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By Bhutta, Simonetti, Avvisati

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Impact of financial deepening on exchange rate: spillover evidence from developed and developing economies

Nousheen Tariq Bhutta, Biagio Simonetti^a and Gala Avvisati^b

^a*University of Sannio, Benevento, Italy*

^b*National Institute of Geophysics and Volcanology, Italy*

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Financial Deepening refers to improvements in both the volume of money in circulation and the resultant increase in the pool of financial services tailored to all levels of society. This paper provides a unique framework for exploring important factors, through which Financial Deepening leads to financial crises. The excessive Financial Deepening in the base country spills over into other economies, leading to financial instability. In this study, annual data from 42 countries were collected from the International Monetary Fund for the period 2000-2016. Augmented Dicky Fuller, Correlation, VIF, linear regression, and ARCH-GARCH family models were applied in order to analyse and validate the outcomes. In the end, recommendations and future research directions are presented for both developed and developing countries.

keywords: Financial Deepening, Exchange Rate, Spillover Evidence.

1 Introduction

Over the last decade, mostly worldwide economies have encouraged financial development to promote economic growth (Gries et al., 2009). This nexus has been cited both in theoretical and empirical contexts for Uni-country-specific and cross-nationally as well as at industry and firm-specific like (1911) found the financial development plays a vital role in fostering economic growth and novelty by mobilizing resources, evaluating assignments, employing risk management strategies as well as monitoring entrepreneurs. Financial integration enhances economic growth (McKinnon, 1973; Shaw, 1973). From a finance-leading view, financial intermediaries and institutions play a vital

role in channelling funds in the economy (Bencivenga and Smith, 1991). According to the McKinnon-Shaw Theory, most countries reform their financial systems and markets in order to improve the efficiency of their financial institutions, create financial deepening and increase GDP growth. However, financial integration overemphasizes economic growth which may arise due to the demand of the financial sector (Robinson, 1954; Lucas Jr, 1988), which is automatically fulfilled through the financial system (Arestis, 2006). However, excessive credit booms and inflation negate the benefits of financial deepening on growth and lead to the depreciation of exchange rates, which in turn leads to financial crises. Numerous factors trigger financial crises, including severe fiscal imbalance. However, the factor which contributes the most to these crises is the mismanagement of financial liberalisation, as evidenced by the financial crises of 1994 in Mexico and 1997 in East Asia (Mishkin and Eakins, 2019). Moreover, some studies demonstrated that financial and banking crises are the result of a capital inflow "bonanza" as an episode in which there are larger-than-normal net inflows (McKinnon and Pill, 2007; Reinhart et al., 2009; Magud et al., 2014). Similarly, financial crises hit countries that are overly liberalised in order to increase GDP growth and encourage financial boom (Shah and Bhutta, 2014). However, the main factor explored in this paper, exchange rate fluctuation, through which financial deepening leads to financial crises, remains unexplored. These findings prompted us to investigate the impact of financial deepening on foreign exchange rates and how it spills over into developed and developing economies. The primary research questions for the present study are as follows:

1. What are the positive as well as the negative roles of financial deepening?
2. What are theories and main drivers of financial deepening?
3. Does financial deepening in one economy affect exchange rates of other economies?

The remainder of the paper is organized as follows: Section 2 presents the literature review. Section 3 outlines the methodology used in this study. Section 4 interprets the results and Section 5 presents concluding remarks and future research directions.

2 Literature Review

Over the last decade, most economies have enhanced financial integration by reducing governmental interference in the financial sector. Financial development plays a key role in promoting economic growth by applying risk-management techniques, allocating financial resources, evaluating tasks, and monitoring entrepreneurs. Ultimately, these economies may create high direct investment at national and international level (Gries et al., 2009). Financial deepening is usually a multi-faceted method comprised of markets, instruments, and stakeholders. As Shaw (Shaw, 1973:8) has demonstrated, financial deepening is a specialization in financial functions as well as organized domestic institution and markets gain to foreign financial markets and the control (informal). He argued

a rise in the real volume of the monetary system that will create the profitable opportunities, from bill dealers to industrial banks as well as insurance companies? According to Levine (2005), financial deepening is a process in which financial markets as well as financial institutions exchange goods and services, pool the savings of large volumes of investors, inquire about information regarding companies' investments and projects, implement corporate governance, and manage risk. Regarding the financial liberalization theories by McKinnon and Shaw in 1973, government restriction on financial systems can negatively affect financial development. They proposed discouraging financial repression plans in order to quicken financial development in the economy. Moreover, high inflation may also have an adverse effect on financial deepening, which depicts macroeconomic stability (Moore, 1986). However, Stiglitz (1994) criticized this theory, as financial liberation may lead to a negative impact on financial development. Financial deepening can improve an economic scenario by increasing efficiency in financial markets. There are two ways by which financial deepening can improve the economic growth of a country. First, it induces more investments by reducing transaction costs and the effective mobility of resources (Merton and Bodie, 1995). Second, it increases productivity through the proper allocation of financial resources (Beck et al., 2000). It also assists the choice of financial services resulting from a financial infrastructure.

2.1 Theories of Financial Deepening

The relationship between financial deepening and economic growth has been cited have been cited in a number of theories including:

- **Bank-Based Theory** This theory focuses on the significant role of commercial banks in order to promote economic growth by mobilization of resources as well as eliminating the risks (Levine, 2005);
- **Market-Based Theory** This theory focuses on the proper-functioning of markets in order to foster growth, corporate governance, and diversification as well as policies for better risk management (Levine, 2005);
- **Financial-Services Theory** This theory focuses on both market-based and bank-based approaches through banks offering significant financial services that enhance both industrial and economic growth (Kose et al., 2010);
- **Law and Finance Theory** This theory focuses on the legal system with regard to the economic performance of a firm, an industry and a country (Porta et al., 1998).

2.2 Drivers of Financial Deepening

Many researchers have examined the few drivers which are crucible for financial development and which have been presented in the ensuing paragraphs. Credit infrastructure that provides easy access of loans to individuals or enterprises. An effective legal system is the backbone of efficient financial markets. A strong legal system provides bylaws for

property rights that translate into easy recovery of loans. Macroeconomic stability controls the inflation rate, exchange rate fluctuations, and the government budget deficit (Claessens and Feijen, 2007). Competition in the financial sector is a crucial determinant of financial deepening because it enhances the effectiveness of production services, a product's quality, and the frequency of innovation in financial sector (Claessens and Laeven, 2005). Additionally, it increases the governmental invention in finance and banking, the existence of the forex market, prudential monitoring of commercial banks and property rights (Creane et al., 2006). The introduction of prudential standards is likely to enhance competition in a financial sector that favors more efficient private banks (Suzuki and Miah, 2010). However, bank concentration increases financial hurdles in the development of the financial sector in low income countries with high governmental meddling in the banking system and a higher instance of government-owned banks (Beck and Levine, 2004).

2.3 Positive Role of Financial Deepening

Financial deepening increases hidden costs by applying effective laws, which enables entrepreneurs to take the initiative for innovative tasks (Ang, 2008). It heightens governmental strategies by restraining credit and low interest rates, which in turn eliminates the entry barriers for global financial institutions (Bumann et al., 2013). Similarly, it heightens the merits of foreign direct investment (Kose et al., 2008). This then enhances the efficiency of price mechanisms and market competition, which translates to high savings through which makes more opportunities for investment purposes accessible (Bumann et al., 2013). Moreover, it identifies favourable business prospects as well as effective corporate governance mechanisms (Levine, 2005). It also facilitates the initial suppliers' funds by declining their risk. Ultimately, by using an intermediary approach, the financial sector may diversify their speculations. Additionally, this approach supplies professional information by reducing investors' transaction costs (Hamori and Hashiguchi, 2012). Finally, it encourages the allocation of resources and capital accumulation (Danchen and Juan, 2007). Financial deepening reduces both monitoring and screening costs, which in turn reduces principal agent problems and enhances the number of novelties (Aghion and Howitt, 2008), thereby eliminating credit rationing by adopting modern technology-based strategies, which enhance the promotion of technology-intensive companies (Hamori and Hashiguchi, 2012). It also eliminates financial and economic crises both at the domestic and the global level (Bumann et al., 2013) and reduces the relationship lending allowing borrowers to access many options for funding their business and investment opportunities (Boot and Thakor, 2000). Furthermore, it channels the economic sources to fruitful uses (Schumpeter, 2008) and helps in poverty reduction. Odhiambo (2010) has outlined the ways that this strategy has been particularly effective in Zambia.

2.4 Negative Role of Financial Deepening

Financial deepening does not resolve the dilemma of asymmetric information which restricts the efficiency of financial markets, irrespective of governmental interference (Stiglitz and Weiss, 1981; Stiglitz, 2000). It reduces the lending relationships which demolish information and lead to higher chances of asymmetric information (Boot and Thakor, 2000), which in turn increases the number of bank failures, financial instability, and severe negative outcomes for an economy. Similarly, it reduces the profit margins, which cause which generally increases the financial fragility of markets and banks. Decrease in profit margins may encourage banks to cut down on monitoring efforts when granting loans. Hence, financial deepening may trigger financial crises if excessive risks are taken due to increased competition (Hellmann et al., 2000).

2.5 Exchange Rate

Exchange rate fluctuations are an essential factor which influences productivity growth. Aghion and Howitt (2008) have confirmed that real exchange rate movements influence productivity growth for long-term periods. Their study has proved that slight financial development reduces the growth; however, high financial development does not bring any significant outcomes. Moreover, foreign exchange intervention should be envisioned while investigating the impact of financial development and exchange rates. By developing a dynamic general-equilibrium model, the different behaviors of monetary rule which reflect an exchange rate's flexibility have been identified. A trade-off between floating and fixed exchange rates was seen among mature industrialized economies and emerging ones (Devereux, 2001). Furthermore, contractionary monetary shocks lead to nominal and real exchange rate appreciations (Eichenbaum and Evans, 1995; Zettelmeyer, 2004). There is fluctuation in the exchange rate in response to the high volatility of monetary returns as well as steady price adjustments (Mussa, 1986). Therefore, the exchange rate can be an essential component of determining monetary returns (Glick et al., 1989). In contrast, while studying floating exchange rate periods, Stockman (1980) highlighted high fluctuations in monetary returns.

2.6 How the financial deepening impacts the exchange rate?

Macroeconomic shocks are transmitted through large bank lending. According to the theory of monetary transmission, monetary policy monitors real economic activity by changing the borrowers' balance sheets with regard to their composition and strength. In response to these regulations, banks either restrict or expand the amount of lending, which ultimately regulates economic activity (Aysun, 2016). Moreover, US expansionary monetary policy has led to more expansion in economic and financial conditions. Therefore, monetary policy can be a strong predictor of financial instability (Chen et al., 2016). Many researchers have studied the factors which trigger financial crises. For example, (Demirgüç-Kunt and Detragiache, 2005) have demonstrated that sudden capital inflow fluctuations can be predictors of financial crises. Similarly, interest rate dynamics in industrialized economies can easily lead to financial crises. However, current account

and external debt burdens were less significant to create financial crises (Eichengreen and Rose, 1998). Moreover, in Feretti's study, the size of the current account deficits was the strong predictor of financial crises (Milesi-Ferretti and Razin, 2007). However, the countries with current account surpluses are able to suffer less in financial crises (Rose and Spiegel, 2011). Similarly, economies with less debt burden and current account surpluses are better insulated from financial crises. In contrast, the imbalance of external assets and liabilities can be identified as the major cause of financial instability Obstfeld (2012). Interest rate volatility in the base country passed, among other pegged economies (Shambaugh, 2004), like when a base country increases lending domestically. The interest rate becomes low and most people can borrow at low interest rates. Ultimately, their consumption will be high. They can easily access and buy expensive things from foreign countries. As a result, imports increase as compared to exports, which leads to current account deficits and currency depreciations. Currency depreciation in turn leads to monetary shocks. Hence, from the above discussion, we can infer the following hypothesis:

H1: Financial deepening has significant impact on nominal exchange rates among economies.

2.7 Proposed Model

In the following diagram, we proposed that financial deepening has a spillover effect on nominal exchange rate of different economies. Here, financial deepening is taken as independent variable, nominal exchange rates as dependent variable and countries as control variables.

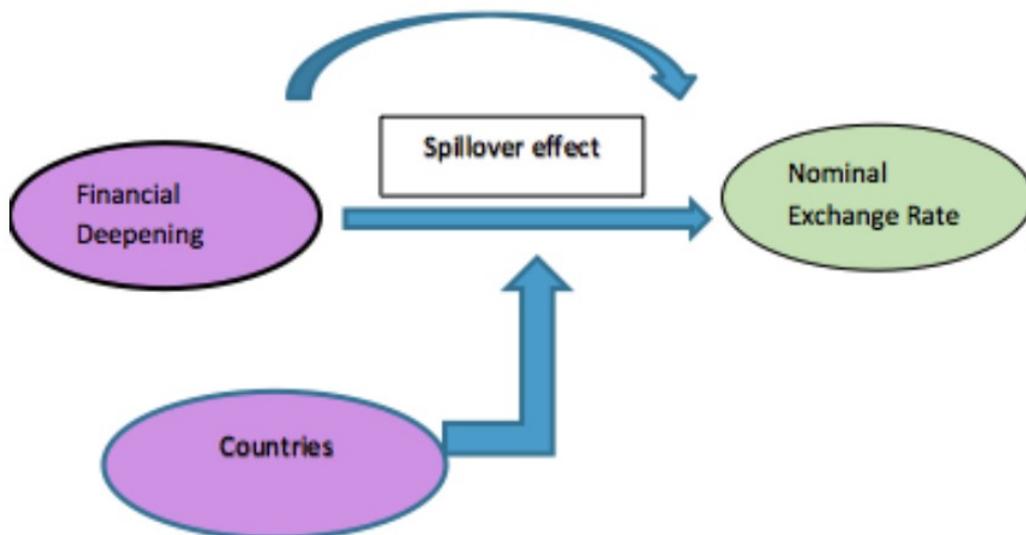


Figure 1: The proposed model

3 Methodology

The methodology section is comprised of two parts. The first part discusses the details of variables and their measurements. The second highlights the analytical tools which were applied to the data in the present study.

3.1 Variables

$$NER_{it} = \alpha + \beta_1 FD_{it} + \beta_2 D_1 C_{it} + \epsilon$$

Where α is the overall intercept term, D represents the dummy variable, FD shows Financial Deepening as independent variable, NER depicts Nominal exchange rate as dependent variable, $\sum C$ represents countries and ϵ shows error term.

3.2 Measurement of variables

Financial Deepening

Two measures were used for measuring the financial deepening

1. Broad monetary aggregate (M2) to GDP
2. Number of account holders, Debit/Credit card users

Exchange rate

Natural log of nominal exchange rate (NER), measured at US base.

3.3 Sources of data

For the present study, data were taken on an annual basis for the period of 2000-2016 across 42 developed-developing economies. The USA was taken as the base country. The data were extracted from the International Monetary Fund. The names of countries have been presented in Table 1. The software used for analysis are Eviews 10 and Stata 14.

Table 1: Countries

N	Country	N	Country
1	Pakistan	22	United States
2	Australia	23	Nigeria
3	Brazil	24	New Zealand
4	Canada	25	Norway
5	Chile	26	Peru
6	China	27	Philippines
7	Croatia	28	Poland
8	Czech Republic	29	Portugal
9	Denmark	30	Paraguay
10	Egypt	31	Romania
11	Hongkong	32	Russia
12	Hungry	33	Singapore
13	Indonesia	34	Spain
14	Iceland	35	Slovakia
15	Italy	36	Sweden
16	Ireland	37	Switzerland
17	Korea	38	Colombia
18	Japan	39	Thailand
19	Latvia	40	Turkey
20	Malaysia	41	Taiwan
21	Mexico	42	South Africa

3.4 Methodological Tests

- The Augmented Dickey Fuller test was applied to check the stationarity of data, through the presence of the unit root in an autoregressive model. In the case that the test rejects the null hypothesis, the data is stationary.
- Autoregressive conditional heteroskedasticity (ARCH) is a time-series statistical model used to analyse an error term unexplained by econometric models. If the variance of this term is uniform, it is known as "homoskedasticity." However, in some scenarios, if variance is not uniform, it is known as "heteroskedasticity". It provides a variance in a time series over time. It models as a function of the residual errors from a mean process

- Variance inflation factor (VIF) was applied to provide a measure of multicollinearity among the explanatory variables in a multiple regression model. A high VIF value indicates that there is highly collinearity among explanatory variables in the model, which reduces the statistical significance of the independent variables.
- Correlation test was applied to find the interrelationship among financial deepening, the nominal exchange rate, and the real exchange rate. The value of correlation should be between -1 and +1, indicating the strength of the association.
- Linear regression was used to investigate the impact of the explanatory variable of the dependent variable by fitting a linear equation to observed data. In this study, the impact of financial deepening on exchange rates was studied. Before applying the linear regression model, it is necessary to determine the interrelationship among variables through correlation.
- Generalized Autoregressive Conditional Heteroskedasticity (GARCH) is extension of the ARCH model that incorporates a lag variance term together with the autoregressive error term. i. Exponential GARCH model (EGARCH) is a new feature in the GARCH model introduced by Nelson (1991) that proposes that there should be a weighed invention which allows for the unequal changes of the volatility in stock returns. ii. GJR Garch is another feature in the GARCH model introduced by Glosten et al. (1993). It is better for capturing the movements of negative shocks, as they have a bigger effect on volatility than the positive shocks do (Tsay, 2005). The conditional standard deviation should be determined by the sign of the earlier lagged values (Bollerslev, 2010). iii. Threshold GARCH model (TGARCH) is similar to the GJR model. It only differs for using the standard deviation, instead of the variance, in the specification.

Table 1: Country list

4 Discussion of Results

4.1 Augmented Dicky Fuller Test

When the ADF test has been applied to data, the result that all variable are stationary at level that confirms the assumption of OLS multiple regression. VIF test shows that there is no multicollinearity in data. Correlation test has been applied to check the interrelationship between variables, it has been observed that financial deepening is a significant positive relationship to nominal exchange rate.

4.2 Linear Regression

When the linear regression model has been applied, it is shown that financial deepening has insignificant impact on nominal exchange rate. The R square is 97%, which means that this model explains only 97% of independent factors that affect the nominal exchange rate (NER) and real exchange rate while 3% is other factors that influence the

nominal exchange rate (NER). F-statistics is significant at 0.000. When the ARCH test applied to check the Heteroskedasticity of data, the result shows the p value is significant at 0.000, which confirms the presences of heteroskedasticity in data. It has been presented in following graph.

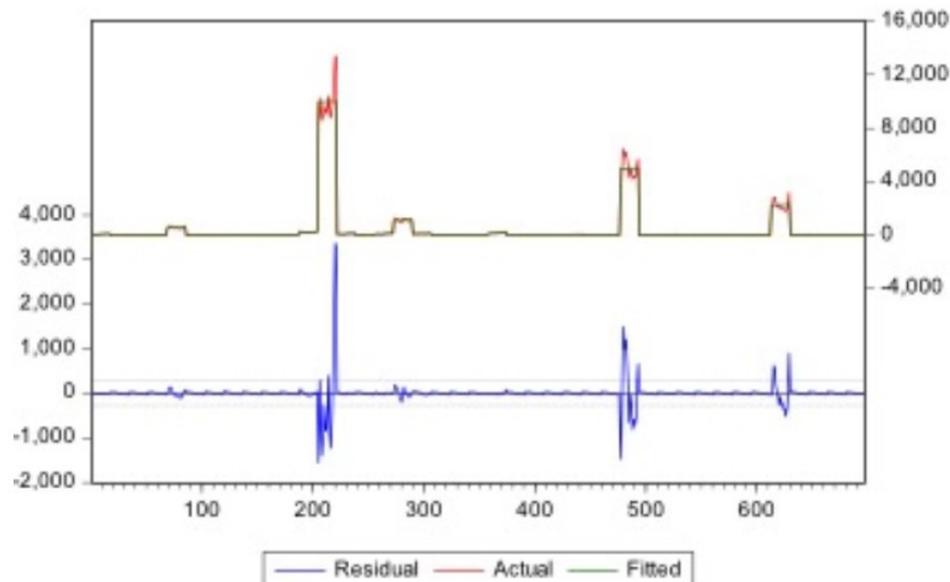


Figure 2: Residuals plot

4.3 ARCH-GARCH Models

When the ARCH-GARCH family models have been applied on data to check the volatility of financial deepening on nominal exchange rate. The result shows that financial deepening has significant impact on the nominal exchange rate at 0.000. Moreover, it has been seen that financial deepening in US generate significant volatility on nominal exchange rate among all economies except Croatia, Czech Republic, Nigeria and Sweden. The Schwarz criterion is 9.0 and Hannan-Quinn criterion is 8.8. When the GJR-Garch (1,1) was applied, it has been seen that financial deepening has insignificant impact on nominal exchange rate at 0.66. According to this model, financial deepening in US generatesignificant volatility on nominal exchange rate only in Colombia, Indonesia and Paraguay. Moreover, The Schwarz criterion is 14.1 and Hannan-Quinn criterion is 13.9. When the ARCH (5) was applied, it has been seen that financial deepening has insignificant impact on nominal exchange rate at 0.39. According to this model, financial deepening in US generate significant volatility on nominal exchange rate only in Korea,Colombia, Indonesia and Paraguay. Moreover, The Schwarz criterion is 13.2 and Hannan-Quinn criterion is 13. When the EGarch (1,1) was applied, it has been seen that financial deepening has insignificant impact on nominal exchange rate at 0.27.

According to this model, financial deepening in US generates significant volatility on nominal exchange rate only in Colombia, Indonesia and Paraguay. Moreover, The Schwarz criterion is 14.3 and Hannan-Quinn criterion is 14.1. Based on Schwarz criterion and Hannan-Quinn criterion of all ARCH-GARCH family models, the Garch(1,1) is the best model.

5 Conclusion and Future Research Directions

Financial deepening plays a crucial role in a country's economic development and growth. The positive aspects of financial deepening are: it provides favourable hiding costs, efficient price mechanisms, and enhancement of governmental policies, and it improves market competitions. However, if financial deepening is excessive, it may lead to financial instability. This paper provides a new framework for understanding. The findings suggest that if one economy increases lending in the base country, the impact spills over among developed and developing countries through fluctuations in exchange rates, which create account deficits and financial instabilities. This research proposes that economies can be saved from future financial crises by responding differently to the monetary policies of the base economy in order to offset negative outcomes. On example of this approach is China tightening monetary policy during the low US corporate spread in order to offset the expansionary impact on output growth. However, in Brazil, the expansionary US monetary policy created expansion in financial and economic circumstances (Chen et al., 2016). Future research should be conducted to assess the financial behaviours of developed and developing economies in response to US monetary policy and explore these factors in order to grasp the true scenario of financial stability.

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