

A Synthetic Review of Exchange Rate Volatility and Soybean Meal Exports from India

Dr. Nishant Joshi

Associate Professor, Prestige Institute of Research and Management, Indore.

Abstract

The exchange rate is considered to be an important macro variable with significant implications on the overall economy of the country. Owing to its potential to up-regulate or down-regulate the economic growth, exchange rate has been widely researched by the policymakers and the academicians. However, exchange rate is highly volatile and given the dynamicity associated with exchange rate volatility the current study intends to explore the short term and long term impact of exchange rate variation on exporting. The study considers soy meal export in India as an example to portray the impact of exchange rate volatility.

Keywords: Commodity price, Exchange rate, Exports, Exchange rate volatility, India,

1. Introduction

The exchange rate is considered to be an important macro variable with significant implications on the overall economy of the country. Owing to its potential to up-regulate or down-regulate the economic growth, exchange rate has been widely researched by the policymakers and the academicians. Since the 1970s, there has been a substantial amount of debate regarding the type of exchange rate that should be regularized. The different types of exchange rate include fixed exchange rate or pegged exchange rate, and floating exchange rate (Backman, 2006). Stability in the exchange rate is highly prioritized by the economists owing to the ability of a

stable exchange rate to ensure foreign trade and favorable external environment that supports economic development. On the contrary, an unstable exchange rate although enhances the probability of future income, but at the same time also increases the risk of financial uncertainty and risk of investments in domestic and international markets. A substantial reduction in the social welfare standards have been also reported as a result of the exchange rate instability (Devereux, 2004; Byrne and Davis, 2005).

Exchange rate volatility can be defined as movements in the exchange rate that have not been anticipated previously (Ozturk, 2006). The impact of exchange of volatility is not just restricted to the trading status of the country but also extends to the associated countries as well. For example when there is a substantial decrease in the international trade and investment a subsequent lowering in the welfare of the residents is also noted for all countries associated with the (Edmonds and So, 2004). The increased dynamicity that encompasses exchange rate volatility has led to the increased quest of the policymakers to elucidate the different aspects of exchange rate volatility.

In context of the developing countries, several studies have revealed that increased exchange rate volatility enhances the risk of domestic and foreign direct investments (Urata and Kawai, 2000; Serven, 2003; Byrne and Davis, 2005). Exploring several models that attempt to shed light on the

probable relationship between exchange rate volatility and export flows have suggested that an increase in the exchange rate volatility causes maximization of the uncertainty of profits on contracts that are driven by foreign currency. Under such circumstances the risk managing agencies are forced to consider investments in the low risk home market. Another school of thought however, contemplates that increased exchange rate volatility could serve as scope for enhanced profits and export (Serenis&Tsounis, 2014). Given the dynamicity associated with exchange rate volatility the current study intends to explore further by evaluating the short term and long term impact of exchange rate variation on exporting. The study considers soy meal export in India as an example to portray the impact of exchange rate volatility.

2. Aims and Objectives

This section will state the aims and objectives of the study. The objectives of the study are as follows:

- (1) To examine the short term and long term impact of exchange rate variation on 'exporting'.
- (2) To analyze the impact of exchange rate volatility rate on soybean meal export from India and their relationship.
- (3) To assess the commodity level panel data analysis of exchange rate and soybean export from India.

3. Literature Review

3.1 Status of Exchange rate volatility in India

The volatility within the world economy has been evident over the past few years. In this regard the increased capriciousness for the economy of the countries belonging to the European Union, have led to an increased risk of potential disruptive consequences worldwide. The advanced economies have been in the mares nest characterized by unemployment, increased debt and fiscal

deficit. In an attempt to fight the concerns that have emerged as a result of economic depression have further led to enhancement of the volatility standards within the financial market globally. During the onset of the global financial crisis, the currencies of the developing nations witnessed substantial depreciation which triggered the higher exchange rate volatility (Sharma et al., 2012).

Within the economy, the exchange rate remains associated with high volatility. This primarily owes to its increased probability of being affected either directly or indirectly by a string of variables such as the demand and supply rates, and the subsequent factors that influence the demand and the supply rates (Tripathy, 2013). The influence of the factors on exchange rate is bidirectional. Thus, it is not just the exchange rate behaviour modulated by the determinants, the latter is also impacted upon by the altered exchange rate behavior. Exchange rate dynamics serves as the umbrella term that deals with assessment of the exchange rate fluctuations. The degree of dynamicity associated with the foreign exchange rate has been advocated by the economists to be significantly high. Some of the notable factors with highest implications in the foreign exchange rate dynamicity has been macro and microeconomic fundamentals, aggregate supply and demand, nominal, monetary and real shocks, order flow, foreign investment flows (foreign direct and portfolio investment), changes in equity returns, turnover in forex market, interest rates, and tariffs.

The impact of the economic and financial crisis of major or minor stature is perceived differentially by the developed and the emerging markets. Economic and financial crises for developing/ emerging economies result in a reduced capital inflow or withdrawal of the investment from the market by the foreign investors. This leads

to a sudden plummet in the currency value paving the way towards major episodes of currency crisis. Exchange rate behaviour remains highly sensitive to currency crisis and is influenced negatively by the same.

The global financial crisis that initiated owing to the housing bubble burst in the United States in the year 2008 had outreaching impacts on both the developed and developing economies owing to its global trading linkages. Despite the minimalistic impact upon the emerging markets, a holistic view revealed that the economic growth of the country largely depends upon the channel of trade, investment, and productivity (Marjan, 2009). Rodrick, (2008), in their study attempted to develop a formal model that elucidates the correlation between real exchange rate and economic growth. The study findings proposed that enhanced economic growth could be ensured, when the real exchange rate remains high. Although applicability of the study findings has been at a global level, its relevance is highly significant for the developing countries. The use of different measures and estimation techniques for the exchange rate evaluation enhanced the robustness of the study results. In the concluding remarks the author contemplated that the impacts of the government or market failures upon the tradables has been disproportionate thus restricting the convergence of the financially poor nations with the high income countries. The two factors that have been identified to contribute in this regard are institutional weaknesses, and product-market failures (Rodrik, 2008).

Owing to the intricate correlation between exchange rate volatility and economic stability, exchange rate behavior often serves as the primary determinant of the country's economic growth. Exchange rate also has been identified to have significant correlation with international trading levels.

In India, the exchange rate was unified in 1993 as a part of the liberalisation and privatization processes. A pre-set framework of exchange control guided the operations of the freely floating exchange rate within the Indian economy. However, since the introduction of the unified exchange rate system, a significant drop has been recorded in the value of Indian Rupee against the US dollar. India thus witnessed a significant amount of volatility in the exchange rate market. Under conditions of high volatility the Reserve Bank of India is entrusted upon for the implementation of monetary and regulatory measures that are intended to address the concerns governing the foreign exchange market (Misra & Gupta, 2017).

3.2 Impact of exchange rate volatility on sectoral exports in India

Several studies have been conducted over the years to investigate the implications of exchange rate volatility within the Indian trading market. Some of the early studies by Virmani (1991), and Srinivasan (1998) revealed that the exchange rate and merchandise aggregate exports are negatively correlated.

Srinivasan & Kalaivani (2012) in their study utilised the Autoregressive Distributed Lag (ARDL) bound testing procedures to investigate how real exports in India is influenced by the exchange rate volatility. To fulfill the study objectives, annual data on real exchange rate, Gross Domestic Product (GDP), exchange rate volatility, and foreign economic activity were accessed for the time period extending between 1970 to 2011. The study results revealed that the four parameters under consideration, that is, real exchange rate, GDP, exchange rate volatility, and foreign economic activity remains cointegrated with real exports. In terms of exchange rate volatility it was observed that be it in the long run or short run, real exports in India

are negatively impacted by volatile exchange rates. Thus a reduction in the degrees is unavoidable when high exchange rate fluctuation tends. The short run and long run effects of real exchange rate upon real exports has been contradictory. While the short run effects were negative, the long run effects were observed to be positive. In context of GDP, the study results prompted the long run effects on real exports to be significantly positive. However, insignificant impact on real exports were noted in the short-run. Lastly, analysis of the influence rendered by the foreign economic activity on real exports revealed short-run and long-run impacts to be negative and positive, respectively. The results were significant in both cases.

Panda & Mohanty, (2015) highlighted the Indian scenario pertaining to the impacts of exchange rate volatility on the exports. Similar to the approach by Srinivasan &Kalaivani (2012), the current study also accessed time series data ranging from 1970-71 to 2011-12. Exchange rate volatility was measured using a simple rolling standard deviation while to fathom the long run correlations between the variables, Johansen cointegration technique was exploited. The study results revealed the presence of a cointegrating relationship among real exchange rate volatility, real exports, and the world GDP. In India while the World GDP remains positively related to the export volume, the latter is negatively influenced by the real exchange rate volatility. The authors however suggested exchange rate volatility can increase the export volume provided the volatility remains under moderation.

Bal (2012), reported no statistically significant correlation between exchange rate volatility and the Indian export levels. Dhasmana (2012) analyzed the real exchange rate and its correlation with trade balance of India with its partners spread

across different countries. The study results revealed a negative correlation between real exchange rate volatility and India's trade balance in the long run.

Undoubtedly, the outreaching impacts of exchange rate volatility on the economic growth status of the nation has necessitated measures that could be implemented to overcome the same. In this regard the study by Srinivasan &Kalaivani (2012) proposed several measures that could be implemented in India to overcome the consequences of exchange rate volatility. The first and the foremost recommendation has been to maximise stability concerning the exchange rate volatility so as to ensure enhanced real exports of the Indian economy. In this regard the authors advocated that the Reserve Bank of India (RBI) should undertake policy measures to enforce a sustainable and stable exchange rate. While designing policy measures to address the exchange rate volatility in India, apart from considering the trade and exchange rate, the policy makers are also required to acknowledge the existence and assess the degree of exchange rate volatility. Considering the negative impacts of depreciation in the value of Indian rupee upon real exports, the authors suggested that a control over the situation could only be achieved with RBI intervention. Lastly, the study emphasized upon foreign trade policy finely tuned to remain at par with the dynamic changes in the global economy, an important measure to overcome the alarming global economic crisis.

3.3 Energy costs and actual exchange rate of nations with commodity-export

A sudden surge in the commodity prices experienced in the early 2000's, sparked interest among the researcher to evaluate the potential link that may exist between real exchange rate and terms-of-trade that are followed by the countries associated with commodity export. In this regard researches

have revealed that there exists a positive link between exchange rate and terms-of-trade (Chen & Rogoff, 2003; Cashin et al., 2004). Further evaluations have led to the concept of commodity currencies which holds true for both the developed and developing countries (Coudert et al., 2011; Bodart et al., 2012).

Kohlscheen et al., (2016) in their study investigated the correlation between commodity prices and the exchange rates. The study findings revealed commodities to be a significant determinant of currency fluctuations. There exists a statistically significant linkage between commodity prices and exchange rates. The relation also holds true even under high-frequency circumstances. The study has been also instrumental in depicting that the changes in global risk appetite does not drive the linkage existing between commodity prices and exchange rates.

A recent study by Butt et al., (2020) evaluated the nexus between exchange rate and commodity price in Malaysia. The authors examined the linkage between energy and agricultural commodity prices in terms of long and short term dynamics associated with the asymmetric adjustments. To fulfill the study objectives time series data on exchange rate and commodity prices were accessed for the period extending from 1994 to 2017. The key findings of the study revealed that there exists a long-run relationship between commodity price and the exchange rate. The claim was substantiated with results of the Engle–Granger cointegration test. However, the incompatibility of the Engle–Granger cointegration test in the long-run analysis aspect owing to the lack of a threshold adjustment was addressed in the study with the threshold autoregressive (TAR) and momentum threshold autoregressive (M-TAR) models. In the short run, the adjustments towards the long-run

equilibrium position were observed to be asymmetric. The authors concluded that since commodity based exports form the basis of Malaysian economy, a rise in the commodity prices may have negative economic outcomes. This primary owes to the accumulation of the foreign exchange reserves which is reciprocated in terms of enhanced currency demand. With increased demand there has been a consequent domestic currency appreciation. Thus, instead of responding to negative shocks the nominal exchange rate remains associated with positive shocks. In the Malaysian context, the overvaluation serves as the major determinant of exchange rate rather than undervaluation. Response to overvaluation poses threat to economic growth of the country as it may lead to unsustainable deficits in the current account, increase in the external debt, and enhanced risk of speculative attacks. On the contrary, for undervalued currency there remains the scope for an equivocal effect on growth.

Bayoumi&Muhleisen, (2006), in their study correlated energy, exchange rate, and economy. The study made an attempt to investigate the potential benefits that Canada enjoyed over the expansion of the oil sands production, enhanced export of energy, and trade improvements. Post analysis of the relevant data the authors concluded that the beneficial impact of the oil sands production expansion has been limited with respect to the Canadian economy. The minimal gains in export revenues have been the outcomes of the upward pressure on the exchange rate. Such pressure is not sufficient to bring about a significant impact upon the non-energy exporters.

Fossil fuels serve as the primary source of energy that is exploited widely for the production and transportation purposes. Oil being one of the most popular forms of fossil fuel utilised for transportation, it is

often referred to as the engine that drives the overall economic activities. Fluctuations in the oil prices under majority of the circumstances renders either a direct or indirect impact upon the macroeconomic variables. Several studies thus have evaluated the interconnections between oil prices and the exchange rates. Du et al., (2011) not just investigated the factors that induce volatility in the crude oil prices but also attempted to unravel the underlying links prevailing between volatility and agricultural commodity markets. To fulfill the study objectives the authors implemented a stochastic volatility model to examine the weekly prices of crude oil, corn, and wheat within the time frame ranging from 1998 to 2009. Results of the study revealed that in the course of explaining the crude oil price volatility, petroleum inventories, speculation, and scalping hold significant relevance. Further, observations depicted the oil price shocks in recent times to have negative implications on the commodity prices. A sharp rise in prices within the agricultural commodity for corn and wheat has been evident. In justifying the specific rise for corn and wheat the authors contemplated the same could be an indication that these food/feed bears a tighter interconnection with the energy markets.

Huang et al., (2005) in their study investigated the impact of oil price volatility on economic activities utilising multivariate threshold models. Accessing monthly data on oil prices, and economic activities of US, Canada, and Japan from 1970 to 2002 the study concluded that the dependency of the economy on imported oil largely dictates the optimal threshold level. In this regard the nations favorability for energy-saving technology also has been identified to have significant impact in ascertaining the optimum thresholds. Further, the study proclaimed that oil price volatility when

remains below the threshold levels, it renders a limited impact upon the economic outcomes. For price changes above the threshold levels, oil prices have been identified as the most prominent determinant of the macroeconomic variables compared to the volatility. The last key finding of the study claims that when the changes exceed the optimum threshold, change in oil price or its volatility could pose as a better alternative to real interest rate for explaining the threshold model.

Huang et al., (2020) examined the dynamicity in the interconnections that links crude oil prices and the exchange rates. The significance of the study stems from its global perspective in evaluation of the dynamic cross linkages between the two concerned parameters and pooled mean group approach to investigate the long- and short-run relations. To execute the same monthly data of real oil prices and real exchange rates were collected from January 1997 to July 2015. Analysing the data 81 countries were classified based upon the net oil import status and exchange rate arrangement systems. It was observed that in the long-run, the relationship between oil prices and exchange rates is dictated by the country-specific circumstances. In countries with flexible exchange rates, the relationship between oil prices and exchange rates is negative and bidirectional for the oil importers, while for the oil exporters there exists no correlation at all. In the case of managed floating systems, the perspective of oil importers and exporters holds no relevance. The exchange rates possess the predictive content that would help ascertain the oil prices. The authors advocated that a holistic knowledge of the correlations between the oil prices and exchange rates would assist the governments in designing policies that would help countries withstand the sudden

shocks that may result from movements in the crude oil prices and the exchange rate.

Dauvin, (2013) specifically investigated how energy prices influence the real effective exchange rate of countries associated with export of commodities. In doing so the study considered collected data from 1980-2011 for 10 energy-exporting and 23 commodity-exporting countries. The study results revealed the existence of energy currencies. Deriving from the estimations made by the panel smooth transition regression (PSTR) models, the study concluded that beyond a certain optimum threshold the real effective exchange rate of both energy and commodity exporters remains sensitive to changing oil prices. Explaining it further, it was elucidated that under circumstances of low oil price variation, the terms-of-trade do not dictate the real effective exchange rate. Given the increased volatility that remains associated with the oil prices, the study concluded terms-of-trade to be a significant driver of the real exchange rate.

3.4 Relationship between exchange rate risk and export of soybean meal

Soybean, a member of the legume family, is an oilseed bean with an oval shape, similar to the size of a common pea. Owing to its richness in terms of oil (18%) and protein (45%), soybean is often considered to be a miracle crop with immense marketing potential. The nutritive value of soybeans is further enhanced by the presence of high levels of unsaturated fatty acids that have significant implications in maintaining good health standards. Further, reduced agricultural demands and adaptability to grow in a wide variety of soil types, makes soybean a crop suitable for large scale production as well. Global scale estimations have revealed soybean as the largest produced oilseed. Given the increased nutritive value accompanied by extensive climate and soil adaptability, soybean is

considered as the most economic crop that could be largely exploited by the producing countries for export purposes to enhance their economy (Banaszkiewicz, 2011).

In India soybean has been a widely produced crop with significant agricultural value. India ranks 5th position in the global ranking of countries for soybean production. Indian economy being largely driven by agriculture soybeans holds a worthwhile position in positively contributing towards the economy. Estimates have revealed that in Indian agriculture and economy the worth of soybeans is as high as Rs 5000 crores. The net production of soybeans in India is estimated to be 7 million tons. Among the various states, the state of Madhya Pradesh leads in soybean production. In terms of soybean consumption, India ranks 6th and consumes about 10-12% of its overall soybean production. The rest is crushed and transformed into other potential forms of high demand such as soy oil and soy meal. The high quality of soy meal produced in India has managed to gather worldwide appreciation and in countries of Europe and Asia, Indian soy meal is highly preferred over any other variants. This has led to identification of soy meal as a potential candidate for export that could contribute significantly to the Indian economy. Of the total soy meal produced in India, 65% is exported to countries like South Korea, Thailand, Philippines, and Japan. In terms of export to Asian countries, India poses as one of the largest exporters of soy meal (Malukani, 2016).

The study by Mishra et al., (2018) however expressed their concern over the growing decline of soybean meal export owing to the increased domestic demands. Apart from the enhanced domestic demands, the additional factors that have contributed towards the reduced export status of soy meals are as follows- lack of export orders,

overshooting cost of production, rising competition owing to the increased number of producers, and the availability of cheaper soy meal variant in the market produced by South America. The study thus analysed soy meal export in India taking into consideration the yield, production and export factors so as to analyze the factors contributing to and the implications of reduced soy meal export. The study results revealed a clear lack of advanced technology adaptation in soy meal production which has contributed to increased production cost and low quality yield. Indian soy meal thus often fails to sustain the market demands resulting in lowered export rates. Further, the farmers of the leading soybean producing states such as Madhya Pradesh, and Gujarat have reported prices offered for soybean seed to be even below the minimum support price. This has restricted their ability to sustain the financial crunches associated with soybean production thus leading to a decline in the overall production levels as well. Such uncertainty in soybean seed availability also reflects in the soy meal production as well thus limiting the country's ability to export the same post-sufficing the domestic demands. The authors thus advocated the need to introduce modern technology in order to enhance the overall production and quality standards that pose as inevitable parameters for consideration in the Indian context to regain its global stature as a soy meal exporter.

Acknowledging the volatility in the prices of the agricultural commodities in India owing to the differential production rates, Bodhanwala et al., (2018) in their study investigated the impacts of agriculture commodity price volatility in terms of three macroeconomic factors namely- crude oil price movements, INR/USD exchange rate movements, and the Sensex. To fulfill the study objectives the authors implemented a

non-linear cointegration and causality test. Both the instruments aided in the understanding of the factors that contribute to the price volatility of the commodities and the subsequent impacts experienced from the macroeconomic factors. Results of the study revealed that the structural breaks evident in the agriculture commodity prices primarily owe to the variations in the fundamental demand-supply factors. Factors that attribute to the low supply often remain associated with low carryover stocks, poor weather conditions and increased demand of the commodity both at the national and international levels. Thus, possible arbitrage opportunity largely depends upon the futures market of the commodity. The study thus suggested that spot and future prices of the agricultural commodities are required to be cointegrated with crude, forex and Sensex. Boubkari et al., (2019) in their study investigated how the real effective exchange rate (REER) of commodity-exporting countries remains correlated to the volatility in the real commodity prices. The 42 commodity-exporting countries incorporated in the study were subdivided into four categories as follows- food and beverages, energy, metals, and raw materials. Results of the study revealed that there exists a non-linear relationship between real commodity price volatility and REER. The linkage between the two parameters depends upon the degree to which the commodity market has been financialized.

4. Findings and Discussions

The potential to up-regulate or down-regulate the economic growth, exchange rate has been widely researched by the policymakers and the academicians. Exchange rate volatility has been defined by Ozturk, (2006) as movements that have not been anticipated by the economists at the early stages. The impact of exchange of

volatility is not just restricted to the trading status of the country but also extends to the associated countries as well. Within the economy, the exchange rate remains associated with high volatility. This primarily owes to its increased probability of being affected either directly or indirectly by a string of variables such as the demand and supply rates, and the subsequent factors that influence the demand and the supply rates (Tripathy, 2013). The influence of the factors on exchange rate is bidirectional. Owing to the intricate correlation between exchange rate volatility and economic stability, exchange rate behavior often serves as the primary determinant of the country's economic growth. Exchange rate also has been identified to have significant correlation with international trading levels. In India, the exchange rate was unified in 1993 as a part of the liberalisation and privatization processes. In terms of exchange rate volatility it was observed that be it in the long run or short run, real exports in India are negatively impacted by volatile exchange rates. Thus a reduction in the degrees is unavoidable when high exchange rate fluctuation tends. The short run and long run effects of real exchange rate upon real exports has been contradictory (Srinivasan & Kalyavani, 2012). Several other studies that investigated the concept of exchange rate volatility in the Indian trading market reported that there exists no statistically significant correlation between exchange rate volatility and the Indian export levels. Further, a negative correlation between real exchange rate volatility and India's trade balance was noted in the long run (Bal, 2012; Dhasmana, 2012) reported. Analyzing commodity prices and exchange rates, Kohlscheen et al., (2016) reported commodities to be a significant determinant of currency fluctuations. There exists a statistically significant linkage

between commodity prices and exchange rates. Fossil fuels serve as the primary source of energy that is exploited widely for the production and transportation purposes. Fluctuations in the prices of fossil fuels such as oil have been reported to render either a direct or indirect impact upon the macroeconomic variables. Several studies thus have evaluated the interconnections between oil prices and the exchange rates. It was concluded that beyond a certain optimum threshold the real effective exchange rate of both energy and commodity exporters remains sensitive to changing oil prices (Dauvin, 2013; Huang et al., 2005; Huang et al., 2020).

Considering the context of soy meal export it was observed that India despite being one of the most prominent exporters of soy meal at the global scale, has been suffering from a substantial reduction in the export standards. This has been primarily due to the lack of advanced technology incorporation to back the existing soy meal production. Fluctuations in the production has impacted the export standards which in turn affected the overall exchange rate of the product. Acknowledging the volatility in the prices of the agricultural commodities in India owing to the differential production rates, Bodhanwala et al., (2018) in their study thus suggested that spot and future prices of the agricultural commodities are required to be co-integrated with crude, forex and Sensex.

5. Conclusion and Recommendation

The current study has been an overall representation of the exchange rate volatility and its impact on the economic growth of the country. Conducting extensive review of literature it was observed that exchange rate volatility has myriad implications and its impacts are specific to different countries. In India, exchange rate volatility has been highly prevalent. However, its impact upon the

export levels has been variable in the short run and long turn. Considering soy meal export to evaluate the impact of exchange rate it was concluded that the variable production status of soy meal has led to a gap in the demand and supply. The resulting gap impacted the export ability of the country which thus influencing the exchange rate of the product as well.

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