UNIVERSITI PUTRA MALAYSIA

ECONOMIC OPENNESS, EXCHANGE RATE VOLATILITY, AND THE ROLE OF FINANCIAL DEVELOPMENT

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ECONOMIC OPENNESS, EXCHANGE RATE VOLATILITY, AND THE ROLE OF FINANCIAL DEVELOPMENT

By

MASOUMEH HABIBI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

September 2015

This study is dedicated to my mother, Foruzandeh Amiri Bigvand, for her unconditional love and to my husband, Karam Shaar, for his unconditional support.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Master of Science

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September 2015

Chairman : **Professor Azali Mohamed PhD**
Faculty : **Economics and Management**

This study employs a panel of 59 countries over the period 1980-2011, applying the Two-Step System GMM, to study the relationship between the trade-weighted real exchange rate volatility and openness of an economy, taking the role of financial development level into account. In order to capture the role of financial development level, interaction terms are introduced into the regression and thresholds of financial development are calculated above which, higher financial and trade openness have a stronger impact on real exchange rate volatility. The findings suggest that; (a) higher levels of trade openness as well as financial openness are associated with lower exchange rate volatility, (b) countries with higher levels of financial development experience a stronger negative effect of financial openness on real exchange rate volatility, (c) the effect of trade openness on exchange rate volatility is independent from the level of financial development.

Abstrak tesis yang dikemukakan senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains

KETERBUKAAN EKONOMI, KETIDAKSTABILAN KADAR PERTUKARAN, DAN PERANAN PEMBANGUNAN KEWANGAN

Oleh

MASOUMEH HABIBI

September 2015

Pengerusi   **: Profesor Azali Mohamed, PhD**
Fakulti   **: Ekonomi dan Pengurusan**

Tesis ini merangkumi panel 59 negara dari tahun 1980-2011 menggunakan "Two-Step System GMM", untuk mengkaji hubungan antara keberkesanan turun naik kadar pertukaran wajaran dagangan sebenar dan keterbukaan, dengan mengambil kira fungsi pembangunan kewangan oleh sesebuah negara. Untuk mencapai fungsi pembangunan kewangan, terma interaksi diperkenalkan ke dalam regresi dan pembangunan kewangan diambil kira di mana, keterbukaan kewangan dan perdagangan yang tinggi mempunyai impak yang lebih kuat kepada turun naik kadar pertukaran sebenar. Penemuan tesis ini menunjukkan (a) keterbukaan dagangan dan kewangan yang lebih tinggi mempunyai kaitan dengan turun naik kadar pertukaran yang lebih rendah (b) negara yang mempunyai perkembangan kewangan yang lebih tinggi mengalami kesan negatif yang lebih kuat terhadap keterbukaan kewangan pada turun naik kadar pertukaran sebenar (c) Kesan keterbukaan dagangan terhadap turun naik kadar pertukaran adalah terdiri daripada tahap pembangunan kewangan.

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I certify that a Thesis Examination Committee has met on 15 September 2015 to conduct the final examination of Masoumeh Habibi on her thesis entitled "Economic Openness, Exchange Rate Volatility, and the Role of Financial Development" 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 Master of Science.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the supervisory committee were as follows:

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Date:

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Declaration by graduate student

I hereby confirm that:
- this thesis is my original work;
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This is to confirm that:
- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

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Supervisory	Supervisory
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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides a background on the topic of this study and gives a general overlook about its objectives and organization. The chapter is organized as follows; section 1.2, background of study, provides a brief explanation of the role of exchange rate and the theoretical link between real exchange rate volatility and the openness of an economy in relation with financial development, followed with sections 1.3: problem statement, 1.4: research objectives, 1.5: significance of the study, and 1.6: organization of the study.

1.2 Background of the study

Exchange rate is a key indicator in the macroeconomic literature. Its importance is observed in the amount of empirical work and new theoretical models that are developed in order to have a better understanding on exchange rate. Soto and Elbadawi (2007) mention that exchange rate has a strong influence on the medium and long-run activities of economy. Additionally, it also determines almost entirely the expected profitability of investment in the traded sector. Therefore, exchange rate is highly related with a country's capital accumulation and trade flows.

Nominal real exchange rate is defined as the price of a currency in terms of another. Real exchange rate is the exchange rate adjusted to the price levels of countries. This adjustment for inflation allows comparability over time. Finally, real effective exchange rate is the geometric trade-weighted average of a country's bilateral real exchange rate (Erlandsson & Markowski, 2006). That is, real effective exchange rate reflects the overall value of a currency, and since it is real, it is comparable over time as well.

The growing number of empirical studies on real exchange rate as one of the key factors in cross-border economic transactions in recent decades proves its significance in the macroeconomic literature. Besides, the effect of exchange rate on the performance of monetary policy in open economies is an additional proof of the relevance of studying the fluctuation of exchange rate and its variability drivers. Hence, before discussing the research background of exchange rate volatility, it is quiet necessary to briefly explain the connection of exchange rate with monetary policy.

Monetary policy is an economic instrument to insure the price stability and trust in the currency. Monetary stability is mainly defined by the stability of the value of money,

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which is measured in terms of: (a) domestic purchasing power, (b) the interest rate; and (c) the exchange rate. Empirically, investigating the role of exchange rate in monetary policy, Ball (1999) argued that using exchange rate as a policy benchmark would improve the overall macroeconomic performance. Taylor (1999), as well, found that such a benchmark would improve the economic performance of some countries.

In general, many macroeconomic indicators including trade, finance, and investment, can be affected by exchange rate movements since monetary policy principally influences international finance through the value of its currency. Fundamentally, monetary policy determines exchange rate through money supply and open market operations conducted in the financial sector. On the other hand, when the central bank of a country increases money supply, the country's currency depreciates. This might lead to an undesirable overshooting impact in the long run value of the exchange rate, mainly because of sticky prices and expectations (Dornbusch, 1976).

In the case of open market operations, central banks can either inject or absorb liquidity through the financial markets. This enables central bank to manipulate money supply and interest rate of the economy. Hence, considering the role of exchange rates and capital inflows and outflows of countries (international finance), monetary policy and exchange rate policy are expected to have different behaviors in an open economy (Lee, 1983). These facts can point to the importance of exchange rate, and consequently its movements, in an open economy.

An overall look on the literature indicates that the concept of exchange rate volatility has received more attention after the collapse of the Bretton-Woods system in the early 1970s. After Bretton-Woods system, many countries changed their exchange rate regimes and, as a result, faced more instability in their exchange rate. This especially applies to the industrial countries that changed their exchange rate regimes from fixed to flexible (Mussa, 1986; Sutherland, 1996). Therefore, initially, the reason of the increased exchange rate volatility was attributed to the changes in exchange rate regimes and monetary policy tools.

On the impact of monetary instability, Dornbusch (1976) discussed that unanticipated monetary policy shocks cause excessively large fluctuations in the exchange rates (overshooting effect). However, through actually stabilizing the inflation at annual rates below 3% in most industrial countries, the hypothesis of considering monetary shocks as the only reason of real exchange rate volatility has gradually lost ground (Rogoff, 1999). On this matter, Calderón and Kubota (2009) argued that monetary instability is only one of the several factors driving exchange rate volatility.

Theoretically, the increasing capital mobility has an important influence on the choice of exchange rate regime and consequently the performance of monetary policy. Mundell (1963) shows that in presence of open capital markets, there should be a choice of monetary policy autonomy or a fixed exchange rate regime. Hence, in presence of capital mobility, the exchange rate regime that an economy follows is

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considered to be a crucial determinant in opting effective monetary policy (Bleaney, Lee, & Lloyd, 2013).

Unlike the advanced countries that are able to successfully float their exchange rate, small economies with less financial development level are afraid of floating for the sake of keeping the economy stable. Thus, in order to have the access to capital markets, they follow fixed exchange rates regime. Besides exchange rate regime, openness of an economy is widely considered to be an important determinant of exchange rate.

According to new open economy macroeconomics school, launched by Obstfeld and Rogoff (1996), it is expected that trade and financial openness affect the exchange rate volatility by strengthening or weakening the impact of monetary shocks on exchange rate movements. The objective of the new open economy macroeconomics was to overcome the limitations of the Mundell (1963) model, preserving the empirical wisdom, and keeping the connection with policy debates of the traditional literature.

Openness, by definition in economics, is "the extent to which an economy is open to trade, and sometimes also to inflows and outflows of international investment". To measure openness, some studies such as Hau (2000) and Bleaney (2008), only take the trade openness into account. More recent studies, such as Calderón and Kubota (2009) and Calderón (2004), measure both trade and financial openness. This study follows the more modern definition of openness and includes both trade and financial openness as its determinants.

According to new open economy macroeconomics, openness to goods market causes higher flexibility in aggregate price adjustment. Consequently, the impact of shocks, either nominal shocks (changes in interest rate or inflation) or real shocks (changes in terms of trade or labor productivity), on exchange rate volatility will be reduced in the presence of trade openness (Hau, 2002; Obstfeld & Rogoff, 1996). On the other hand, openness to capital markets or financial openness reduces the frictions in capital flows across countries, which tend to reduce the exchange rate volatility in real terms (Sutherland, 1996).

Basically, trade openness refers to the level in which an economy allows for trade with other economies. While, financial openness indicates the extent of access to the international capital market. In other words, financial openness is the openness of a country's financial market to other countries. Chinn and Ito (2007) defined financial openness as the extent of openness in cross-border capital transactions. In general, financial openness provides the essential conditions to link the domestic financial system with the global market and allows for higher investment through lower costs of capital transactions.

A noteworthy point in openness analysis is that, apart from the importance of high globalization, measuring openness is at the center of debate, especially financial

openness. The measurements of openness are basically de jure, de facto, and hybrid which is blended de facto/de jure (Quinn, Schindler, & Toyoda, 2011). In general, de jure indices consider the legal restrictions of goods and financial markets, while de facto measurements reflect the actual reality of traded goods and capital flows. This study follows de facto indices to capture trade and financial openness.

As mentioned, an increase in the level of financial openness of a country helps it mitigate the volatility of its real exchange rate. This is due to the fact that higher financial openness indicates less friction and fewer barriers in the inflow and outflow of capital transfers. Therefore, when a monetary shock takes place in an economy with open financial market, interest rate will quickly adjust to the international level in real terms preventing multilateral long-run interest rate disparities. This quick adjustment in the domestic interest rate allows the real exchange rate to return back to equilibrium in a reasonable amount of time (Sutherland, 1996).

Consequently, financial openness is argued to allow agents within a country to share risks as well as the companies and individuals across countries to share country-specific risks. Hence, financial openness may allow economic agents to deal more effectively with random shocks (Calderón & Kubota, 2009). On the other hand, the level of financial development of a country is the key determinant for its agents to hedge against the risks of economic shocks (Berglöf, Korniyenko, Zettelmeyer, & Plekhanov, 2009).

Therefore, this study assumes that the strength of the impact of financial openness on exchange rate volatility is restricted by the level of financial development. That is, in a country where financial openness is high, yet financial development is low resulting in higher risk of changes in price, the ability of financial openness in mitigating the impact of monetary shock on exchange rate would be weaker, vice versa. This study expects this to be true because adjusting for the changing interest rate through financial openness is less effective in a country where traders are not protected against economic risks.

Supporting this assumption, empirical literature also shows that financial development which is simply defined as the process of improvements in quantity, quality, and efficiency of financial structure of an economy, has an impact on both financial and trade openness. With regards to the link between financial development and financial openness, Kletzer and Bardhan (1987) indicate that industries and sectors in a country with higher financial development level have a comparative advantage when it comes to using the external finance. Additionally, the level of financial development affects trade balance through nature of transactions in the financial sector and trade reforms (Beck, 2002).

This study initially intended to examine a larger cross section sample. However, due to the limitation of data availability, the data set ended up with a sample of 59 countries. Yet in order to achieve the main research objective, the role of financial development level in the real exchange rate volatility and openness nexus, the study considers

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selecting countries with different financial development levels to have a balanced distribution. Figure 1.1 depicts the average of financial development, measured as liquid liabilities to GDP, during the whole period for each of the 59 countries.

Financial Development: Liquid liabilities/GDP
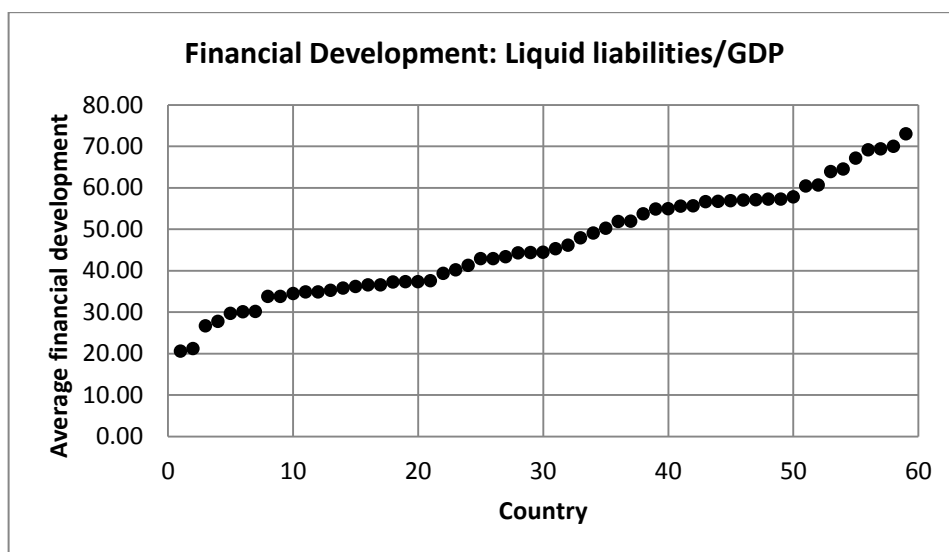
Source: Institutional Financial Statistics (IMF), and World Bank

Figure 1.1: Average financial development during 1980-2012 for each cross section

This measurement of financial development is a general indicator of the size of financial intermediaries relative to the size of the economy that is frequently used as an overall measure of financial sector development (King & Levine, 1993). As observed from Figure 1.1, the level of financial development among the sample of countries is largely balanced with almost half of the observations below and above 45. Having adequate observations from both more and less levels of financial development yields more reliable empirical results through increasing the level of variability in the independent variable. In the same sense, the averages of financial and trade openness of the cross-section sample are depicted in Figures 1.2 and 1.3 respectively.

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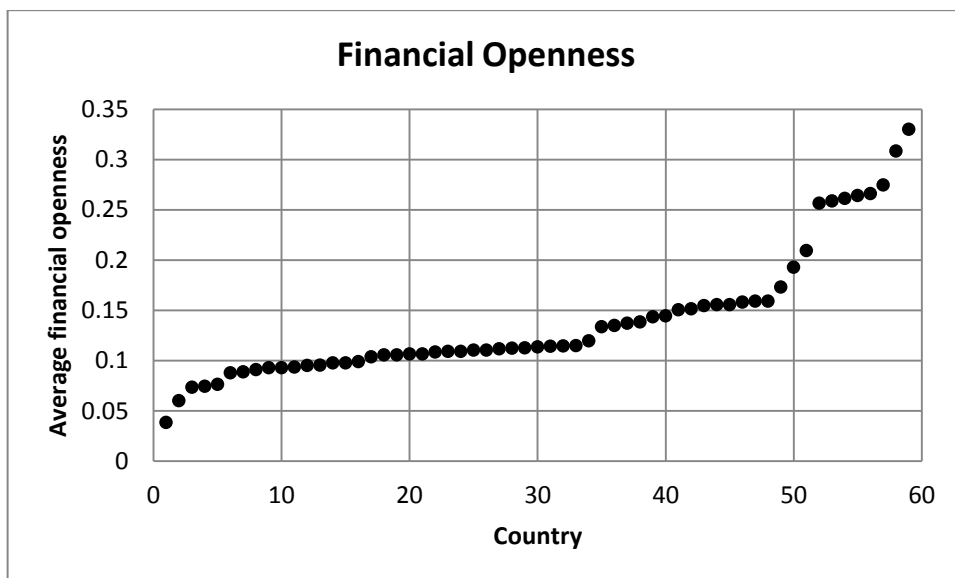
Source: Lane and Milesi-Ferretti (2007)

Figure 1.2: Average financial openness during 1980-2012 for each cross section
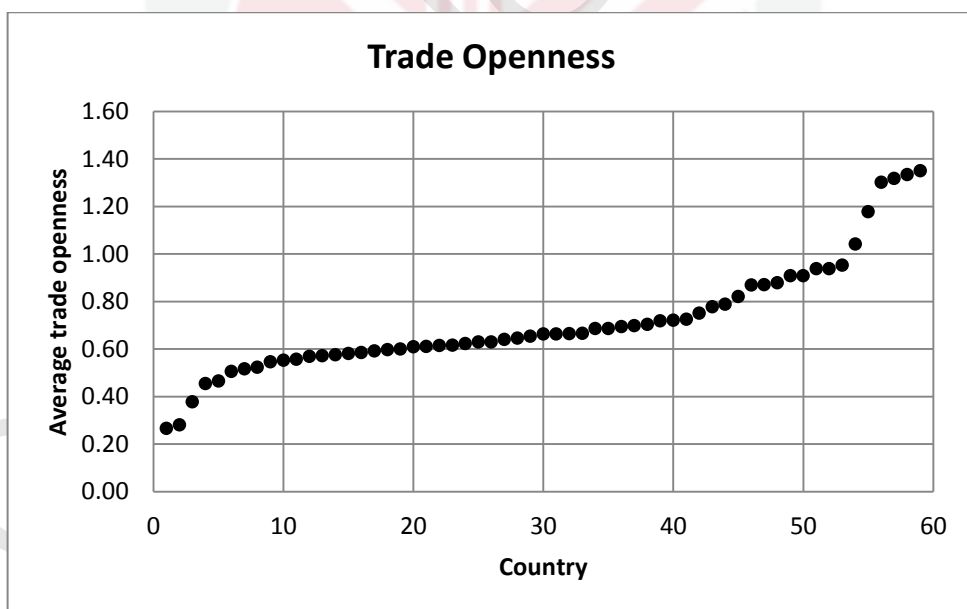
Source: World Bank (World Development Indicators)

Figure 1.3: Average trade openness during 1980-2012 for each cross section

From Figures 1.2 and 1.3, it is assured that there are sufficient observations for both more and less financially and trade open economies. In these scatter plots, de facto measurements are used to capture both financial and trade openness. To further describe the sample of countries investigated in this study, Figures 1.4, 1.5, and 1.5 depict the averages of real exchange rate volatility, trade openness, and financial openness for all countries in a given time window respectively.
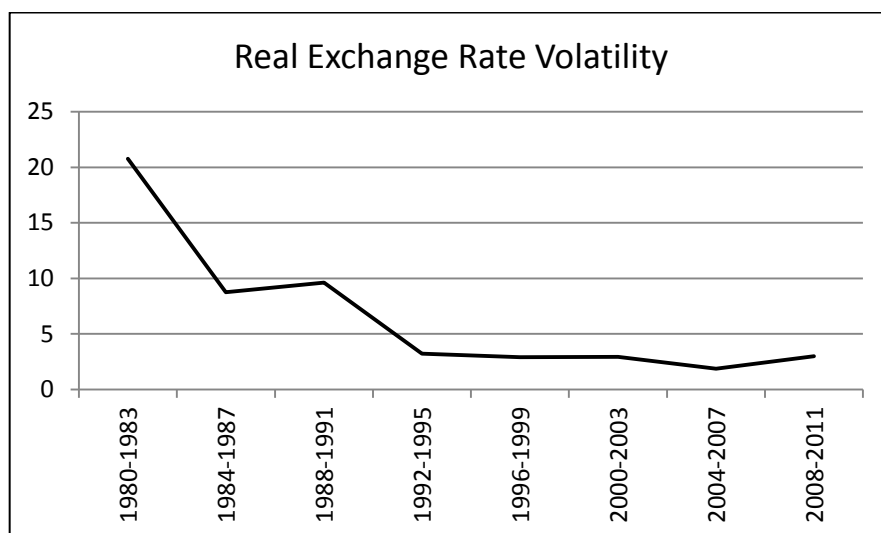
Source: Institutional Financial Statistics (IMF), OECD, and JP Morgan

Figure 1.4: Average real exchange rate volatility for all cross-sections
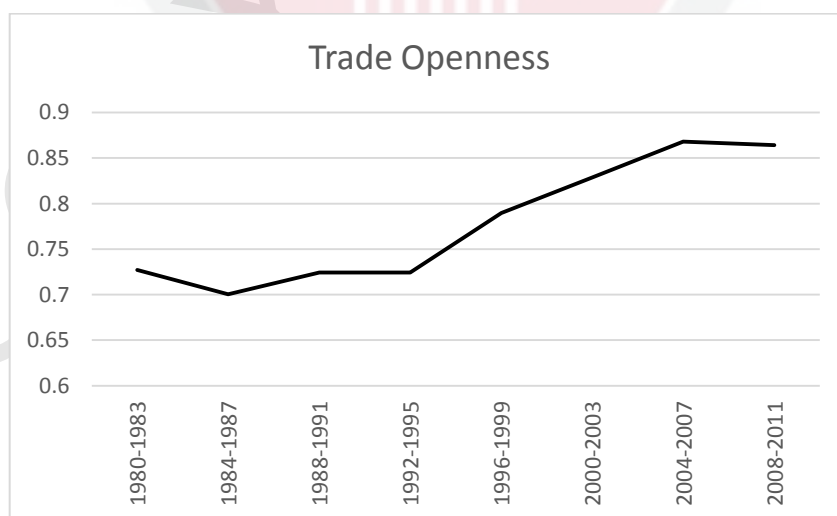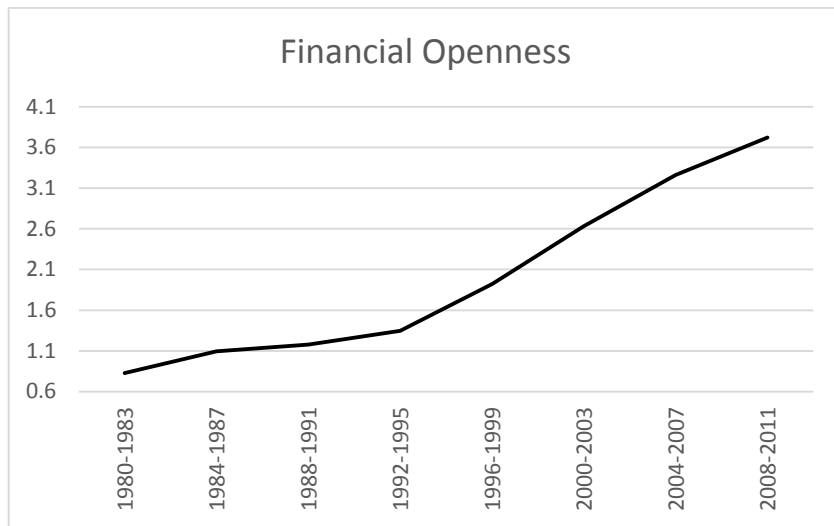

Source: World Bank (World Development Indicators)

Figure 1.5: Average trade openness for all cross-section

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Financial Openness

Figure 1.6: Average financial openness for all cross-sections

The initial assessments of the trend of the main variables indicates a diminishing trend of real exchange rate volatility and an upward trend for the averages of financial and trade openness. The trends are largely in line with the theory suggesting negative relationship between exchange rate volatility and openness. Regarding financial openness, Figure 1.6 shows that it has remarkably increased in over last two decades, which supports the importance of the contribution of this study.

More details about the main variables of this study in each country are reported in Appendix A. The table lists the average along the period 1980-2011 for each of the 12 month volatility (standard deviation) of real effective exchange rate, trade openness, financial openness, and financial development. The table also reports the exchange rate regime (de facto measurement), and income level of countries at the end of period, i.e. 2011. The data on income level indicates that almost 45% of the cross-sections are developed countries and the rest are developing. In terms of the end of period exchange rate regimes as one of the control variables of the study, most countries seem to be recently following either fixed /crawling peg policies

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1.3 Problem statement

The substantially growing level of globalization and international economic integration have drawn the interest of researchers to investigate the impact of openness on exchange rate volatility. As shown in Figures 1.5 and 1.6, the trends of both financial and trade openness have been increasing over time through the period 1980-2011, reflecting the increasing level of globalization. Comparatively, the global trend of real exchange rate volatility, as shown in Figure 1.4, has been generally decreasing. These facts might provide an initial proof of the negative impact of openness on exchange rate fluctuation as argued in the literature.

Despite of the adequate justification in the theory behind the exchange rate volatility-openness nexus, to the best knowledge of the author, the role of financial development in this link has been widely ignored. This study aims to examine whether financial development does matter in the relationship between real exchange rate volatility and openness or not. As discussed earlier, financial development helps economic agents to hedge against economic risks. Therefore, where openness mitigates the impact of random shocks on exchange rate volatility, the ability of an economy to hedge against those shocks is expected to impact the mechanism in which openness and exchange rate volatility interact.

To this end, this study uses an interaction term to test the hypothesis of a nonlinear effect of financial and trade openness on exchange rate volatility given the level of financial development. The employed econometric method reports threshold levels of financial development above which more openness in financial and trade markets has a stronger negative impact on real exchange rate volatility. Since real exchange rate volatility-openness nexus has received strong criticism regarding the dependent variable being correlated with the error term, which leads to biased coefficient estimates (Arellano & Bond, 1991; Nickell, 1981; Wooldridge, 2010), this study applies two-step system GMM in order to account for this shortcoming.

In summary, this study takes the role of an important macroeconomic variable, financial development, into account and tests the exchange rate volatility-openness nexus by applying a Two-Step System Generalized Method of Moments (GMM) for a balanced sample of 59 countries from 1980 to 2011. Accounting for the role of financial development in the openness-exchange rate volatility nexus genuinely contributes to the literature and policymakers alike. On one hand, this study improves the comprehension of scholars about the mechanism of the relationship between openness and exchange rate volatility. On the other, this comprehensive study with a large country sample and lengthy time period would benefit policymakers in forecasting and conducting sound monetary policy regarding the openness to international goods and capital markets.

1.4 Research objectives

The general objective of this study is to identify the determinants of real effective exchange rate volatility by taking into consideration the role of financial development on 59 economies during the period 1980-2011. The specific objectives are:

i) To investigate the relationship between trade/financial openness and exchange rate volatility.

ii) To construct an interaction term to test the hypothesis of a nonlinear effect of financial and trade openness on exchange rate volatility given the level of financial development. That is, to measure threshold levels of financial development above which the exchange rate volatility-openness relationship is stronger.

1.5 Significance of study

This study contributes to the existing literature on real exchange rate volatility-openness nexus in different aspects. First, it takes the role of financial development level of an economy into account and examines if the impact of openness on real exchange rate volatility is stronger in financially developed countries in comparison with financially underdeveloped countries. The role of financial development, to the best of the author's knowledge, has been largely ignored. The study interacts financial development with each of the financial and trade openness to capture its impact on the relationship between real effective exchange rate volatility and openness. This study uses three measures to financial development level in order to get more robust result.

Second, the existing studies in the literature have examined a limited basic range of econometric approaches to investigate the relationship between real exchange rate volatility and openness. Alternatively, this study applies the Two-Step System Generalized Method of Moments (GMM) estimator to examine this link, which is expected to be more efficient as it combines the first differenced variables along with the variables at level to reduce the weakness of instruments. This econometric method also accounts for the endogeneity problem of variables that is expected to arise in this study as the main variables, trade and financial openness, are not strictly exogenous with real exchange rate volatility (Calderón & Kubota, 2009).

Third, the findings of this empirical study provide an updated evidence on the research issue. It additionally helps policymakers of both financially developed and developing countries to anticipate the expected level of exchange rate instability when a country gets more involved in international financial and goods markets, while the financial structure of the economy is taken into account. In addition, the findings help the researchers to understand the role of financial development on the link of exchange rate volatility with its determinants, particularly openness.

1.6 Organization of study

This thesis is organized in five chapters; first, introduction, second, literature review, third, research methodology, fourth, empirical results, and five, conclusion. The first

chapter is organized as follows: section 1.2, briefly explains the role of exchange rate in an open economy and the theoretical link of real exchange rate volatility-openness nexus emphasizing the role of financial development. Section 1.3, states the problem statement, 1.4, develops the research objectives, and 1.5 explains the significance of the study.

The chapter of literature review examines the theoretical and empirical studies on the impact of trade and financial openness on exchange rate volatility and financial development. This chapter is organized as follows: section 2.2 reviews the theoretical literature. The determinants of the dependent variable, real exchange rate volatility, are reviewed in 2.2.1. The theoretical literature on the main variables of the study is reviewed in 2.2.2. Section 2.3 provides a review of empirical literature. Where 2.3.1 focuses on trade openness-real exchange rate volatility nexus, section 2.3.1 reviews the financial openness-real exchange rate volatility nexus. The last section 2.4 provides a summary on the literature review and the justification of the research topic.

Chapter three introduces the research methods applied in the study. The chapter is organized as follows: section 3.2 reviews the variables of the study. The dependent variable is introduced in section 3.2.1, while section 3.2.2 explains the independent as well as the control variables. Section 3.2.3 provides a summary of the variables. Section 3.3 introduces the empirical estimation method. Finally, the chapter is concluded with a summary in section 3.4.

Chapter four presents and interprets the empirical results of the study. The chapter is organized as follows: section 4.2 explains the econometric estimator, Two-Step System GMM, in details. Section 4.3 first, using the descriptive statistics and the correlation matrix, describes the variables. It later interprets the empirical test results. The last section 4.4 gives the summary of the results and highlights the major findings.

Finally, chapter five concludes the study and illustrates the major findings as well as the policy implications. Section 5.2 concisely states the research approach followed in order to achieve the research objectives and summarizes the findings of the study. Section 5.3 states the research implications on policymakers. Finally, the last section lists some of the limitations of the study and provides future researchers with some suggestions.

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