rates and real interest rates: 1974–1990. *Journal of Monetary Economics, 31*(2), 165-187.

Eichenbaum, M., and Evans, C. L. (1995). Some empirical-evidence on the effects of shocks to monetary-policy on exchange-rates. *Quarterly Journal of Economics, 110*(4), 975-1009.

Engle, R. F., and Granger, C. W. J. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica, 55*(2), 251-276.

Everaert, G. (2014). A panel analysis of the fisher effect with an unobserved I(1) world real interest rate. *Economic Modelling, 41*, 198-210.

Fama, E. F. (1984). Forward and spot exchange rates. *Journal of Monetary Economics, 14*(3), 319-338.

Fama, E. F., and French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance, 47*(2), 427-465.

Fama, E. F., and French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*(1), 3-56.

Fama, E. F., and French, K. R. (1998). Value versus growth: The international evidence. *The Journal of Finance, 53*(6), 1975-1999.

Fama, E. F., and French, K. R. (2004). The capital asset pricing model: theory and evidence. *The Journal of Economic Perspectives, 18*(3), 25-46.

Fama, E. F., and MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *The Journal of Political Economy, 81*, 607-636.

Ferreira, A. L., and León-Ledesma, M. A. (2007). Does the real interest parity hypothesis hold? Evidence for developed and emerging markets. *Journal of International Money and Finance, 26*(3), 364-382.

Ferson, W. E., and Harvey, C. R. (1994). Sources of risk and expected returns in global equity markets. *Journal of Banking & Finance, 18*(4), 775-803.

Fisher, I. (1930). *The theory of interest*. New York: Macmillan.

Fisher, M. E., and Seater, J. J. (1993). Long-Run Neutrality and Superneutrality in an ARIMA Framework. *The American Economic Review, 83*(3), 402-415.

Fleissig, A. R., and Strauss, J. (2000). Panel unit root tests of purchasing power parity for price indices. *Journal of International Money and Finance, 19*(4), 489-506.

Fleming, J. M. (1962). Domestic Financial Policies under Fixed and under Floating Exchange Rates *Staff Papers - International Monetary Fund, 9*(3), 369-380.

Fong, W.-M., Valente, G., and Fung, J. K. W. (2010). Covered interest arbitrage profits: The role of liquidity and credit risk. *Journal of Banking & Finance, 34*(5), 1098-1107.

Frankel, J. A. (1986). International capital mobility and crowding out in the US economy: imperfect integration of financial markets or of goods markets? : National Bureau of Economic Research Cambridge, Mass., USA.

Frankel, J. A. (1992). Measuring International Capital Mobility: A Review. *The American Economic Review, 82*(2), 197-202.

Frankel, J. A., and Rose, A. K. (1996a). Currency crashes in emerging markets: An empirical treatment. *Journal of international Economics, 41*(3), 351-366.

Frankel, J. A., and Rose, A. K. (1996b). A panel project on purchasing power parity: mean reversion within and between countries. *Journal of International Economics, 40*(1), 209-224.

Franses, P. H. (1998). *Time series models for business and economic forecasting*: Cambridge University Press, New York.

Frenkel, J. A. (1976). A monetary approach to the exchange rate: doctrinal aspects and empirical evidence. *the scandinavian Journal of economics, 78*(2), 200-224.

Frenkel, J. A., and Levich, R. M. (1975). Covered Interest Arbitrage: Unexploited Profits? *Journal of Political Economy, 83*(2), 325-338.

Fujii, E., and Chinn, M. (2001). Fin de Siècle real interest parity. *Journal of International Financial Markets, Institutions and Money, 11*(4), 289-308.

Gaunt, C. (2004). Size and book to market effects and the Fama French three factor asset pricing model: evidence from the Australian stockmarket. *Accounting & Finance, 44*(1), 27-44.

Gengenbach, C., Palm, F. C., and Urbain, J. P. (2006). Cointegration Testing in Panels with Common Factors. *Oxford Bulletin of Economics and Statistics, 68*(s1), 683-719.

Gengenbach, C., Urbain, J.-P., and Westerlund, J. (2008). *Panel error correction testing with global stochastic trends*

Gregory, A. W., and Hansen, B. E. (1996). Residual-based tests for cointegration in models with regime shifts. *Journal of econometrics, 70*(1), 99-126.

Grierson, P. (1991). *The coins of medieval Europe*: Seaby.

Griffin, J. M., and Stulz, R. M. (2001). International competition and exchange rate shocks: a cross-country industry analysis of stock returns. *Review of Financial Studies, 14*(1), 215-241.

Grilli, V., and Kaminsky, G. (1991). Nominal exchange rate regimes and the real exchange rate: evidence from the United States and Great Britain, 1885–1986. *Journal of Monetary Economics, 27*(2), 195.

Grilli, V., and Roubini, N. (1992). Liquidity and exchange rates. *Journal of International Economics, 32*(3–4), 339-352.

Gujarati, D. (2012). *N, 2003, Basic Econometrics.*: Tata McGraw-Hill Education

Gutierrez, L. (2010). Simple tests for cointegration in panels with structural breaks. *Applied Economics Letters, 17*(2), 197-200.

Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *Econometrics Journal, 3*(2), 148-161.

Hall, S. G., Hondroyiannis, G., Kenjegaliev, A., Swamy, P., and Tavlas, G. S. (2013). Is the relationship between prices and exchange rates homogeneous? *Journal of International Money and Finance, 37*, 411-438.

Hansen, L. P., and Hodrick, R. J. (1980). Forward exchange-rates as optimal predictors of future spot rates - an econometric-analysis. *Journal of Political Economy, 88*(5), 829-853.

Harvey, C. R. (1991). The world price of covariance risk. *The Journal of Finance, 46*(1), 111-157.

Hatemi-J, A. (2008). Tests for cointegration with two unknown regime shifts with an application to financial market integration. *Empirical Economics, 35*(3), 497-505.

Hau, H., and Rey, H. (2002). *Order flows, exchange rates and asset prices.* Paper presented at the IFM meetings of the NBER summer institute, Cambridge, MA.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society, 46*(6), 1251-1271.

He, H., Chou, M. C., and Chang, T. (2014). Purchasing power parity for 15 Latin American countries: Panel SURKSS test with a Fourier function. *Economic Modelling, 36*, 37-43.

Hill, C. H. (Ed.). (2004). *International business: Competing in the global marketplace* (5 ed.). McGraw-Hill College

Ho, C. S., and Ariff, M. (2015). Parity and Non-Parity Determinants of Exchange Rates in Latin American Economies. *Taylor's Business Review (TBR), 4*(2), 1-20.

Hoffmann, M., and MacDonald, R. (2003). *A re-examination of the link between real exchange rates and real interest rate differentials*: CESifo Working Paper Series No. 894

Holmes, M. J., and Maghrebi, N. (2004). Asian real interest rates, nonlinear dynamics, and international parity. *International Review of Economics & Finance, 13*(4), 387-405.

Hsieh, D. A. (1988). The statistical properties of daily foreign exchange rates: 1974–1983. *Journal of international economics, 24*(1), 129-145.

Huang, C.-H., and Yang, C.-Y. (2015). European exchange rate regimes and purchasing power parity: An empirical study on eleven eurozone countries. *International Review of Economics & Finance, 35*, 100-109.

Hunter, J. (1992). Tests of cointegrating exogeneity for PPP and uncovered interest rate parity in the United Kingdom. *Journal of Policy Modeling, 14*(4), 453-463.

Im, K. S., Pesaran, M. H., and Shin, Y. (1995). *Testing for unit roots in heterogeneous panels*: Cambridge University

Im, K. S., Pesaran, M. H., and Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of econometrics, 115*(1), 53-74.

IMF. (2014). *Annual Report on Exchange Arrangement and Exchange Restrictions*. Washington D.C.: International Monetary Fund

Jagannathan, R., and Wang, Z. (1998). An Asymptotic Theory for Estimating Beta-Pricing Models Using Cross-Sectional Regression. *The Journal of Finance, 53*(4), 1285-1309.

Jensen, M., and Scholes, M. (1972). The capital asset pricing model: Some empirical tests. *The Bell Journal of Economics and Management Science, 3*, 357-398.

Jensen, M. C. (1968). The performance of mutual funds in the period 1945–1964. *The Journal of Finance, 23*(2), 389-416.

Jensen, M. J. (2009). The Long-Run Fisher Effect: Can It Be Tested? *Journal of Money, Credit and Banking, 41*(1), 221-231.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of economic dynamics and control, 12*(2), 231-254.

Johansen, S. r., and Juselius, K. (1992). Testing structural hypotheses in a multivariate cointegration analysis of the PPP and the UIP for UK. *Journal of Econometrics, 53*(1–3), 211-244.

Jorion, P. (1990). The exchange-rate exposure of US multinationals. *Journal of business, 63*, 331-345.

Jorion, P. (1991). The pricing of exchange rate risk in the stock market. *Journal of Financial and Quantitative Analysis, 26*(3), 363-376.

Juselius, K. (1995). Do purchasing power parity and uncovered interest rate parity hold in the long run? An example of likelihood inference in a multivariate time-series model. *Journal of Econometrics, 69*(1), 211-240.

Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of econometrics, 90*(1), 1-44.

Kao, C., and Chiang, M.-H. (2001). On the estimation and inference of a cointegrated regression in panel data. *Advances in econometrics, 15*, 179-222.

Kao, C., and Chiang, M. (2000). Testing for structural change of a cointegrated regression in panel data, *Syracuse University. Manuscript*.

Kapetanios, G., Pesaran, M. H., and Yamagata, T. (2011). Panels with non-stationary multifactor error structures. *Journal of Econometrics, 160*(2), 326-348.

Keynes, J. M. (1923). *A Tract on Monetary Reform, by John Maynard Keynes*: Macmillan.

Kim, Y. (2000). Causes of capital flows in developing countries. *Journal of International Money and Finance, 19*(2), 235-253.

Kindleberger, C. P. (1993). *A financial history of Western Europe*

King, F. H. (1965). *Money and monetary policy in China, 1845-1895* (Vol. 19): Harvard Univ Pr.

Koedijk, K. G., Schotman, P. C., and Van Dijk, M. A. (1998). The re-emergence of PPP in the 1990s. *Journal of International Money and Finance, 17*(1), 51-61.

Koráb, P., and Kapounek, S. (2013). International fisher effect under exchange rate regime shifts: Evidence from 10 examples. *Society and Economy, 35*(4), 451-469.

Kouri, P. J. (1976). *The determinants of the forward premium*. Institute for International Economic Studies: University of Stockholm.

Kremers, J. J., Ericsson, N. R., and Dolado, J. J. (1992). The power of cointegration tests. *Oxford bulletin of economics and statistics, 54*(3), 325-348.

Kuo, B.-S., and Mikkola, A. (2001). How sure are we about purchasing power parity? Panel evidence with the null of stationary real exchange rates. *Journal of Money, Credit and Banking, 33*, 767-789.

Lamont, O. A. (2001). Economic tracking portfolios. *Journal of Econometrics, 105*(1), 161-184.

Lee, B.-J. (2013). Uncovered interest parity puzzle: Asymmetric responses. *International Review of Economics & Finance, 27*, 238-249.

Lettau, M., and Ludvigson, S. (2001). Resurrecting the (C) CAPM: A cross-sectional test when risk premia are time-varying. *Journal of Political Economy, 109*(6), 1238-1287.

Levi, M. D. (1977). Taxation and "Abnormal" International Capital Flows. *Journal of Political Economy, 85*(3), 635-646.

Levich, R. M. (1978). Tests of forecasting models and market efficiency in the international money market. In J. A. Frenkel and H. G. Johnson (Eds.), *The economics of exchange rates* (pp. 48-64). Addison Wesley, Reading, Mass.

Levich, R. M. (2011). *Evidence on Financial Globalization and Crises: Interest Rate Parity*

Levich, R. M., and Amihud, Y. (1994). *Exchange Rates and Corporate Performance*: Irwin Professional Pub.

Levin, A., Lin, C.-F., and James Chu, C.-S. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics, 108*(1), 1-24.

Levin, A. T., and Lin, C.-F. (1992). *Unit root tests in panel data: asymptotic and finite-sample properties*: University of California at San Diego, Economics Working Paper Series

Levin, A. T., and Lin, C.-F. (1993). *Unit root in panel data: new results; University of California*: San Diego, Working Paper

Levy-Yeyati, E., and Sturzenegger, F. (2005). Classifying exchange rate regimes: Deeds vs. words. *European economic review, 49*(6), 1603-1635.

Liew, J., and Vassalou, M. (2000). Can book-to-market, size and momentum be risk factors that predict economic growth? *Journal of Financial Economics, 57*(2), 221-245.

Lintner, J. (1965). Security prices, risk and maximal gains from diversification *The Journal of Finance, 20*(4), 587-615.

Liu, J., Wu, S., and Zidek, J. V. (1997). On segmented multivariate regression. *Statistica Sinica, 7*(2), 497-525.

Lothian, J. R. (1997). Multi-country evidence on the behavior of purchasing power parity under the current float. *Journal of International Money and Finance, 16*(1), 19-35.

Lothian, J. R., and Taylor, M. P. (1996). Real exchange rate behavior: the recent float from the perspective of the past two centuries. *Journal of political economy, 104*, 488-509.

Lothian, J. R., and Taylor, M. P. (2000). Purchasing power parity over two centuries: strengthening the case for real exchange rate stability: a reply to Cuddington and Liang. *Journal of International Money and Finance, 19*(5), 759-764.

Lucas, R. E. (1982). Interest rates and currency prices in a two-country world. *Journal of Monetary Economics, 10*(3), 335-359.

MacDonald, R. (1998). What determines real exchange rates?: The long and the short of it. *Journal of International Financial Markets, Institutions and Money, 8*(2), 117-153.

MacDonald, R., and Nagayasu, J. (2000). The Long-Run Relationship Between Real Exchange Rates and Real Interest Rate Differentials: A Panel Study. *IMF Staff Papers, 47*(1), 116-128.

MacDonald, R., and Ricci, L. A. (2001). *PPP and the Balassa Samuelson effect: The role of the distribution sector* (Vol. 442): International Monetary Fund.

MacDonald, R., and Taylor, M. P. (1992). Exchange rate economics: a survey. *Staff Papers-International Monetary Fund*, 1-57.

Maddala, G. S., and Wu, S. (1996). *A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test*: Ohio State University

Maddala, G. S., and Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics, 61*(S1), 631-652.

Madura, J. (2012). *International financial management*: Cengage Learning.

Manzur, M., and Ariff, M. (1995). Purchasing power parity: new methods and extensions. *Applied Financial Economics, 5*(1), 19-26.

Marini, G., and Piersanti, G. (2003). Fiscal deficits and currency crises, *CEIS Tor Vergata-Research Paper Series*.

Mark, N. C. (1985). Some evidence on the international inequality of real interest rates. *Journal of International Money and Finance, 4*(2), 189-208.

Mark, N. C. (1990). Real and nominal exchange rates in the long run: An empirical investigation. *Journal of International Economics, 28*(1–2), 115-136.

Mark, N. C., and Moh, Y.-K. (2003). Official interventions and occasional violations of uncovered interest party in the Dollar-DM market, *Working Paper Series*: National Bureau of Economic Research.

Mark, N. C., and Sul, D. (2003). Cointegration Vector Estimation by Panel DOLS and Long-run Money Demand. *Oxford Bulletin of Economics and Statistics, 65*(5), 655-680.

Martin, F., Keltie, J. S., Renwick, I. P. A., Epstein, M., Steinberg, S. H., and Paxton, J. (1896). *The Statesman's year-book* (Vol. 33): St. Martin's Press.

Martínez, J. (1999). Mexico's balance of payments and exchange rates: a cointegration analysis. *The North American Journal of Economics and Finance, 10*(2), 401-421.

McCallum, B. T. (1994). A reconsideration of the uncovered interest parity relationship. *Journal of Monetary Economics, 33*(1), 105-132.

McCormick, F. (1979). Covered Interest Arbitrage: Unexploited Profits? Comment. *Journal of Political Economy, 87*(2), 411-417.

McKinnon, R. I., and Ohno, K. (1989). Purchasing power parity as a monetary standard. In O. F. Hamouda, Rowley, R., and Wolf, B.M. (Ed.), *The future of the international monetary system: Change, coordination or instability* (pp. 42-67). Aldershot: Edward Elgar.

Meese, R., and Rogoff, K. (1988). Was It Real? The Exchange Rate-Interest Differential Relation over the Modern Floating-Rate Period. *The Journal of Finance, 43*(4), 933-948.

Mehl, A., and Cappiello, L. (2009). Uncovered Interest Parity at Long Horizons: Evidence on Emerging Economies. *Review of International Economics, 17*(5), 1019-1037.

Meredith, G., and Chinn, M. D. (1998). *Long-horizon uncovered interest rate parity* (Working Paper): National Bureau of Economic Research

Miller, M. H., and Scholes, M. (1972). Rates of return in relation to risk: A reexamination of some recent findings. In M. C. Jensen (Ed.), *Studies in the theory of capital markets*. NewYork: Praeger.

Mishkin, F. S. (1984). Are Real Interest Rates Equal Across Countries? An Empirical Investigation of International Parity Conditions. *The Journal of Finance, 39*(5), 1345-1357.

Mollick, A. V. (1999). The real exchange rate in Brazil Mean reversion or random walk in the long run? *International Review of Economics & Finance, 8*(1), 115-126.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica: Journal of the Econometric Society, 34*, 768-783.

Mundell, R. A. (1963). Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates. *The Canadian Journal of Economics and Political Science / Revue canadienne d'Economique et de Science politique, 29*(4), 475-485.

Mussa, M. (1976). The Exchange Rate, the Balance of Payments and Monetary and Fiscal Policy under a Regime of Controlled Floating. *The Scandinavian Journal of Economics, 78*(2), 229-248.

Mussa, M. (1982). A model of exchange rate dynamics. *The Journal of Political Economy, 90*, 74-104.

Mussa, M. L. (1984). The theory of exchange rate determination. In *Exchange rate theory and practice* (pp. 13-78). NBER Conference Report (eds) J.F.O. Bilson and R.C. Marston,: Chicago: Chicago University Press.

Nakagawa, H. (2002). Real exchange rates and real interest differentials: implications of nonlinear adjustment in real exchange rates. *Journal of Monetary Economics, 49*(3), 629-649.

Nussbaum, A. (1957). *A History of the Dollar*: New York: Columbia University Press.

O'Brien, T. J., and Dolde, W. (2000). A currency index global capital asset pricing model. *European Financial Management, 6*(1).

O'Connell, P. G. (1998). The overvaluation of purchasing power parity. *Journal of international economics, 44*(1), 1-19.

Obstfeld, M., and Rogoff, K. (1996). *Foundations of international macroeconomics* MIT Press.

Obstfeld, M., and Stockman, A. C. (1985). *Exchange-rate dynamics*: National Bureau of Economic Research Cambridge, Mass., USA

Omay, T., Yuksel, A., and Yuksel, A. (2015). An empirical examination of the generalized Fisher effect using cross-sectional correlation robust tests for panel cointegration. *Journal of International Financial Markets, Institutions and Money, 35*, 18-29.

Özmen, E., and Gökcan, A. (2004). Deviations from PPP and UIP in a financially open economy: the Turkish evidence. *Applied Financial Economics, 14*(11), 779-784.

Papell, D. H., and Theodoridis, H. (1998). Increasing evidence of purchasing power parity over the current float. *Journal of International Money and Finance, 17*(1), 41-50.

Pedroni, P. (1997). *Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis*. (Bloomington, Indiana: Economics Department, Indiana University) Working Paper

Pedroni, P. (1999). Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors. *Oxford Bulletin of Economics and Statistics, 61*(S1), 653-670.

Pedroni, P. (2004). Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis. *Econometric Theory, 20*(3), 597-625.

Pesaran, M. (2004). General diagnostic tests for cross section dependence in panels: CESifo Working Papers.

Pesaran, M. H. (2006). Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica, 74*(4), 967-1012.

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics, 22*(2), 265-312.

Pesaran, M. H., Smith, L. V., and Yamagata, T. (2013). Panel unit root tests in the presence of a multifactor error structure. *Journal of Econometrics, 175*(2), 94-115.

Pesaran, M. H., and Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of econometrics, 68*(1), 79-113.

Phillips, P. C., and Moon, H. R. (1999). Linear regression limit theory for nonstationary panel data. *Econometrica, 67*(5), 1057-1111.

Phillips, P. C., and Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335-346.

Phillips, P. C., and Sul, D. (2003). Dynamic panel estimation and homogeneity testing under cross section dependence*. *The Econometrics Journal, 6*(1), 217-259.

Powell, J. (2005). *A history of the Canadian dollar* (No. 0660195712)

Quah, D. T. (1990). *International Patterns of Growth: Persistence in Cross-county Disposities*.

Quandt, R. E. (1960). Tests of the hypothesis that a linear regression system obeys two separate regimes. *Journal of the American statistical Association, 55*(290), 324-330.

Rivera-Batiz, F. L., and Rivera-Batiz, L. A. (2001). International financial liberalization, capital flows, and exchange rate regimes: an introduction. *Review of International Economics, 9*(4), 573-584.

Robertson, R., Kumar, A., and Dutkowsky, D. H. (2014). Weak-form and strong-form purchasing power parity between the US and Mexico: A panel cointegration investigation. *Journal of Macroeconomics, 42*, 241-262.

Rogoff, K. (1996). The purchasing power parity puzzle. *Journal of Economic literature, 34*(2), 647-668.

Sarafidis, V., and Robertson, D. (2009). On the impact of error cross-sectional dependence in short dynamic panel estimation. *The Econometrics Journal, 12*(1), 62-81.

Sarno, L., and Taylor, M. (2002). Purchasing power parity and the real exchange rate. *International Monetary Fund Staff Papers, 49*(1), 65-105.

Schnabl, G., and Baur, D. (2002). Purchasing power parity: Granger causality tests for the yen–dollar exchange rate. *Japan and the World Economy, 14*(4), 425-444.

Sener, E., Satiroglu, S., and Yildrim, Y. (2012). Empirical Investigation of Covered Interest Rate Parity in Developed and Emerging Markets: SSRN Working Paper Series.

Shanken, J. (1985). Multivariate tests of the zero-beta CAPM. *Journal of Financial Economics, 14*(3), 327-348.

Shanken, J. (1992). On the estimation of beta-pricing models. *Review of Financial Studies, 5*(1), 1-55.

Shanken, J., and Weinstein, M. I. (1990). *Macroeconomic variables and asset pricing: Estimation and tests*: Simon School of Business Administration, University of Rochester.

Sharpe, W. F. (1964). Capital asset prices: a theory of makret equilibrium under conditions of risk *The Journal of Finance, 19*(3), 425-442.

Shin, Y., and Snell, A. (2006). Mean group tests for stationarity in heterogeneous panels. *The Econometrics Journal, 9*(1), 123-158.

Shively, P. A. (2001). A test of long-run purchasing power parity. *Economics Letters, 73*(2), 201-205.

Sjoo, B. (1995). Foreign transmission effects in Sweden: do PPP and UIP hold in the long run. *Advances in International Banking and Finance, 1*, 129-149.

Skoulakis, G. (2005). *Assessment of asset-pricing models using cross-sectional regressions*. Northwestern University

Söderbom, M. (2009). Brief instructions for md_ar1. University of Gothenburg.

Solnik, B., and Solnik, V. (1997). A multi-country test of the Fisher model for stock returns. *Journal of International Financial Markets, Institutions and Money, 7*(4), 289-301.

Solnik, B. H. (1973). *European capital markets: towards a general theory of international investment*: Lexington Books Lexington, MA.

Solnik, B. H. (1974). An equilibrium model of the international capital market. *Journal of Economic Theory, 8*(4), 500-524.

Stoll, H. R. (1978). The supply of dealer services in securities markets. *The Journal of Finance, 33*(4), 1133-1151.

Su, J.-J., Cheung, A., and Roca, E. (2014). Does Purchasing Power Parity hold? New evidence from wild-bootstrapped nonlinear unit root tests in the presence of heteroskedasticity. *Economic Modelling, 36*, 161-171.

Taylor, A. M., and Taylor, M. P. (2004). *The purchasing power parity debate*: National Bureau of Economic Research

Throop, A. W. (1993). *A generalized uncovered interest parity model of exchange rates*. Federal Reserve Bank of San Francisco

Tipton, F. B. (2003). *A history of modern Germany since 1815*: A&C Black.

Ugolini, S. (2012). The origins of foreign exchange policy: the National Bank of Belgium and the quest for monetary independence in the 1850s. *European Review of Economic History, 16*(1), 51-73.

Vassalou, M. (2003). News related to future GDP growth as a risk factor in equity returns. *Journal of Financial Economics, 68*(1), 47-73.

Wagner, M., and Hlouskova, J. (2009). The performance of panel cointegration methods: results from a large scale simulation study. *Econometric Reviews, 29*(2), 182-223.

Westerlund, J. (2006). Testing for Panel Cointegration with Multiple Structural Breaks. *Oxford Bulletin of Economics and Statistics, 68*(1), 101-132.

Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and Statistics, 69*(6), 709-748.

Westerlund, J. (2008). Panel cointegration tests of the Fisher effect. *Journal of Applied Econometrics, 23*(2), 193-233.

Wu, J.-L., and Chen, S.-L. (1998). A Re-Examination of Real Interest Rate Parity. *The Canadian Journal of Economics / Revue canadienne d'Economique, 31*(4), 837-851.

Wu, Y. (1996). Are real exchange rates nonstationary? Evidence from a panel-data test. *Journal of Money, Credit, and Banking, 28*(1), 54.

Ye, M., Hutson, E., and Muckley, C. (2014). Exchange rate regimes and foreign exchange exposure: The case of emerging market firms. *Emerging Markets Review, 21*, 156-182.

Zhang, S. (2003). *Two essays in international economics: An empirical approach to purchasing power parity and the monetary model of exchange rate determination.* Unpublished Ph.D., Washington State University, Ann Arbor.

Zhou, B. (1996). High-frequency data and volatility in foreign-exchange rates. *Journal of Business & Economic Statistics, 14*(1), 45-52.