IMPACT OF EXCHANGE RATE VOLATILITY ON THE INTERNATIONAL TRADE OF AFGHANISTAN

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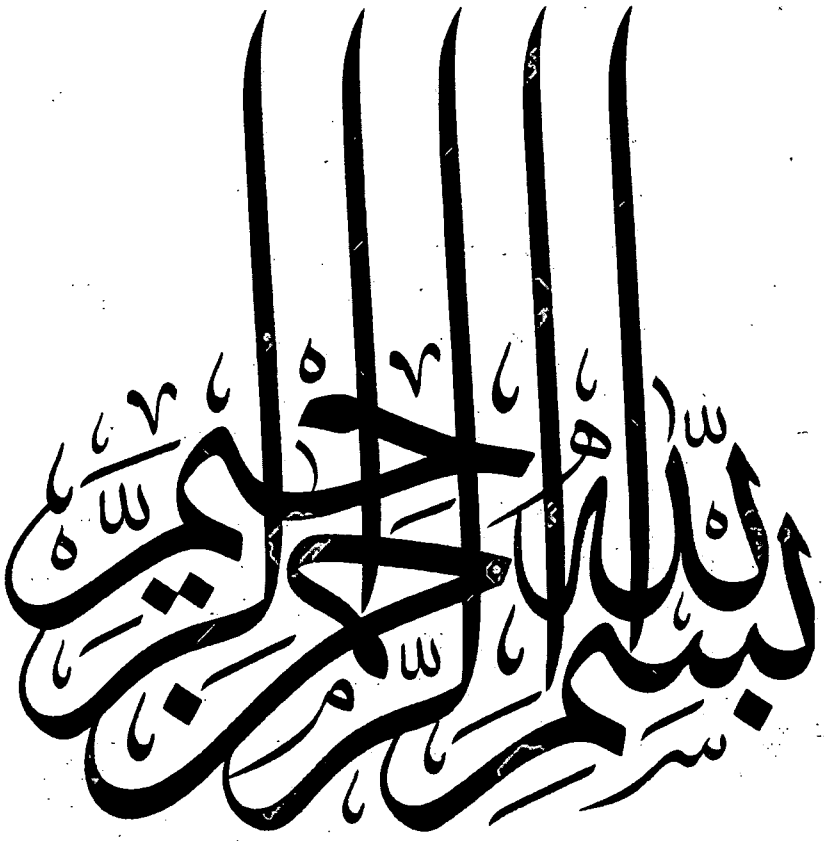
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APPROVAL SHEET

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DEDICATION

I would like to dedicate my thesis to my beloved parents. To my father Saifullah Khayal who supported me since the beginning of my studies and did great efforts for my education and intellectual development. To my mother, who incredibly cared me much and motivated me for learning and has been a source of strength during the moments of discouragement. To my elder and younger brothers (Faizullah Faiz and Fazal Rahim) for giving me spirit to purse my academic goals.

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ABSTRACT

In this study we have examined the impact of exchange rate volatility on the international trade of Afghanistan with its trade partners. We have applied augmented gravity model on the data of imports, exports and total trade, simultaneously for the period of 2001 to 2014. We have chosen the trading partners of the Afghanistan on the basis of data availability. We have constructed and unbalanced panel series by collecting the data from various sources like WDI and CEPII. We have estimated our empirical model by using OLS estimating technique. Independent variables of the study are; GDPs per capita of Afghanistan and its trade partners for determining demand and supply sides, distance as proxy for transportation cost, common border, exchange rate and exchange rate volatility of Afghanistan, and foreign exchange reserves. Our results reveal that the GDP per capita of Afghanistan has significant positive impact on its imports and exports. However, partners GDP per capita has insignificant positive impact on imports, significant negative impact on exports and significant positive impact on total trade of Afghanistan. On the other hand, distance has a significant negative impact on imports, exports and total trade of Afghanistan. Furthermore, common border is positive and significant for imports and total trade, and positive but insignificant for exports. Moreover, we found that exchange rate volatility does not have a significant impact on Afghanistan's imports, exports and total trade. Finally, the impact of foreign exchange reserves is positive but insignificant on imports, exports and total trade of Afghanistan. However, the impact of all these variables is different for different commodity groups as classified by SITC. These results are consistent with the previous studies and the economic theories of gravity model. Overall, the study suggests that the government is required to pay more attention in regulating exchange rates, providing facilities that help in increasing income of people and promoting trade within region.

Key Words: Gravity Model, Panel Data, OLS Model, Afghanistan's Trade.

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INTRODUCTION

1 CHAPTER

This chapter includes the introduction of the study. First we present a brief introduction of the study and describe the topic. Secondly, we show research problem and gap, objectives, research questions, hypothesis and significance of the study. Finally, we present the structure of our study.

1.1 Introduction

International trade is the lifeblood of any economy. It has a significant share in world's GDP, which has been increasing as a percentage of GDP, and GDP of today is highly influenced by international trade. According to the International Trade Statistics (2015) the average share of exports and imports of goods and commercial services in world GDP increased significantly from 20 percent in 1995 to 30 percent in 2014. But still there are fluctuations in international trade. These fluctuations are due to different factors like demand for a country's goods, trading cost, transportation cost, political stability and interest rates. However, exchange rate and exchange rate volatility are among the most important factors that determine the international trade. It is shown in literature that higher exchange rate volatility will reduce trade by creating uncertainty about the future profit of trade. If changes in exchange rates become unpredictable, this creates uncertainty about the profits to be made and, hence, reduces the benefits of international trade. According to Brodsky (1984), due to risk averse (or even risk neutral) behavior of commodity traders, higher exchange rate uncertainty may lead to a reduction in the volume of trade.

Exchange rate affects international trade through prices of the exports and imports of final products and the raw materials. Because when a country's currency appreciates its exports become expensive while its imports from other countries become cheaper, thus its imports rise and exports fall. Similarly, when a country's currency depreciates, its exports become cheaper while imports become expensive; therefore, its exports rise and imports fall. Also, when prices of raw materials change due to changes in exchange rate, it affect the profit and returns of productive firms, and as a result it affect their production and trade. Because for purchasing raw materials from other countries the firms' payment in their home currency will also change. But these changes in exchange rate due to these three variables could not affect prices soon, as exchange rate changes. Because merchants and firms make forward/future contracts with their trading partners, so changes in exchange rate before the termination of their contract can not affect their returns but their next transactions and contract can be affected.

However, exchange rate volatility or changes in exchange rate have a fundamental role in the determination of trade balance. Exchange rate volatility can affect trade directly through uncertainty and adjustment costs and indirectly through its effect on the structure of output, investment and government policy (Cote, 1994). Similarly, Hooper and Kohlhagen (1978), explain that higher exchange rate volatility leads to changes in the cost of trade for a risk-averse trader and ultimately, changes the volume of foreign trade. Because the exchange rate is settled at the time of the trade contract, but payment is not made until the future delivery actually takes place. So, the volatility of exchange rate is the source of exchange rates risk and has certain implications on the volume of international trade, particularly on the balance of payments.

Moreover, not just exchange rate and its volatility, but exchange rate regimes also affect foreign trade of a country. Because, different exchange rate regimes may have different

maintenance and adjustment costs as well as different effects on the economy. After the collapse of Bretton Wood Agreement (1973) of fixed exchange rates, major economies of the world started shifting their exchange rate regime from fixed to floating exchange rate system. As a result, exchange rate uncertainty has increased that has consequences for international trade to decrease. A flexible exchange rate regime allows a country to have an independent monetary policy, providing the economy with flexibility to accommodate domestic and foreign shocks, including changes in external terms of trade and interest rates. However, this flexibility usually comes at the cost of some loss in credibility and, thus, tends to be associated with higher inflation. Moreover, a usual criticism of flexible exchange rate system is that exchange rate uncertainty increases with flexible exchange rate which causes international trade to decrease (Taussig, 1924). On the other hand, fixed exchange rates reduce the degree of flexibility of the system but impart a higher degree of credibility to policy making (Edwards and Savastano, 1999).

These effects of exchange rate volatility on international trade vary from country to country, because of different exchange rate regimes and differences in exports/imports demands and elasticity. This is exposed by pass-through or elasticity of exchange rate or prices. It implies that due to a one percent change in exchange rate, if there is one percent change in trade, then it is unitary elastic. If the change in trade is less than the change in exchange rate, then elasticity is less than one, and it will not have a significant effect on trade. And if changes in exchange rate causes more changes in trade, then it is elastic and will have a significant negative/positive effect on trade.

Many studies have been conducted to empirically examine the impact of exchange rate variations on international trade, which give different results. For instance, Chou (1999) for

China, Mustafa and Nishat (2005) for Pakistan, Hayakawa and Kimura (2008) for East Asia, Hooy and Choong (2010) for SAARC region found negative impact of exchange rate volatility on international trade. On the other hand, Asseery and Peel (1991) for five developed countries of the world, and Al-Shammari and Al-Salman (2010) for Kuwait found a positive relation between these variables. However, the empirical findings of Kyriacos Aristotelous (2001) for UK's exports to USA and Tenreyro (2007) for a broad sample of countries show no significant impact of exchange rate volatility on trade. A common result found from most of the empirical studies is that exchange rate variations negatively affect the trade volume.

The impact of exchange rate volatility on international trade is still controversial and there is no consensus on whether the impact is negative, positive or ambiguous as shown in the result of the above mentioned studies. Therefore, we cannot generalize the results of one country to another. Thus, in this study we analyze the impact of exchange rate and its volatility on the trade of Afghanistan. This study will contribute to existing literature because this type of the analysis has not been done so far, for the Afghanistan in the existing literature. Hence, we want to check it for Afghanistan that how its trade directions responses to variations in exchange rates. Studying the case of Afghanistan may also be important for Afghanistan because Afghanistan is highly depended on imported products.

1.2 Research Problem and Gap

Many studies have been conducted to empirically examine the impact of exchange rate volatility on international trade. But their results vary from one another. Some studies show positive impact, some negative and some show ambiguous impact of exchange rate volatility on international trade as shown in introduction and in the chapter of literature review of this study.

So, the impact of exchange rate volatility on international trade is still controversial, and there is no consensus on whether the impact is negative, positive or ambiguous. Therefore, we cannot generalize the results of one country to another.

Since, no empirical study has been done to analyze the impact of exchange rate volatility on the international trade flows of Afghanistan so far. Therefore, we fill this gap by analyzing the impact of exchange rate volatility on trade in case of Afghanistan. The main purpose of this study is to investigate the effects of exchange rate volatility on Afghanistan's international trade, to know how overall trade of Afghanistan responds to the variations in its exchange rates. Also, we extend our analysis on 1different commodities groups, classified by SITC to check which group of the commodities is being effected more by the fluctuations in exchange rate.

1.3 Objectives of the Study

In general this study has been designed to investigate the impact of exchange rate volatility on Afghanistan's trade. However, the main objectives of the study are:

- To explore the impact of exchange rate and its volatility on exports, imports and total trade of Afghanistan.
- We analyze the impact of exchange rate and its volatility on exports and imports of 10 different commodity groups, classified by SITC, as well, to know which commodity group is being affected more by the fluctuations in exchange rate.

1.4 Research Questions

The study attempts to find answers in particular to the following research questions:

a) Do exchange rate and its volatility affect Afghanistan's foreign trade?

b) Which commodity group is being affected more by exchange rate and its volatility?

1.5 Hypotheses

The study is based on the following hypotheses:

Hypothesis 1: Exchange rate volatility has an impact on Afghanistan's international trade.

Hypothesis 2: Exchange rate volatility has different impacts on different commodity groups traded.

1.6 Significance of the Study

As the existing literature shows that, impact of exchange rate and its volatility on trade varies from country to country, and also varies on imports and exports. This implies that this topic is still controversial and there is no consensus on whether the impact of exchange rate volatility on trade is negative or positive. Similarly, its policies formation varies from country to country. Because as different countries are affected differently, so their commercial policies will also be affected differently. Thus, in this study we analyze the impact of exchange rate and its volatility on the international trade of Afghanistan. This study will contribute to existing literature because this type of the analysis has not been done so far, for the Afghanistan in the existing literature. The study will provide information about the topic for a country as Afghanistan and show that

how Afghanistan's trade reacts to its exchange rate volatility. Therefore, it will be useful for its traders, policy makers, coming researchers and students.

1.7 Structure of the Study

The remaining study is prepared as follows. Second chapter makes a review of the previous researches conducted in this perspective. Third chapter presents the historical background of Afghanistan's international trade and exchange rate. Fourth chapter describes the methodology, model, data sources and estimation techniques. Fifth chapter revolves around discussion on empirical results and sixth chapter consists of conclusion, recommendations for policy makers and gap for further research.

LITERATURE REVIEW

2 CHAPTER

First of all in this chapter we explain different exchange rate systems/regimes. Secondly, we present theoretical background and theoretical literature of the exchange rate and its volatility and their relationship with international trade. Thirdly, we discuss all (positive, negative and ambiguous) results of the empirical literature on the relationship between exchange rate volatility and exports/imports or total trade with the help of a table. A brief conclusion of the overall literature is also given at the end of this chapter.

2.1 Exchange Rate Systems/Regimes

An exchange rate regime is how a country manages its currency in the foreign exchange market. It is directly associated with a country's monetary policy. The earliest exchange rate system is the gold standard which started with the Greek and Roman civilizations. The current foreign exchange market began shaping in the 1970s after two and half decades of restrictions by government on foreign exchange transactions, when countries gradually switched to floating exchange rates from the previous exchange rate regime, which remained fixed as per the Bretton Woods system. However, the Bretton Woods system of monetary management (1944-1973), established the rules for commercial and financial relations among the world's major industrial states after World War II. There are three main types of exchange rate regimes: fixed, floating and pegged float exchange rates (Boundless.com).

- A floating or fluctuating exchange rate regime is that wherein a currency's value is allowed to fluctuate freely in the foreign exchange market. The dollar is the best example

of a floating currency. Many economists consider floating exchange rates as the best possible exchange rate regime, since these systems are automatically regulated to economic conditions. However, a free floating exchange rate enhances foreign exchange volatility, which can be a major issue for developing countries.

- A fixed exchange rate system which is also known as pegged exchange rate system is a currency system on the basis of which authorities try to keep the value of their currency rigid and stable against a specific currency or good. Moreover, in fixed exchange rate system, central bank of a country decides the value of its currency in terms of either a fixed weight of an asset, another currency, or a basket of other currencies. The most famous fixed exchange rate system is the gold standard, where a unit of currency is pegged to a specific measure of gold.
- Pegged floating exchange rate regime is that system in which currencies are pegged to some band or value, either permanent or periodically altered. This mechanism is a combination of fixed and floating systems. There are three types of pegged float regimes: Crawling bands, Crawling pegs and Pegged with horizontal bands.

Whereas, all exchange rate regimes share this problem that they allow one country to export a recession to another country (Boundless.com).

Fixed and Purely floating systems are of course, only two of the possible exchange rate systems which can be selected by a country. In fact, there are many layers between these two boundaries. Table 2.1 lists nine alternative exchange rate regimes, classified according to the degree of flexibility that they convey to the economy or, in inverse order, according to the relative stability they afford to the nominal exchange rate. The table describes briefly the main features of each regime, summarizes their supposed merits and shortcomings, and mentions some

relevant historical experiences. One thing the table makes clear is that the excess of exchange rate systems and the unclear boundaries between many of them makes any attempt to empirically determine the merits of alternative regimes extremely difficult (Edwards and Savastano, 1999).

Table2.1: Alternative/Different Exchange Rate Regimes

Regime	Main Features	Main Benefits	Main Shortcomings	Key Episodes/Comments
1. Free Float	-Value of foreign exchange freely determined in the market. Actual and expected changes in demand/supply of assets and goods reflected in exchange rate changes.	-Changes in nominal exchange rate shoulder bulk of adjustment to foreign and domestic shocks. -High international reserves not required.	-High nominal (and real) exchange rate volatility may distort resource allocation. -Monetary policy needs to be framed in terms of nominal anchors different from the exchange rate; scope for discretion and inflation bias may be large.	-Virtually no country has a pure float. The United States, Germany, Switzerland (and Japan, according to some) come close.
2. Dirty Float or Managed Float	-Sporadic central bank interventions in foreign exchange market. Modes and frequency of intervention vary, as do the objectives guiding the intervention. -Active intervention (sterilized and non-sterilized) results in changes in international reserves. Indirect intervention (through changes in interest rates, liquidity and other financial instruments) does not result in changes in reserves.	-Same as in a free float, except that higher international reserves may be needed. - Dampens "excessive" fluctuations of exchange rates.	-Lack of transparency of central bank behavior may introduce too much uncertainty. -Effects of intervention are typically short-lived (even when intended as a signal) and may be destabilizing.	-Many advanced economies have adopted this regime—Canada, Australia (Japan, according to others). -Mexico adopted a system similar to this following the 1994-95 crises. -A dirty float could be thought of as a managed float with wide bands, with the (undisclosed) position of the bands providing the criterion for intervention.
3. Floating within a Band (Target zone)	-The nominal exchange rate is allowed to fluctuate (somewhat freely) within a band. The center of the band is a *fixed rate*, either in terms of one currency or of a basket of currencies. The width of the band varies (in the ERM it was originally ± 2.25 percent). - Some band systems are the result of cooperative arrangements, others are unilateral.	-System combines the benefits of some flexibility with some credibility. -Key parameters (bands, mid-point) help guide the public's expectations. - Changes in the nominal rate within the bands help absorb shocks to fundamentals.	-In some cases (especially when the band is too narrow and when domestic macro policies are not consistent with a "horizontal" band) the system can be destabilizing and prone to speculative attacks. -Selecting the width of the band is not trivial. -Systems that allow for the possibility of realignment of the bands and central parity weaken the credibility afforded by the regime.	-The Exchange Rate Mechanism of the European Monetary System is the best known example of this type of regime. - The ERM crises of 1992-93 showed clearly that the system can be subjected to severe speculative pressures, and even collapse, when currencies become misaligned and central banks are hesitant to defend the bands.

Regime	Main Features	Main Benefits	Main Shortcomings	Key Episodes/Comments
4. Sliding Band	-There is no commitment by the authorities to maintain the central parity "indefinitely". Instead, it is clear at the outset that the central parity will be adjusted periodically (e.g., due to competitiveness considerations). -The system is an adaptation of the band regime to the case of high-inflation economies.	-The system allows countries with an ongoing rate of inflation higher than world inflation to adopt a band without having to experience a severe real appreciation.	-The fact that the timing and size of central parity adjustments are unknown, introduces considerable uncertainty, which often leads to high interest rate volatility. -As in the case of the standard band system, it is difficult to choose the appropriate width for the band.	-Israel had a system similar to this from early 1989 to December 1991. -The uncertainty and volatility associated with this system makes it less attractive than other alternatives, such as the crawling band.
5. Crawling Band	-A band system whereby the central parity crawls over time. -Different rules can be used to determine the rate of crawl. The two most common are: backward-looking crawl (e.g., based on past inflation differentials), and forward looking crawl (e.g., based on the expected, or target, rate of inflation).	-System allows high inflation countries to adopt a band system without having to undertake (large) stepwise adjustments of the central parity.	-Choosing the criteria for setting the rate of crawl entails serious risks. A backward-looking approach can introduce considerable inflationary inertia into the system. A forward-looking approach that sets the "wrong" inflation target can produce overvaluation and give rise to speculative pressures.	-Israel adopted this system in December 1991. Chile had a widening band system from 1986 to mid-1998. Italy also had, effectively, a system of this type between 1979 and 1991.
6. Crawling peg	-The nominal exchange rate is adjusted periodically according to a set of indicators (usually lagged inflation differentials) and is not allowed to fluctuate beyond a narrow range (say, two percent). -One variant of the system consists of adjusting the nominal rate by a pre-announced rate set deliberately below ongoing inflation (variant known as a "tablita" regime).	-Allows high-inflation countries to avoid severe real exchange rate overvaluation. -The "tablita" variant helps to guide the public's expectations, and buys a limited amount of credibility.	-A pure backward-looking crawling peg (where the nominal rate is mechanically adjusted according to past inflation differentials) introduces inflationary inertia and may eventually cause monetary policy to lose its role as nominal anchor. -Equilibrium changes in the real exchange rate are difficult to accommodate. -A "tablita" system will not last if fiscal and incomes policies are not supportive.	-This system became popular in the 1960s and 1970s in Chile, Colombia and Brazil. It had its longer running in Colombia, which to this date has a high degree of inflationary inertia.

Regime	Main Features	Main Benefits	Main Shortcomings	Key Episodes/Comments
7. Fixed-but-adjustable exchange rate	-The regime epitomized by the Bretton Woods system. The nominal exchange rate is fixed, but the central bank is not obliged to maintain the parity indefinitely. No tight constraints are imposed on the monetary and fiscal authorities, who can follow, if they so decide, policies that are inconsistent with preserving the parity. - Adjustments of the parity (devaluations) are a powerful policy instrument.	-Provides macroeconomic discipline by maintaining (tradable good prices) in line with foreign prices in a context of relatively low uncertainty. -The built-in "escape clause" (which allows the authorities to devalue in case of need) provides the system with some flexibility.	-Realignments (devaluations) under this system have typically been large and disruptive (introducing uncertainty and inflationary pressures) rather than smooth and orderly events. -If supplemented by the right institutions (e.g., an independent central bank) the time inconsistency problems embedded in the system could be attenuated.	-The most popular regime of this century. Most developing countries held on to (variants of) it after the formal collapse of the Bretton Woods agreement in 1973. -Many emerging countries continue to subscribe to this system de facto (e.g., Mexico 1993-93, Thailand, 1997), if not de jure.
8. Currency board	-Strict fixed exchange rate system, with institutional (legal and even constitutional) constraints on monetary policy and no scope for altering the parity. - The monetary authority only can issue domestic money when it is fully backed by inflows of foreign exchange.	-The system maximizes credibility and reduces (eliminates) problems of "time inconsistency".	- The system is long on credibility but short on flexibility. Large external shocks cannot be accommodated through exchange rate changes but have to be fully absorbed by changes in unemployment and economic activity. - The central bank loses its role as lender of last resort.	-Historically, a number of small countries have had systems of this type. Some of them, however, have not been successful. When faced with major external shocks, countries have been forced to abandon the regime. -Currently, Hong Kong and Estonia have currency boards. Argentina and Bulgaria have (quasi)-currency boards arrangements.
9. Full 'dollarization'	-Generic name given to an extreme form of a currency board system where the country gives up completely its monetary autonomy by adopting another country's currency.	-Credibility is maximized under this regime. Monetary authorities have, in theory, no scope for "surprising" the public.	-As in the currency board, the system is long on credibility but short on flexibility. Adverse external shocks have to be absorbed fully by the real economy. -The central bank loses its role as lender of last resort. -A non trivial shortcoming of this system is that it is usually resisted on political and nationalistic grounds. Another one is that the rules of the game can be changed under extreme circumstances.	There are few historical episodes of full dollarization. A regime similar to this has worked relatively well in Panama. However, the case of Liberia unmasked a serious shortcoming of this type of system: when faced with an emergency (civil war) politicians decided to change the rules of the game and issued a national currency.

Source: Edwards and Savastano (1999).

agreement, but payment is pending until the future delivery actually takes place. In addition, exchange rate risk is usually not hedged because forward markets are not accessible to all traders. Even if hedging in the forward markets were possible, there are limitations and costs.

Moreover, the effect of exchange rate volatility on trade prices depends on the degree of competition and the relative degree of risk aversion and risk exposure of importers and exporters. If exporters bear the risk, prices will increase. If importers do, prices may fall. Invoicing in the domestic currency does not eliminate the exporter's risk, as quantity demanded becomes uncertain. An increase in exchange rate volatility may also have secondary effect on trade prices, reducing the pass-through of changes in competitiveness (Cote, 1994). Similarly, there is economic exposure to exchange risk that can be divided into two components: transaction exposure and operating exposure. Transaction exposure is the probability of incurring future exchange gains or losses on already agreed transactions that are denominated in a foreign currency. Since transaction exposure is a cash flow exposure, it is part of economic exposure. Operating exposure arises because currency fluctuations can alter the amounts and riskiness of a company's future revenue and cost streams; it's operating cash flows. In general, a decline in the value of a nation's currency makes its exports and import-competing goods more competitive. On the other hand, an appreciating currency hurts the nation's exporters and those producers competing with imports (Pilbeam, 1998).

Conversely, recent theoretical developments suggest that there are situations where exchange rate volatility could have either negative or positive impacts on trade volume, (Ozturk, 2006). According to De Grauwe (1992), changes in the exchange rate do not only represent a risk but also create opportunities for firms to make profits by using the theoretical case of a profit-maximizing firm. Similarly, Gunter (1991) argues that exporting firms can gain benefits from an

increase in exchange rate volatility under fairly general conditions. Trading firms will optimally adjust their export volumes to the different levels of the exchange rate. In this case, exporting is an option which is exercised if profitable.

2.3 Empirical Literature on the Impact of Exchange Rate Volatility on Trade

The previous literature shows mixed results about the impact of exchange rate volatility on trade. Some of them indicate positive relationship, some ambiguous and most of them show a negative relationship between exchange rate volatility and trade. It says that exchange rate volatility discourages or reduces international trade. First we mention the literature which shows negative relationship between these economic terms.

Dell'Ariccia, G. (1999), investigates the effects of exchange rate volatility on bilateral trade flows. They take panel data from Western Europe. They use a gravity model and a Hausman specification test, which rejected the hypothesis that no simultaneity bias exists. Their findings show small but significant negative impact of bilateral volatility on trade.

And Chou (2000) conducts a research about impact of exchange rate variability on total exports of China by SITC category. He collects data sample over the period from 1981 Q1 to 1996 Q4. He measures the exchange rate variability by the conditional variance of a real effective exchange rate index from an ARCH (1) model. The evidence from the estimation of error-correction models shows that exchange rate variability has a significant negative long run effect on total exports, exports of manufactured goods, and exports of mineral fuels, but not on exports of foodstuffs, beverages and tobacco. But ARDL model results indicate that exchange rate variability has a positive impact on exports of industrial materials.

Moreover, Doganlar (2002) examines the impact of exchange rate volatility on the exports of five Asian countries (Turkey, South Korea, Malaysia, Indonesia and Pakistan). He uses an Engle-Granger residual-based co integrating technique. The results indicate that there is a long-run equilibrium relationship between real exports, foreign activity, relative prices and exchange rate volatility. He also finds that real exports of these countries are reduced by exchange rate volatility.

Similarly, Mustafa and Nishat (2004) explore the effect of exchange rate volatility on exports growth between Pakistan and its leading trade partners. They use quarterly data from 1991 to 2004, and apply co integration and error correction techniques. Their result shows that the volatility of exchange rate has significant negative effects on exports, both in the long run and short run with major trade partners.

Furthermore, Hayakawa and Kimura (2008) also conduct an empirical study for a sample of 60 countries from 1992 to 2005 to test the impact of exchange rate volatility on trade in East Asia. The findings show that firstly, exchange rate volatility discourages trade of intra-East Asia more seriously than trade in other regions. Secondly, they find that important source of discouragement is the trade of intermediate goods in international production networks, which is pretty sensitive to exchange rate volatility as compared with other kinds of trade, occupies an important portion of East Asian trade. Thirdly, the negative effects of the volatility are smaller than that of distance-related costs and greater than that of tariffs and in East Asia. Fourth, the source of such negative impacts of the volatility is time-variant country-specific elements. Last, their imitation analysis indicates that the introduction of a common or a basket would have a bigger positive impact on international trade than free trade.

Another study by Hooy and Choong (2010) analyze the impact of currency volatility on the export demand within the SAARC region. They use a multivariate symmetric CCC-GARCH model and apply the bound testing approach on the standard trade model framework. Their findings show that evidence of significance long-run steady state equilibrium exists, where foreign income, real exchange rate and exchange rate volatility does affects export decisions of producers at the SAARC region. Real exchange rate volatility is found to have a significant and negative impact on the export demand of most of the SAARC countries. Further, they find that foreign income is significant and positive related to real exports. Also real exchange rate variable is negative and significant in most cases.

In addition, Khan *et al* (2014) investigate the impact of domestic and foreign currencies exchange rate volatility on the import and export demand functions with regard to trading partners of Pakistan. Using exchange rate volatility based on the GARCH, and the least-square techniques of dummy variable with estimation of fixed-effects to measure the impact of volatility on both demand functions. The period of their data set is (1970 – 2009), and compares the impact of volatility in the long term with that in the short term. Their results show that, while Pakistan engaged the US dollar as the vehicle currency with its trading partners, both imports and exports are discouraged by volatility. On the contrary, whilst Pakistan traded with its developing partners, both the export and import demand functions remained unchanged by volatility distortions with bilateral exchange rates which were valued in term of local currencies.

On the other hand, there are some literatures which show positive relationship between exchange rate volatility and trade. Asseery and Peel (1991) analyze the impact of exchange rate volatility on exports of five developed countries (Australia, Japan, UK, USA and West Germany) by taking quarterly data from the period 1972 to 1987. They find that exchange rate volatility has

a significant impact on exports of these countries and for most of the countries the impact is positive.

Similarly, Al-Shammari and Al-Salman (2010), investigates the impact of real exchange rate volatility between Kuwait and its major trading partners on their bilateral trade volume. Their data set covers 169 countries over the period from 1990 through 2005. They use an augmented gravity model with fixed effects specification. Their findings show that the impact of Kuwaiti Dinar (KD) exchange rate volatility have positively influence on its exports and imports.

But there are also some studies that show ambiguous relationship of exchange rate volatility with trade. Kyriacos Aristotelous (2001) investigate the impact of exchange rate volatility and exchange rate regime on UK exports to the US, using data for the period 1889-1999. His empirical results suggest that both exchange-rate volatility and exchange-rate regimes that spanned the last century did not have an effect on export volume.

There is a lot of empirical literature, available on the relationship between exchange rate volatility and international trade. It is not easy to discuss all studies with detail. For providing an inclusive literature review, we summarize the details of various studies in the following table (Table 2.2).

Table 2.2: Summary of the Empirical Literature

Study/Author& Year	Time Period and Countries	Estimation technique used and Specification of dependent variable	Main Findings/ Results
Dell'Ariccia, G. (1999)	Annual: (1975 – 1994) *Western Europe*	Gravity model and a Hausman specification test. *Trade flows*	Small but significant negative effect.
Chou (2000)	Quarterly: (1981 Q1 – 1996 Q4) *China*	ARCH (1) and ARDL models. *Exports*	Negative and significant long run effects on total exports. While positive impact on exports of industrial materials.
Sukar and Hassan (2001)	Quarterly: (1975 Q1 – 1993 Q2) *United States*	GARCH, Co integration techniques (Engel & Granger). *Exports*	Significant negative impact of exchange rate volatility on US exports volume.
Doganlar (2002)	Quarterly: (1980:1 – 2000) *Turkey, South Korea, Malaysia, Indonesia and Pakistan*	ADF unit root test, Engle-Granger residual- co integrating technique. *Exports*	Negative impact.
Esquivel and Larrain (2002)	Annual: (1973 – 1998) *G3 (Germany, Japan & US) and developing countries*	Probit model *Exports*	Impact of G-3 exchange rate volatility is robust, significant and negative on the exports of developing countries.
Siregar and Rajan (2002)	Quarterly: (1980 Q2 – 1997 Q2) *Indonesia*	ADF Unit root tests *Exports, Imports and Trade performance*	Adverse impact.
Fang and Miller (2004)	Monthly: (1979 – 2002) *Singapore*	GARCH-M *Exports*	Exchange rate depreciation improves exports, but not significantly.
Mustafa and Nishat (2004)	Quarterly: (1991: 3– 2004: 2) *Pakistan*	Co integration and error correction techniques. *Export Growth*	Significant negative effects on exports to major trade partners, both in the short run and long run.

Study/Author& Year	Time Period and Countries	Estimation techniques and dependent variable	Main Findings/ Results
Larson *et al* (2005)	Annual: (1989 – 2002) *MERCOSUR Countries*	Gravity model *Sectoral Trade*	Negative effect on Brazil's trade by its own and Mercosur partner's exchange rate movements.
Ozturk (2006)	1978 – 2005 *Literature Survey*	Literature Survey	Overall, a great number of studies show that the level of trade is reduced by the exchange rate volatility.
Bustaman and Jayanthakumaran (2007)	Monthly: 1997 – 2005 *Indonesia to US*	ARDL *Exports*	Negative and significant for the majority of commodities.
Hayakawa and Kimura (2008)	Annual: (1992 – 2005) *East Asia*	Gravity model, OLS *Bilateral Trade*	Intra-East Asian trade is discouraged & main source of discouragement is the trade of intermediate goods in international production networks.
Hooy and Choong (2010)	Monthly: (1980 – 2010) *SAARC region*	CCC-GARCH model- standard trade model framework *Export Demand/ Bilateral Exports*	Impact of the real exchange rate volatility on the export demand of most of the SAARC countries is negative and significant.
Coric and Pugh (2010)	EconLit Data base (Period ending March 2003) *58 Studies*	Meta-regression Analysis (followed Stanley and Jarrell, 1989). Tests: OLS, WLS and cluster-robust estimates. *58 Studies*	The empirical literature on the variability of exchange rate and trade indicates a moderately negative relationship with distinct heterogeneity.
Ramli and Podivinsky (2011)	Monthly: (Jan 1990 – Dec 2010) *Regional Asian countries (Southeast Asia) to US*	Co-integration analysis and error correction model. ADF unit root test and Johansen and Juselius (1990). *Exports*	Exchange rate volatility has a significant negative impact for all countries taken in the sample, except for Indonesia.

Study/Author& Year	Time Period and Countries	Estimation techniques and dependent variable	Main Findings/ Results
Bakhromov (2011)	Annual: (1999 – 2009) *Uzbekistan*	Johansen co integration framework *Trade Balance*	Negative and significant impact on exports and imports.
Yuksel *et al* (2012)	Monthly: (2003: 2 – 2010: 12) *Turkey*	OLS regression method *Exports*	Negative but insignificant impact of exchange rate volatility on exports.
Saqib & Sana (2012)	Annual: (1981 – 2010) *Pakistan*	ADF and Phillips Perron (PP) Test *Export volume*	Significant and inverse impact of real effective exchange rate on the volume of international export.
Serenis and Tsounis (2012)	Quarterly: (1973 – 2010) *Germany, Sweden and U.K.*	Augmented Dickey fuller (ADF) Test *Sectoral Exports*	Significant negative effects of exchange rate volatility on sectoral exports.
Rahutami (2012)	Annual: (2001 – 2011) *Southeast Asia (ASMSs)*	Panel regression method *Trade*	No impact of ERV on exports and imports. But real exchange rate has a significant negative impact on import value.
Liu *et al* (2013)	Monthly: (2000 – 2006) *China*	Different econometric methods. *Exports*	Negative and significant effect of currency appreciation on exports.
Shaheen (2013)	Annual: (2000 – 2010) *Pakistan*	Different regression techniques. *Import and export balance*	Significant negative impact of exchange rate on imports, and insignificant positive impact on exports.
Kurihara (2013)	Panel Data *Developed and developing courtiers.*	Dynamic panel model, OLS and robust estimation. *International trade*	Exchange rate fluctuations can have negative effects on international trade in developing countries only.
Saqib (2013)	Annual: (1980 – 2011) *Saudi Arab and GCC member countries.*	PPP model, two-step Engel-Ganger co-integration technique, OLS and ADF tests. *Trade Balance*	Significant relationship between ERV and trade balance in the long term but not in the short term.

Study/Author& Year	Time Period and Countries	Estimation techniques and dependent variable	Main Findings/ Results
Hericourt and Poncet (2013)	Annual: (2000 – 2006) *Chinese firms*	Gravity model *Exports*	Negative impact of RER volatility on exports and this is even stronger for financially vulnerable firms.
Khan *et al* (2014)	Annual: (1970 - 2009) *Pakistan*	LS dummy variable technique with fixed-effects estimation. *Trade*	Discourage both imports and exports.
Danladi *et al* (2015)	Annual: (1980 – 2013) *Nigeria*	ADF, co-integration, granger causality tests and (ECM). *Trade*	Negative effects.
Asseery and Peel (1991)	Annual: (1972 - 1987) *Australia, Japan, UK, USA and West Germany*	Co integration LS, DF, ADF *Exports*	Significant impact on exports and for the big majority of the countries the impact is positive.
Rahman (2003)	Annual: (1972 - 1999) *Bangladesh*	Gravity Model, REM, LM and Hausman tests, FEM *Bilateral Trade; Panel analysis*	Positive impact on exports, no impact on imports.
Al-Shammari and Al-Salman (2010)	Annual: (1990 – 2005) *Kuwait and its major trading partners*	Gravity model with FE specification, Pooled OLS, *Bilateral Trade volume*	Positive influence on exports and imports.
Cote (1994)	A literature survey till 1988	Both theoretical and empirical literature.	Ambiguous. Relatively small effect of ERV to reduce the trade.
Aristotelous (2001)	Annual: (1889 – 1999) *UK - US*	Gravity model, ADF and PP unit root tests, Johansen co int. *Exports*	No impact on exports.
Tenreyro (2007)	(1970 – 1997) *A broad sample of countries*	PPML, OLS *Trade*	No significant impact of nominal exchange rate changeability on trade flows.

Study/Author& Year	Time Period and Countries	Estimation techniques and dependent variable	Main Findings/ Results
Yarmukhamedov (2007)	Monthly: (1993 – 2006) *Sweden*	EGARCH, Multiple regressions *Export and import*	Indeterminate and insignificant (ambiguous).
Goudarzi *et al* (2012)	Annual: (1978 – 2008) *Iran*	GARCH, ADF and PP, ARDL *Agricultural Exports*	Different impacts on different commodities.
Zakaria (2013)	Monthly: (2000 – 2012) *Malysia*	GARCH (1,1) *Exports*	Ambiguous result (for some countries positive, for some negative and for some no impact).
Haseeb and Iqbal (2014)	Annual: (1981 – 2011) *Pakistan*	Auto regressive distributive lags (ARDL) method. *Sectoral exports*	Significant negative effect on some sectors' products, while on some others mixed insignificant.
Lotfalipour & Bazargan . (2014)	Annual: (1993 – 2011) *Iran*	Unit Root Test, GARCH (1, 1) and balanced panel data model. *Trade balance*	No significant effect of the real effective exchange.

2.4 Conclusion

This chapter has presented the past theoretical and empirical evidences on significance of the relationship between exchange rate volatility and trade. In spite of the fact the vast literature is available on the impact of exchange rate volatility and trade, but still controversies exist. The existing studies present ambiguous results, however, most of them show negative impact of exchange rate volatility on exports/imports or total trade but, some show positive relationship and some show ambiguous relationship between exchange rate volatility and trade.

So far, no research has been undertaken relevant to the case of Afghanistan. So, we want in this study to know how Afghanistan's trade is affected by its exchange rate volatility.

In next chapter we will discuss the methodology, model, data, data sources and estimation technique.

A BRIEF OVERVIEW OF AFGHANISTAN'S TRADE AND EXCHANGE RATE

3 CHAPTER

In this chapter, we present a concise overview of Afghanistan's trade and exchange rate. We focus mainly on exports, imports, total trade volume, trading commodities and exchange rate regime of Afghanistan's economy. This is of great concern to know Afghanistan's major export and import commodities and its trade directions. In order to analyze its past trade performance and to make future policy for it (how to expand its trade markets, increase focus on some exports and find alternative markets in some harsh conditions).

3.1 Overview of Afghanistan's Trade

Afghanistan is located in the heart of south-central Asia. However, Afghanistan is not connected to the sea, but surrounded by countries, and it also connects countries with one another. With having a unique geographical location, known as a 'land bridge', Afghanistan connects Central Asian countries with South Asians, facilitates China and the countries of Far East with a straight trade route with the Middle East and Europe. However, it is economically a less developed country that depends highly on agriculture and livestock. Afghanistan has a regulated economic system where central government controls the economy concerning the production and distribution of goods. The economic activities were generally interfered with the Soviet invasion and civil war, which were responsible for the mass destruction of the country's limited infrastructure. But, with the fall of Taliban in 2001, and incoming of billions of US dollars developed trade significantly. Trade is mostly done with neighboring and close countries (Economy Watch).

Although Afghanistan has abundant natural resources, but it has been rarely explored. Some of these sources are huge reserves of natural gas, oil, coal, copper, chromite, sulfur, lead, talc, bariten, zinc, iron ore, salt and precious stones and semi-precious stones. On the other hand, the mountainous area of Afghanistan and inconvenient transportation network has restricted its trade activities. In 1980s, the export of natural gas was with highest value ($300 million) in export revenue usually. But, 90 percents of this revenue was used for the installments of imports and debts of the Soviet Union (Economy Watch).

However, over the past one and a half decade, Afghanistan has gained significant development. For instance, GDP per capita increased about two times between 2002 and 2015, rising from $372 to $623. Moreover, GDP growth in 2014 was estimated at 1.31% having fallen from 11.17% in 2005 as shown in Table 2.1and figure 2.1 (ADB, 2014).

As for other countries, foreign trade is very important for Afghanistan's economy also. The value of total trade (exports and imports) equals 52 percent of GDP in 2014. In addition, Afghanistan's exports are limited, so, it is having a large trade deficits and trade remains greatly concentrated by both partners and products. In 1991, exports of Afghanistan worth to about $188.2 million, while cost of its imports worth to $616.4 million. Moreover, Afghanistan's total imports have been usually rising since 2008 when they equaled at $3,019 million. Besides, exports have grown in recent years, though, low in overall volume. However, in 2013 total merchandise exports of Afghanistan were $515 million, while its imports were $8,724 million. Indeed, merchandise exports grew 20% in 2013 whereas imports contracted by 4%. This shows powerless relations between imports and exports which indicates a lack of capacity to engage in many value-adding activities (World Bank, 2013).

Afghanistan is dependent greatly on imports of fuels, foods, processed materials, and manufactured goods, mainly caused by a lack of domestic infrastructure for production and processing. Moreover, in 2012, Afghanistan's major classes for imported commodities included mineral products were 34% mostly made of identical parts of peat and sophisticated petroleum; machines equal to 12%, including phones, computers, and other electric equipments; foods and vegetables equal with 11% such as rice, wheat flours, tea, potatoes and citrus; transportation equipment equal to 9%, such as tractors, trucks, motorcycles, passenger cars and specialized vehicles; and textiles were equal with 6%. The major exported categories of goods included fruits and vegetable products such as grapes, spice insect resins, and oily seeds and nuts make about 44 percent of total exports; textile about 22 percents, such as knotted carpets, raw cotton and animal hair; products of mineral and natural resources consisting almost totally of coal briquettes makes about 12% of total exports; metals consisting almost entirely of scrap iron were about 10 percents; and animal skins, consisting of raw fuzz skins and bovine and sheep skins. However, due to weaknesses in Afghanistan's security of border and customs, about 4 percents of total trade goes underground and unrecorded (World Bank, 2013).

In addition, in terms of trade partners; Afghanistan's trade in merchandise commodities is greatly concentrated. Afghanistan's main trade partners are its neighbors, regional countries and some other countries, like; Pakistan, Iran, China, India, Central Asian republics, Germany and USA (Economy Watch). According to the statistics of WTO, Pakistan being the largest trading partner of Afghanistan, by covering of 47% of exports and 14% of imports in 2013. However, a part of Afghanistan-Pakistan trade is done through underground and not recorded. As Pakistan is the major transit route to the sea of Afghanistan, so Pakistan is expected to play an important role in Afghanistan's trade, but, it also makes issues in transit through Pakistan of critical importance.

Moreover, Russian Federation is also a potentially significant trade partner of Afghanistan, although not currently among the top 5 trading partners of Afghanistan. In 2013, Afghanistan's exports to Russian Federation were only $14 million from Afghanistan, more than $13 million of which included fruits and vegetables. In contrast, Afghanistan imported $418 million from the Russia Federation. More than $300 million of imports were of mineral fuels, other categories of importance were woods articles about $55 million and animal and vegetable fats were equal to $20 million (UN-ESCAP, 2015).

Besides, Afghanistan has trade agreements with Pakistan, Iran, Uzbekistan, Tajikistan, Turkmenistan, Kazakhstan, India, China, EU, US, etc (Afghan Trade Policy 2012; Ministry of commerce and industries).

For more information we present some tables about the performance of Afghanistan's trade. Table 3.1 explains exports, imports and total trade of Afghanistan.

However, Table 2.3 shows the ratio of Afghanistan's exports, imports and total trade of goods and services with its GDP for the years 2002 to 2015.

Table 3.2: Afghanistan's Exports, Imports and Total Trade as Percentage of GDP

Year	Exports (% of GDP)	Imports (% of GDP)	Trade (% of GDP)
2002	32.38	65.28	97.67
2003	43.55	94.34	137.90
2004	33.99	87.13	121.13
2005	27.39	77.46	104.86
2006	26.47	74.08	100.55
2007	17.82	58.35	76.17
2008	17.99	55.07	73.06
2009	14.70	42.19	56.90
2010	10.02	44.94	54.96
2011	6.10	44.19	50.30
2012	5.51	39.14	44.65
2013	6.30	49.75	56.06
2014	6.63	45.77	52.34

Source: WDI

It is shown in the table that Afghanistan's imports ratio is greater than that of its exports as compared to its GDP. It means that its imports ratio is equivalent to a great part of its GDP. Moreover, the ratios of imports in the years 2003, 4, 5 and 2006 are greater and maximum as compared to its other years' ratios.

3.2 Afghanistan's Major Exports and Imports Commodities

Following are the main commodities those are exported and imported by Afghanistan:

- Export commodities include fruits and nuts, Items nesoi, hand-woven carpets, wool, cotton, hides and pelts, Gums & Resins, Gums & Resins, precious and semi-precious gems, Oil Seeds, Oil & Mineral Fuels, Vegetables and Natural Minerals & Stone.

- Imports include machinery and other capital goods, Items nesoi, Oil & Mineral Fuels, Precision Instruments, Coffee & Spices, food, textiles, petroleum products (Economy Watch).

Moreover, we present the tables of Afghanistan's commodity exports and imports based on Standard International Trade Classification, Revision 3 (SITC-3) of UN COMTRADE with codes (SITC0 to 9) from the year 2008 to 2014. The values are in US Dollars. See Appendix B for the description of the SITC commodities groups.

Table 3.3: Commodity Exports of Afghanistan

Year/Com	SITC0	SITC2	SITC6	SITC8	SITC9
2008	280276257	30570489	154159000	32797773	42262075
2009	206309803	45344470	72611699	182358	78992676
2010	130936018	67537791	76220063	25906	113763859
2011	128300790	68381894	53031208	31860	126105185
2012	54147304	21656220	72759125	-	280340061
2013	61123964	9301151	73225738	-	371322130
2014	70840817	12132781	83993654	-	403566755

Source: UN-COMTRADE (2008-14)

Table 3.5 shows the commodities exports of Afghanistan. The first left column of the Table 3.5 shows years and its first row shows commodities groups of SITC. However, Table 3.5 expresses that Afghanistan does not have exports of all 10 commodity groups of SITC (SITC0 to SITC9), but of SITC (0, 2, 6, 8 and 9).

Moreover, Table 3.6 shows Afghanistan's commodities imports based on SITC-3 for the years of 2008 to 2014. However, the values of some commodity groups are missing for the last three years, or, Afghanistan has stopped their exports.

Table 3.4: Commodity Imports of Afghanistan

Comod &Year	2008	2009	2010	2011	2012	2013	2014
SITC0	309541080	513681471	495808087	565378464	251481480	641806683	728267816
SITC1	51769043	53962194	90597388	161864281	13845091	3781248	3984800
SITC2	1520625	1177591	4259351	1817855	-	-	-
SITC3	25405096	788229566	1075187326	2222108850	1517526125	1452547655	1488624239
SITC4	163225370	42710907	119306562	169271318	-	-	-
SITC5	52016469	36687156	82350186	97927092	47210459	172984958	91763440
SITC6	275034960	243906506	433241789	433477278	310721510	389445479	511509732
SITC7	176243804	204833256	339327813	245354128	9333232	283843	6616036
SITC8	480399825	76519482	138943959	115684583	40648239	36047351	37283251
SITC9	1484703857	1374726652	2375227406	2377427104	4014217965	5857516532	4829128856

Source: UN-COMTRADE (2008-14)

3.3 Overview of Afghanistan's Exchange Rate

Afghanistan provides an unusual application of the monetary approach in the case of flexible exchange rate Exchange rate. Afghan currency's exchange rate has been determined freely by market forces except during the Second World War. However, a double exchange rate regime exercised by Afghanistan for some periods; An official rate of exchange that was set by the central bank of Afghanistan, and an open market exchange rate that was determined by the demand and supply forces in money bazaar of Kabul. When Da Afghanistan Bank (DAB) was established as the central bank of Afghanistan, the practice of such an official fixed exchange rate continued. Though, DAB tried to maintain its official exchange rate closer to the free market exchange rate of money bazaar's, but the gap between these two exchange rates extended during 1980s and civil war (ExchangeRate.com).

Afghanistan has been made significant promotion in strengthening its financial sector. The establishment has created a modern central bank 'Da Afghanistan Bank; DAB' that has the responsibility of the banking supervision, maintaining domestic price stability, appropriate performance of the financial system, promotion of a good national payment institution and introduce the major components of a legal structure which is in accordance with the international standards. Moreover, DAB run monetary policy initially through intervening in the foreign exchange market, and also through the dealing of domestic currency (DAB Bulletin, 2015).

A major characteristic of the Afghan economy is the great sustainability between Afgahni and US Dollar. As indicated by Agenor and Montiel (1991), that currency substitution is the process in which foreign currency is substituted for domestic currency to act and fulfill the functions of money has become a common phenomenon of the developing world.

The earliest Afghani (AFA) was printed and introduced in 1925. Prior to that period of time the official currency of Afghanistan was Afghan Rupee. In 1981 the AFA was pegged with US Dollar, where one USD was equal with fifty Afghanis. However, in the April of 2000 the Afghani was exchanged with USD at 6400 AFA per US Dollar. And in 2002 the value of AFA further reduced and was equal to 43,000 per USD. Yet in October 2003 Afghanistan introduced new Afghani (AFN) as its official currency. By 2009, the Afghani was valued at 45 AFN per USD (OANDA). Still there is no stock market in Afghanistan. So, money lending as well as foreign exchange is done through money bazaars. Since 2005 the Afghan economy has grown at a steady pace.

Since the new currency (AFN) is introduced, it has been appreciating steadily and appears to be relatively stable. Moreover, Donors are also progressively making payments in Afghanis (AFN) instead of USD, and this is shown to be broadly accepted (ExchangeRate.com).

Finally, Table 3.5 shows the real exchange rate of Afghani in terms of U.S Dollar, in different time periods since 1950.

Table 3.5: Afghani's Exchange Rate and Exchange Rate Volatility

Year	Exchange rate	Exchange Rate volatility*
1950	39	-
1960	193.9	-
1970	436.28	-
1980	429.28	-
1990	490.57	-
2000	4836.51	-
2003	48.76	-
2004	47.84	0.651
2005	49.49	1.167
2006	49.92	0.304
2007	49.96	0.028
2008	50.24	0.198
2009	50.32	0.057
2010	46.45	2.737
2011	46.74	0.205
2012	50.92	2.956
2013	55.37	3.147
2014	57.24	1.322

Source: WDI & ExchangeRate.com

*Author's own estimation based on WDI.

Table 3.7 shows exchange rate of Afghani in terms of U.S Dollar from the year 1950 to 2014. The Table shows the Afghani's exchange rate from 1950 to 2000 for decades only, and after 2003 the Table shows it annually. Furthermore, the table shows that before 2003, the Afghani has more volatility, but after 2003 its value is to more extent stable. It is actually due to the establishment and introduction of new Afghan currency in 2002, as we mention before also. So, we have estimated and presented exchange rate volatility of Afghani after 2003. However, it is shown from the Table that exchange rate volatility is neither so high, nor so less.

METHODOLOGY AND DATA

4 CHAPTER

This chapter encompasses the detail discussion on the methodology, model, data and data sources, descriptive statistics and estimation techniques. It is also inclusive of discussion on those variables which affect the global trade. The study has evaluated GDP per capita, distance, common border, exchange rate, exchange rate volatility and foreign reserves, as control variables to measure the impact of exchange rate volatility on Afghanistan's trade.

4.1 Methodology

Different models have been used by different researchers in studies for empirically examining the impact of exchange rate volatility on international trade. However, a large number of researchers have used a gravity model for empirical investigation of correlations between international trade and the variables that affect it. Since, the gravity model can be supported by various theoretical models and foundations. For instance; trade theories just explain why countries trade in different products but do not explain why some countries' trade links are stronger than others and why the levels of trade between countries tends to increase or decrease over time. This is the limitation of trade theories in explaining the size of trade flows. Therefore, while trade theories cannot explain the extent of trade, the gravity model is successful in this regard. It allows more factors to take into account to explain the extent of trade as an aspect of international trade flows (Paas 2000).

The gravity model was primarily established in the Newton's physical theory which states that the force of attraction between two bodies is proportional directly to the product of their

masses and indirectly to the square of the distance between them. Latter on an astronomer, Stewart, and a sociologist Zipf transferred this law to the social sciences and attempted to apply it to spatial interactions, such as trips among cities. The gravity model for trade is also analogous to this law. However, the application of gravity concept to empirical analysis of international trade was first introduced by Tinbergen (1962), Poyhonnen (1963) and Linneman (1966). The original model developed by Tin Bergen and Poyhonnen, specified that the volume of trade between two countries is related positively to their economies size measured by their national incomes and negatively to the distance between them (as proxy for the transportation cost). Their basic model is specified in the following manner:

$$\text{Trade}_{ij} = \alpha . \frac{\text{GDP}i.\text{GDP}j}{\text{Distance}ij} \qquad \text{(A)}$$

Moreover, this model can be written in linear form as under:

$$\text{Log (Trade}_{ij}) = \alpha + \beta_1 \log (\text{GDP}_i . \text{GDP}_j) + \beta_2 \log (\text{Distance}_{ij}) + u_{ij} \qquad \text{(B)}$$

Where Trade_{ij} is the value of bilateral trade between the two countries, GDP_i and GDP_j is the national income of countries concerned, Distance measure the physical distance between them, α is the constant of proportionality and the error term (u) captures shocks and chance events that may affect bilateral trade. It has proved to be robust and successful in a large range of empirical applications.

Furthermore, Linneman (1966) included an additional variable 'population' which is also the measure of country size besides the national income. Later on, the researchers included several other variables in the analysis like, per capita GDP, price levels, tariffs, language relationships, border and colonial history etc. All of these variables either facilitating or restricting trade

between pairs of countries and have been found to be statistically significant determinants of trade in various empirical studies. Thus, the resulting specification is called the augmented gravity model. Therefore, this study is an attempt to find out the major determining factors of Afghanistan's trade. We have applied augmented gravity model for our analysis.

4.2 Model

By following Rahman (2003), we also exercise augmented gravity model, in order to check the impact of exchange rate volatility on bilateral trade of Afghanistan. Using the panel data set in this study, we estimate five gravity models of Afghanistan's trade: (1) the gravity model of Afghanistan's imports, (2) the gravity model of Afghanistan's exports, (3) the gravity model of Afghanistan's total trade (exports + imports), (4) the gravity model of Afghanistan's imports of different commodities and (5) the gravity model for Afghanistan's exports of commodities.

Moreover, we divide the first three of these five models into other three secondary models and estimate three models (Model 1, Model 2, and Model 3) for each of these models. Secondary model 1 includes five independent variables, namely; real GDP per capita of the home country, real GDP per capita of foreign countries, distance, common border and real exchange rate of the home country. Secondary model 2 includes all variables of Model 1 and one more variable (exchange rate volatility of home country). Secondary model 3 also includes Model 1 and one more variable (foreign reserves of the home country; Total reserves minus gold (current US$) or in nominal term). However, the data of the dependent variables are in real terms.

Thus, the gravity models in this study are:

$$LnM_{ajt} = \beta_0 + \beta_1 LnGDPpc_{at} + \beta_2 LnGDPpc_{jt} + \beta_3 LnDist_{aj} + \beta_4 CB_{aj} + \beta_5 ER_{ajt} + \beta_6 ERV_{at} + \beta_7 LnFRes_{at} + \in_{ajt} \quad (4.1)$$

$$LnX_{ajt} = \beta_0 + \beta_1 LnGDPpc_{at} + \beta_2 LnGDPpc_{jt} + \beta_3 LnDist_{aj} + \beta_4 CB_{aj} + \beta_5 ER_{ajt} + \beta_6 ERV_{at} + \beta_7 LnFRes_{at} + \in_{ajt} \quad (4.2)$$

$$LnT_{ajt} = \beta_0 + \beta_1 LnGDPpc_{at} + \beta_2 LnGDPpc_{jt} + \beta_3 LnDist_{aj} + \beta_4 CB_{aj} + \beta_5 ER_{ajt} + \beta_6 ERV_{at} + \beta_7 LnFRes_{at} + \in_{ajt} \quad (4.3)$$

We also use similar models for commodity wise imports and exports, and have the following models.

$$LnM_{cajt} = \beta_0 + \beta_1 LnGDPpc_{at} + \beta_2 LnGDPpc_{jt} + \beta_3 LnDist_{aj} + \beta_4 CB_{aj} + \beta_5 ER_{ajt} + \beta_6 LnFRes_{at} + \in_{ajt} \quad (4.4)$$

$$LnX_{cajt} = \beta_0 + \beta_1 LnGDPpc_{at} + \beta_2 LnGDPpc_{jt} + \beta_3 LnDist_{aj} + \beta_4 CB_{aj} + \beta_5 ER_{ajt} + \beta_6 LnFRes_{at} + \in_{ajt} \quad (4.5)$$

Here,

M_{ajt} = real import value of Afghanistan from country j, at time t

X_{ajt} = real export value of Afghanistan to country j, at time t

T_{ajt} = total trade between Afghanistan and country j, at time t

M_{cajt} = commodity wise imports of Afghanistan from country j at time t

X_{cajt} = commodity wise exports of Afghanistan to country j, at time t

$GDPpc_{at}$ = real GDP per capita of Afghanistan at time t

$GDPpc_{jt}$ = real GDP per capita of foreign country (j) at time t

$Dist_{aj}$ = geographical distance between Afghanistan and its trading partner '$country_j$'

ER_{ajt} = real exchange rate of Afghanistan with $country_j$, at time t

ERV_{at} = exchange rate volatility of Afghanistan at time t, which is constructed as the moving standard deviation of the annual changes in real exchange rate of Afghani (AFN).

$FRes_{at}$ = Foreign reserves of Afghanistan at time t

CB_{aj} = a binary variable for a sharing border, and

ϵ_{ajt} = error term, at time t.

And the subscript *t* indicates the time period.

All variables except exchange rate and exchange rate volatility are in natural logarithms.

4.3 Data and Data Sources

We use panel data set of more than fifty trade partners of Afghanistan and for the period of 2001 to 2014, for the analysis in this study. Overall, our data is unbalanced panel. However, selection of the trading partners is based on data availability. The data of total trade, exports and imports are obtained from the UN COMTRADE. The data on exchange rates, GDPs per capita and foreign exchange reserves are drawn from World Development Indicators (WDI), the database of the World Bank. The data of distance and common border are taken from CEPII website.

Moreover, the trade partners are shown in Appendix A, and traded goods or commodities are based on SITC-3 of UN COMTRADE which include 10 different groups 'with codes 0 - 9', are given in Appendix B.

4.4 Descriptive Statistics

Descriptive statistics also called summary statistics summarize the basic features of data in a meaningful way. Moreover, it aims to summarize the sample using statistical measures, such as mean, median, standard deviation etc. Summary statistics of variables related to this study are presented in Table 4.1. The first three rows of the table show the dependent variables of the study. The subsequent rows present the statistics of the key determinants of the independent variables.

Table 4.1: Summary statistics of the study's variables, period from 2001 to 2014

	Statistics				
Variables	**Obs.**	**Min**	**Max**	**Mean**	**Std. Dev.**
Total Imports*	1367	0.000027	974	19.5	76.2
Total Exports*	389	0.000092	146	7.2	19.9
Total Trade*	445	0.000268	1530	130	240
Home Country's Exch. rate	1367	46.45	57.24	48.74	2.55
H. Country's ER volatility**	1027	0	3.15	1.22	1.28
Home Country's GDP pc	1367	259.77	651.02	517.57	101.12
Foreign Country's GDP pc	1367	574.11	90806.8	20963.39	20712.74
Home Country's Forn. Res*	1367	2430	6680	4160	1180
Distance (Mile)	1367	230	9488	2750.76	1925.13

*Values in Million US$

**Calculated according to procedure described in model's variables.

Table 4.1 shows that the total observations of total imports are 1367 while its minimum is '0.000027' and maximum '974' so, it deviates more. Moreover, mean value obtained for total imports, is '19.5' and standard deviation is '76.2' (greater than mean) which indicates more diversification in total imports. The value of total exports deviates from its minimum '0.000092' to its maximum '146' while its mean value obtained is '7.2' and standard deviation is '19.9' which show more diversification in the value of total exports. The range of the value of total trade is from '0.000268' to '1530' while its mean value is '130' and its standard deviation is '240' which suggest more diversification in the value of total trade. The value of the home country's exchange rate varies from its minimum '46.45' to maximum '57.24' with its mean value '48.742' and standard deviation '2.552' which unveil a less variations in the value of the home country's exchange rate. The minimum and maximum values of the home country's exchange rate volatility are 0 and 3.15 respectively and its mean value is '1.22' along-with standard deviation of '1.28' indicating more fluctuation in the value of reporter's exchange rate volatility. Moreover Table 4.1 shows that the minimum and maximum values of the home country's GDP per capita are '259.77' and '651.02' along with its mean value and standard deviation of '517.57' and '101.12' respectively, indicating a less diversification in the value of GDP per capita of the home country. The variation from minimum to maximum value of foreign countries' GDP per capita is '574.11' to '90806.8', whereas its mean and standard deviation are '20963.39' and '20712.74' respectively, observing less diversification in the value of the foreign countries GDP per capita. Foreign reserves of the home country ranges from '2430' to '6680' with mean value of '4160' and standard deviation of '1180' indicates less diversification in the value of the foreign reserves of the home country. Finally, the value of distance vary from minimum '230' to maximum '9488' with its mean value and standard deviation of '2750.76'

and '1925.13' respectively, which means that there is less diversification in the value of the term of distance.

4.5 Estimation Technique

We have estimated our models given in equations 4.1 to 4.5 by using Ordinary Least Squares "OLS". As usually we use Pooled OLS, Random effects model and fixed effects model for panel data regression. But here in this data set, some of our variables are time invariant and not changing with time, such as distance and common border. So, when we apply fixed effect regressions on this model, then it will drop these variables from regression and will not show their results. Thus, we use only simple OLS model here.

RESULTS AND DISCUSSIONS

5 CHAPTER

This chapter provides the empirical results of the models we have estimated and their interpretation. Our empirical analysis starts with simple regression on equations (4.1, 4.2, 4.3, 4.4 and 4.5) to examine the impact of the exchange rate, exchange rate volatility and gravity model's variables on the international trade of Afghanistan. Our analysis consists of parts: a) results of imports, b) results of exports, c) results of total trade, d) results of commodity imports, and e) results of commodity exports. These results are presented in different sections. Section 5.1 discusses the regression analysis of total imports; section 5.2 discusses the result of total exports and section 5.3 presents the result for total trade. Furthermore, the section 5.4 explains the commodity wise imports, and finally section 5.5 represents the commodity wise exports of Afghanistan. Moreover, the first three models or parts include other three secondary models (Model 1, Model 2, and Model 3) each differs from one another by one variable, as we explained it in chapter 4.

5.1 Total Imports

Table 5.1: Total Imports of Afghanistan

Dependent Variable: log (Imports)			
Variables	**Model 1**	**Model 2**	**Model 3**
Home Country's GDP per capita	**2.425*** **	**4.970*** **	**2.350*** **
	(0.773)	(1.79)	(0.79)
Foreign Countries' GDP pc	**0.1**	**0.159***	**0.1**
	(0.076)	(0.088)	(0.076)
Distance	**-1.030*** **	**-1.098*** **	**-1.030*** **
	(0.157)	(0.18)	(0.157)
Common Border	**0.715** **	**0.751** **	**0.715** **
	(0.319)	(0.362)	(0.319)
Home Country's Exchange Rate	**0.102*** **	**0.091*** **	**0.101*** **
	(0.031)	(0.033)	(0.031)
Home Country's ER Volatility	---	**0.102**	---
		(0.073)	
Home Country's Foreign Res.	---	---	**0.121**
			(0.26)
Constant	**-0.157**	**-15.863**	**-2.279**
	(5.524)	(11.149)	(7.179)
N	1367	1027	1367
R^2	0.136	0.161	0.136

Note: Standard errors are in parentheses.
* = significant at 10%, **= significant at 5%, ***=significant at 1% level.

Table 5.1 shows the results when we estimate the equation 4.1, considering total imports as dependent variable, and independent variables are in first left column which we mentioned before also for each three models. Column 2 of the Table 5.1 shows the results of regression for model 1 of imports. Column 3 of the Table 5.1 indicates the results of regression for model 2 of imports. Column 4 of the Table 5.1 presents the results of regression for model 3 of imports.

First we consider model 1 of imports. The results presented in Table 5.1 shows that Afghanistan's imports are highly sensitive to its per capita GDP. This implies that demand side

plays an important role in Afghanistan's imports. Regression results presented in Column 2 of the Table 5.1 shows that a one percent rise in per capita GDP of home country "Afghanistan" leads to more than two percent rise in its imports while holding constant for all other variables. This finding is consistent with the basic theory of the gravity model that the imports increase with an increase in economic size. However, Table 5.1 shows that foreign or exporter countries' per capita GDP has a positive but insignificant impact on Afghanistan's imports. This implies that the supply side does not play an important role in explaining the imports of Afghanistan.

Another important factor that plays a significant role in explaining the imports of a country through price channel is the cost of transportation concerned in carrying the product from initial place to the last consumer of the product. The transportation cost is an important element of the international trade, and is positively related with the distance between countries where goods are produced and the countries where goods are consumed. The transportation cost increases the price of the product for the consumers which results in decreasing the demand for that particular product. Results given in Table 5.1 support this hypothesis. We have used the distance between the importing and exporting country as a proxy for the transportation cost. The larger the distance between the importer and exporter country, the higher will be transportation costs. The negative and highly significant coefficient for the distance shown in Table 5.1 implies that transportations cost impedes Afghanistan's imports from countries that are far way. Moreover, the distance coefficient measures relative differences. An increase in the coefficient of distance indicates that trade with closer countries increases faster than that with far away countries.

Moreover, common border being a trade promoting factor, play a significant role in determining Afghanistan's imports. Table 5.1 demonstrates that the coefficient of the common border is positive and significant. This implies that Afghanistan imports more from the countries

with whom it has a common border. Actually, this factor reduces the cost of imports which results in reducing the prices of imported goods from the trading partners with whom Afghanistan have a common border. Rahman (2003) reports similar results.

Furthermore, the results presented in Table 5.1 shows that imports of Afghanistan are highly sensitive to the changes in its real exchange rate. Moreover, Table 5.1 shows that when the domestic currency depreciates, the imports of Afghanistan increase. Furthermore, it explains that a one unit increase in the value of the domestic currency leads to less than one unit increase in Afghanistan's imports, by keeping the effect of all other variables constant. About 10 percent of the increase in Afghanistan's imports is caused by the fluctuations in the real exchange rates. Our finding is consistent with findings of Al-Shammari and Al-Salman (2010) who found similar results.

Secondly, we consider Model 2 of imports. We add one more variable "exchange rate volatility of the home country" here to the model 1. Table 5.1; Column 3, shows that exchange rate volatility of the home country "Afghanistan" has a positive but insignificant impact on its imports. This implies that volatility in the value of Afghani does not have an important role in determining the imports of Afghanistan. Our results are comfortable with Rahman (2003). However, this observation is in contrast with the many recent studies, such as Siregar and Rajan (2002) and Bakhromov (2011) that find consistently strong evidence that exchange rate volatility depresses trade flows.

Moreover, Table 5.1 indicates that the results of all variables of Model 2 are similar with that of Model 1, having same signs and same levels of significance, but some changes in coefficients, except GDP per capita of the foreign countries which is significant here, and is positive as

before. This implies that a one percent increase in the GDP per capita of foreign countries or exporters leads to increase imports of Afghanistan by less than one percent. This finding is consistent with the findings of earlier studies and with the basic assumption of the gravity model also.

Thirdly, we consider model 3 of imports in which we have added here 'foreign exchange reserves of the home country' in to Model 1. Table 5.1; Column 4, shows that the impact of total foreign exchange reserves of Afghanistan on its import is positive but insignificant. This implies that foreign exchange reserves do not play any role in determining the imports of Afghanistan. In fact, foreign currency reserves indicate the stability of the exchange rates. The more the foreign currency reserves of a country are the more stable the currency of that country is. The more stable the currency of a country is the more will be its imports.

Moreover, Table 5.1 shows that the results of Model 3 of imports are so closer with that of Model 1. The signs and significance levels of all variables of Model 3 common with Model 1are same with that of Model 1. So, we can apply the implications of results of model 1 here also.

5.2 Total Exports

Table 5.2: Total Exports of Afghanistan

Dependent Variable: log (Exports)			
Variables	**Model 1**	**Model 2**	**Model 3**
Home Country's GDP per capita	**2.582****	**7.665*****	**2.246***
	(1.276)	(2.527)	(1.317)
Foreign Country's GDP pc	**-0.283***	**-0.453****	**-0.286***
	(0.169)	(0.203)	(0.169)
Distance	**-0.766****	**-0.384**	**-0.760****
	(0.299)	(0.356)	(0.299)
Common Border	**0.023**	**0.176**	**0.02**
	(0.476)	(0.552)	(0.476)
Home Country's Exchange Rate	**0.127****	**0.091****	**0.121****
	(0.051)	(0.056)	(0.051)
Home Country's ER Volatility	---	**-0.031**	---
		(0.138)	
Home Country's Foreign Res.	---	---	**0.464**
			(0.447)
Constant	**-1.272**	**-33.031****	**-9.127**
	(8.793)	(15.791)	(11.602)
N	389	293	389
R^2	0.1762	0.187	0.178

Note: Standard errors are in parentheses.
* = significant at 10%, **= significant at 5%, ***=significant at 1%

Table 5.2 shows the results when we estimate the equation 4.2, considering total exports as dependent variable, and independent variables are in first left column. Column 2 of the Table 5.2 shows the results of regression for model 1 of exports. Column 3 of the Table 5.2 indicates the results of regression for model 2 of exports. Column 4 of the Table 5.2 presents the results of regression for model 3 of exports.

First we consider model 1 of exports. The results reported in the Table 5.2 shows that per capita GDP of the home country "Afghanistan" significantly explains its exports. This indicates

that with the increase in Afghanistan's GDP per capita, its capacity to exports increased. A one percent increase in Afghanistan's per capita GDP leads to more than two percent increase in its exports. It shows that supply side plays an important role in Afghanistan's exports. This result is consistent with the basic theory of the gravity model and with findings of most of the existing literature.

However, Table 5.2 shows that foreign or importer countries' GDP per capita negatively affect the exports of Afghanistan. Negative and significant coefficient of importer countries GDP per capita indicates that demand for Afghanistan's exports decreases with an increase in the importer countries' GDP per capita. A one percent increase in GDP per capita of the foreign countries will reduce Afghanistan's exports by less than one percent. This implies that demand side plays an important role in exports of Afghanistan. The negative coefficient shows that Afghanistan's exports decrease due to importers' self-production and sufficiency.

Moreover, results given in Table 5.2 indicate that an increase in the distance between the foreign countries and Afghanistan significantly decreases the exports of Afghanistan. A one percent increase in the distance between Afghanistan and importer country leads to less than one percent decrease in Afghanistan's exports while keeping the effects of all other variables constant. This indicates that Afghanistan exports less to faraway countries. This also implies that as the transportation cost increases, the exports of Afghanistan decreases. This result is consistent with the basic assumption of the gravity model that the greater the distance between the exporting and importing country, the higher will be the transportation cost which increases the price of the product that decreases the demand of the product.

In addition, Table 5.2 indicates that common border does not significantly explain the exports of Afghanistan. This implies that major part of Afghanistan's exports is not exported to its neighbors.

Furthermore, Table 5.2 shows that Afghanistan's exports are sensitive to the variations in its real exchange rates. This further indicates that Afghanistan's exports increase with the depreciation of the domestic currency. This implies that as the domestic currency depreciates, the goods of Afghanistan become relatively cheaper in the foreign markets, leading to an increase in their demand. However, the exchange rate elasticity of Afghanistan's exports is less than one. Our finding is consistent with the findings of Asseery and Peel (1991) and Rahman (2003).

Secondly, we consider Model 2 of exports. We add one more variable "exchange rate volatility of the home country" here to the model 1. Results displayed in Table 5.2, Column 3; shows that the home country's exchange rate volatility has negative but insignificant impact on Afghanistan's exports. This finding is in conformity with findings of Doganlar (2002), Siregar and Rajan (2002), and Khan *et al* (2014).

Moreover, Table 5.2; Model 2, indicates that Afghanistan's exports are highly sensitive to its GDP per capita. This implies that a one percent increase in GDP per capita of Afghanistan leads to 7.66 percents increase in its exports while keeping the effects of all other variables constant. However, the coefficient of the GDP per capita of foreign countries to the exports of Afghanistan is negative and significant as before. But here its strength of significance is higher than that in model 1.

Furthermore, the term of distance is also negative here as before, but not significant. This indicates that Afghanistan does not export more only to neighbor and nearer countries. It is

reality that Afghanistan also exports more to other regional and Asian countries like India and Arab countries. In addition, the term of common border is also positive and insignificant as before in Model 1. Also, Table 5.2; Model 2, shows that the sign and significance level of the home country's exchange rate are same as in Model 1.

Thirdly, we consider model 3 of exports, and we add the variable "total foreign exchange reserves of the home country" here to Model 1. Results presented in Table 5.2; Column 4 indicates that home country's foreign exchange reserves have positive but insignificant impact on Afghanistan's exports. This implies that foreign reserves of Afghanistan do not have any role in explaining its exports.

Lastly, Table 5.2; Column4, shows that the results of Model 3 of exports are so closer with that of Model 1. The signs and significance levels of all variables of Model 3 common with Model 1 are same with that of Model 1 except home country's GDP per capita which is less significant here. So, we can apply the implications of Model 1 of these variables, here to Model 3 also.

5.3 Total Trade

Table 5.3: Total Trade of Afghanistan (2001 – 2014)

Dependent variable: log (Total Trade)			
Variables	**Model 1**	**Model 2**	**Model 3**
Home Country's GDP per capita	**-1.548****	**-3.691*****	**3.663**
	(0.625)	(0.83)	(6.434)
Foreign Country's GDP pc	**0.253****	**0.246****	**0.337****
	(0.112)	(0.115)	(0.135)
Distance	**-1.148*****	**-1.118*****	**-1.135*****
	(0.247)	(0.253)	(0.298)
Common Border	**1.540****	**1.278****	**2.486*****
	(0.529)	(0.527)	(0.694)
Home Country's Exchange Rate	**0.217*****	**0.245*****	**0.170*****
	(0.045)	(0.043)	(0.049)
Home Country's ER Volatility	---	**0.306****	---
		(0.123)	
Home Country's Foreign Res.	---	---	**0.68**
			(2.184)
Constant	**21.484*****	**33.343*****	**-25.476****
	(4.224)	(5.292)	(12.252)
N	445	380	328
R^2	0.226	0.278	0.293

Note: Standard errors are in parentheses.
* = significant at 10%, **= significant at 5%, ***=significant at 1%

Table 5.3 displays the relationship between total trade as dependent variable and other independent variables while estimating equation 4.3. Column 2 of the Table 5.3 shows the results of regression for model 1 of total trade. Column 3 of the Table 5.3 indicates the results of regression for model 2 of total trade. Column 4 of the Table 5.3 presents the results of regression for model 3 of total trade.

First we consider model 1 of total trade. The results presented in Table 5.3 reveals that total trade of Afghanistan is negatively affected by GDP per capita. In other words, Afghanistan's per capita GDP is a significant determinant of its trade volume. Results presented in Column 2 of the Table 5.3 show that a one percent rise in per capita GDP of Afghanistan leads to more than one percent decrease in its trade volume. This can be due to rise in Afghanistan's self demand and consumption of its production and self-sufficiency. This finding is in contrast with findings of Rahman (2003). However, Table 5.3 depicts that foreign countries' GDP per capita has a significant positive impact on Afghanistan's trade volume. Their coefficient implies that a one percent rise in the GDP per capita of foreign countries leads to less than one percent rise in Afghanistan's trade volume, while keeping the effect of other variables constant. This result is in accord with the findings of Rahman (2003).

Another factor that plays a significant role in explaining the total trade of Afghanistan is the distance. We have used the distance between Afghanistan and its trade partners as a proxy for the transportation cost. The greater the distance between the countries, the higher will be the transportation cost. The negative and highly significant coefficient for the distance in Table 5.3 implies that transportation cost impedes Afghanistan's trade with countries that are far way. Our result also shows that Afghanistan do more trade with closer countries as compared to far flung countries. This result supports the hypothesis of the gravity model and is also comfortable with the findings of Rahman (2003).

Furthermore, Table 5.3 indicates that common border plays a significant role in determining the trade volume of Afghanistan. It demonstrates that its coefficient is positive and significant. This implies that Afghanistan has more trade with its neighbor countries.

Lastly, Model 1 of Table 5.3 shows that trade volume of Afghanistan are highly sensitive to its exchange rate changes. Moreover, Table 5.3 shows that when the domestic currency depreciates, the trade volume of Afghanistan increases. Furthermore, it explains that a one unit increase in the value of the domestic currency leads to less than one unit increase in Afghanistan's trade volume by keeping the effect of all other variables constant. About 20 percent of the increase in Afghanistan's total trade is caused by the fluctuations in the real exchange rates. This finding is consistent with the existing literature. For instance Al-Shammari and Al-Salman (2010) find similar results.

Secondly, we consider Model 2 of total trade. We add one more variable "exchange rate volatility of the home country", here to the model 1. The results presented in Table 5.3; Column 3 shows that the coefficient of Afghanistan's exchange rate volatility to its trade volume is positive and significant. It is observed that a one unit increase in Afghanistan's exchange rate volatility leads to less than one unit increase in the total trade of Afghanistan while keeping the effect of other variables constant. This implies that with more volatility in Afghani, the total trade of Afghanistan increases. Our finding is consistent with the finding of Al-Shammari and Al-Salman (2010).

Moreover, the home country's GDP per capita in model 2 is negative as in Model 1, but here it is highly significant. Its coefficient implies that a one percent increase in the GDP per capita of the home country, leads to diminish its total trade by more than three percents. Its implication is also same as before.

Furthermore, Table 5.3 shows that foreign countries' GDP per capita, distance and common border in model 2 have same signs and significance levels as in Model 1. In addition, Table 5.3;

Model 2 shows that sign and significance level Afghanistan's exchange are same as in Model 1 "positive and highly significant".

Thirdly, we consider model 3 of total trade, and we add the variable "foreign exchange reserves of the home country" here to Model 1. Results displayed in Table 5.3; model 3 shows that home country's foreign reserves have positive but insignificant impact on its trade volume. This implies that Afghanistan's foreign reserves do not have any role in its total trade.

Moreover, Table 5.3; model 3 shows that the impact of Afghanistan's GDP per capita on its trade volume is positive but insignificant. This implies that per capita GDP of Afghanistan does not have any role in its trade volume. However, foreign countries' GDP per capita and distance have same signs and significance levels here in Model 3 as in Model 1.

Furthermore, Table 5.3; model 3 indicates that common border is positively related with total trade of Afghanistan as in Model 2 and Model 1, but here the coefficient is highly significant. This implies that Afghanistan have more trade with its neighbors because the transportation cost is less as compared to others. In addition, Table 5.3; Column 4 shows that sign and significance level of the home country's exchange are same as in Model 1 "positive and highly significant".

5.4 Imports by Commodity Groups

Table 5.4: Commodity Level Imports of Afghanistan

Variables	Dependent Variable : log (Imports)									
	SITC-0	SITC-1	SITC-2	SITC-3	SITC-4	SITC-5	SITC-6	SITC-7	SITC-8	SITC-9
Home Country's GDP pc	**2.153**	**2.722**	**-2.145**	**11.575*** **	**-3.876**	**5.351*** **	**0.205**	**-0.126**	**-4.509** **	**6.419*** **
	(1.797)	(2.177)	(5.662)	(3.024)	(4.938)	(1.938)	(2.377)	(2.580)	(1.919)	(2.077)
Foreign Countries GDP pc	**-0.340** **	**0.295**	**-0.803** **	**0.919*** **	**0.290**	**-0.120**	**-0.528** **	**0.513** **	**0.389***	**0.603*** **
	(0.148)	(0.190)	(0.369)	(0.279)	(0.297)	(0.193)	(0.240)	(0.245)	(0.221)	(0.186)
Distance	**-0.799*** **	**-1.524*** **	**0.358**	**-1.562*** **	**-0.955***	**-0.926** **	**-1.176** **	**-1.314** **	**-2.050*** **	**-1.388*** **
	(0.304)	(0.401)	(0.602)	(0.520)	(0.525)	(0.438)	(0.482)	(0.555)	(0.465)	(0.397)
Common Border	**1.213***	**-1.703** **	**0.413**	**4.284*** **	**-0.622**	**-0.048**	**-0.003**	**-0.160**	**-0.116**	**2.574*** **
	(0.723)	(0.835)	(1.034)	(0.842)	(1.080)	(0.795)	(0.980)	(1.113)	(0.933)	(0.879)
Home Country's Exch. Rate	**0.108**	**-0.069**	**-0.123**	**-0.168** **	**-0.202**	**0.212*** **	**0.199** **	**0.007**	**-0.023**	**0.161** **
	(0.078)	(0.100)	(0.276)	(0.081)	(0.257)	(0.075)	(0.079)	(0.112)	(0.079)	(0.077)
Home Country's F. Res.	**-0.273**	**0.609**	**2.105***	**0.273**	**0.863**	**-0.094**	**1.099**	**-0.111**	**0.517**	**-0.782**
	(0.581)	(0.653)	(1.132)	(0.785)	(1.007)	(0.694)	(0.817)	(0.832)	(0.687)	(0.698)
Constant	**10.127**	**-5.319**	**-11.786**	**-55.578** **	**32.980**	**-21.274**	**-8.311**	**21.086**	**42.823** **	**-11.547**
	(16.739)	(21.395)	(49.888)	(24.061)	(47.459)	(17.724)	(20.626)	(25.270)	(18.786)	(17.569)
N	184	120	31	98	82	154	152	156	168	222
R^2	0.304	0.144	0.396	0.53	0.072	0.234	0.302	0.06	0.23	0.261

Note: Standard errors are in parentheses.

* = significant at 10%, **= significant at 5%, ***=significant at 1%

Likewise, Table 5.4 shows the results when we estimate the equation 4.4, considering imports of different commodities as dependent variable. And independent variables are in first left column. Other columns of the Table 5.4 show the results of regression for the imports of commodity groups of SITC codes 0 to 9(See Appendix B for their descriptions).

Results presented in Table 5.4 show that home country's "Afghanistan" per capita GDP does not significantly explain the variations in its imports for most of the commodity groups. However, the Afghanistan's imports of "Mineral fuels, lubricants and related materials", "Chemicals and related products, n.e.s" and "Commodities and transactions not classified elsewhere in the SITC" are highly sensitive to its per capita GDP (See Commodity codes' description in Appendix B). This implies that Afghanistan's demand for the imports of these commodity groups has increased with the rise in its income. And income elasticity of demand for these commodity groups is greater than one which shows that a one percent rise in the per capita GDP of Afghanistan leads to more than one percent increase in its imports of these commodities. On the other hand, it shows that Afghanistan's imports of "Miscellaneous manufactured articles" decreases significantly with increase in its per capita GDP. And income elasticity of demand for this commodity group is greater than one. In addition, Table 5.4 shows that the impact of Afghanistan's GDP per capita on its imports of the "Food and live animals chiefly for food", "Beverages and tobacco" and" Manufactured goods classified chiefly by materials" is positive but insignificant. However, the impact of Afghanistan's GDP per capita on its imports of the "Crude materials, inedible, except fuels", "Animal and vegetable oils, fats and waxes" and "Machinery and transport equipment" is negative but insignificant.

However, Table 5.4 shows that foreign or exporter countries' per capita GDP significantly explains most of the commodity group level imports of Afghanistan. In the case of "Food and

live animals chiefly for food", "Crude materials, inedible, except fuels" and "Manufactured goods classified chiefly by materials" we found a significant negative impact of the foreign countries per capita GDP. For these commodities groups the income elasticity for import is less than one. This implies that, the domestic demand of the foreign countries has increased for these commodities groups. On the other hand, in the case of "Mineral fuels, lubricants and related materials", "Machinery and transport equipment", "Miscellaneous manufactured articles" and "Commodities and transactions not classified elsewhere in the SITC" we found a significant positive impact of the exporter countries per capita GDP on Afghanistan's imports. This implies that supply of these commodity groups in Afghanistan's markets increases with increase in the GDP per capita of the exporter countries, because of increase in their production. For these commodity groups the income elasticity of demand for import is less than one. In addition, Table 5.4 shows that the impact of the exporter country GDP per capita on Afghanistan's imports of the "Chemicals and related products, n.e.s" is negative but insignificant, and on "Beverages and tobacco" and "Animal and vegetable oils, fats and waxes" is positive but insignificant.

Similar to the results for overall imports of Afghanistan reported in the Table 5.1 we find negative and significant impact of the distance on all commodity group level imports of Afghanistan except "Crude materials, inedible, except fuels" having positive and insignificant coefficient. The negative distance elasticity of imports shown in Table 5.4 indicates that as the distance between Afghanistan and exporters increases, their trade relations contract. In simple words, Afghanistan prefers to import from relatively nearer countries. This implies that transportation cost is really an important factor in determining the commodity level imports of Afghanistan. These findings seem to be very similar to those estimated by other previous studies.

Moreover, Table 5.4 shows that the coefficients of common border are significant for some commodity group level imports of Afghanistan, while insignificant for some others. It has positive and significant impact on "Food and live animals chiefly for food", "Mineral fuels, lubricants and related materials" and "Commodities and transactions not classified elsewhere in the SITC". And their coefficients are greater than one. This implies that Afghanistan imports these commodities more from the countries with which it has a common border. However, common border has a significant negative impact on "Beverages and tobacco". Its coefficient is also greater than one. In addition, common border has negative but insignificant impact on "Animal and vegetable oils, fats and waxes", "Chemicals and related products, nes", "Manufactured goods classified chiefly by materials", "Machinery and transport equipment" and "Miscellaneous manufactured articles".

Furthermore, Table 5.4 indicates that the imports of most of the commodities groups of Afghanistan are not sensitive to changes in its currency's exchange rates. But it significantly explains the "Mineral fuels, lubricants and related materials", "Chemicals and related products, n.e.s", "Manufactured goods classified chiefly by materials" and "Commodities and transactions not classified elsewhere in the SITC". And the coefficient of the first commodity group from these four groups is negative, but positive for the rest three groups of commodities. And a one unit increase in Afghanistan's exchange rate leads to less than one unit increase/decrease in imports of these commodities groups. The positive exchange rate elasticity of imports implies that as the domestic currency depreciates, the imports of the commodities included in these commodity groups increase, and vice versa for negative exchange rate elasticity.

Finally, results presented in Table 5.4 show that there is no significant impact of the home country's foreign reserves on its imports of all commodity groups except "Crude materials,

inedible, except fuels" for which its impact is positive and significant. This implies that a one percent increase in Afghanistan's foreign reserves on average leads to more than one percent increase in its imports of commodities included in this group while keeping the effect of other variables constant. In addition, for most of the commodity group level imports of Afghanistan, the coefficients of its foreign reserves are positive but insignificant which implies that increase in foreign exchange reserves increases Afghanistan's imports by providing stability to its domestic currency.

5.5 Exports by Commodity Groups

Table 5.5: Commodity Level Exports of Afghanistan

Variables	Dependent Variable : log (Exports)				
	SITC-0	**SITC-2**	**SITC-6**	**SITC-8**	**SITC-9**
Home Country's GDP pc	**0.927**	**0.625**	**-0.902**	**-24.440*** **	**5.668** **
	(2.162)	(3.378)	(2.508)	(7.636)	(2.484)
Foreign Countries' GDP pc	**-0.145**	**-1.039** **	**0.034**	**-0.245**	**0.167**
	(0.270)	(0.402)	(0.370)	(0.509)	(0.291)
Distance	**-1.451*** **	**1.146**	**-1.305** **	**-1.330**	**-1.449** **
	(0.474)	(0.770)	(0.552)	(0.891)	(0.565)
Common Border	**-1.216**	**0.019**	**0.541**	**0.872**	**0.340**
	(0.739)	(1.188)	(0.991)	(1.505)	(0.807)
Home Country's Exch. Rate	**0.083**	**0.111**	**-0.131**	**-0.247**	**0.256*** **
	(0.079)	(0.137)	(0.103)	(0.481)	(0.080)
Home Country's F. Res.	**-0.028**	**2.587***	**1.263**	**0.280**	**0.260**
	(0.717)	(1.231)	(0.903)	(1.543)	(0.743)
Constant	**16.785**	**-52.843**	**6.333**	**179.844** **	**-31.764***
	(18.450)	(34.961)	(24.030)	(65.272)	(18.131)
N	104	74	63	31	117
R^2	0.286	0.142	0.370	0.642	0.330

Note: Standard errors are in parentheses.
* = significant at 10%, **= significant at 5%, ***=significant at 1%

Table 5.5 indicates the regression analysis of the commodity level exports of Afghanistan when we estimate the equation 4.5, considering exports of different commodities as dependent variable. And independent variables are in first left column. Other columns of the Table 5.5 show the results of regression for the exports of commodity groups of SITC codes. As shown in the Table 5.5, Afghanistan does not have exports of all commodity groups of SITC division, but of SITC codes (0, 2, 6, 8 and 9).

Results given in Table 5.5, indicates that Afghanistan's GDP per capita does not significantly explain most of the commodity level exports of Afghanistan. However, the Afghanistan's export of "Miscellaneous manufactured articles" is highly sensitive to its GDP per capita. This implies that a one percent increase in Afghanistan's per capita GDP leads to decrease the export of this commodity group by more than one percent. It can be due to self consumption or increase in domestic demand of Afghanistan. In addition, Table 5.5 shows that Afghanistan's exports of "Commodities and transactions not classified elsewhere in the SITC" are sensitive to its per capita GDP. This implies that as GDP per capita of Afghanistan increase, its exports of this commodity group also increases. Its income elasticity to export is also greater than one.

Similarly, we could not find a significant impact of the foreign or importer countries' GDP per capita on most of the commodity group level exports of the Afghanistan. This finding is clear from the results reported in Table 5.5. Only in the case of "Crude materials, inedible, except fuels" we found a significant impact of the importer countries per capita GDP. This implies that a one percent increase in partners per capita GDP leads to more than one percent decrease in Afghanistan's exports of this commodity group.

Moreover, results given in Table 5.5 indicate that an increase in the distance between Afghanistan and importer countries significantly decreases Afghanistan's exports of most of the commodity groups. This implies that an increase in distance decreases Afghanistan's exports of "Food and live animals chiefly for food", "Manufactured goods classified chiefly by materials" and "Commodities and transactions not classified elsewhere in the SITC". However, the coefficient of distance for "Crude materials, inedible, except fuels" is positive and insignificant and for "Miscellaneous manufactured articles" is negative and insignificant. This indicates that

transportation cost is actually an important factor in determining the commodity level exports of Afghanistan. This further implies that Afghanistan exports more to near and regional countries.

However, Table 5.5 shows that common border is not an important factor in explaining the variation in commodity level exports of Afghanistan. Moreover, the coefficients of common border for most of the commodity level exports of Afghanistan are positive and insignificant. This implies that Afghanistan's exports are not dependent to neighboring countries only.

Furthermore, Table 5.5 shows that Afghanistan's currency's exchange rate does not significantly explain the variations in most of the commodity level exports of Afghanistan, even the signs of their coefficients vary. Only the export of "Commodities and transactions not classified elsewhere in the SITC" of Afghanistan is highly sensitive to its exchange rate. This implies that depreciation of the domestic currency or Afghani significantly increases the exports of this commodity group of Afghanistan.

Lastly, results reported in Table 5.5 shows that the coefficients of Afghanistan's foreign reserves for most of its commodity level exports are positive and insignificant. Only in case of the "Crude materials, inedible, except fuels" its coefficient is significant. This implies that a one percent increase in Afghanistan's foreign reserves leads to more than one percent increase in its exports of this commodity group.

5.6 Recapitulation and Main Conclusion

In summary, our empirical results indicate the following: Firstly, Afghanistan's per capita GDP has a significant positive impact on its imports and exports while it has a significant negative impact on its total trade. Conversely, foreign countries' per capita GDP has an insignificant positive impact on imports, a significant negative impact on exports and a significant positive impact on total trade of Afghanistan.

Secondly, the term of distance between Afghanistan and its trade partners has a highly significant negative impact on imports, exports and total trade of Afghanistan. Moreover, common border has a significant positive impact on imports, while it has an insignificant positive impact on its exports and a significant positive impact on total trade of Afghanistan. Finally, the impact of foreign reserves of Afghanistan on its imports, exports and total trade is positive but insignificant.

Thirdly, exchange rate has a significant positive impact on imports, exports and total trade of Afghanistan. However, we found that exchange rate volatility has an insignificant impact on imports and exports while it has a significant positive impact on total trade of Afghanistan.

On the other hand, the impact of all these variables on commodity group level imports and exports of Afghanistan vary from one commodity group to another. Most of these results are in line with the basic assumption of the Gravity model, previous studies and with our hypotheses of this study.

SUMMARY AND CONCLUSION

6 CHAPTER

This chapter presents the background of the study, major findings of the study and policy suggestions and a pathway for further research. The study used unbalanced type of panel data selected for more than fifty trade partners of Afghanistan and for 14 years. Ordinary Least Square "OLS" model has been applied for regression. The study is based on the following hypotheses: (1) Exchange rate volatility has an impact on Afghanistan's international trade. (2) Exchange rate volatility has different impacts on different commodity groups.

6.1 Background of the Thesis

Exchange rate is considered as one of the important policy variable. Because it plays a vital role in balance of payments, the trade growth of country, and in turn, in process of sustainable economic growth of the economy. In this study we are concerned with exports, imports and total trade volume of Afghanistan. We aim to investigate how changes in the value of Afghan currency affect Afghanistan's trade. However, export and import performance of countries contributes significantly to the health of the economy and particularly to their balance of payments. Since the 1970s, exchange rates have been fluctuated extensively throughout the world, which might have an impact on different variables of the economy. For instance, changes in exchange rate and its volatility could affect the trade performance, either at micro level or at country level. Hence, most of the researchers are interested recently to examine the impact of exchange rate changes on trade, but their findings are inconclusive. Further, due to political instability, ineffective economic policies, and import dependent economies, a wide range of

fluctuations and volatility have been perceived in exchange rates of developing countries, particularly in Afghanistan.

Therefore, the main objective of this study is to explore the effects of exchange rate changes and its volatility on the international trade of Afghanistan covering a large panel of countries for the annual period of 2001-2014. The study used the dynamic panel data estimator, the Ordinary Least Square (OLS) to estimate the model.

6.2 Major Findings of the Study

The main results of the thesis are as follows. Afghanistan's GDP per capita has an extraordinary positive and significant impact on its imports and exports while it has a negative and significant impact on its total trade. On the other hand, foreign countries' GDP per capita has positive but insignificant impact on Afghanistan's imports, negative and significant impact on exports and positive and significant impact on its total trade. Moreover, the impact of distance between Afghanistan and its trade partners on imports, exports and total trade of Afghanistan is negative and highly significant. This result is in line with the basic hypothesis of Gravity model. In addition, common border has a positive and significant impact on Afghanistan's imports, while it has positive but insignificant impact on its exports and positive and significant impact on its total trade. Furthermore, exchange rate has a positive and significant impact on imports, exports and total trade of Afghanistan. However, we found that the exchange rate volatility has an insignificant positive impact on imports and insignificant negative impact on exports while it has positive and significant impact on Afghanistan's total trade. Finally, the impact of Afghanistan's foreign reserves on its imports, exports and total trade is positive but insignificant.

On the other hand, the impact of these variables on commodity group level imports and exports of Afghanistan differ from one commodity group to another. This result is in accord to our second hypothesis.

6.3 Policy Implications and Further Extensions

The findings of the study indicate that the government of Afghanistan should stabilize the exchange rate of Afghani, in order to encourage exports and overall trade.

Since, our findings suggest that demand side has a vital role in explaining the exports and imports of Afghanistan, therefore, government is recommended to assist in increasing per capita income of the people in order to enhance exports and imports through initiating different types of cash transfer programs for consumers and subsidy provisions programs to the producers.

As distance between Afghanistan and its trade partners and the variable of common border have significant negative impacts on its imports, exports and total trade due to higher transportation cost, hence, government is required to facilitate and increase trade with closer and regional countries, in order to reduce transportation cost and hence, save public money and increase demand.

Moreover, the regulatory authority is required to help indirectly in increasing reserves, to make it significant and supportive in trade promotion.

Finally, the regulatory authorities may be suggested to increase the production of some commodities in which Afghanistan is abundant and easy to export and leave production of some commodities which are cheaper to import.

Our work can be extended in several directions. We examine the impact of exchange rate volatility on exports, imports and total trade of Afghanistan as a whole with other countries. However, one can work on it with specific and individual trade partners. Moreover, one can work on trade potential, trade conversion and diversion of Afghanistan.

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APPENDIX

Appendix A: Trade Partners of Afghanistan

The trade partners are: Albania, Azerbaijan, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Sri Lanka, China, Colombia, Cuba, Cyprus, Denmark, Egypt, Finland, France, Germany, Greece, Guatemala, Hong Cong, Hungary, India, Indonesia, Iran, Iraq, Italy, Japan, Kazakhstan, Jordan, Kenya, Korea, Kyrgyz Republic, Lebanon, Latvia, Malaysia, Nepal, Netherlands, New Zealand, Norway, Pakistan, Philippine, Poland, Russian Federation, Saudi Arabia, Singapore, Slovak Republic, Vietnam, Spain, Swaziland, Sweden, Switzerland, Syria, Tajikistan, Thailand, Turkey, Turkmenistan, Ukraine, U.A.E., UK, USA and Uzbekistan. The trade partners on average cover 90% of Afghanistan's trade.

Appendix B: Standard International Trade Classification, Revision 3

SITC Code	Explanation
0	Food and live animals chiefly for food
1	Beverages and tobacco
2	Crude materials, inedible, except fuels
3	Mineral fuels, lubricants and related materials
4	Animal and vegetable oils, fats and waxes
5	Chemicals and related products, nes
6	Manufactured goods classified chiefly by materials
7	Machinery and transport equipment
8	Miscellaneous manufactured articles
9	Commodities and transactions not classified elsewhere in the SITC